QUEENSLAND FLOODS COMMISSION OF INQUIRY

STATEMENT OF ANDREW KROTEWICZ

CONTENTS

On 13 September 2011 I, Andrew Krotewicz of c/ Level 2, HQ North Tower, 540 Wickham Street, Fortitude Valley in the State of Queensland, say on oath:

1. I am the former General Manager Generation Operations of Tarong Energy Corporation. I held this position between 1 September 2007 and 30 June 2011.

2. On 1 July 2011, I was appointed the Executive General Manager Asset Strategy of CS Energy at the same time as CS Energy became the successor in law to Tarong Energy Corporation of the Wivenhoe Business Unit as defined in the *Government Owned Corporations Act 1993* (Qld) (*Generator Restructure) Regulation 2011* which includes the Wivenhoe Power Station and rights to move water in and out of Splityard Creek Dam.

[redacted]

1.0 Information about how the Deed of Practice between South East Queensland Water Corporation Limited and Tarong Energy Corporation Limited for Wivenhoe Dam and Power Station is implemented, in particular:

1.1 Annexed hereto and marked **'ATK-1'** is a copy of the Deed of Practice.

1(a) ***the procedures followed for Tarong Energy to comply with section 3.2***

(i) There are no formal procedures for Tarong Energy to comply with section 3.2.

(ii) Annexed hereto and marked '**ATK-2**' and '**ATK-3**' is a copy of the operating instructions in place with Seqwater in force from 7 October 2011 to current.

1(b) ***whether and how section 5 or any other section involves Tarong Energy notifying Seqwater as to releases of water from Splityard Creek Dam into Wivenhoe Dam, both during and outside of flood events***

(i) Section 5 does not deal with controlled releases of water, and instead deals with events which may cause damage to the Wivenhoe Dam.

(ii) Section 5 does not deal with notification of releases of water as water from Splityard Creek is not designed to 'cause damage or unlawful pollution' as contemplated by the section.

1(c) ***the procedures followed for Tarong Energy to comply with sections 7 and 8***

(i) In respect of section 7, in order to comply with its obligations under the National Electricity Law (**NEL**), Tarong Energy (now CS Energy) can notify SEQWater, however the obligations under Australian Law override the obligations in contract and under Queensland law with respect to Seqwater and CS Energy cannot contract to fetter the exercise of the NEL Administrator, Australian Energy Market Operator (**AEMO**).

(ii) Section 8 is an obligation to cooperate and no formal procedures exist.

2.0 A description of the relative scope and interaction between the Emergency Action Plan Wivenhoe Power Station Splityard Creek Dam (T-MISC-149) and the Wivenhoe Power Station Business Procedure for Wivenhoe – High Rainfall, High Dam Water Levels (WIV-OPS-15) with respect to rainfall events causing any of Somerset, Wivenhoe or Splityard Creek Dams to exceed full capacity level.

2.1 Annexed hereto and marked '**ATK-4**' is a copy of the Emergency Action Plan Wivenhoe Power Station Splityard Creek Dam (T-MISC-149) ('**Emergency Action Plan**').

[redacted]

2.2 Annexed hereto and marked '**ATK-5**' is a copy of the Wivenhoe Power Station Business Procedure for Wivenhoe – High Rainfall, High Dam Water Levels (WIV-OPS-15) ('**WPS High Rainfall Procedure**').

2.3 The Emergency Action Plan does not deal with high rainfall events, only threats to the integrity of the Splityard Creek Dam which have been previously assessed to be primarily related to earthquake and/ or piping failure events. It does not deal with the Somerset or Wivenhoe Dams being at full capacity or higher as they are not considered credible risk events to the Splityard Creek Dam due to its elevated position and design.

2.4 Splityard Creek Dam is unrelated to and is designed to have no relationship to high rainfall events in Somerset Dam.

2.5 Splityard Creek Dam is frequently filled to 100% capacity to support the operation of the Wivenhoe Power Station.

2.6 Splityard Creek Dam is designed with a remote spillway that returns water to Wivenhoe Dam so that the Splityard Creek Dam does not overflow in an uncontrolled manner.

3.0 With respect to the Emergency Action Plan, an explanation as to whether and how high rainfall events which may cause overtopping trigger its application.

3.1 Splityard Creek is designed so that high rainfall events and runoff cannot cause overtopping of the dam wall due to the size and design of the spillway.

3.2 The Emergency Action Plan does not deal with the risk of Splityard Creek Dam overtopping.

4.0 With respect to the WPS Business Procedure, and explanation of:

4(a) what is meant by the note "Maximum flood level for Wivenhoe Power Station is EL77.0'.

(i) Wivenhoe Power Station machine hall top floor is built at the level of EL78, and if the water level of Wivenhoe Dam reaches EL77, there is a risk of water ingress below that floor. At levels higher than EL77 and up to EL78, the water presents a credible threat to the power station and operations may cease early as certain

[redacted]

switchrooms could be flooded and there would be a threat to auxiliary power supplies. EL77 and rising represents the final trigger level that would still allow for a buffer period to finalise the station flood preparation actions.

4(b) why the document is premised on the water level of Wivenhoe Dam and not also dependent on the water level of Splityard Creek Dam.

(i) The Wivenhoe Power Station is built inside the confines of the Wivenhoe Dam and is therefore at risk if the Wivenhoe Dam rises above EL 77, with inundation commencing at EL78. The Dam and the Power Station were built as co-dependent infrastructure and changes to one need to consider the other.

(ii) The operation of the power station requires the Splityard Creek Dam to be up to 100% full at times. The water level in Splityard Creek Dam can be controlled by the power station, as opposed to the level in Wivenhoe Dam.

(iii) Wivenhoe Dam is the source of water for the operation of the power station (its lower reservoir) via Splityard Creek Dam (its upper reservoir), hence if the Wivenhoe Dam is operating in drought conditions, there may be inadequate water to enable entitlements to be circulated between Wivenhoe Dam and Splityard Creek Dam to enable operation of the power station.

4(c) an explanation of when the handwritten note "Ensure Provide Seqwater with planned generation and pump water movements, TPS Operators provide the data, WPS must monitor to ensure this is being done" on page 3 (section 3.2.1) of the document was entered, by whom and with what authority.

(i) The handwritten note was made after the protocol was established in October 2010 (refer **ATK-2**) by Mr Trevor Lush, Production Officer Hydro and second-in-charge to the Station Manager.

4(d) an account of whether the provisions of section 3.2.1 (including the handwritten note described in (c) above) were complied with during the 6 to 19 January 2011 flood event at Wivenhoe Dam and details of how they were complied with.

(i) Annexed hereto and marked '**ATK-6**' is a copy of the Tarong Energy Report *Exceptional Rainfall Event – Review of Events and Actions– Wivenhoe Power Station / Splityard Creek Dam* by David Evans dated 14 February 2011

5.0 ***For the period 8 to 13 January 2011, a detailed account of:***

5(a) the loss of communication suffered at the Wivenhoe Power Station, including its cause and effects

(i) Refer **ATK-6** and the items appended hereto and marked '**ATK-7(i)-(vi)**'.

5(b) the uncertainty experienced regarding the dam level readings at Splityard Creek Dam, including the reason for the uncertainty and steps taken to ameliorate it

(i) Refer **ATK-6**, where it is noted that monitoring of the integrity of Splityard Creek Dam is carried out regularly in accordance with the Dam Safety Program.

(ii) The visual checks could not be undertaken for a period due to the access route being closed, and the control system was showing that at least one of the two (2) level indicators had failed

(iii) Appended hereto and marked '**ATK-8**' is a graph showing one failed transmitter at Splityard Creek Dam.

(iv) The Power Station operators determined that it would be appropriate to monitor the two (2) level indicators and watch for either one move, which would indicate which monitor was still operating satisfactorily.

(v) The level trend shown contradicted past experience as Splityard Creek Dam was receiving significant runoff from its (very small) catchment in addition to the water previously pumped from Wivenhoe Dam.

(vi) Due to the uncertainty regarding the water level in Splityard Creek Dam and the potential risk to the integrity of the Dam wall as a result of the conditions and inability to carry out the usual checks, an attempt was made to contact SunWater, and when no response was received, Station Operators made contact with the Dam Safety Regulator (refer **ATK-6**) and the decision was made to run the Power Station to reduce the water level in Splityard Creek Dam.

5(c) the potential discrepancies as to the water level of Wivenhoe Dam between those recorded at the Wivenhoe Power Station and at the Wivenhoe Dam wall including the reason for any discrepancy, problems caused by any discrepancies and action taken as a result.

[redacted]

(i) There is no direct link between the water level measured on Wivenhoe Dam and the Power Station. Any small discrepancies are inconsequential to the power station except in events where the level reaches EL 77 and above as operations will be compromised and the power station may be flooded.

5(d) the concern that the rainfall event may cause reservoir rim slips, rock movements and dam wall erosion/scour, including the reasons for that concern any expert reports regarding such occurrences and action taken in response to the concern.

(i) High rainfall events of the magnitude experienced in January 2011, notably greater than experienced in the operational life of the Wivenhoe Power Station and Splityard Creek meant that when dam safety surveillance activities could no longer be undertaken of Splityard Creek Dam, Station Operators became concerned.

(ii) This was an operational decision, not based on expert reports. Concerns were founded on the technical knowledge and experience of the Station Operators as well as the witnessed landslides and rock falls in the immediate vicinity of the power station.

5(e) the risk that Splityard Creek Dam would overtop including Tarong Energy's estimate of that risk, the causes of it and actions taken to minimise it.

(i) Splityard Creek Dam is designed with a remote spillway which diverts water back to Wivenhoe Dam.

(ii) Tarong Energy did not have procedures for the overtopping of Splityard Creek Dam as it is not designed to overtop.

5(f) the access problems suffered around Wivenhoe Power Station

(i) Appended hereto and marked '**ATK-9(i)-(viii)**' are emails, photographs and staff updates detailing the access issues.

(ii) Also refer to **ATK-6**.

6.0 ***For the period 1 October 2010 to 13 January 2011, a detailed account of:***

6(a) a chronology of all interaction with officers or representatives of Seqwater and the Department of Environment and Resource Management during flood events at Wivenhoe Dam

(i) Appended hereto and marked '**ATK-10(i)-(xvii)**'.

6(b) a description of whether and how the communication requirements of the following documents were complied with:

(i) The "communication protocol" between Tarong Energy and Seqwater

The Communications Protocol was complied with in the majority of cases. On 11 January 2011, both the Tarong Energy Corporate Office and Wivenhoe Power Station phone and email links were unavailable. Tarong Power Station would have been able to liaise with Seqwater, however did not do so due to other demands and lack of personnel resulting from flooding in the vicinity of that power station at the time.

(ii) Deed of Practice

Generally, yes.

(iii) Emergency Action Plan

The Emergency Action Plan did not trigger in high rainfall events.

(iv) WPS Business Procedure

Yes.

7.0 ***A description of the type of interaction between officers and representatives of Tarong Energy and:***

(a) Officers and representatives of Seqwater

(b) Officers and representatives of the Department of Environment and Resource Management, and

(c) The flood operations engineers for Wivenhoe and Somerset Dams (Messrs Robert Ayre, John Ruffini, Terrence Malone and John Tibaldi for the 2010-2011 wet season.

Emails and phone correspondence generally between

(i) Wivenhoe Power Station management,

(ii) Tarong Energy (now CS Energy) technical managers where necessary for environmental and other issues, and

(iii) email correspondence in **ATK-10(i)-(xvii).**

8.0 ***A description of the "Control System" planned for the Wivenhoe Power Station mentioned in the memorandum Response to TE Board Request Following High Rainfall Event 11 January 2011 dated 20 January 2011.***

(i) The project to upgrade the control system is designed to update the current analogue technology installed in 1978 when the power station was built, due to age and obsolescence of parts.

(ii) This project will enhance the operational security and reliability of the station and facilitate the trending of various equipment parameters.

(iii) The instrumentation at the Splityard Creek Dam is installed with double contingency (two transmitters) which operated as per the design philosophy during the flood event such that upon failure of one, the other could be checked. Some instrumentation upgrades are under consideration as a part of the whole of system upgrade, and the hardware selected has the capacity to accept enhancements to the Splityard Creek instrumentation as required.

9.0 ***A description of:***

(a) Tarong Energy's procedures for monitoring the level of Splityard Creek Dam both during the 2010-2011 wet season and currently

The aforementioned control system and procedures operated as per their design philosophy during the 2010-2011 wet season and are still in operation.

(b) Tarong Energy's procedures for estimating inflows into Splityard Creek Dam or otherwise predicting the future level of Splityard Creek Dam both during the 2010-2011 wet season and currently

The aforementioned control system and procedures operated as designed during the 2010-2011 wet season and are still in operation.

(c) Tarong Energy's consideration of the dam surveillance methods available for monitoring Splityard Creek Dam (including as to lake level, structural integrity, leakage) including a description of how it is intended to monitor Splityard Creek Dam during the 2011-2012 wet season

The aforementioned control system and procedures operated as designed during the 2010-2011 wet season and are still in operation.

10.0 ***A description of Tarong Energy*** *[now CS Energy]* ***plans or procedures to deal with an outage of phone or email communication methods during high rainfall events.***

(i) Station Management have secured access to the Dam Operator station at the Wivenhoe Dam wall in the event of a failure of existing satellite and 2-way radio technology. Alternative radio technology is also under investigation by the Company.

(ii) Members of the Station personnel are members of the RFB - Rural Fire Brigade, will carry 2-way radios and be in contact with emergency services.

11.0 ***Opinion as to what, if anything, could be improved about the interaction between Tarong Energy and:***

(a) Seqwater

(b) The Flood Operations Engineers

Interaction has been satisfactory.

12.0 Opinion as to how, and by whom, releases from Splityard Creek, and pumping into Splityard Creek during flood events would be best controlled.

(i) In circumstances where email and telephone communications, or some alternate means of making contact is available, the cooperative system in place under the *Deed of Practice* is effective.

(ii) CS Energy's activities under the NEL are governed by electricity system security obligations managed by the Australian Energy Market Commission (AEMC).

(iii) A main source of statutory powers for the AEMC comes from the National Electricity Law (NEL). The NEL is contained in a Schedule to the *National Electricity (South Australia) Act 1996*, and is applied as law in each participating jurisdiction of the NEM by application statutes, for example the *Electricity - National Scheme (Queensland) Act 1997*.

13.0 ***In particular, opinion as to whether it would be appropriate for the flood operations centre to have control over releases from Splityard Creek Dam during flood events.***

(i) The AEMC has statutory authority to direct CS Energy to operate, or refrain from operating certain assets connected to the National Electricity Market. The Wivenhoe Power Station is one such asset.

(ii) The Wivenhoe Power Station can only generate electricity i.e. release water into Wivenhoe Dam for relatively short periods of time, generally up to 10 hours at maximum output if Splityard Creek is at 100 % capacity.

(iii) The statutory authority of the AEMC is constitutionally higher than that of Seqwater any other Queensland state authority. It is for this reason that the Deed of Practice is drafted as a mutual obligation on Seqwater and Tarong Energy (now CS Energy) to cooperate and for CS Energy to 'assist' Seqwater.

(iv) CS Energy intends to continue the good working relationship it has with Seqwater coming into the 2011-2012 wet season and beyond.

(v) CS Energy considers that it is not appropriate for the flood operations centre to have control over water movements in and out of Splityard Creek Dam during flood events.

14.0 ***Terms of Reference***

(i) The Terms of Reference of the Inquiry extends to recommendations which could possibly include reconsideration of the height of the wall of Wivenhoe Dam.

(ii) The Wivenhoe Power Station is under threat of inundation in circumstances where the Wivenhoe Dam reaches EL 77.0 or above and is flooded at EL 78 or above.

(iii) If the wall of the Wivenhoe Dam wall was to be raised to increase the flood mitigation capacity of the Dam, the recommendation will need to deal with the associated technical and financial costs to the state including:

a. the risks to the power system security and demand management;

b. the need to modify the power station to accommodate a higher level; and

c. potential contamination of the water in the Wivenhoe Dam where plant modifications are not made or where modifications are not successful.

~~Sworn /~~Affirmed at Brisbane in the State of Queensland

Before me:

[redacted]

[redacted]

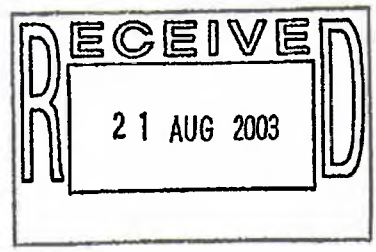
Solicitor

ATK-1

3

13 OCT 2003

SEQWATER
Wivenhoe, Somerset & North Pine Dams
Quality of water. Quality of life.



WS 20/1:GLG

20 August 2003 [redacted]

Mr [redacted]
General Manager (Asset Strategy)
Tarong Energy Corporation Ltd
GPO Box 800
BRISBANE QLD 4001

Dear [redacted]

DEED OF AMENDMENT AND CONSOLIDATION

Attached please find one copy of the signed Deed of Amendment and Consolidation for the operation of our respective works at Wivenhoe Dam.

If you require any further information, please contact me on 07 3229 3399 (ph), 07 3229 7926 (fax) or ggrant@seqwater.com.au.

Yours sincerely

[redacted]

Commercial Manager

(1) Original to Legal Services
(2) Copy to Wivenhoe for filing.
(3) Scanned copy for our knowledge base
GG 21/8/03

South East Queensland Water Corporation Limited | Head Office: Level 3, 240 Margaret St Brisbane, Queensland 4000 | Ph: 07 3229 3399 | Fax: 07 3229 7926 | www.seqwater.com

Wivenhoe Dam 'Lake Wivenhoe'
Brisbane Valley Highway
via Fernvale Queensland 4306
Phone: 07 5427 8100
Fax: 07 5426 1097

Somerset Dam 'Lake Somerset'
Somerset Dam Township
Queensland 4312
Phone: 07 5426 0188
Fax: 07 5426 0107

North Pine Dam 'Lake Samsonvale'
Forgan Road, Joyner
Queensland 4500
Phone: 07 3882 1422
Fax: 07 3882 1759

All correspondence to:
Chief Executive Officer
PO BOX 236 Albert Street
Brisbane Queensland 4002

ABN: 14 066 729 765

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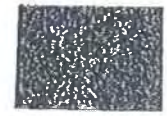

WIVENHOE DAM AND WIVENHOE POWER STATION

DEED OF AMENDMENT AND CONSOLIDATION

SOUTH EAST QUEENSLAND WATER CORPORATION LIMITED

AND

TARONG ENERGY CORPORATION LIMITED

CONTENTS

DEED OF AMENDMENT AND CONSOLIDATION

DATED:

PARTIES

1. SOUTH EAST QUEENSLAND WATER CORPORATION LIMITED ABN 14 088 729 766 of Level 3, 240 Margaret Street, Brisbane, Queensland ("SEQWater").

2. TARONG ENERGY CORPORATION LIMITED ABN 52 078 848 736 of Level 10, AMP Place, 10 Eagle Street, Brisbane ("TEC").

BACKGROUND

A. The antecedent organisations of TEC and SEQWater entered into a Deed of Practice on 22 October 1987 for the operation of their respective works at Wivenhoe Dam (the "Deed of Practice").

B. SEQWater and TEC wish to restate, amend and consolidate the Deed of Practice as set out in this Deed.

OPERATIVE PROVISIONS

1. DEFINITIONS AND INTERPRETATION

Words used in this Deed and the rules of interpretation that apply are set out and explained in the definitions and interpretation clause at the back of this Deed.

2. COMMENCEMENT

The Parties agree that the amendments to the Deed of Practice as set out in the Schedule will commence on the date of execution of this Agreement by both Parties.

3. AMENDMENTS

The Parties agree that the Deed of Practice is restated, affirmed, amended and consolidated, in the form contained in the Schedule.

4. DEFINITIONS AND INTERPRETATION

4.1 Definitions

In this Deed unless the context otherwise requires:

Deed of Practice means the deed of practice described in Recital A.

4.2 Interpretation

In this Deed unless the context otherwise requires:

(a) clause and subclause headings are for reference purposes only;

(b) the singular includes the plural and vice versa;

(c) reference to a person includes any other entity recognised by law and vice versa;

(d) where a word or phrase is defined its other grammatical forms have a corresponding meaning;

(e) any reference to a party to this Deed includes its successors and permitted assigns;

(f) any reference to any agreement or document includes that agreement or document as amended at any time;

(g) an agreement, representation or warranty on the part of two or more persons binds them jointly and severally;

(h) an agreement, representation or warranty on the part of two or more persons is for the benefit of them jointly and severally; and

(i) reference to a provision described, prefaced or qualified by the name, heading or caption of a clause, subclause, paragraph, schedule, item, annexure, exhibit or attachment in this Deed means a cross reference to that clause, subclause, paragraph, schedule, item, annexure, exhibit or attachment.

EXECUTED as a **DEED**

Signed for and on behalf of **SOUTH EAST QUEENSLAND WATER CORPORATION LIMITED** ABN 14 088 729 766 by Robert Alan Grice, Director, and Wayne Gregory Hardy, Company Secretary, in the presence of:

[redacted]

[redacted]

Signature of Witness

[redacted]

Name of Witness (print)

Signed for **TARONG ENERGY CORPORATION LIMITED** ABN 52 078 848 736 by an authorised officer in the presence of:

[redacted]

Signature of officer

[redacted]

Signature of witness

[redacted]

Name of officer (print)

[redacted]

Name of witness (print)

[redacted]

Office held

SCHEDULE

DEED OF PRACTICE

DEED OF PRACTICE

BETWEEN

SOUTH EAST QUEENSLAND WATER CORPORATION LIMITED

AND

TARONG ENERGY CORPORATION LIMITED

FOR

WIVENHOE DAM AND WIVENHOE POWER STATION

THIS DEED is made this Twenty Second day of October 1987

BETWEEN: SOUTH EAST QUEENSLAND WATER CORPORATION LIMITED ABN 14 088 729 766 of Level 3, 240 Margaret Street, Brisbane, Queensland ("SEQWater").

AND: TARONG ENERGY CORPORATION LIMITED ABN 52 078 848 736 of Level 10, AMP Place, 10 Eagle Street, Brisbane ("TEC").

WHEREAS:

A. The assets and undertakings relating to the Wivenhoe Dam are owned by SEQWater.

B. The assets and undertakings relating to the Wivenhoe Power Station are vested in TEC pursuant to the Queensland Government's restructure and corporatisation of the Queensland electricity supply industry.

C. TEC has a right to take and use water from Wivenhoe Dam for use in connection with the operation of the Wivenhoe Power Station, subject to the terms of this Deed.

NOW THIS DEED WITNESSES that the parties hereto covenant and agree as follows:-

1. DEFINITIONS

(a) Unless the content implies to the contrary, the following expressions shall in this Deed have the meanings respectively ascribed:

"**Contractor**" means the contractor to SEQWater for the operation and maintenance of Wivenhoe Dam;

"**EL**" means elevation in metres from Australian Height Datum;

"**Manual of Operational Procedures for Flood Mitigation for Wivenhoe and Somerset Dam**" means the Manual of Operational Procedures for Flood Mitigation for Wivenhoe and Somerset Dam that has been approved by the Chief Executive as provided for in Chapter 9, Part 2, Division 3 of the *Water Act 2000*;

"**Operating Agreement**" means the Operating Agreement between SEQWater and the Contractor for the supervision, management, operation and maintenance of Wivenhoe Dam;

"**Pollution**" means a substance in the water that is likely to cause a significant risk to the health of the general community;

"**Property or Works**" means:

(a) with respect to SEQWater, buildings, plant, equipment and other works or infrastructure constructed at Wivenhoe Dam and owned by SEQWater;

and

(b) with respect to TEC, buildings, plant, equipment and other works or infrastructure constructed at Wivenhoe Dam or Splityard Creek Dam and owned by TEC;

"Wivenhoe Dam" means the complex consisting of the dam constructed on the Brisbane River at Wivenhoe and all the works constituted or provided in association with that dam;

"Wivenhoe Power Station" means the complex consisting of the dam constructed on Splityard Creek, the inlet canal from the Wivenhoe Dam, and all the works constructed or provided in association with both dams for the purpose of or ancillary to the generation and conveyance of electricity.

(b) Headings, sub-headings and notes are inserted for guidance only and shall not affect the construction of any of the provisions hereof.

(c) Words importing the singular number or plural number shall respectively include the plural number and singular number.

2. OBLIGATIONS OF SEQWATER

2.1 SEQWater acknowledges and agrees that the efficient operation of Wivenhoe Power Station requires that the level of water in Wivenhoe Dam be not less than EL49.00 nor more than EL67.00.

2.2 SEQWater covenants and agrees that SEQWater, subject to the availability of water, shall use its best endeavours to manage Wivenhoe Dam so that at all times, except in times of flood and drought the level of water in Wivenhoe Dam is not less than EL49.00 and not more than EL67.00, subject to the primary responsibilities of SEQWater in respect of Wivenhoe Dam set out in clause 3.1.

3. OBLIGATIONS OF TARONG ENERGY

3.1 TEC acknowledges and agrees that:

(a) the primary responsibilities of SEQWater in respect of Wivenhoe Dam are to manage the dam in such manner as to ensure the adequate supply of water to its customers and to achieve the maximum measure of flood mitigation in the Brisbane River; and

(b) SEQWater's obligations are constrained by its duties under the *Water Act 2000* and the rights of the Minister under that Act.

3.2 TEC covenants and agrees that, subject to its obligation to achieve the efficient and cost effective generation of electric power, TEC shall operate Wivenhoe Power Station in such manner as to assist as far as practicable the achievement by SEQWater of its primary responsibilities.

4. NOTICE BY SEQWATER

4.1 SEQWater shall:

(a) regularly advise TEC of any changes in the level of water in Wivenhoe Dam; and

(b) give notice to TEC as soon as practicable of SEQWater's intention to act or omit to act which may result in the variation of the level of water in Wivenhoe Dam.

4.2 SEQWater shall not, except in the case of an emergency, take such proposed action in clause 4.1(b) until TEC has had reasonable opportunity to comment on the proposed action and SEQWater has in good faith tried to take those comments into account and used its best endeavours, subject to the primary responsibilities of SEQWater in respect of Wivenhoe Dam, to give practical effect to strategies to mitigate any negative impacts on TEC's operation of the Wivenhoe Power Station.

5. NOTICE BY TEC

5.1 TEC shall give notice to SEQWater as soon as practicable after becoming aware of any happening or event caused by TEC's operation of Wivenhoe Power Station or occurring on any property under the control of TEC which has:

(a) damaged, or is in the opinion of TEC likely to damage, SEQWater property; or

(b) polluted, or is in the opinion of the TEC likely to cause pollution to, the water in Wivenhoe Dam.

5.2 To the extent that TEC has caused such damage or unlawful pollution, TEC shall immediately after becoming aware of any such occurence take such action as TEC considers reasonably necessary, and as SEQWater may reasonably require, to repair any such damage or to remove any such pollution and to use its reasonable endeavours and do such things as SEQWater may reasonably require to prevent any further such damage or pollution as the case may be.

6. LIABILITY FOR DAMAGE

6.1 Each Party shall be liable to the other for any loss or damage (other than consequential damage or loss of revenue or profits) caused to the Property or Works of the other by the wilful or negligent action, default or omission of the Party, its servants or agents in breach of this Deed.

6.2 Each party is excused from its obligations to the other in respect of non-performance caused by or resulting from any act of God or happenings beyond the control of that Party and against which that Party could not have reasonably been expected to take reasonable precautions.

7. MANUAL OF OPERATIONAL PROCEDURES

7.1 TEC and SEQWater acknowledge the Manual of Operational Procadures for Flood Mitigation for Wivenhoe and Somerset Dam.

7.2 TEC shall as far as practicable observe and assist SEQWater in the implementation of the Manual of Operational Procaduras for Flood Mitigation for Wivenhoe and Somerset

Dam and any alteration thereto or substitutions therefore, PROVIDED THAT SEQWater shall give notice to TEC of any proposed alteration or substitution and shall give TEC reasonable opportunity to make comment on such proposed alteration or substitution and SEQWater has in good faith tried to take those comments into account and used its best endeavours, subject to the primary responsibilities of SEQWater in respect of Wivenhoe Dam, to give practical effect to strategies to mitigate any negative impacts of the proposed alteration of substitution on TEC's operation of the Wivenhoe Power Station.

8. CO-OPERATION OF PARTIES

8.1 SEQWater and TEC shall each co-operate with and assist the other to achieve the purpose for which the works were vested in each of them, including the exchange of all technical data in respect of the joint works and shall advise and consult with the other as far as may be necessary.

9. ACCESS RIGHTS

9.1 SEQWater and TEC covenant and agree that each of them shall allow the other such rights of access to the Property or Works under their respective control at all reasonable times as may be necessary to enable that other party to perform all obligations, duties or functions which may be imposed upon that party by any statute or pursuant to this Deed.

10. OPERATING AGREEMENT

10.1 TEC acknowledges that SEQWater and the Contractor have entered into an Operating Agreement for the supervision, management, operation and maintenance of the Wivenhoe Dam.

10.2 TEC covenants and agrees that it will deal and communicate in the first instance directly with SEQWater with respect to day-to-day operational matters concerning Wivenhoe Dam and Wivenhoe Power Station if obliged to communicate under this Deed.

11. DISPUTES

11.1 The Parties shall negotiate in good faith to settle between themselves, any claim, disputes, or controversy arising out of or in connection with this Deed, or the breach of this Deed. If no resolution is reached, the dispute shall be referred to the Chief Executives of each of the Parties.

11.2 If the Parties have not resolved the dispute by negotiation within a period of twenty-one (21) days after referral to the Chief Executives, any Party may approach the President of the Australian Commercial Dispute Centre Limited (Qld), (the "ACDC"), to organise mediation. The mediation shall be held in accordance with the Rules of the ACDC in force at the date of the dispute and be held in Brisbane, or any alternate location that the Parties shall agree.

11.3 Nothing in this clause shall prevent a Party from seeking urgent equitable relief before an appropriate court.

7

COORDINATION AGREEMENT

BETWEEN

SOUTH EAST QUEENSLAND WATER CORPORATION LIMITED

AND

TARONG ENERGY CORPORATION LIMITED

FOR

WIVENHOE DAM AND WIVENHOE POWER STATION

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10/107405

THIS AGREEMENT is made this day of 2002

BETWEEN: **SOUTH EAST QUEENSLAND WATER CORPORATION LIMITED** ABN 14 088 729 766 of Level 3, 240 Margaret Street, Brisbane, Queensland ("SEQWater").

AND: **TARONG ENERGY CORPORATION LIMITED** ABN 52 078 848 736 of Level 10, AMP Place, 10 Eagle Street, Brisbane ("TEC").

WHEREAS:

A. The assets and undertakings relating to the Wivenhoe Dam are owned by SEQWater.

B. The assets and undertakings relating to the Wivenhoe Power Station are vested in TEC pursuant to the Queensland Government's restructure and corporatisation of the Queensland electricity supply industry.

~~C. TEC has an unrestricted right to take and use water from Wivenhoe Dam for use in connection with the operation of the Wivenhoe Power Station.~~

~~D.~~C. The antecedent organisations of TEC and SEQWater entered into a Deed of Practice on 16 May 1988 for the operation of their respective works at Wivenhoe Dam (the "**1988 Deed of Practice**").

~~E.~~D. SEQWater and TEC wish to terminate the 1988 Deed of Practice and have agreed to replace it with a new practice as set out in this Agreement.

~~F.~~E. SEQWater has agreed to make water available to TEC for use in the Wivenhoe Power Station on and subject to the terms of the Agreement. ~~SEQWater acknowledges that TEC will suffer significant direct and indirect loss and damage (including loss of profits and trading and portfolio losses) should SEQWater not comply with its obligations under this agreement.~~

NOW THIS AGREEMENT WITNESSES that the parties hereto covenant and agree as follows:-

1. DEFINITIONS

(a) Unless the content implies to the contrary, the following expressions shall in this Agreement have the meanings respectively ascribed:

"**Contractor**" means the contractor to SEQWater for the operation and maintenance of Wivenhoe Dam;

"**EL**" means elevation in metres from Australian Height Datum;

"Manual of Operational Procedures for Flood Mitigation for Wivenhoe and Somerset Dam" means the Manual of Operational Procedures for Flood Mitigation for Wivenhoe and Somerset Dam that has been approved by the Chief Executive as provided for in Chapter 9, Part 2, Division 3 of the *Water Act 2000*;

"Operating Agreement" means the Operating Agreement between SEQWater and the Contractor for the supervision, management, operation and maintenance of Wivenhoe Dam;

"Pollution" means a substance in the water that is likely to cause a significant risk to the health of the general community;

"Property or Works" means:

(a) with respect to SEQWater, buildings, plant, equipment and other works or infrastructure constructed at Wivenhoe Dam and owned by SEQWater; and

(b) with respect to TEC, buildings, plant, equipment and other works or infrastructure constructed at Wivenhoe Dam or Splityard Creek Dam and owned by TEC.

"Wivenhoe Dam" means the complex consisting of the dam constructed on the Brisbane River at Wivenhoe and all the works constituted or provided in association with that dam;

"Wivenhoe Power Station" means the complex consisting of the dam constructed on Splityard Creek, the inlet canal from the Wivenhoe Dam, and all the works constructed or provided in association with both dams for the purpose of or ancillary to the generation and conveyance of electricity.

(b) Headings, sub-headings and notes are inserted for guidance only and shall not affect the construction of any of the provisions hereof.

(c) Words importing the singular number or plural number shall respectively include the plural number and singular number.

2. COMMENCEMENT

2.1 The Parties agree that this Agreement shall commence on the date of execution by both Parties and replaces the 1988 Deed of Practice, which is terminated on and from the commencement of this Agreement, without prejudice to the rights that accrued to the parties before termination.t.

3. OBLIGATIONS OF SEQWATER

3.1 SEQWater acknowledges and agrees that the efficient operation of Wivenhoe Power Station requires that the level of water in Wivenhoe Dam be not less then EL49.00

nor more than EL67.00.

3.2 SEQWater covenants and agrees that SEQWater subject to the availability of water, shall use its best endeavours to manage Wivenhoe Dam so that at all times, except in times of flood and drought the level of water in Wivenhoe Dam is not less than EL49.00 and not more than EL67.00, subject to ~~whilst still satisfying~~ the primary responsibilities of SEQWater in respect of Wivenhoe Dam set out in clause 4.1.

4. OBLIGATIONS OF TARONG ENERGY

4.1 TEC acknowledges and agrees that the primary responsibilities of SEQWater in respect of Wivenhoe Dam are to manage the dam in such manner as to ensure the adequate supply of water to its customers and to achieve the maximum measure of flood mitigation in the Brisbane River and that SEQWater's obligations are constrained by its duties under the Water Act and the rights of the Minister under that Act.

4.2 TEC covenants and agrees that, subject to its obligation to achieve the efficient and cost effective generation of electric power, TEC shall operate Wivenhoe Power Station in such manner as to assist as far as practicable the achievement by SEQWater of its primary responsibilities.

5. NOTICE BY SEQWATER

5.1 SEQWater shall:

(a) regularly advise TEC of any changes in the level of water in Wivenhoe Dam; and

(b) give notice to TEC as soon as practicable of SEQWater's intention to act or omit to act which may result in the variation of the level of water in Wivenhoe Dam.

5.2 SEQWater shall not, except in the case of an emergency, take such proposed action in clause 5.1(b) until TEC has had reasonable opportunity to comment on the proposed action and SEQWater has in good faith tried to take those comments into account and used its best endeavours, subject to the primary responsibilities of SEQWater in respect of Wivenhoe Dam, to give practical effect to strategies to mitigate any negative impacts on TEC's operation of the Wivenhoe Power Station.

6. NOTICE BY TEC

6.1 TEC shall give notice to SEQWater as soon as practicable after becoming aware of any happening or event caused by TEC's operation of Wivenhoe Power Station or occurring on any property under the control of TEC which has:

(a) damaged, or is in the opinion of TEC likely to damage, SEQWater property; or

(b) ~~unlawfully~~ polluted, or is in the opinion of the TEC likely to ~~unlawfully~~ cause pollution to, the water in Wivenhoe Dam.

6.2 To the extent that TEC has caused such damage or unlawful pollution, TEC shall

immediately after becoming aware of any such occurgance take such action as TEC considers reasonably necessary and as SEQWATER may reasonably require to repair any such damage or to remove any such ~~unlawful~~ pollution and to use its reasonable endeavours and do such things as SEQWater may reasonably require to prevent any further such damage or ~~unlawful~~ pollution as the case may be.

7. LIABILITY FOR DAMAGE

7.1 Each Party shall be liable to the other for any loss or damage (other than consequential damage or loss of revenue or profits) caused to the Property or Works of the other by the wilful or negligent action, default or omission of the Party, its servants or agents in breach of this agreement. , ~~PROVIDED THAT, , neither party shall be liable to~~

7.2 Each party is excused from its obligations to the other in respect of non-performance~~any loss or damage~~ caused by or resulting from any act of God or happenings beyond the control of that Party ~~which could not have been reasonably foreseen~~ and/or against which that Party could not have reasonably been expected to take reasonable precautions.

8. MANUAL OF OPERATIONAL PROCEDURES

8.1 TEC and SEQWater acknowledge the Manual of Operational Procedures for Flood Mitigation for Wivenhoe and Somerset Dam.

8.2 TEC shall as far as practicable observe and assist SEQWater in the implementation of the Manual of Operational Procedures for Flood Mitigation for Wivenhoe and Somerset Dam and any alteration thereto or substitutions therefore, PROVIDED THAT SEQWater shall give notice to TEC of any proposed alteration or substitution and shall give TEC reasonable opportunity to make comment on such proposed alteration or substitution and SEQWater has in good faith tried to take those comments into account and used its best endeavours, subject to the primary responsibilities of SEQWater in respect of Wivenhoe Dam, to give practical effect to strategies to mitigate any negative impacts of the proposed alteration of substitution on TEC's operation of the Wivenhoe Power Station.

9. CO-OPERATION OF PARTIES

9.1 SEQWater and TEC shall each co-operate with and assist the other to achieve the purpose for which the works were vested in each of them, including the exchange of all technical data in respect of the joint works and shall advise and consult with the other as far as may be necessary.

10. ACCESS RIGHTS

10.1 SEQWater and TEC covenant and agree that each of them shall allow the other such rights of access to the Property or Works under their respective control at all reasonable times as may be necessary to enable that other party to perform all obligations, duties or functions which may be imposed upon that party by any statute or pursuant to this Agreement.

11. OPERATING AGREEMENT

11.1 TEC acknowledges that SEQWater and the Contractor have entered into an Operating Agreement for the supervision, management, operation and maintenance of the Wivenhoe Dam.

11.2 TEC covenants and agrees that it will deal and communicate in the first instance directly with SEQWater with respect to day-to-day operational matters concerning Wivenhoe Dam and Wivenhoe Power Station if obliged to communicate under this Agreement.

12. DISPUTES

12.1 The Parties shall negotiate in good faith to settle between themselves, any claim, disputes, or controversy arising out of or in connection with this Agreement, or the breach of this Agreement. If no resolution is reached, the dispute shall be referred to the Chief Executives of each of the Parties.

12.2 If the Parties have not resolved the dispute by negotiation within a period of twenty-one (21) days after referral to the Chief Executives, any Party may approach the President of the Australian Commercial Dispute Centre Limited (Qld), (the "ACDC"), to organise mediation. The mediation shall be held in accordance with the Rules of the ACDC in force at the date of the dispute and be held in Brisbane, or any alternate location that the Parties shall agree.

12.3 Nothing in this clause shall prevent a Party from seeking urgent equitable relief before an appropriate court.

EXECUTED as an AGREEMENT

Signed for SOUTH EAST QUEENSLAND WATER CORPORATION LIMITED ABN 14 088 729 766 by an authorised officer in the presence of:

Signature of officer

Signature of witness

Name of officer (print)

Name of witness (print)

Office held

Signed for TARONG ENERGY CORPORATION LIMITED ABN 52 078 848 736 by an authorised officer in the presence of:

Signature of officer

Signature of witness

Name of officer (print)

Name of witness (print)

Office held

Commentary on the major changes:

1. **Deletion of Recital C**

   This statement has been deleted because it is not an accurate reflection of TEC's water usage entitlements. TEC's right to use water is constrained and regulated by the Agreement.

2. **Deletion of Recital E**

   The original contract was drafted long before the introduction of the competitive market for electricity. We believe our amendment more correctly states the nature of the current arrangements between the parties (having regard to our suggested amendments in the balance of this letter).

3. **Clause 2.1**

   This is simply a formal legal amendment. It preserves the rights of the parties that accrued prior to the termination of the 1998 Deed of Practice.

4. **Clause 3.2**

   The first two amendments simply reflect the former agreement. The third amendment is intended to recognise that SEQWater's ability to perform this Agreement is constrained by its enabling legislation.

5. **Clause 4.1**

   This is a formal amendment designed to reflect the statutory position.

6. **Clause 6.1(b)**

   We have deleted the word 'unlawfully'. SEQWater has responsibilities in respect of all pollution, lawful or unlawful. In any event, we think that it may not be in TEC's interest only to advise you when pollution is unlawful as this might create an admission which would be used against it by environmental authorities.

7. **Clause 6.2**

   These changes reinstate the commercial position under the old agreement.

8. **Clause 7.1**

   This clause has been split into two. The old agreement did not really work legally. We have also excluded consequential damage or loss, as we do not think it is appropriate for SEQWater to be liable for

TEC's loss of national electricity market revenues as a result of SEQWater's breach of the Agreement.

ATK-2

[redacted]

From: _Tarong DOI
Sent: Thursday, 7 October 2010 4:30 PM
To: Tarong DOI Alert
Cc: [redacted]
Subject: DOI Alert - Operating Instruction for Wivenhoe Power Station ...

Author : [redacted]
Plant : Wivenhoe Power Station
From To : 7/10/2010 5:00:00 PM - 30/10/2010 5:00:00 PM Details : As mentioned, we have received a request from SEQ Water to inform their Flood Engineers of any upcoming "movements" of water from Wivenhoe Power Station. Please follow the following protocol where notice to the below email adresses is necessary. These water movements are important with Wivenhoe dam at 101% and may trigger a response from SEQ water to release water from the dam where levels rise or reduce releases based on fall of the dam level. Notification of actual water movement is an early warning of dam level movements for SEQ water.

Where pump or generate is required please email the entire list below with an estimate of the actual flows based on the examples provided by Sorin.

EMAIL LIST:
John Tibaldi: [redacted]
Terry Malone: [redacted]
Rob Ayre: [redacted]
John Ruffini: [redacted]
+ Wivenhoe On-Call Officers from Tarong Energy email listing.

Examples:

Example 1: upcoming pumping tonight for two hours, single pump. 0.2 ML/s (pump capacity) x 3600 sec/hr x 2 hours = ~1,500ML withdrawal from Wivenhoe Dam.
E-mail to to say only "1,500ML withdrawal tonight"

Example 2: generation just started, one unit at 200MW for what looks like 3 hours. 4ML/MWh (approx turbine water rate) x 200MW x 3 hours = ~ 2,400ML.
E-mail to read "2,400ML released"

The actual time for pump can be taken from the pre-dispatch and will be fairly accurate, the time expected when in generate may be best obtained from the durty market trader. The email should be forwarded only where there is some certainity off water movements for example immediately after pump or generate is activated.

Tarong / SEQ Water protocol

ATK-8

[redacted]

From: _Tarong DOI
Sent: Friday, 24 December 2010 1:30 PM
To: _Tarong DOI Alert
Subject: DOI Alert - Operating Instruction for Wivenhoe Power Station ...

Author : [redacted]
Plant : Wivenhoe Power Station
From To : 29/10/2010 3:00:00 AM - 31/01/2011 3:00:00 AM Details : Please note the addition of dutyseq@uqconnect.net to the e-mail list. [redacted]

A request has been received from SEQ Water to inform their Flood Engineers of any upcoming "movements" of water from Wivenhoe Power Station. Please follow the following protocol where notice to the below email addresses is necessary.
These water movements are important with Wivenhoe dam at 100% or greater then 100%, these movements may trigger a response from SEQ water to release water from the dam where levels rise or reduce releases based on fall of the dam level. Notification of actual water movement is an early warning of dam level movements for SEQ water.

Where pump or generate is required please email the entire list below with an estimate of the actual flows based on the examples provided by Sorin. The advice must only contain water quantites and not market information.

EMAIL LIST:
John Tibaldi: [redacted]
Terry Malone: [redacted]
Rob Ayre: [redacted]
John Ruffini: [redacted]
+ Wivenhoe On-Call Officers from Tarong Energy email listing.

Examples:

Example 1: upcoming pumping tonight for two hours, single pump. 0.2 ML/s (pump capacity) x 3600 sec/hr x 2 hours = ~1,500ML withdrawal from Wivenhoe Dam.
E-mail to to say only "1,500ML withdrawal tonight"

Example 2: generation just started, one unit at 200MW for an estimated 3 hours.
4ML/MWh (approx turbine water rate) x 200MW x 3 hours = ~ 2,400ML.
E-mail to read "2,400ML released" or "..... taken from Wivenhoe" (for pumping).

The actual times for pump and generate can be taken from the market pre-dispatch and will be accurate enough for this advice.
The process should be (1) the event (generated / pump) is initiated, (2) the duration is then taken / estimated from the predispatch, (3) the water volume is calculated and (4) an email forwarded to the above email address..

The volume of water under generate or pump conditions is only best estimate of the volume of water movement.

Tarong/SEQ Water protocol

Emergency Action Plan

WIVENHOE POWER STATION

SPLITYARD CREEK DAM

T - MISC - 149

TABLE OF CONTENTS

1. CONTROLLED COPY DISTRIBUTION SHEET

COPY NUMBER	POSITION	LOCATION
1	Operations Manager	Wivenhoe Power Station
2	Operations Room, Units 1 & 2	Tarong Power Station
3	Operations Room, Units 3 & 4	Tarong Power Station
4	Manager, Asset Strategy	Tarong Energy, 42 Albert St., Bris
5	Director, Dam Safety	Dept. of Water & Resource Management, WIC, Mineral House, George & Margaret Sts, Brisbane
6	Disaster District Coordinator	Ipswich District Police Headquarters
7	Officer in Charge Police	Lowood
8	SES Controller	Somerset Regional Council
9	Executive Director, State Disaster Coordination Centre, Emergency Management Queensland	Cnr. Park Rd. and Kedron Park Rd, Kedron, Brisbane
10	Regional Director South East Region	32 Tansey Street, Beenleigh
11	Senior Engineer Headworks Assessment Infrastructure Management	Sun Water Asset Solutions, 10/179 Turbot St, Brisbane PO Box 15536 City East Brisbane

The contacts within this document are to be reviewed annually, the remaining content requires review on a 5 year review cycle.

2. DOCUMENT CONTROL SHEET

CONTROLLED COPY NUMBER: ___

Document Management: This manual forms part of Tarong Energy's Quality Assurance System. The management, revision and distribution control of this manual shall be controlled in accordance with Tarong Energy's Corporate Business Procedure GOV-PROC-01 — TP3 Management.

AUTHORISATION:

Managed by:_____ Date: _____
(Wivenhoe Power Station Manager)

Approved by: _____ Date: _____
(Operations Manager, Tarong Energy)

This Emergency Action Plan was originally prepared by Engineering Services, Sun Water, for Tarong Energy

REVISION STATUS:

Revision Number	Revision Description	Revision Date
1	Initial Issue	19.01.2001
2	Revision Pt1, Pt2, Pt4, Pt6	20.02.2002
3	Notification list revised and formatting	26.03.2003
4	Document completely revised various changes made.	08.04.2008
5	Document revised various changes made.	10.11.2010

3. TELEPHONE NOTIFICATION LIST

TITLE / NAME	Phone Business	Phone A/H	Phone Mobile	Fax E-mail
TARONG ENERGY Chief Executive Officer, Tarong Energy.	[redacted]		[redacted]	[redacted]
WIVENHOE POWER STATION Hydro Duty Officer	[redacted]	[redacted]	[redacted]	
Manager Wivenhoe Hydro: [redacted]			[redacted]	
Lead Engineers Hydro: [redacted]			[redacted]	
Production Officer Hydro: [redacted]				
TARONG POWER STATION **Operator TPS Control Room** Shift Coordinator				
Other Contacts Manager Asset Strategy: [redacted]				
Manager Operations: [redacted]		[redacted]	[redacted]	
Out of hours Surveillance Storage Level	Level may be checked from Tarong Power Station 24hrs/day			
South East Qld. Water Corporation	[redacted]		Ops Manager: Rob Drury [redacted]	[redacted]
Dept. of Water & Resource Management Director, Dam Safety (Water Supply) Peter Allen		33599094		
Somerset Regional Council Counter Disaster Executive Officer: Bob Bain				[redacted]
Chemical Hazards: Local Fire Service				
Police Disaster District Coordinator Ipswich		24 Hours [redacted]		Ipswich Police [redacted]
Lowood Police:				
State Disaster Coordination Centre Watch Desk Officer		Satellite phone [redacted]	[redacted]	[redacted]
Flood Alert:	Refer to Appendix 1			

4. REGISTER - CONTACT LIST FOR EMERGENCIES AND FLOOD INFORMATION - SPLITYARD CREEK DAM

Agency	Position	Working Hrs Priority	Out of Hrs Priority	Name	Work Ph	Fax	Pager	Mobile	After Hrs	Contacted By
SEQ Water	Principal Engineer Dam Safety	1	1	John TIBALDI	[redacted]	[redacted]		[redacted]	[redacted]	TEC/FCC
	Dam Operations Manager	2	2	Robert DRURY						
	Flood Operations Engineer	3	3	Terry MALONE						
	Operations Coordinator General	4	4	[redacted]						
	Executive General Manager, water Delivery	5	5	Jim PRUSS						
	Chief Executive Officer	3	3	Peter BORROWS						
	Chairman	4	4	[redacted]						
	Hydrographic Staff	1	1	[redacted]						
	Hydrographic Staff	2	2	[redacted]						
Department of Environment & Resource Management	Director, Dam Safety	1	1	Peter ALLEN						TEC/FCC
	Dam Safety Engineer	2	2	Ron GUPPY						
Flood Operations Centre (operated by SunWater)	Principal Engineer Sam Safety	1	1	John TIBALDI						TEC/FCC
	Flood Operations Engineer	3	3	Terry MALONE						
	Senior Flood Operations Engineer	3	3	Rob AYRE						
	Senior Flood Operations Engineer	4	4	John RUFFINI*					3844 7457	
	Flood Control Room, Operational	5	5	General Phones						
	Flood Control Room, operational							[redacted] (Satellite)		

4. REGISTER - CONTACT LIST FOR EMERGENCIES AND FLOOD INFORMATION - SPLITYARD CREEK DAM (cont'd)

Agency	Position	Working Hrs Priority	Out of Hrs Priority	Name	Work Ph	Fax	Pager	Mobile	After Hrs	Contacted By
Department of Community Safety – State Disaster Coordination Centre	Watch Desk Officer* (24 hrs)	1	1	Rostered	[redacted]	[redacted]		[redacted]	[redacted]	TEC/FCC
Somerset Regional Council	Local Disaster Response Coordinator	1	1	[redacted]						
	Local Disaster Response Coordinator	2	2	[redacted] (SES Controller)						TEC/FCC
	Local Disaster Response Coordinator	3	3	Robert BAIN (CEO)						

4. REGISTER - CONTACT LIST FOR EMERGENCIES AND FLOOD INFORMATION - SPLITYARD CREEK DAM (cont'd)

Agency	Position	Working Hrs Priority	Out of Hrs Priority	Name	Work Ph	Fax	Pager	Mobile	After Hrs	Contacted By
Ipswich City Council	Local Disaster Response Coordinator	1	1	Tony TRACE	[redacted]	[redacted]		[redacted]		TEC/FCC
	Local Disaster Response Coordinator	2	2	[redacted]						
	Local Disaster Response Coordinator	3	3	[redacted]						
	Local Disaster Response Coordinator	4	4	[redacted]						
	SES Local Controller	5	5	[redacted]						
Emergency Management Queensland	Regional director, Brisbane District	1	1	[redacted]						TEC
	Area Director Brisbane	1	1							
Toogoolawah Ambulance	Officer in Charge	1	1							TEC
Wivenhoe Power Station (Tarong)	Wivenhoe Power Station Manager	1	2						[redacted]	TEC
	On call officer - rotational	2	1	Contact Tarong Shift Co-ordinator						
Police	District Disaster Coordinator Ipswich	1	1	[redacted]						TEC
	District Disaster Coordinator Brisbane	1	1						[redacted]	
Bureau of Meteorology	Engineer in Charge Flood Warning*	1	1							FCC
	Meteorologist in Charge (24 hrs)	2	2							

4. REGISTER - CONTACT LIST FOR EMERGENCIES AND FLOOD INFORMATION - SPLITYARD CREEK DAM (cont'd)

Agency	Position	Working Hrs Priority	Out of Hrs Priority	Name	Work Ph	Fax	Pager	Mobile	After Hrs	Contacted By
Ambulance					000					TEC/FCC

Notes:	1.	Contact with an agency is to be made via position with highest priority. That person contacted is then responsible to forward notification to other relevant persons within the agency
	2.	* = contact person nominated by agency as contact point for amendments
	3.	Updated register to be issued to holders of controlled copies of Emergency Action Plan as well as contact person nominated by agency as contact point for receipt of updated register (indicated by *)
	FCC	Flood Control Centre (for issue of Flood Information only)
	SEQWater	South East Queensland Water Corporation
	TEC	Tarong Energy Corporation

5. EMERGENCY EVENTS AND ACTIONS

EVENT

☹ **DESCRIPTION OF SITUATIONS**
✓ **ACTION**

☹ **Storage at Full Supply Level of EL 166.50 AHD**

Earthquake felt in the area - Trigger level - ask SEQWater (refer to section 3 of this EAP)

During normal work hours, the Manager Hydro , Wivenhoe Power Station shall:

- ✓ Immediately inspect the downstream face of the Dam for damage, particularly for **slumps** and **springs**
- ✓ Inspect the Outlet Works Tunnel for water leakage
- ✓ *Record all Actions and Communications on the Log of Events /Actions and Record of Communications Sheets included in Appendix 7 of this EAP*
- ✓ If any **springs** or **water flows** through the Dam are observed, immediately notify in order:
  - The Downstream Landholders (Refer to Appendix 1 of this EAP)
    Advise to evacuate as a precautionary measure
  - The Disaster District Coordinator, Ipswich (refer to section 3 of this EAP)
  - The Lowood Police (refer to section 3 of this EAP)
  - SES Controller, Somerset Regional Council (refer to section 4 of this EAP)
  - The Manager, Asset Strategy, Tarong Energy (refer to section 3 of this EAP)
  - The Director, Dam Safety, (Water Supply), (refer to section 3 of this EAP)
  - Department of Water & Resource Management (refer to section 4 of this EAP)
- ✓ Continuously monitor the flow through the Dam, and if any increase in flow is observed, go to the next scenario listed below

5. EMERGENCY EVENTS AND ACTIONS (cont'd)

EVENT

☹ **DESCRIPTION OF SITUATIONS**
✓ **ACTION**

Emergency Situation has developed or is developing (cont'd)

☹ **Increasing Leakage through the Embankment**

The Manager Hydro (Wivenhoe Power Station), shall:

Record all Communications and Events on the Record Sheets in Appendix 7

✓ Report observations immediately to:
- The Disaster District Coordinator, Ipswich Police (refer to section 3 of this EAP)
- The Lowood Police (refer to section 3 of this EAP)
- Residents close downstream of the Dam who are listed in Appendix 1 of this EAP

Advise to evacuate immediately

- The Manager, Asset Strategy Tarong Energy (refer to section 3 of this EAP)
- Director, Dam Safety (Water Supply) (refer to section 3 of this EAP)
- Department of Water & Resource Management (refer to section 4 of this EAP)

✓ Monitor the flows continuously and if a rapidly increasing trend is observable, initiate the next action plan for **"Large Increasing Flows"** listed below

✓ After the Event, compile an Emergency Event Report and forward unedited copies to the Chief Executive Officer, Tarong Energy, and the Director, Dam Safety, Department of Water & Resources Management

☹ **Large Increasing Flows through the Embankment with cloudy water**

The Manager Hydro, (Wivenhoe Power Station), shall:

Record all Communications on the Record Sheets in Appendix 7 of this EAP

✓ Notify the Disaster District Coordinator Ipswich Police (refer to section 3 of this EAP)

✓ Notify the Lowood Police (refer to section 3 of this EAP)
and the Counter Disaster Executive Officer, Somerset Regional Council, (refer to section 3 of this EAP), maintain contact, and report the status frequently

5. EMERGENCY EVENTS AND ACTIONS (cont'd)

EVENT

☹ **DESCRIPTION OF SITUATIONS**
✓ **ACTION**

Emergency Situation has developed or is developing (cont'd)

☹ **Large Increasing Flows through the Embankment with Cloudy Water (cont'd)**

- ✓ Notify all other contacts in the lists contained in section 4 of this EAP
- ✓ Monitor the flows continuously and report the progress of the Event to the Disaster District Coordinator, Ipswich Police as frequently as requested (refer to section 3 of this EAP)
- ✓ After the Event, compile an Emergency Event Report, and forward unedited copies to the Chief Executive Officer, Tarong Energy, and the Director, Dam Safety, (Water Supply) Water Industry Compliance, Department of Water & Resource Management (refer to section 3 of this EAP)

☹ **Storage at Full Supply Level of EL166.50 AHD**

Earthquake reported felt in the Area

Outside of normal Working hours, the Shift Coordinator at Tarong Power Station, on becoming aware of a reported earthquake, shall:

- ✓ Contact the Hydro Duty Officer, Wivenhoe Power Station, on the Mobile number and request an immediate inspection be made of the Dam Embankment (refer to section 3 of this EAP)
- ✓ Monitor the Storage level recorder and advise the Manager Hydro if a falling Storage Level trend is noticeable

The Manager Hydro (Wivenhoe Power Station) shall:

- ✓ Immediately proceed to the Dam and inspect the Embankment and Abutments for springs and deformation, and check for signs of slumps and erosion on the downstream face of the Dam
- ✓ Report any observed damage immediately to:
  - The Disaster District Coordinator, Ipswich Police (refer to section 3 of this EAP)
  - The Counter Disaster Executive Officer, Somerset Regional Council (refer to section 3 of this EAP)
  - The Shift Coordinator, Tarong Power Station Control Room (refer to section 3 of this EAP)
  - The State Counter Disaster Organisation Duty Officer (refer to section 3 of this EAP)

5. EMERGENCY EVENTS AND ACTIONS (cont'd)

EVENT

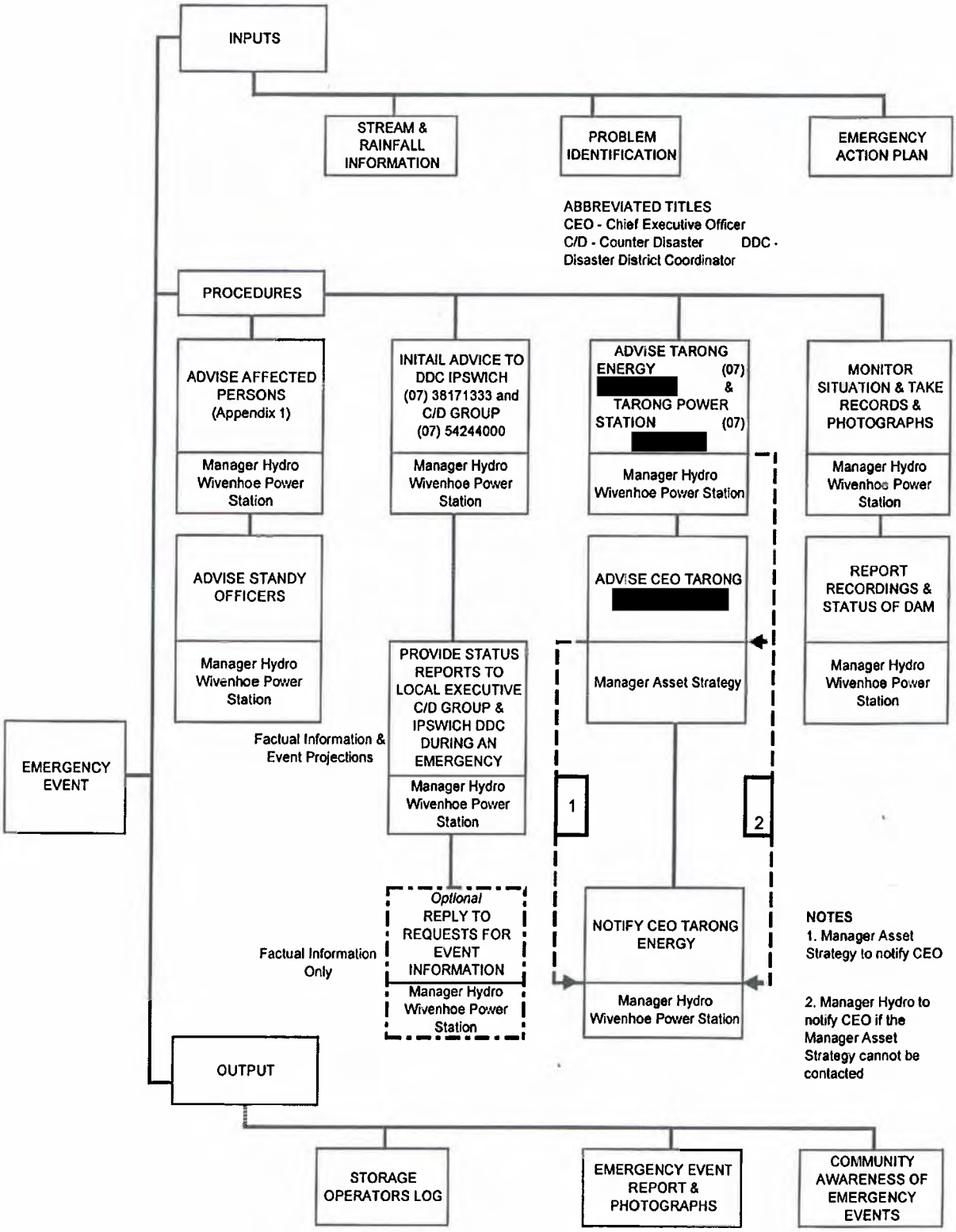
☹ **DESCRIPTION OF SITUATIONS**
✓ **ACTION**

Emergency Situation has developed or is developing (cont'd)

☹ **Storage at Full Supply Level of EL166.50 AHD**
Earthquake reported felt in the Area (cont'd)

- ✓ On detection of springs, proceed with the Emergency Action Plans for **"Increasing Flows and Leakage"** and / or **"Large Increasing Flows through the Embankment with Cloudy Water"** as set out on the preceding page
- ✓ After the Event, compile an Emergency Event Report, and forward unedited copies to the Chief Executive Officer, Tarong Energy, and the Director, Dam Safety, Department of Water & Resource Management

6. PROCEDURAL FLOW CHART



7. HYDRAULIC MODEL RESULTS

7.1 Introduction

The results of the hydraulic model simulations are presented in this section of the report. The results are presented for the 'Sunny Day' piping failure of the main earth and rock fill embankment. As the two failure modes considered would result in similar breach shapes and would effectively take the same time to develop, only one downstream flooding scenario has to be reported.

7.2 Peak Flood Levels

The results are presented as a plot of the extent of inundation due to the failure of the dam. This plot is shown as Figure 7 "Drawing A3-216118 Dam Failure Analysis Sunny Day Failure". Table 7.1 "Sunny Day Piping Failure Event Peak Flood Levels" provides a summary of the estimated peak flood levels at key locations for the 'Sunny Day' piping failure event.

Table 7.1 - Sunny Day Piping Failure Event — Peak Flood Levels

Location	Cross-section	Peak Flood Level (m AHD)
Splityard Creek Dam	1	105.93
Switchyard on Pryde Creek	5	79.80
Houses on Pryde Creek	9	59.92
Twin Bridges on Brisbane R.	600m *DIS* of XS 15	33.82
Fernvale Bridge on Brisbane R	17	33.80
Junction	19	33.77
Savages Crossing on Brisbane R	24	32.78

7.2.1 Splityard Creek Dam

Figure 8 "Sunny Day Failure – Breach Hydrograph" shows the flow profile from a breach in Splityard Creek Dam peaking at 8,500 m3/sec at approximately 1 hour 5 minutes from the failure

7.2.2 Pryde Creek

Figures 9 "Pryde Creek Longitudinal Section – Maximum Flood Level for Sunny Day Failure" and 10 "Brisbane River Longitudinal Section – Maximum Flood Level for Sunny Day Failure" show the longitudinal profiles of the peak flood levels along and the Brisbane River respectively.

Figure 11 "Sunny Day Failure – Stage Hydrographs" shows stage hydrographs at various key locations along Pryde Creek and the Brisbane River. As can be seen from these plots the failure of the dam results in an increase in water level of between 15m immediately downstream of the dam in Pryde Creek to 13m at Savages Crossing on the Brisbane River.

Due to the topography of Pryde Creek, the flood wave is not attenuated greatly until it reaches the junction of the Brisbane River, where it then spreads out and flows upstream and downstream over the flood plain terraces of the Brisbane River.

7.2.2 Pryde Creek (con't)

The peak flood level estimated at the Fernvale Bridge is approximately equal to the deck level. Whilst the bridge is not expected to be threatened by such an event, it is very likely the northern approaches of the bridge will be inundated, effectively closing the Brisbane Valley Highway for a period of time.

7.3 Time to Peak Flood Levels

The time of start of rise and time to peak for various key locations is summarized in Table 7.3 "Sunny Day Piping Failure Event – Time to Peak Flood Level Splityard Creek Dam". This summary provides an indication of the available response time for each of the sites indicated.

Table 7.3 - Sunny Day Piping Failure Event — Time to Peak Flood Level Splityard Creek Dam

Location	Cross-section	Time to Start of Rise (Hours)	Time to Peak Flood Level (Hours)
Splityard Creek Dam	1	0.05	1.17
Switchyard on Pryde Creek	5	0.10	1.25
Houses on Pryde Creek	9	0.17	1.33
Twin Bridges on Brisbane R.	600m *DIS* of XS 15	0.83	2.16
Fernvale Bridge on Brisbane R	17	0.75	2.17
Junction	19	0.50	2.18
Savages Crossing on Brisbane R	24	0.75	2.22

The times indicated do not provide sufficient warning times to evacuate the population at risk.

7.4 Peak Flood Flows

Table 7.4 "Sunny Day Failure Event – Peak Flood Flows Splityard Creek Dam" summarizes the estimated peak flood flows at various key locations along Pryde Creek and the Brisbane River.

Table 7.4 - Sunny Day Failure Event - Peak Flood Flows Splityard Creek Dam

Location	Cross-section	Peak Flood Flow *(m3/s)*
Splityard Creek Dam	1	8473
Switchyard on Pryde Creek	5	8430
Houses on Pryde Creek	9	8355
Twin Bridges on Brisbane R	600m *DIS* of XS 15	-606
Fernvale Bridge on Brisbane R	17	-1933
Junction	19	7763
Savages Crossing on Brisbane R	24	2665

Note: A negative value indicates flow in opposite direction.

Figure 11a "Sunny Day Failure – Discharge Hydrograph" shows flow hydrographs at various key locations. This comparison highlights the effect the junction area has on the attenuation of the flood wave. The peak flow at Savages Crossing is estimated to be 2,700 m3/s compared to the breach outflow peak of 8,500 m3/s.

The estimated dam failure hydrograph is not expected to cause significant property damage further downstream along the Brisbane River as the magnitude is below the known damage value of 3500 m3/s. Several low level crossings will be inundated as a result of the dam failure. These bridges include:

- Burtons Bridge
- Kholo Bridge
- Mt Crosby Weir Bridge
- Colleges Crossing

7.5 Peak Mean Velocity

The peak mean velocity at each of the key locations is summarized in Table 7.5 "Piping Failure Event — Peak Mean Velocity Splityard Creek Dam". The peak mean velocity together with the depth of flooding provides an indication of the likely consequences of the flooding because it can affect the stability of pedestrians wading through flood-waters and motor vehicles traversing

flooded roads. The two factors are usually combined to produce hazard graphs, so that emergency service agencies can undertake hazard analyses as part of emergency response plans.

It should be noted however, the peak mean velocity is only an average value for the entire cross-section and if there are large variations in depth across the section then it is likely the mean value will under or over estimate the actual values within the section. The peak mean velocity may not necessarily coincide with the peak flood level and it is often the case that the peak mean velocity occurs on the rising limb of the stage hydrograph.

Table 7.5 - Sunny Day Piping Failure Event — Peak Mean Velocity Splityard Creek Dam

Note: A negative value indicates flow in opposite direction.

Location	Cross-section	Peak Mean Velocity *(m/s)*
Spiltyard Creek Dam	1	5.5
Switchyard on Pryde Creek	5	4.7
Houses on Pryde Creek	9	5.8
Twin Bridges on Brisbane R	600m *DIS* of XS 15	-0.8
Fernvale Bridge on Brisbane R	17	-2.2
Junction	19	6.0
Savages Crossing on Brisbane R	24	1.7

8. SUMMARY AND CONCLUSIONS

The main embankment of Splityard Creek Dam appears to be in good condition and any failure is considered to be remote. Failure of the main embankment due to overtopping is considered highly unlikely due to the available spillway capacity and current extreme flood estimates. The probability of failure due to piping of the embankment has been assessed in accordance with procedures described in Fell and Foster (2000) as being 0.00095% AEP.

The most likely failure mode for Splityard Creek Dam is considered to be a seepage failure of the embankment. Such a failure would be initiated by either earthquake activity causing a transverse crack in the clay core material at the crest of the dam, or deformation of the foundation resulting in the cracking of the outlet conduit and hence piping of the core material around the conduit.

It is estimated that piping failure of the main embankment would result in the removal of approximately 720,000 m3 of material with a breach development time of between 1.5 to 2.0 hours.

Such a breach would have the following dimensions:

Base width of breach b	= 52 m at an elevation of 92.0 m AHD
Breach depth h	= 76 m
Top width of breach B	= 103m at an elevation 168.0 m AHD
Side Slope of Breach	= I H:3V

The resultant outflow from the dam would have a peak discharge 8,500 m3/s and it would result in the complete release of the reservoir volume, which is 28 700 ML.

The impacts of the resultant dam break flood on Pryde Creek and the Brisbane River have been assessed as follows:

The Wivenhoe —Somerset Dam Road will be completely inundated by depths of water in excess of 10 m that will be flowing very swiftly (around 5 *mls),* effectively preventing the road from being used as a possible evacuation route.

The switchyard located along Pryde Creek is situated above the estimated extent of inundation and therefore should not be affected.

At least six properties located adjacent to Pryde Creek will be inundated by the dam failure flood hydrograph. The time available for warning is only very small, with the initial rise occurring within 10 minutes and peak levels being attained within 80 minutes.

It is likely the Brisbane Valley Highway will be inundated on the northern approach to the Brisbane River. Fernvale Bridge however, should not be overtopped.

Savages Crossing and Twin Bridges will be inundated by floodwaters for a period of at least 12 hours. These crossings should not be subject to damaging velocities so it is unlikely they will be completely destroyed. Low level crossings located on the Brisbane River downstream of Savages Crossing, such as Burtons Bridge, Kholo Bridge and Colleges Crossing will also be overtopped by the floodwaters. Mt Crosby Weir Bridge may also be subject to inundation, although the degree of attenuation of the dam break flood hydrograph may be such that it is spared. The duration of inundation of the low level crossings is expected to be less than one day.

Figure 7 – Drawing A3-216118 Dam Failure Analysis Sunny Day Failure

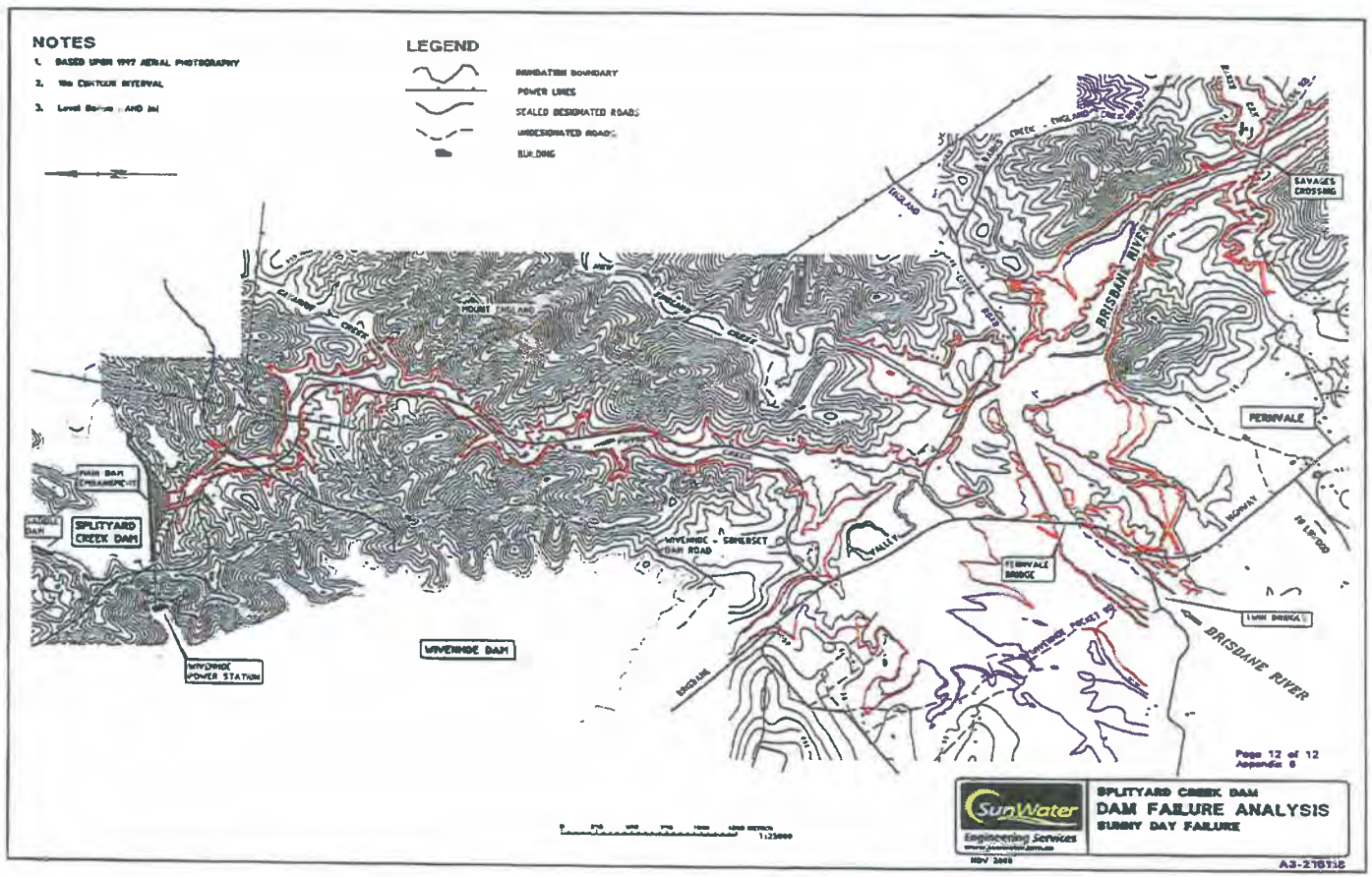


Figure 8 – Sunny Day Failure – Breach Hydrograph

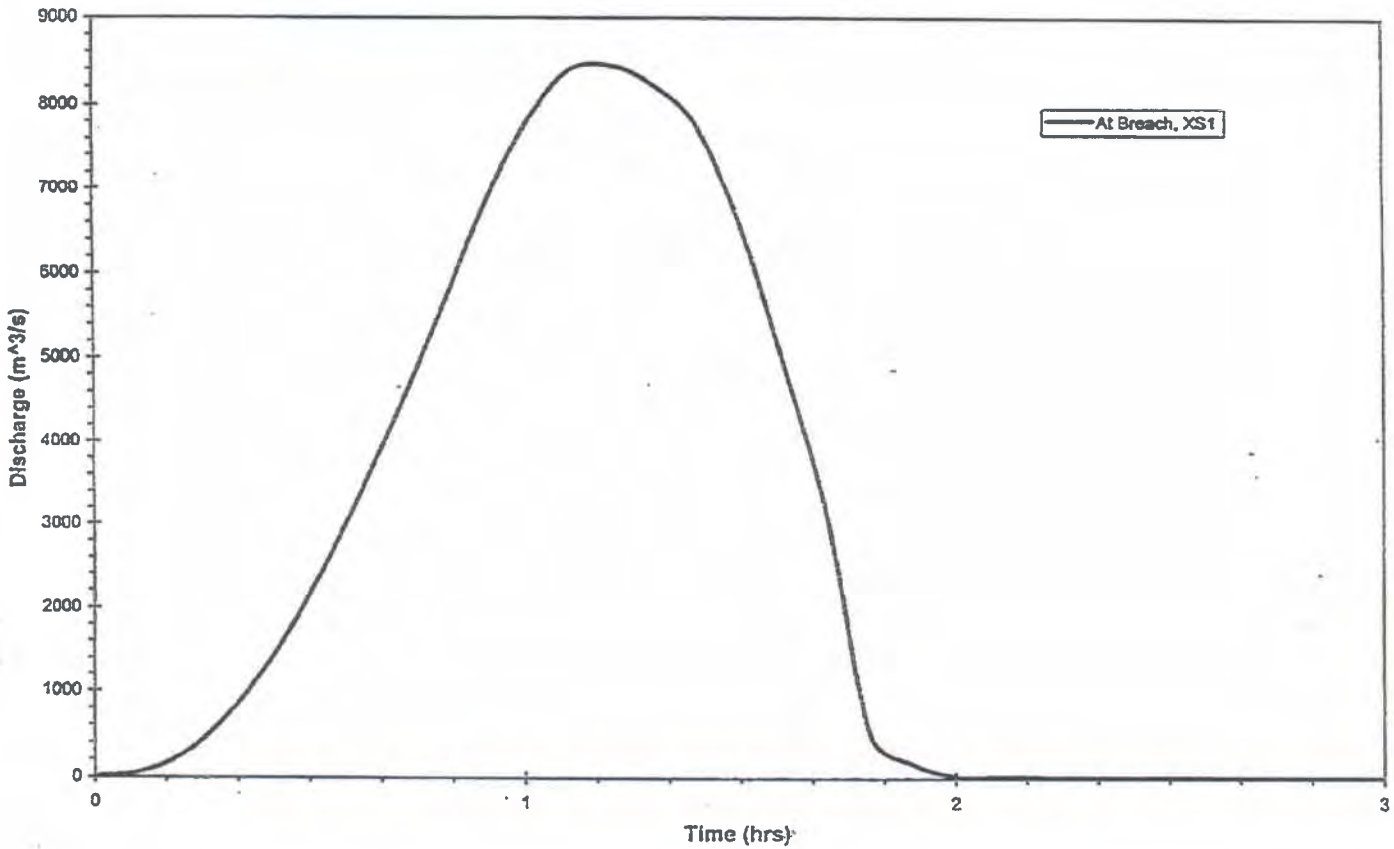


Figure 9 – Pryde Creek Longitudinal Section – Maximum Flood Level for Sunny Day Failure

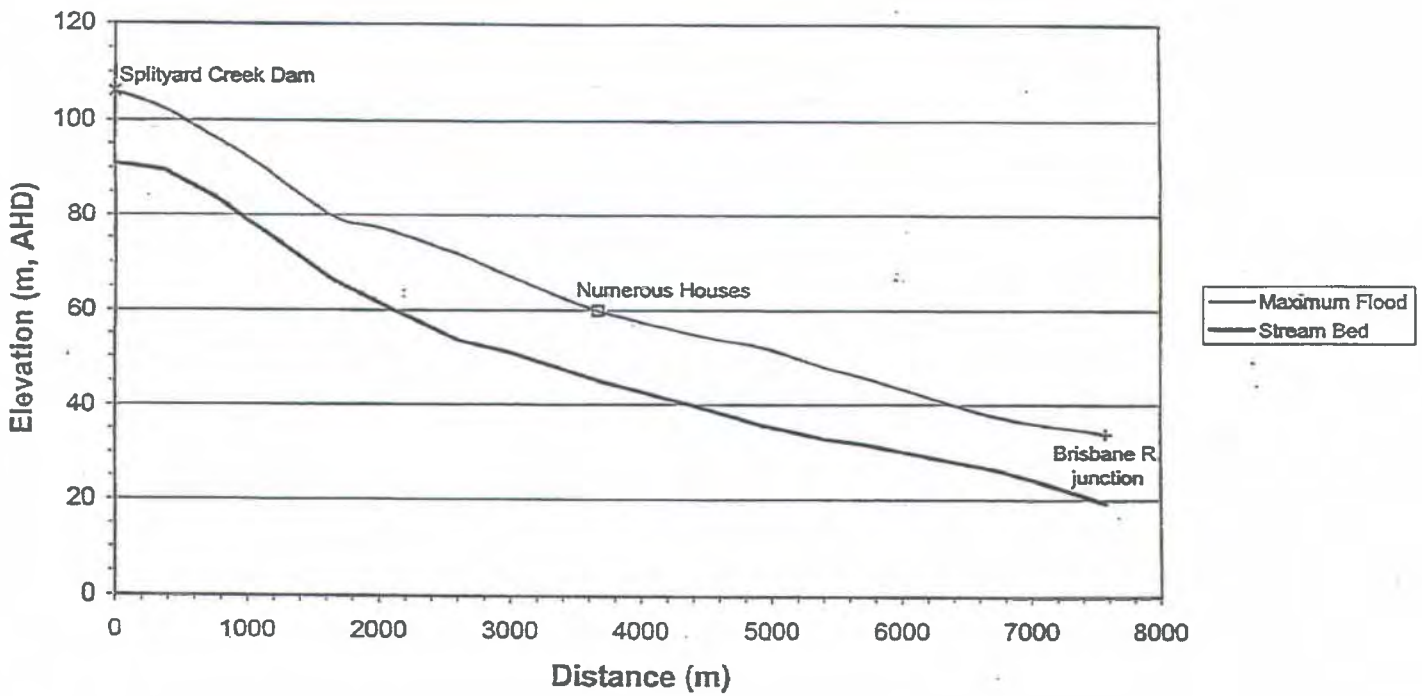


Figure 10 – Brisbane River Longitudinal Section – Maximum Flood Level for Sunny Day Failure

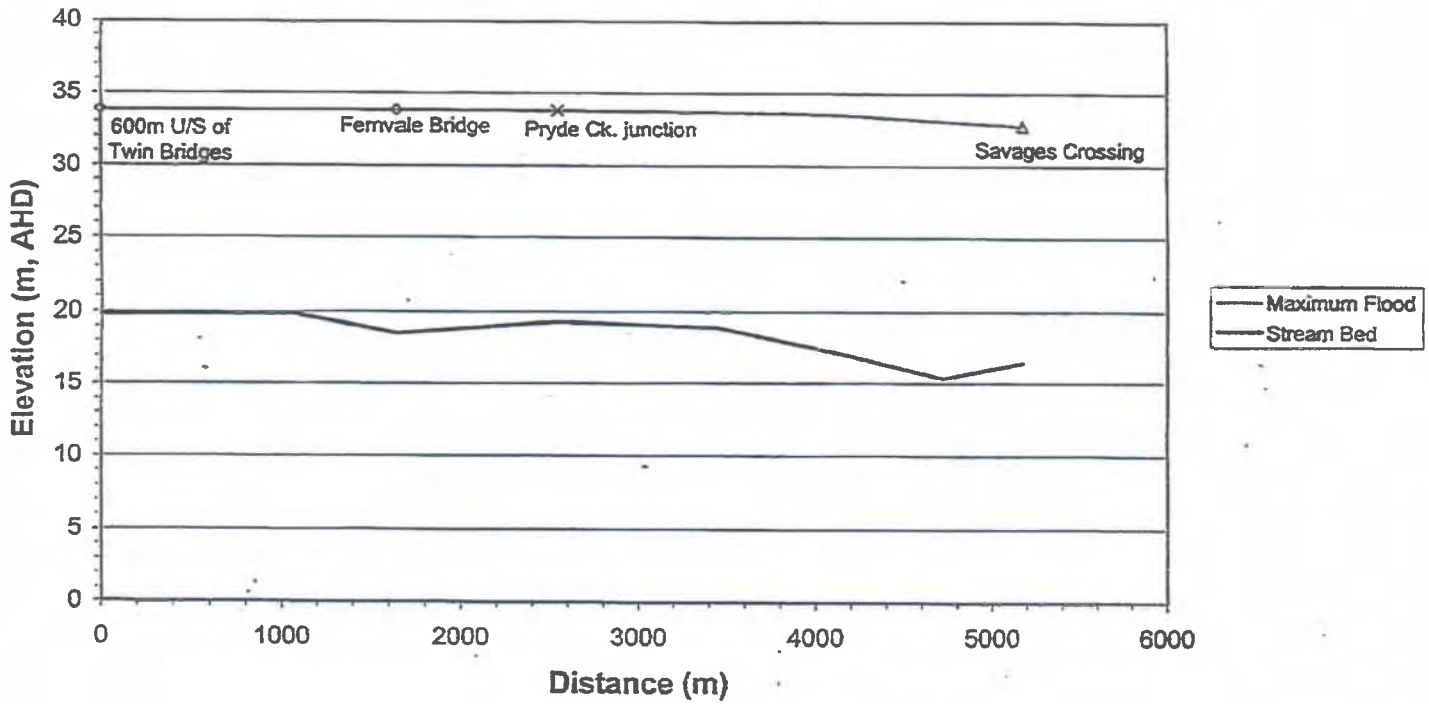


Figure 11 – Sunny Day Failure – Stage Hydrographs

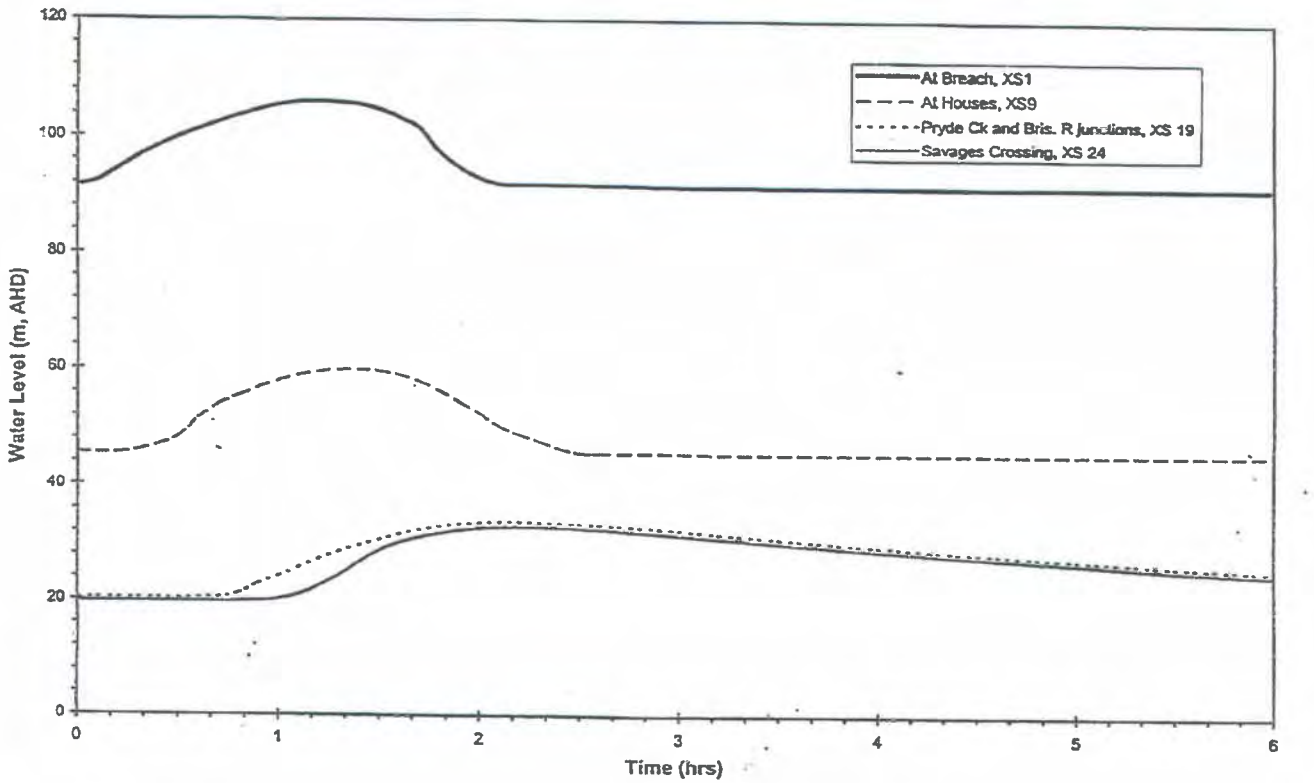
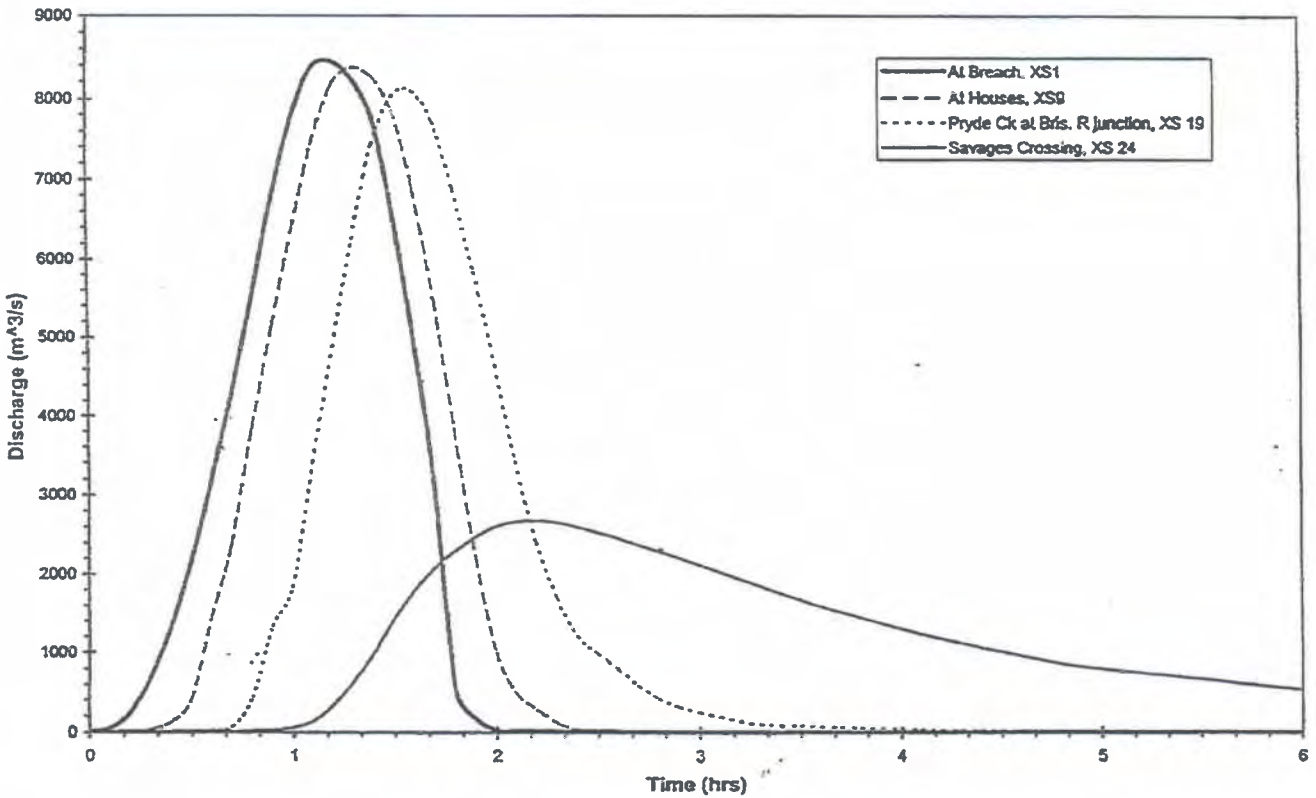


Figure 11a – Sunny Day Failure – Discharge Hydrograph



APPENDIX 1 - DOWNSTREAM LAND HOLDERS AFFECTED BY SUNNY DAY FAILURE OF SPLITYARD CREEK DAM

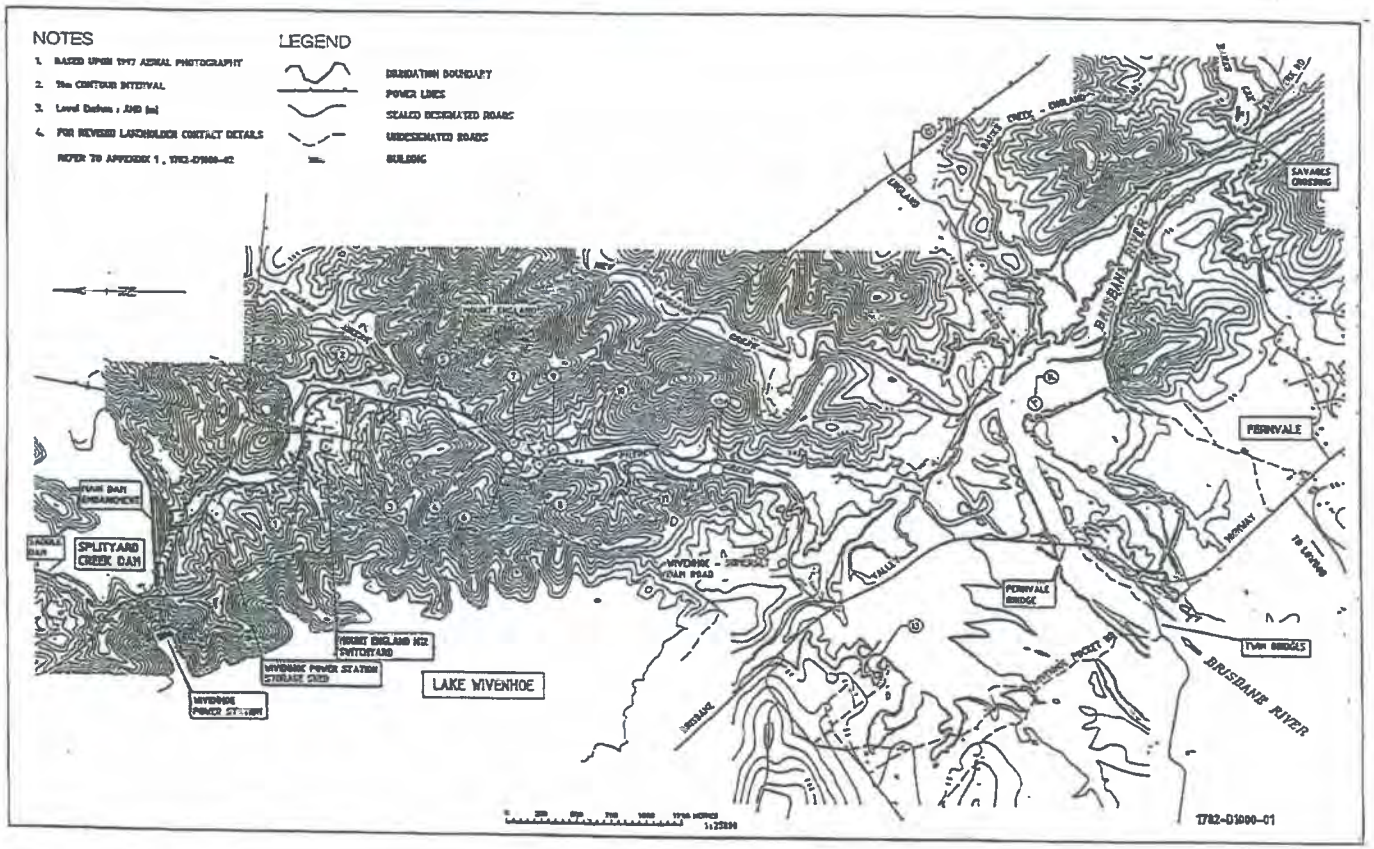
No	Description	Landholder	Residents	Address	Phone Nos	Structures
1	[redacted] on SP167564	[redacted]	3	[redacted] Wivenhoe Somerset Road Splityard Creek Q 4306 [redacted] Fernvale Q 4306	[redacted]	House
2	on RP866870		6	[redacted] Wivenhoe Somerset Road Splityard Creek Q 4306		Houses x 2
3	on RP816952		0	Wivenhoe Somerset Road Splityard Creek Q 4306		nil
4	on RP816952		1	[redacted] Wivenhoe Somerset Road Splityard Creek Q 4306		House Farm Buildings
5	on RP866870		2	[redacted] Wivenhoe Somerset Road Splityard Creek Q 4306		House
6	on RP816952		6	[redacted] Wivenhoe Somerset Road Splityard Creek Q 4306		House
7	on RP818405		3	[redacted] Wivenhoe Somerset Road Splityard Creek Q 4306		House Garage
8	on RP816952		6	[redacted] Wivenhoe Somerset Road Splityard Creek Q 4306		House
9	on RP818405		2	[redacted] Wivenhoe Somerset Road Splityard Creek Q 4306		House Farm Buildings
10	on RP818405		0	[redacted] Wivenhoe Somerset Road Splityard Creek Q 4306		House

11	[redacted] on RP866869	J[redacted]	0	[redacted]	House

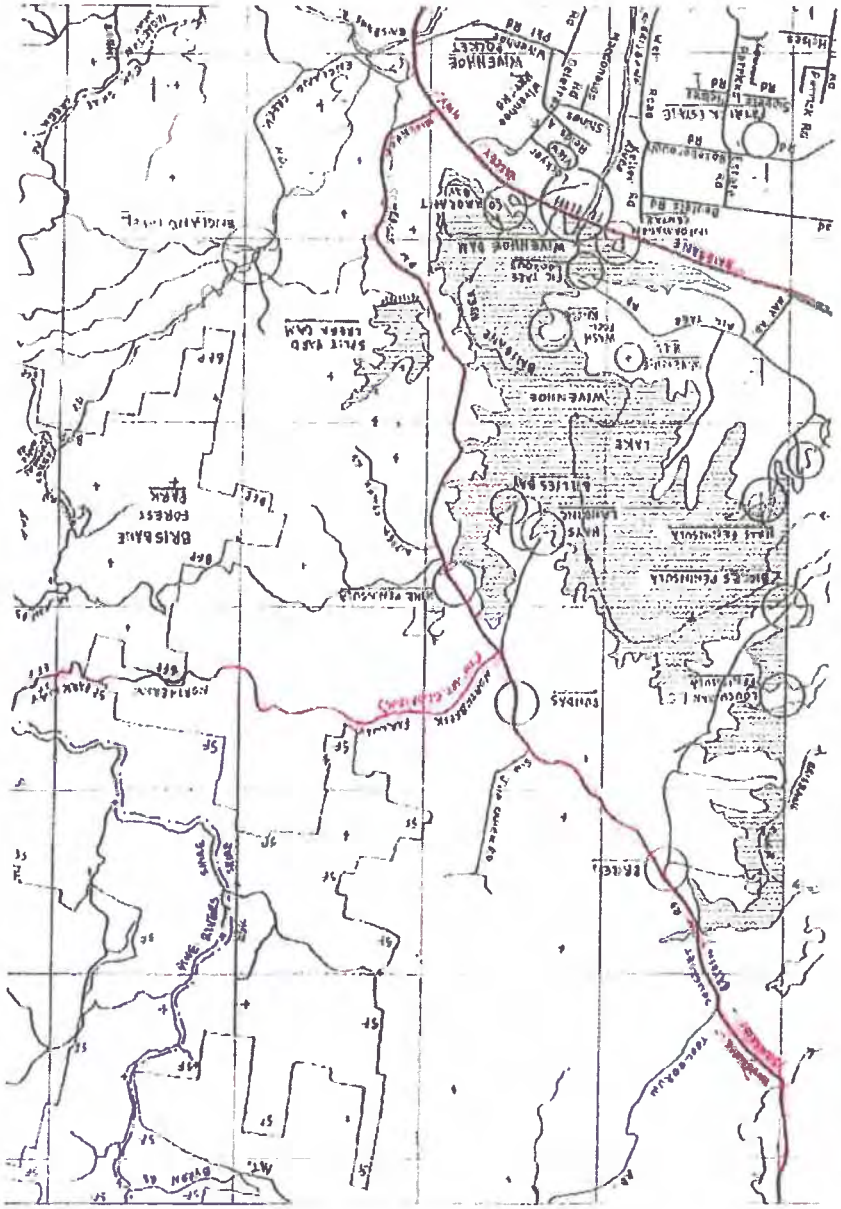
APPENDIX 1 - DOWNSTREAM LAND HOLDERS AFFECTED BY SUNNY DAY FAILURE OF SPLITYARD CREEK DAM (cont'd)

No	Description	Landholder	Residents	Address	Phone Nos	Structures
12	[redacted] RP152064 on	[redacted]	6	[redacted] Wivenhoe Somerset Road Fernvale Q 4306	[redacted]	House
12A	[redacted] n RP866869		2	[redacted] Wivenhoe Somerset Road Splityard Creek Q 4306		House Farm Buildings
13	[redacted] SL9042		5	[redacted] Wivenhoe Somerset Road Fernvale Q 4306 Herries Street Toowoomba Q 4350		House Farm Buildings
14	[redacted] RP884225 RP884225 n RP850384 CH3119 n SP148228		13	[redacted] Brisbane Valley Highway Fernvale Q 4306 PO Box [redacted] Fernvale Q 4306		House x 4 Farm Buildings Industrial Buildings Office Building
15	[redacted] RP28857		4	[redacted] England Creek Road England Creek Q 4306		House Farm Buildings

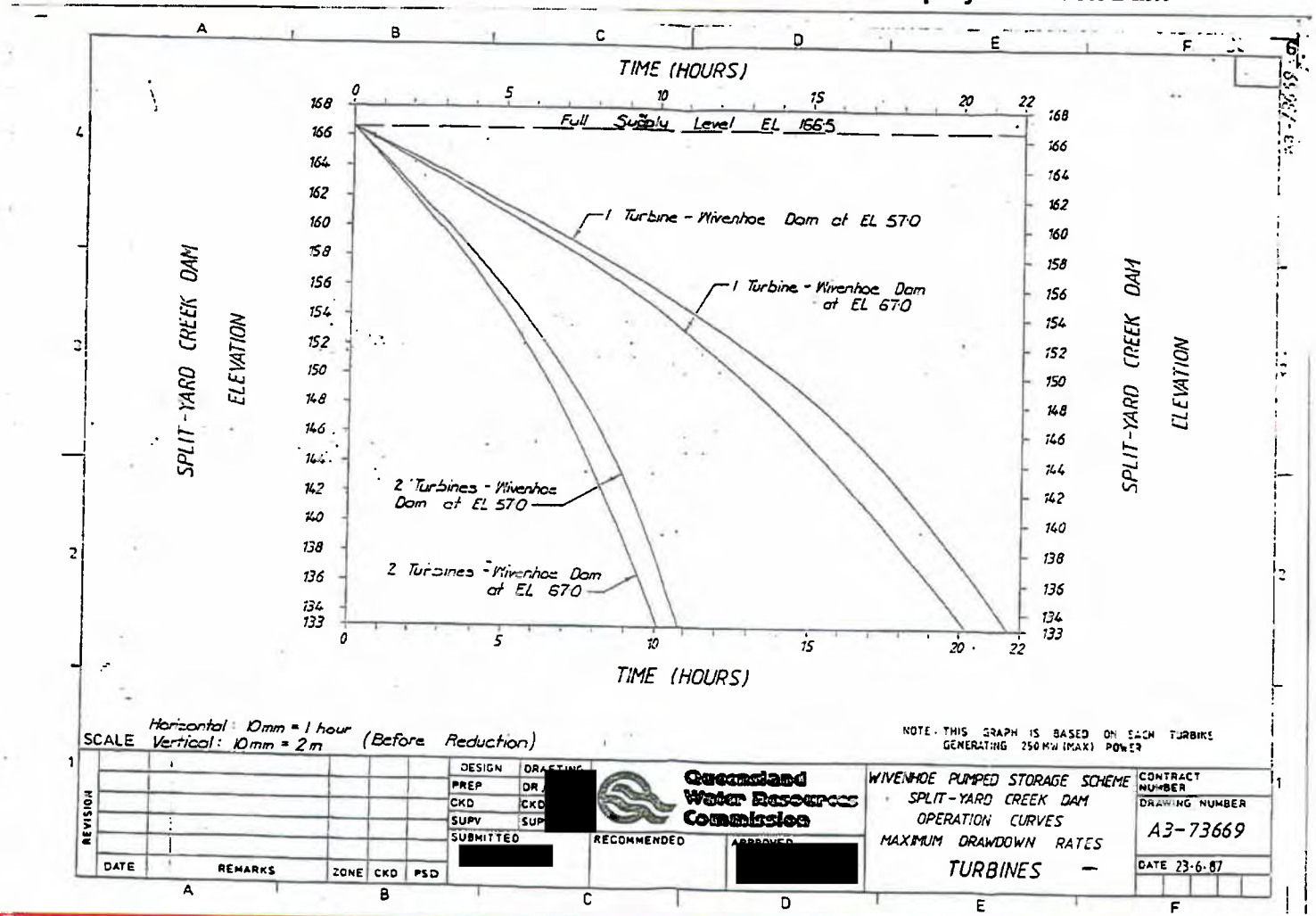
APPENDIX 2 – Drawing 1782-D1000-1 "Splityard Creek Dam Inundation Land Ownership Details



APPENDIX 3 – Alternative Routes to Splityard Creek Dam



APPENDIX 4 – Operational Curves for Maximum Drawdown Rates for Splityard Creek Dam



APPENDIX 5 – Flooding Event Definitions

FLOODING EVENT DEFINITIONS

- **"DCF"** or

"Dam Crest Flood"

The flood Event which when routed through the Reservoir results in a still water level in the Reservoir, excluding wave effects, which for an Embankment Dam is the lowest point of the Embankment Crest.

- **"PMF"** or

"Probable Maximum Flood"

The flood resulting from the Probable Maximum Precipitation, and where applicable, snow melt, coupled with the worst flood producing catchments conditions that can be realistically expected in the prevailing meteorological conditions.

- **"PMP"** or

"Probable Maximum Precipitation"

The theoretical greatest depth of precipitation for a given duration that is physically possible over a particular drainage system.

- **"SDF"** or

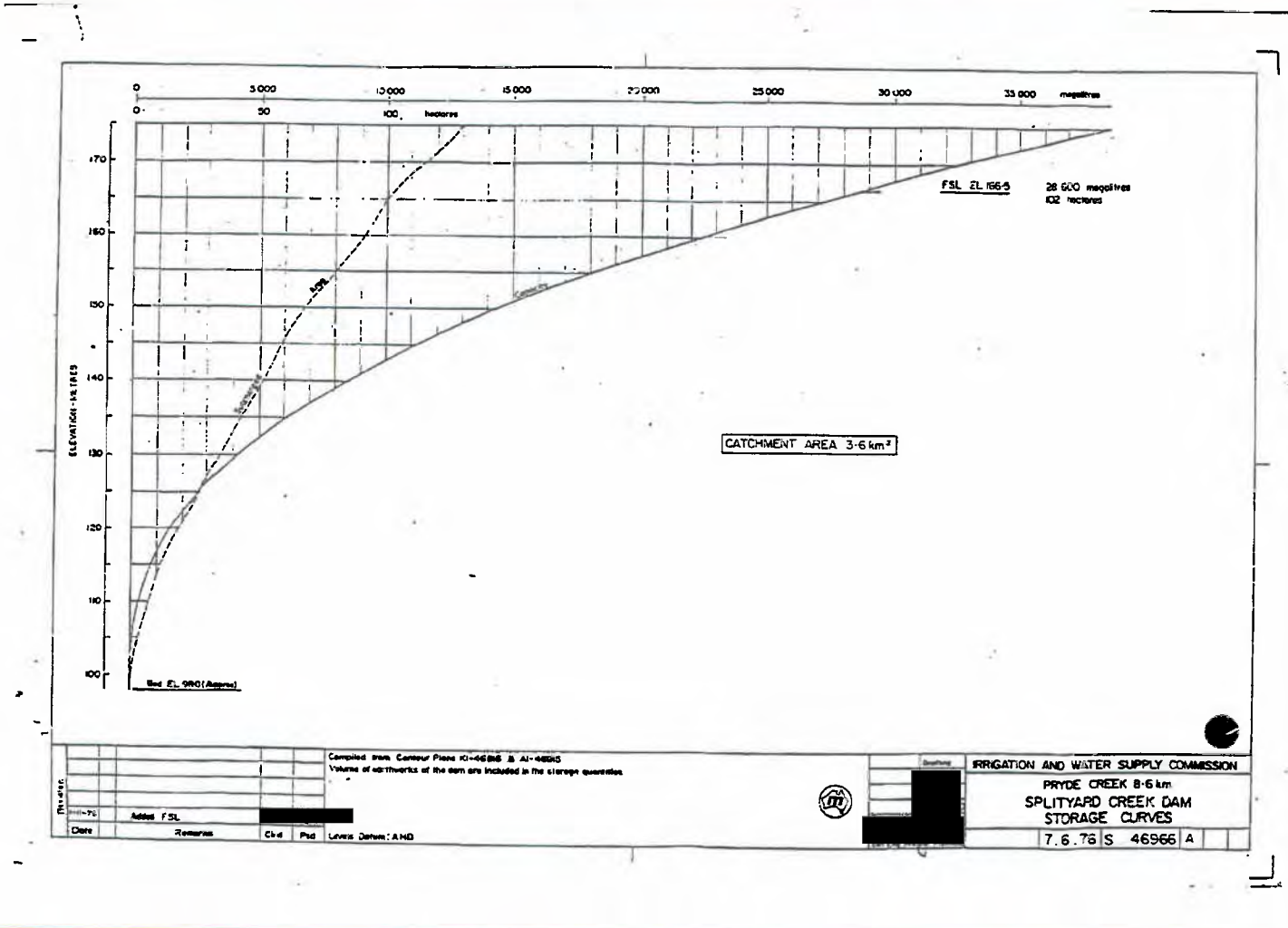
"Sunny Day Failure"

Unexpected failure of a Dam not associated with flooding, but maybe initiated by natural disaster.

- **"AHD"** or "Australian Height Datum"

Height referenced to a standardized datum level in Australia.

APPENDIX 6 – Splityard Reservoir Storage Curves



APPENDIX 7 – Splityard Creek Dam Emergency Event Record of Actions, Events and Communications

Date	Time	Contact Person	Phone No.	Action Taken / Event Recorded / Message Sent or Received	Call Sent By / Received By

ATK-5

DRAFT TEXT

NEEDS FURTHER UPDATE

NOTES MADE "ON THE DAY"

TARONG ENERGY

TARONG ENERGY CORPORATION LIMITED

WIVENHOE POWER STATION BUSINESS PROCEDURE FOR

WIVENHOE - HIGH RAINFALL, HIGH DAM WATER LEVELS

WIV - OPS - 15

ACCESS IN/OUT BY HELICOPTER - TALK TO PHIL DAVID - THEY DID THIS AT TPS 21/DEC/2000

THIS NOTE WAS MADE BEFORE JANUARY 19TH BUT HAD NOT BEEN COMMITTED TO FILE BEFORE THE EVENT

Contents

→ WILL PASS ONTO ROB DRURY & GR.

[redacted] - SEQ WATER - 12.35 / 12.40

GRAHAM KEEGAN. - [redacted]

WRITTEN BY: .... APPROVED BY: .... DATE:..................

NAME [redacted] NAME: [redacted]

QA CHECK BY: .... CONTENTS CHECK BY: ....

NAME [redacted] NAME: [redacted]

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.

REMOVED ORIGINAL SINGLE PHONE NUMBER

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 overRL78 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

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. 3/4
- Check configuration and availability of all Emergency drainage pumps for service. Test run if possible. 5/6

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

THIS NOTE WITS MAJOR BEFORE JANUARY 1999 BUT NOT COMMITTED TO FILE BEFORE THE EVENT

CURRENT RAINFALL & WATER LEVEL DATA http://www.bom.gov.au/qld/flood/seast.shtml.

MAP OF WIV CATCHMENT: ....au/hydro/flood/qld/brochures/brisbane upper/map.shtml

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 .

Appendix 1:

Agency	Position	Working Hours priority	Out of Hours priority	Name	Work Phone	Fax	Mobile	After Hours
SEQ Water	Principal Engineer Dam Safety	1	1	John TIBALDI	[redacted]			
	Dam Operations Manager	2	2	Robert DRURY				
	Flood Operations Engineer	3	3	Terry MALONE				
	Operations Coordinator Central	4	4	[redacted]				
	Executive General Manager, Water Delivery	5	5	Jim PRUSS				
	Chief Executive Officer	3	3	Peter BORROWS				
	Chairman	4	4	[redacted]				
	Hydrographic Staff	1	1	[redacted]				
		2	2	[redacted]				
Sun Water Asset Solutions	Senior Engineer Headworks Assessment Infrastructure Management	NA	NA	[redacted]				
Department of Environment and Resource	Director, Dam Safety	1	1	Peter ALLEN				
	Dam Safety Engineer	2	2	Ron GUPPY				

Management								
Flood Operations Centre (operated by Sunwater)	Principal Engineer, Dam Safety	1	1	John TIBALDI	[redacted]			
	Flood Operations Engineer	2	2	Terry MALONE				
	Senior Flood Operations Engineer	3	3	Rob AYRE				
	Senior Flood Operations Engineer	4	4	John RUFFINI				
	Flood Control Room (operational)	5	5	General Phones				
Department of Community Safety – State Disaster Coordination Centre	Watch Desk Officer (24 hours)	1	1	Rostered				
Somerset Regional Council	Local Disaster Response Coordinator	1	1	[redacted]				
		2	2					
		3	3	Robert BAIN (CEO)				
Ipswich City Council	Local Disaster Response Coordinator	1	1	Tony TRACE				
		2	2	[redacted]				
		3	3					
		4	4					
		5	5					

Emergency Management Queensland	Regional Director, Brisbane District	1	1	[redacted]			
	Area Director, Brisbane	1	1				
Toogoolawah Ambulance	Officer in Charge	1	1				
Tarong Energy	Duty Officer	1	1				
Police	District Disaster Coordinator Ipswich	1	1				
	District Disaster Coordinator Brisbane	1	1				
Bureau of Meteorology	Engineer in charge Flood Warning*	1	1				
	Meteorologist in Charge (24 hours)	2	2				
Ambulance							
Notes Contact with an agency is to be made via position with highest priority. That person contacted is then responsible to forward notification to other relevant persons with the agency.							

1. DRN PIT LVL LOW? SKIMMER HIGH - IS IT WSERV? (W2)
2. PUDDLE UNDER D/V 2.A 3.3KV MSB
3. LEAK FROM ROOF/EL72 SIVOI ONTO EL16 (minor)
4. " IN CABLE GALLERY SILO2.
5. DOM WATER ROOM?/ISOL. DIESEL PUMP?/CHLORINE?/OPEN ~~DO~~ WATER TANK ~~COVER~~ GATIC COVER?

6. STILL TO FIX.
   - W2 D/V GAUGE
   - DWAC 2 AUTO DRAINS STILL OPEN
   -

7. SANDBAGS?

8. TRADER (NIL) QUESTIONED 265MW FOR FIRST 10 MIN THIS MORNING. - OUR D/L GRAPH DOES NOT SHOW THIS, IT MAY HAVE JUST BEEN AS TURBINE WAS DEWATERING? (EL163).

9. D/V LEVELS + PRESSURES (W2)

	HP	SUMP	PRESS	SUMP GAUGE
05 15	- -450	+450		
08.39	- +250	+118	5.2 MPa.	-13.
W1 08.15	+40	+190.		

10. IS DWAC ROOM PROPERLY FIXED? - NO.
11. DWAC ROOM + PLUG?
12. DIESEL DAY TANK - CHECK LVL.
13. - COVER SFU ok.
14. OIL SYSTEMS - ISOLATE UNITS/DWAC'S/HP RECEIVERS?
15. DW AIR RECEIVERS WILL FLOAT - BLOW THEM DOWN?
    - PB - THEY WONT FLOAT.
16. PREPARE TO SWITCH OFF VENTILATION FANS IF W/U LEVEL GETS TO ½ WAY UP CONCRETE LEVEL (EL78.25?)

WIVENHOE POWER STATION

January 2011 Exceptional Rainfall Event

Review of Event and Actions

Operation of Power Station

and

Splityard Creek Dam

WPS - Main Access Road – 11 January 2011

Conducted by: Asset Strategy

[redacted]

February 2011

CONTENTS

Appendices

1. Water Licence for Splityard Creek Dam Reference Number 104049 Expiry 30 November 2011

2. Emergency Action Plan Wivenhoe Power Station Splityard Creek Dam T-MISC-149

3. Chronology of Events – Wivenhoe Power Station – Extreme Rain Event January 2011

    - Station Manager's Log of Events
    - Acting Station Manager Shift 2 – Log of Events
    - P Berthelsen's – Events Log
    - T Lush - Flood Event History

4. Minutes of Crisis management Team meeting held at 11.30 am on 11 January 2011 in AMP Place

5. Wivenhoe Power Station Business Procedure for Wivenhoe – High Rainfall, High Dam Water Levels WIV-OPS-15

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

7. Wivenhoe Dam and Wivenhoe Power Station – Deed of Amendment and Consolidation and covering letter dated 20 August 2003

8. Part copy of SEQwater Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam November 2009

9. Internal email from Peter Berthelsen to David Evans dated Tuesday, 1 February 2011 @ 9.22am detailing the chronology of notifications made to DERM and Sunwater in regard to Splityard Creek Dam during the event

10. Internal emails from Trevor Lush to David Evans dated Wednesday, 2 February 2011 @ 9.04am attaching a pdf graph of all water movements over the flood period and @ 9.40am setting out details of the water volumes and level change effects resulting from the power station operation including an attached table.

11. Internal email from Peter Berthelsen to David Evans dated Friday, 21 January 2011 @ 2.06pm

12. Wivenhoe Power Station Memorandum to GMGO from Wivenhoe Lead Engineers titled, Response to TE Board Request following High Rainfall Event January 2011

13. Internal email from Trevor Lush to David Evans dated Monday 31 January 2011 @ 1.00pm setting out details of Splityard Levels and Unit Operation 6 January to 16 January 2011 including attached graphs.

14. Wivenhoe Power Station – Official Opening Brochure

EXECUTIVE SUMMARY

On Tuesday 11 January 2011 an exceptional rainfall event occurred in the region surrounding Wivenhoe Power Station and Wivenhoe Dam. The photo below is included to demonstrate the high level (RL 75.1), to which Wivenhoe Dam rose during this event and this report's cover photo shows the severity of rainfall runoff and slope failure that occurred on the main access road to the power station.

This review has determined that there were appropriate procedures, polices and manuals in place to which station staff could refer to guide them through most of the issues that arose during the crisis.

Summarised below are the outcomes relating to the particular infrastructure items and issues managed during the crisis.

Splityard Creek Dam –

During exceptional rainfall events, issues including extreme runoff, uncertainty regarding dam levels and the inability to access the dam for inspection resulted in staff needing to make a number of urgent decisions. During these events appropriate contact was made and maintained with the dam regulator.

The lowering of the dam level was prudent and appropriate during the circumstances and although the outcome of the generation and pumping events that occurred on 10 and 11 January did in a nett sense add water to Wivenhoe Dam (5887ML), this small volume of water is minor in comparison to the hundreds of thousands of mega litres that SEQwater were managing over that period. This volume of release would have only resulted in Wivenhoe Dam rising by approximately 40mm when at a level in the range of RL75.

Further to above, lowering the level of water in Splityard Creek Dam and ensuring its safety in such exceptional circumstances was appropriate because had any failure in Splityard Creek Dam developed, then it could have

resulted in uncontrolled release of the full storage of up to 28,700 ML of water. This would have certainly threatened the lives of the immediate downstream residents as well as added a significant volume of water to the already heavily flooded Brisbane River downstream of Wivenhoe Dam.

Although current and available for use, the Emergency Action Plan was not activated as it was not deemed to warrant such action.

Power Station Operation

The operation and integrity of the power station was threatened by both the rising Wivenhoe Dam level as well as surrounding slope runoff and debris resulting from the exceptional rainfall received.

All normal operating protocols were adhered to during the crisis with the exception that SEQwater were not advised of the commencement of generation on 11 January 2011. This advice is not mandatory although normally provided. The failure to advise SEQwater is most likely attributable to the urgency associated with the need to lower the Splityard Creek Dam level, the number of issues staff throughout the Corporation were managing during the exceptional circumstances, and the issues associated with TE operational staffing shortages being experienced during the flood crisis access restrictions. The failure to advise did not materially change any circumstances, given the volume released was only 5887ML.

When requested by SEQwater to stop releases from Splityard Creek Dam on the evening of 11 January 2011, Tarong Energy immediately ceased operation of the unit.

Procedures

The existing procedures proved useful although both the High Rainfall and Business Continuity Procedures need review and improvement to cover exceptional rainfall, flooding, access and power station operation. It is acknowledged that whenever exceptional circumstances occur there will always be unanticipated circumstances that will need urgent action and these will often not be covered in the existing procedures.

Communications

The most significant issue faced by the Wivenhoe event response staff was the loss of communications including mobile phone coverage, internet, email, computer access and VOIP phones. Other issues included the uncertainty associated with dam level readings at Splityard Creek Dam and the potential discrepancy between Wivenhoe Dam levels recorded at the station, versus those recorded by SEQwater at the dam wall. Access restrictions, due to flooded roads as well as slope failure on the main access road, compounded communications and access issues.

Staffing

Although limited in number, the Wivenhoe staff should be commended for the professional and dedicated manner in which they followed procedures and managed the exceptional circumstances they were experiencing. They maintained the integrity of both the dam and power station without impacting the flooding crisis occurring at that time.

BACKGROUND

Wivenhoe Power Station – General Details

The two unit 500MW Wivenhoe Power Station is located on the eastern side of Wivenhoe Dam about 90 kilometres by road northwest of Brisbane. Access to the station from Brisbane is normally through Fernvale and then over the Fernvale Bridge that crosses the Brisbane River. This bridge and surrounding flood plan is subject to flooding when higher flood volumes are released from Wivenhoe Dam.

Water can be pumped out of Wivenhoe Dam (water extraction) up to the higher storage namely Splityard Creek Dam and then released back down into Wivenhoe Dam (water release) when power generation is required.

Wivenhoe Power Station - History

Construction of the power station commenced in 1978 and the units commenced commercial operation in June and August 1984.

There have been a number of occasions during the station life where the water levels in Wivenhoe Dam have been low (droughts) as well as above FSL 67 (floods). Although these times have required some checks and adjustments to occur the power station has operated normally throughout these periods.

Wivenhoe Power Station – Statistics

The power station is connected to Wivenhoe Dam by an open intake channel and to Splityard Creek Dam by two underground steel and concrete lined tunnels, 420 meters long and varying diameters from 8.5 to 6.8 meters. The station has an operating head range of 64m-117.5m and a minimum operating level of EL 49. The combined capability of the two pumps 420 m^3/s.

Splityard Creek Dam – General Details

Splityard Creek Dam consists of an earth and rockfill embankment 76m in height and 1,120 m long. A small saddle dam closes off a low saddle on the northern side of the reservoir rim.

The spillway discharges surplus inflows in a northerly direction into Wivenhoe Dam. The rainfall catchment area for the dam is very limited and is only 3.6 km^2. The original design Probable Maximum Flood (PMF) for the spillway design was 229m3/s while the combined station pumping capability is 420m3/s. The spillway design was dictated by the pumping capacity requirement.

The dam has a total storage volume of 28,700 ML with storage of 23,500 ML available to the station for generation. The dams full supply level is EL 166.5m with the embankment crest level being EL168m.

Splityard Creek Dam - Licensing

Splityard Creek Dam is a licensed dam in accordance with the Water Act and a copy of the licence is attached in Appendix 1. There is a set of dam safety documentation in place at Wivenhoe Power Station as required by the Splityard Creek Dam Water Licence including:

- Emergency Action Plan (copy attached as Appendix 2)
- Data Books
- Operations and Maintenance Manual
- Operating Procedures

Splityard Creek Dam - History

Construction of Splityard Creek Dam commenced in 1976 and the power station units commenced commercial operation in June and August 1984. The dam is one of Queensland's highest earth and rock fill and has been operated and maintain without incident since its construction.

There have been a number of issues addressed throughout the dam life with the more notable including some landslips into the pondage, some increased concerns regarding dam integrity at very high water levels and some failed instrumentation that gave incorrect readings.

The only one of the above issues that has required some amended procedures throughout the dam life relates to the very high water levels and the period of time water should be held at those levels. Dam design reviews have not identified any shortcomings in the design, however, TE has maintained a conservative approach to minimising the duration for which it holds the dam at or near FSL.

The design of the spillway has been reviewed during dam safety inspection reviews and the design criterion for the spillway has remained as the station pumping capacity of 420m^3/s.

JANUARY 2011 EXCEPTIONAL RAIN EVENT

Event Details and Chronology

A request was made of the Wivenhoe management to provide a chronology of details and actions for the exceptional rainfall event.

This chronology has been prepared and copied into this report below as well as a separately attached copy in Appendix 3.

More notable details have been highlighted to help provide summarised clarity of circumstances.

Wivenhoe Power Station – Station Manager's Log of Events
Extreme Rain Event January 2011
-this 7 page document prepared by Sorin Lupulescu on 11/2/11

- Compiled from various hand notes, station SCADA, photographs, conversations plus e-mails, phone records and CCTV when they were operational -

Internal personnel and external people named in the records
[redacted] *Hydro Duty Officer*
[redacted] *Electrical Supervisor*
[redacted] *Production Officer Hydro*
[redacted] *Lead Hydro Engineer, Chef*
[redacted] *Mechanical Supervisor*
[redacted] *Mechanical Fitter*
[redacted] *Admin Clerk*
[redacted] *- Mgr Operations*
Rob Drury – SEQWater Dam Operations Mgr
[redacted] *- Station Mgr's better half*
[redacted] *mi Baloi, Mgr Market Analysis*
GM Gen Ops
elen Gluer, CEO
Richard Van Breda, CFO
Splityard Creek Dam, Category 1 Dam, Wivenhoe Power Station's upper storage
Powerlink – Transmission Network Operator

Sunday 9 Jan 2011

- [Hydro Duty Officer [redacted] e-mails SEQWater for the details of their anticipated releases and likely Lake Wivenhoe level. 72.5m forecast, at least 1m above the highest level ever attained]

Monday 10 Jan 2011

- ~06:20 Lead Hydro Engineer [redacted] phoned; he had reached Fernvale and was turned back as the bridge had "gone under". No access, return home and work from home. Departing for funeral in NSW tomorrow AM.
- ~06:30 Hydro Duty Officer, [redacted] called; no other options to reach the station by land? No, back road via Lowood also closed. [redacted] has a helicopter option in the wings. Only two hydro personne[redacted], live on the "right side" of the

flood and could access the station but both are on leave. Security guard potential fatigue is also discussed.

- 06:50 [redacted] called, Fernvale Bridge under. Mentioned to stay home and requested tucker for Tue shift if helicopter option was going to eventuate
- Personal e-mail account blocked due to password not reset - whilst on annual leave. C'mon… Talk to IT to unlock. [redacted] resolved promptly
- Inform Mgr Ops of road closures and access difficulties. Invited to dial in a meeting being held at AM60. Send [redacted] instead who is closer to the CBD? OK.
- 07:30 cal[redacted] and check his availability to return from annual leave. No problem, he said. Then [redacted] e-mailed the High Rainfall Procedure to [redacted] and [redacted] and on to [redacted] and [redacted]. Must be prepared!
- 09:30 [redacted] reports [redacted] too will be returning from leave and travelling to the station. [redacted] cleared to hire the helicopter, set the pick up point with the pilot and organise the 24 hour changeover transport. [redacted] to ca[redacted] and both to travel to pick up point
- Recal[redacted] from meeting downtown to my place for heli pick-up
- [redacted] offers to go to the shops for some microwave meals for us. Brings back "lean cuisine"!!!
- [redacted] calls re road at Fernvale
- [redacted] now at the station, raises concern that SYCkD, which was pumped full to stage 1 alarm EL166.1 that morning, has now reached stage 2 alarm 166.2 by itself i.e. natural inflows caused by runoff are filling SYCkD. 3.3kV room has a water leak, no threat yet.
- Must ask the traders to start generating and thus let some water out as soon as [redacted] rectifies the DWAC fault condition
- Report to Mgr Ops situation at the station and air travel arrangements
- Notification of release to SEQWater by TPS Operator as per the established communications protocol: initial figure 1,800ML, later revised to 3,200ML.
- ~14:00 Helicopter pick up from Pine Mtn
- ~14:30 Landing at NuSteel. [redacted] and [redacted] disembark. Security guard climbs on board and departs towards Archerfield airport (with taxi fare money from [redacted] and [redacted])
- At the station we find Lake Wivenhoe level at 72.4m and hydromachine 1 generating as requested
- Unit inspections completed; sandbags collected from NuSteel being readied
- 15:30 [redacted] called – get ready for tomorrow's shift
- 16:00 report to Mgr Ops and GM Gen Ops; SYCkD seepage observations from inspections
- [redacted] e-mails through a severe weather warning
- 16:30 Lake Wivenhoe closing in fast on 73.0m
- SYCkD at 163, unit 1 shut down
- ~17:00 [redacted] and [redacted] left site
- Another V-notch reading conducted
- More sandbags being readied, just in case
- Dinner – wish we had a TV to watch the news
- Sleeping arrangements for four: two foldable beds in office [redacted] plus one in First Aid room [redacted] and one on the twin-hull pontoon boat, best seat in the house promptly claimed by [redacted]
- Daily rainfall 68.4mm
- Lake Wivenhoe reached 73.4m

- 02:00 E-mail Mgr Ops state of play

Tuesday 11 Jan 2011

- 05:00 Heavy rain commenced. All wake up pronto – impossible to sleep in such downpour echoing through the station. It's all red colour on the Mt Stapylton weather radar, large areas of rain over the entire Wivenhoe-Somerset catchment; this is gonna be BIG!
- Station inspection checking for leaks. One additional leak found.
- More sandbags ready
- Massive lightning strike in the immediate station proximity. Unit 1 control system goes into a spin. Unit 2 still OK.
- Large landslides occur on the station access road; waves of mud and water rushing towards the station on the access road following blockage of drains and culverts. The noise of the slide, with thousands of rocks rolling down the road combined with the lightning and heavy rain is something else.
- [~ 08:00 CCTV camera in the car park stops working]
- [redacted] still shovelling [...] the lower areas of the road/ higher areas of the car park trying to open some trenches through the mud so that water can be diverted towards the lake
- More landslides. Access road impassable! No further access to SYCkD for V-notch readings and inspections!
- Personally witnessed a large landslide at the back of the tailbay that discharged into the tailbay. That left a gully behind - the landscape is morphing
- SYCkD level instruments read large discrepancy between them – up to 5m. THAT control system again!!! Still, able to make an educated guess that the level is trending up again – that's some inflow! No wonder though, the whole catchment soil was already saturated before the deluge
- Report to Mgr Ops: extreme conditions, containment effort in progress
- Request duty trader [redacted] to reduce dam level to EL160 to take some hydraulic load off. No problem, will do.

Note inserted here by [redacted] to cross reference the CMT minutes of the meeting held at 11.30 am on 11/1/11 in AMP Place at which it was endorsed to lower the Splityard Creek Dam down to EL 157. (Refer Appendix 4)

- Sandbag the station entry. Just in time! Muddy water accumulating in the car park, which has become a lake, and across the blocked drains. Bags holding; close call here!
- Water rises to about 400mm against the sandbags. Roller door is shut and barricaded from inside the machine hall. Water is kept out of the machine hall. Can we sustain this?
- We congratulate ourselves for the good job done at holding the water at bay when water in the machine hall is observed creeping right behind us! It had penetrated the station via the meeting room, through the door from the car park. Muddy water is at ankle-height through the corridor, first aid room and toilets in that part of the station...
- [Swear words] not for publication
- [redacted] and [redacted] sandbag the meeting room outer doors
- Pronto, push the water on the machine floor away from the #1 circuit breaker and #1 generator pit using large squeegees towards the opening to the compressor area down

below, where a larger floor drain exists. Last thing we need is now is water on top of the generators… Not much success though, water pushed away returns and keeps on running towards the #1 generator pit. Finally, we managed to get it under control.

- [redacted] calls the helicopter to get an update of pick-up time. All helicopters grounded due to poor weather conditions. Oops, we're stranded here… We pass the message onto the next shift that no changeover can occur today.
- Rains incessantly. Frequent, loud thunder echoes around the station
- Wondering how our downstream neighbours are doing. Called [redacted], no answer [turned out a lightning strike had tripped off the power to the whole street]
- ~ 11:00 Rain slows down, [redacted] rushes to take the tractor out of the station into the car park. Build levee to divert mud away from station entry, past the office and into the tailbay
- ~11:00 Unit 2 starts generating as per the comms with [redacted]
- Unit 2 Generator coolers appear to be starved of CW. Surely strainers are blocking up with all the impurities in the lake. Lake Wivenhoe looks like chocolate milkshake. [redacted] talks to TPS operator – generator temps still OK but keep a close eye on them
- E-mail few photos to Mgr Ops and GM Gen Ops
- Rain, lightning and thunder, again!!! Levee works but water now threatens office. Must build another levee. Shovels and tractor blade. Tractor blade and shovels. We're tired and wet to the bone but no-one's complaining. [redacted] breaks ranks temporarily to empty his gumboots which had filled with rainwater… [redacted] strips totally of the wet clothes and does indecent exposure in the office by himself.
- Weather radar shows storms redeveloping. This is an extreme event.
- The newly formed lake in the car park is now about to enter the office!!! The new levee is collapsing in places! Keep up with the shovelling. Tractor works overtime. A second levee built is successful at keeping the muddy water away from the office. 20mm to spare!
- Mgr Ops calls and talks to [redacted] about SYCkD
- [redacted] reports a large rock fall into the tailbay at the front of the station. Massive chunk of the northern batter along with trees and bushes is now missing!
- Phone call home - [redacted] says it's pretty bad out there in the Lockyer. Wish we had a [swear] TV at the station.
- [redacted] had tried to move to higher ground the cars the guys had parked in our driveway but only managed 2 out of 3 as the suburban creek cut the road. Asked her to forget the cars and stay safe
- Wonder how SYCkD dam wall is faring re rock falls… One of the site security cameras looks across the water [ie the wet side of the dam wall only] but suffers from lens condensation anyway, so low value.
- Weather radar, river heights - internet, generator dispatch screen, live market data, e-mail and desk phones kaput. 3G mobile network super-congested; calls placed fail instantly. Only contact via fixed satellite phone. Thank God this one works.
- Unit 2 still running? Should have shut down by now. Can't locate an email notification to SEQWater but I hope the TPS operator has informed the flood engineers of our water release today
- ~17:00 rain eases. Using the tractor proceed with caution up the road. Must try to open a path uphill. Rocks, trees, mud everywhere. 18:00 we're at the top. Access restored – 4WD only
- The guys immediately do the long overdue SYCkD inspection and V-notch readings plus photos. Dam wall and abutments appear OK, with little erosion and no visible evidence of slumps or slips

- Wish we could MMS some photos. Nah, functionality disabled on the Tarong Energy i-phone.
- Lake Wivenhoe level steadily increasing. EL75.0 now... Boat ramp has totally disappeared under water!
- ~18:30 out on the deck, check voicemail on mobile phone – reception poor, as usual. Voice mail from SEQWater Ops Mgr. Managed to return call: "please help us by stopping your release of water into the dam". Message passed immediately onto TE Mgr Ops.
- Lake Wivenhoe at EL75.1m for the first time since construction. Power station silos holding up very well
- So much water! Remember those fusible plugs on Wivenhoe Dam! If Lake Wivenhoe level gets to 75.5m and plugs let go as per design, the whole valley and greater Brisbane may become submerged
- Carpet in the control room ruined by a water leak – who cares about carpets now...
- ~19:00 Hydromachine shut down; confirm action with SEQWater Ops Mgr, very grateful.
- Message fro[redacted] – Wivenhoe Pocket residents in a spot of bother – no supplies.
- Mgr Ops called. Words of praise fro[redacted]
- [redacted] then call home via the satphone
- Let's have some dinner; never has leftover microwave dinner tasted so good!
- We shower and organise the sleeping quarters
- Lake level slowed down and holding steady at 75.1m
- I expected the oil boom to pull its anchors out by now and go adrift; instead, it is still holding position!
- Total rainfall on the day 249mm!!!

Wednesday 12 Jan 2011

- 05:00 Lake Wivenhoe retreating further; SEQWater in control now. That was close!
- 06:00 the Sun is up – for a change!
- Unit inspections discover no additional leaks
- CW strainers blocking; disable the standby pump periodic operation. Done.
- [redacted] v-notch readings
- Update to Mgr Ops
- [redacted] check the neighbourhood. Significant flood damage to a few properties on the banks of Pryde Creek. Worse affected houses had water to the eaves. Inspected some properties and spoke to the residents. All very happy to see uniformed personnel and share their experiences. Some families escaped on the house roof and spent part of yesterday up there. No power, no phones, isolated – road blocked to the north 3 km away from SYCkD and south at the last bridge prior to the junction with Brisbane Valley Hwy. This whole Pryde Creek Valley area has become an island!!! Gave those water bottles and diesel for their generators. Invited residents to use satellite phone at the station.
- Update by [redacted] on the situation at Wivenhoe Pocket
- [redacted] can no longer drive to the station for next shift due to the flooded junction. Ask to leave his car at SEQWater Visitor Centre at the Dam and be picked up by helicopter from there.

- Request SEQWater permission to land helicopter at SEQWater Visitor Centre at the dam (for [redacted] and at Mt Crosby Water Treatment Plant (for [redacted]). SEQWater Mgr Ops OK.
- ~15:00 Next shift flies in - [redacted] in charge - [redacted]
- Handover to [redacted] include dam and unit checks, lending our generator to the Flamsteeds, security gates to remain open to allow neighbours to come in for water or diesel

[redacted] has sourced and brought in supplies for Wivenhoe Pocket residents – road still cut by floods. Keep the stuff ready to depart at the first opportunity.

- Late PM; update by [redacted] – he tries portable satphone no good. Errol then uses my landline
- Total rainfall on the day 133mm

Thursday 13 Jan 2011

- ~07:00 Update from [redacted]
- Road passable towards Wivenhoe Pocket; [redacted] plus Fire Brigade rep pick up diesel and [redacted] supplies
- [redacted] picks up his radio from the station (what a great idea this was – it enabled communication via Wivenhoe Power Station's radio directly to the Wivenhoe Pocket residents some of whom are SEQWater employees!)
- AM [redacted] picks up food for Wivenhoe Pocket residents and loads on helicopter; [redacted] picks up medical supplies and meat from SES Fernvale and loads on helicopter. Helicopter overloaded – temporarily trade the weight of these supplies for [redacted] weight. Asked pilot to return and pick up [redacted]
- ~ 14:00 Shift change-over post landing at Wivenhoe
- Road south remains open and allows [redacted] to come and pick up the new medical supplies, food and diesel for the Wivenhoe Pocket fire brigade truck
- 17:00 Communication with Executive Helicopters: chopper unable to depart from Toowoomba and pick up [redacted]. Talk to [redacted] about this.
- [After landing at Blacksoil, [redacted] drove to Fernvale to check on [redacted], who was the only one MIA to that time] 17:30 [redacted] then called the station – she was OK
- Dam and V-notch weirs inspected. Seepage getting clear now.
- Dinner; Chef [redacted] cooks on the sandwich maker!

Friday 14 Jan 2011

- Breakfast: a little BBQ, again on the sandwich maker!
- Launch fast boat. [redacted] inspect station beneath and retrieve large floating logs from tailbay
- Oil boom still OK
- Request by a neighbour to land another helicopter on the Wivenhoe site to evacuate some children. Granted.
- Powerlink helicopter hovering nearby – what now???
- [redacted] picks up more foodstuff and diesel. Other neighbours pick up diesel and water bottles.
- [redacted] arrive from Ipswich/ Lowood via a back road that just opened. [redacted] had earlier picked up Wivenhoe ute from Pine Mtn and waited for [redacted] to arrive]. [redacted]

incoming duty officer [redacted] outgoing. Fernvale bridge still under, but there is a way around, a one-hour trip via Lowood. Cancel future flights.

- Desk phones restored – wohoo!
- Powerlink call to report transmission tower at Splityard with eroded foundations under threat of collapse. [redacted] inspect and confirm situation.
- Powerlink already at Splityard request access with earthmoving machinery. [redacted] and [redacted] on the case.
- Two relatives of a neighbour missing an international flight connection. Divert our helicopter to Brisbane Airport instead of BP Blacksoil and give the two ladies the freed seats on the flight.
- Organise weekend surveillance: one Sat AM unit and dam inspections by two hydro personnel plus one Sat PM unit and dam inspections by other two hydro personnel. Same for Sun.

Sat 15 January

- AM dam inspection and V-notches [redacted] Also worked on one drain and managed to unblock it. Report from [redacted] Hydro Duty Officer: all normal
- Issue DOI note: no utilisation of Pump 2 until landslide into tailbay is cleared
- PM unit inspections and V-notches: [redacted] Report says all OK.

Sun 16 January

- AM dam inspection and V-notches b[redacted] They also cleared the water leakage behind the sewer ejector.
- PM unit inspection and V-notches b[redacted]. All OK.

Mon 17 January

- "Wivenhoe Hydro is open for business" message communicated to all personnel
- This day is an RDO and no-one is specifically requested to come to work; nevertheless, two of the 9-day fortnight hydro personnel report for duty – [redacted] and [redacted] Good on you guys!
- Recovery starts now
- Neighbour [redacted] on site with bobcat and truck clearing access road
- Contact Dept Transport and Main Roads to secure earthmoving machinery already in the proximity of the station. Kilcoy contractor deployed. Bobcat and truck.
- Contact our new land management contractor, Savco for assistance. Excavator immediately deployed from Ipswich depot.
- Shovelling to resume and focus on the drains around the carpark
- A security guard not on duty, [redacted] offers his services, gratefully accepted. He comes from Fernvale, washes top floor and shovels alongside the locals. The security guard on duty, [redacted] also clears drains.
- BBQ lunch
- More drains unblocked
- Unit Transformer checks for water ingress with[redacted]

Tue 18 January

- Unit inspections
- Continue earthworks both with machinery and by shovel
- Remove water damaged carpet from the Control Room
- Thunderstorms on the way – apparently; still no internet access – unable to get the radar up
- [redacted] at home, with internet access, snapshots the weather radar at regular intervals and e-mails the picture at half-hourly intervals between 15:30 and 18:00
- Fair enough, the rain comes again; another landslide blocks a recently cleared drain
- Start preparing response to Board' enquiry

CONTEXT – EXCEPTIONAL RAIN EVENT OPERATIONS

Operation of Wivenhoe Power Station

Wivenhoe Power Station has in place procedures, policies and guidelines associated with its operation.

During the exceptional rainfall event two particular procedures became relevant.

- Wivenhoe Power Station Business Procedure for Wivenhoe – High Rainfall, High Dam Water Levels – WIV-OPS-15 (copy attached as Appendix 5)

- Emergency Response and Business Continuity Plan for Wivenhoe Power Station WIV-MAN-13 (copy attached as Appendix 6)

The first procedure was used extensively during the crisis, however, it is noted that this procedure contained no details of actual power station operation (generation or pumping) during such circumstances. The procedure also refers to high rainfall events, but does not address exceptional rainfall events of the nature that were received on 11 January 2011.

The second procedure was also referred to by staff however, it does not contain any reference to high or exceptional rainfall / flooding events and therefore was of limited use during this crisis

Tarong Energy also has a Deed of Practice Agreement with SEQwater (copy attached Appendix 7). Section 3.2 of this Deed makes reference to TE being required to "as far as practicable" assist SEQwater in achieving its prime objectives. Tarong Energy did, as far as practicable, do everything it could to assist SEQwater during this crisis.

SEQwater have a Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam (part copy attached as Appendix 8) in which reference is made to Wivenhoe Power Station and Splityard Creek Dam. This reference is in Section 8.1 third paragraph and is generally correct except for the statement that the full 28,700ML can be released into Wivenhoe Dam. In fact only 25,100ML can be physically released into Wivenhoe Dam. The remainder of the volume (3600ML) can only be released via a conduit under Splityard Creek Dam and this release flows down Pryde Creek into the Brisbane River downstream of Wivenhoe Dam.

In the event that 25,100Ml were released into Wivenhoe Dam when it was at FSL then the level in Wivenhoe Dam would rise in the order of 260 mm. As Wivenhoe Dam fills beyond FSL of RL 67 then the level increase impact by water released from Splityard Creek Dam would become significantly less. At the Wivenhoe Dam levels experienced on 11 January (RL75) the level impact of releasing the full 25,100 ML would have been in the order of 220mm.

Operation of Splityard Creek Dam

As a result of the exceptional rainfall event there were three documents to which Wivenhoe staff referred. These were:

- Wivenhoe power station Business Procedure for Wivenhoe – High Rainfall, High Dam Water Levels – WIV-OPS-15
- Emergency Action Plan Wivenhoe Power Station Splityard Creek Dam T-MISC-149
- Operations and Maintenance Manual for Splityard Creek Dam

As a result of landslides and exceptional rainfall WPS hydro personnel were not able to physically monitor the integrity of dam as required by the procedures. The protocol for the operation of Splityard Creek Dam when this situation occurs depends on the type of emergency. For example a high rainfall event response is vastly different to that of an earthquake.

During 11 January 2011 exceptional rainfall event the calculated inflow to Splityard Creek Dam was approximately $30m^3/s$ over a 4 hour period which triggered consecutive high water level alarms. While exceptional the inflow of $30m^3/s$ is far less than the spillway capacity of $420m^3/s$.

Despite the fact that the dam was at a low risk of overtopping and its integrity via that failure mechanism was low there were concerns regarding potential reservoir rim slips, rock movements and dam wall erosion/scour caused by exceptional rainfall runoff as was being experienced at the station.

There was also a large discrepancy that became apparent between dam water level instrumentation (a legacy of the obsolete control system).The decision was made to reduce the forces on the dam by lowering the dam water level to EL 157. This decision was made taking into account the Crisis Management Team directions, consultation with DERM (refer to attached email in Appendix 9) and in accordance with WIV-OPS-15 High Rainfall, High Dam Water Level as well as the Splityard Creek Dam O&M Manual.

Attached in Appendix 10 are emails from [redacted] setting out the dam volume versus height curve on which is marked a number of notable levels as well as details of the volumes and times of water movements. In particular the minimum level for Black Start capability is shown and Tarong Energy is contracted with the Australian Electricity Market Operator (AEMO) to maintain water in the dam above this level.

In accordance with good dam safety practice and the respective procedures Wivenhoe hydro staff maintained contact with the dam regulator and the history of these communications is set out in an email from [redacted] dated 1 February at 9.22 am. A copy of this email is attached in Appendix 9.

On Wednesday 19 January 2011, a complete physical inspection of Splityard Creek Dam was carried out by SunWater dam safety engineers. Verbal feedback immediately after the inspection indicated that the dam was in good condition and there were no issues requiring attention. This detail is summarised in an email from [redacted] dated 21 January and attached as Appendix 11.

Normal operation and maintenance of the dam has resumed following this exceptional event.

SYSTEM IMPROVEMENTS

Wivenhoe Power Station experienced an exceptional rainfall event on Tuesday, 11 January 2011 and although the Wivenhoe Dam reached a very high level of RL 75.1 m, the two primary factors that significantly affected the power station and Splityard Creek Dam operation were the loss of computer network facilities (emails, internet, phones) and the inability to access the station, due to flood levels in the surrounding area and landslides on the main power station access road.

Summarised below is a list of improvement recommendations that should be considered in order to overcome the potential of a repeat of the difficulties experience during this event.

1. Review and plan better emergency access arrangements
2. Install Video Cameras on critical infrastructure
3. Install Automatic Rain Gauges at the power station and dam
4. Investigate what seems to be a discrepancy of Wivenhoe Dam levels between Wivenhoe Power Station readings and those read by SEQwater.
5. Review IPhones/mobile phone functionality to enable better communications including internet access
6. Installation of a local satellite internet should be considered
7. A Television should be installed to enhance outside communications
8. VOIP Phones fail with the network and a standard Telstra phone should be considered
9. Internal Radios have a phone capability that should be enabled
10. There is the possibility to use the OTN Network for communication and this should be explored as a contingency option
11. The Emergency Response and Business Continuity Plan should be reviewed to include high and exceptional rainfall events as well as flooding events
12. The High Rainfall, High Dam Water Level Procedure should be updated to include exceptional rainfall events and power station generation and pumping guidance
13. Wivenhoe IMT Pack should be reviewed to ensure it includes all appropriate procedures and information in both electronic and hard copy forms

ATK - 7(1)

[redacted]

From: _Servicedesk
Sent: Monday, 10 January 2011 8:33 AM
To: [redacted]
Subject: Support Call IR39767 - needs nt password reset

Tarong Energy Service Desk Support Call Number IR39767 - needs nt password reset has been logged on your behalf.

You may also obtain details and the status of your call at:
https://tbsm04/enduser/RequestDetails.aspx?RequestsId={e62428f2-cbdc-065f-6b9a-a467490cf09f}&RequestType=incident

The request details are below

Updated by: [redacted]

Description: [redacted] called and advised he is unable to get into the office to reset his password due to flooding and requires email to come through via iphone

Welcome to the new Tarong Energy Service Desk!

Kind Regards
Tarong Energy Service Desk

ATK-7(11)

[redacted]

From: [redacted]
Sent: Thursday, 13 January 2011 7:34 AM
To: Tarong Energy
Subject: Reduced Access to IT Systems - TPS
Attachments: image002.jpg; image001.jpg

Good morning,

Please find the following e-mail from Tony.

Cheers

[redacted]

Colleagues

As a result of the current crisis and the closure of the Brisbane office and server room there will be a reduced level of Information Services available for TPS staff on-site at TPS and to nominated (Wireless card access (GWIP) staff from 7:30 am 13/01/2011:

The following services **will** be available:

Network Drives (on TPS servers only)
Printing
Ellipse
Trim
Email internal
Email external (pending resolution of a connectivity issue this morning)
TAMS
Internet access
Local TPS applications

The following services **will not** be available for TPS staff on-site at TPS:

Any services hosted in Brisbane such as

TM1
Intranet
PhoneBook
VoiceMail
Brisbane Desktop

The service desk will be operating in a reduced capacity. Please be patient.

Regards

[redacted]
Manager Information Services
Business & Financial Services - Information Services
Tarong Energy

[redacted] Mob [redacted]
GPO Box 800, Brisbane, QLD 4001
www.tarongenergy.com.au
www.tarongenergy.com.au/careers

ATK - 7(iii)

[redacted]

From: [redacted] DR
Sent: Friday, 14 January 2011 12:47 PM
To: [redacted]
Cc: [redacted]
Subject: RE: Alarms at Wivenhoe
Attachments: image001.jpg; image002.jpg

Alarm is all okay... just a big mud slide..

From: [redacted]
Sent: Wednesday, 12 January 2011 1:06 AM
To: [redacted]
Cc: [redacted]
Subject: Alarms at Wivenhoe

Hi [redacted]

We have been trying to contact you regarding Wivenhoe Priority Alarms, that is Hydrocarbons in Drainage Pit and Unit 1 Transformer Oil.

Please give me a call if possible.

[redacted]
Shift Co-ordinator
Generation Operations - Production A Shift
Tarong Energy Corporation
[redacted]
PO Box 15, Nanango, QLD 4615
www.tarongenergy.com.au
www.tarongenergy.com.au/careers

Be green...read from the screen

ATK-7(IV)

[redacted]

From: [redacted]
Sent: Saturday, 15 January 2011 5:58 PM
To: [redacted]
Subject: Fwd: Delivery Delayed: Re: DOI Alert - Operating Instruction for Wivenhoe Power Station ...

[redacted] did you get this?

Begin forwarded message:

From: Microsoft Exchange <MicrosoftExchange329e71ec88ae4615bbc36ab6ce41109e@TarongEnergy.com.au>
Date: 15 January 2011 12:34:34 AEST
To: [redacted]
Subject: Delivery Delayed: Re: DOI Alert - Operating Instruction for Wivenhoe Power Station ...

Delivery is delayed to these recipients or distribution lists:

[redacted]

Subject: Re: DOI Alert - Operating Instruction for Wivenhoe Power Station ...

This message has not yet been delivered. Microsoft Exchange will continue to try delivering the message on your behalf.

Delivery of this message will be attempted until 1/17/2011 8:29:59 AM (GMT+10:00) Brisbane. Microsoft Exchange will notify you if the message can't be delivered by that time.

Sent by Microsoft Exchange Server 2007

Reporting-MTA: dns; TTHTS02.internal.tarongenergy Final-recipient: RFC822; [redacted] Action: delayed Status: 5.4.0 X-Supplementary-Info: < #4.4.7 smtp;400 4.4.7 Message delayed> Final-recipient: RFC822; [redacted] Action: delayed Status: 5.4.0 X-Supplementary-Info: < #4.4.7 smtp;400 4.4.7 Message delayed>

ATK-7(N)

[redacted]

From: [redacted]
Sent: Monday, 17 January 2011 12:36 PM
To: [redacted]
Subject: RE: Delivery Delayed: Re: DOI Alert - Operating Instruction for Wivenhoe Power Station ...

no i did not receive any DOI's... the email is playing

From: [redacted]
Sent: Saturday, 15 January 2011 5:58 PM
To: [redacted]
Subject: Fwd: Delivery Delayed: Re: DOI Alert - Operating Instruction for Wivenhoe Power Station ...

[redacted] did you get this?

Begin forwarded message:

From: Microsoft Exchange <MicrosoftExchange329e71ec88ae4615bbc36ab6ce41109e@TarongEnergy.com.au>
Date: 15 January 2011 12:34:34 AEST
To: [redacted]
Subject: Delivery Delayed: Re: DOI Alert - Operating Instruction for Wivenhoe Power Station ...

Delivery is delayed to these recipients or distribution lists:

[redacted]

[redacted]

Subject: Re: DOI Alert - Operating Instruction for Wivenhoe Power Station ...

This message has not yet been delivered. Microsoft Exchange will continue to try delivering the message on your behalf.

Delivery of this message will be attempted until 1/17/2011 8:29:59 AM (GMT+10:00) Brisbane. Microsoft Exchange will notify you if the message can't be delivered by that time.

Sent by Microsoft Exchange Server 2007

Reporting-MTA: dns; TTHTS02.internal.tarongenergy Final-recipient: RFC822; [redacted] Action: delayed Status: 5.4.0 X-Supplementary-Info: < #4.4.7 smtp;400 4.4.7 Message delayed> Final-recipient: RFC822; [redacted] Action: delayed Status: 5.4.0 X-Supplementary-Info: < #4.4.7 smtp;400 4.4.7 Message delayed>

ATK-7(V)

[redacted]

From: [redacted]
Sent: Monday, 17 January 2011 3:50 PM
To: Tarong Energy
Subject: Updated Flood message for employees
Attachments: image001.jpg; image002.jpg

Here is the latest update for Tarong Energy employees regarding access to work sites and work arrangements affected by the flood crisis.

We ask all employees to put safety first in all instances, particularly when traveling to and from work.

Work arrangements

- Normal operations continue at TPS, TN, Meandu Mine and WPS.
- The Brisbane office at AM60 will remain closed this week as work continues to urgently reconnect essential services.
- Brisbane employees will be able to work this week either at AMP Place (10 Eagle St, Brisbane) or via remote access. Managers will contact Brisbane employees tomorrow (Tuesday 18 January 2011) about working from home when remote access is available or when they will be required to work at AMP Place.
- Brisbane employees issued with GWIP cards can work remotely. If you have any technical difficulties, contact the Service Desk on 3228 4111.
- Critical business travel between Brisbane and sites must be approved by a GM.
- Before departing on any travel to TE sites:
  - please check for road closure information on www.131940.qld.gov.au
  - ensure you drive an appropriate vehicle for the conditions – some areas may require 4WD access
  - always drive to the conditions (eg potholes) and do not attempt to cross flooded roads.
- You will continue to receive ongoing updates via:
  - www.tarongenergy.com.au – homepage
  - www.twitter.com - TEJANUARY2011
  - phone for a recorded update on 07 4160 9142 or 0411 021 018
  - direct contact with your manager.

Employee information

If your primary residential dwelling is affected by the flood, TE is offering up to two days special leave with pay. You must discuss your situation with your Supervisor/Manager for approval prior to taking any time. Please fill out leave forms when you are able.

We are aware of the implication for contractors and will be negotiating payment arrangements for the period they are unable to work.

For any Brisbane employee who is not required to be working we encourage you to offer your time and services assisting with the clean up. Please contact Volunteering Queensland to register.

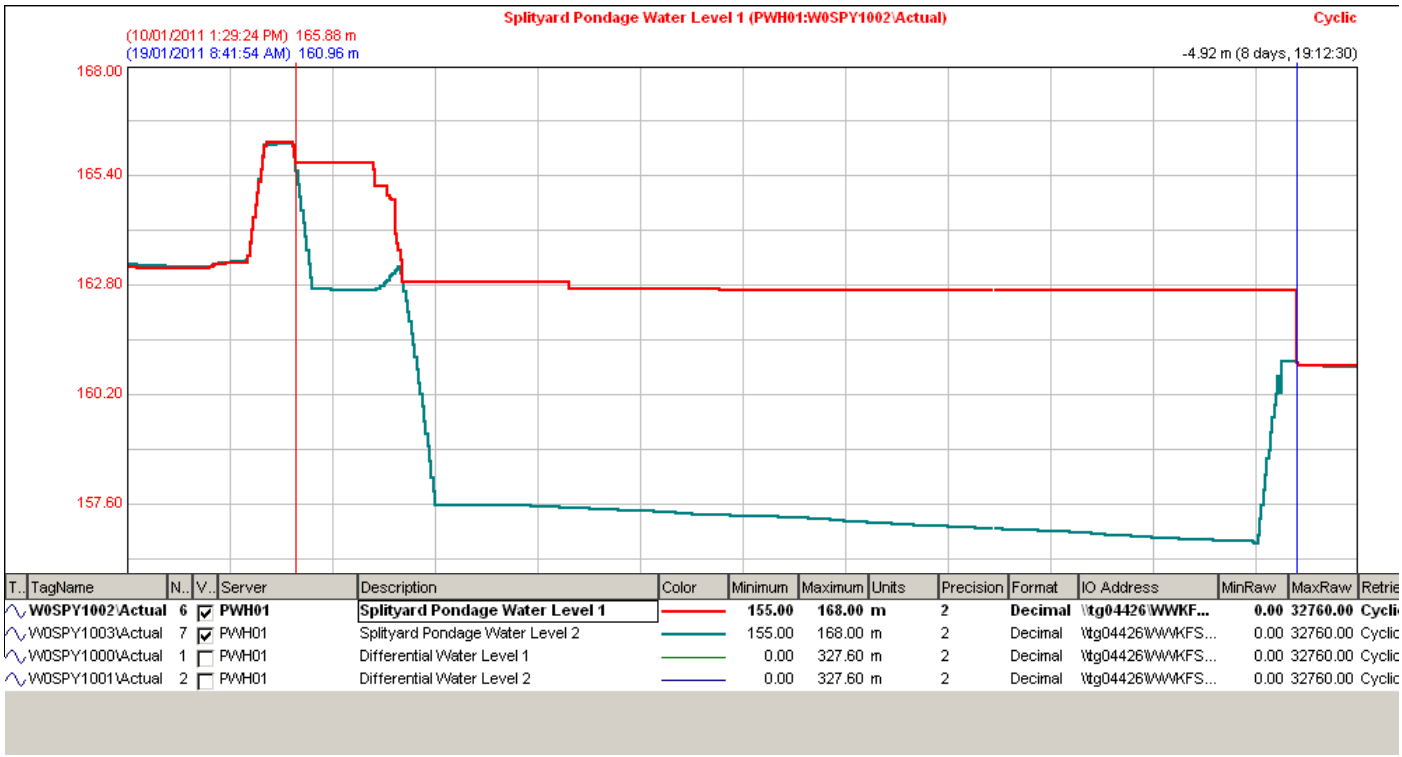
[redacted]
Internal Communications Manager
People & Communications
Tarong Energy Corporation

[redacted]
GPO Box 800, Brisbane, QLD 4001
www.tarongenergy.com.au
www.tarongenergy.com.au/careers

Wivenhoe Power Station

Splityard Creek Dam Water Level Indication

High Rainfall 11 Jan 2011



T..	TagName	N..	V..	Server	Description	Color	Minimum	Maximum	Units	Precision	Format	IO Address	MinRaw	MaxRaw	Retrie
	W0SPY1002\Actual	**6**	☑	**PWH01**	**Splityard Pondage Water Level 1**		**155.00**	**168.00**	**m**	**2**	**Decimal**	**\\tg04426\WWKF...**	**0.00**	**32760.00**	**Cycli**
	W0SPY1003\Actual	7	☑	PWH01	Splityard Pondage Water Level 2		155.00	168.00	m	2	Decimal	\\tg04426\WWKFS...	0.00	32760.00	Cyclic
	W0SPY1000\Actual	1	☐	PWH01	Differential Water Level 1		0.00	327.60	m	2	Decimal	\\tg04426\WWKFS...	0.00	32760.00	Cyclic
	W0SPY1001\Actual	2	☐	PWH01	Differential Water Level 2		0.00	327.60	m	2	Decimal	\\tg04426\WWKFS...	0.00	32760.00	Cyclic

Splityard Creek Dam Water Level indication fault Jan 2011.

Description: Splityard Dam water level transmitter #1 failed at approximately 1329 10/01/2011, as indicated in trend above (red trend line).

Transmitter #2 still operational (green trend line).

Transmitter #1 repaired 0842 19/01/2011; both transmitter calibrations checked.

ATK-9(1)

[redacted]

From: [redacted]
Sent: Monday, 10 January 2011 9:20 AM
To: Tarong Energy
Subject: Road closures - access closed between Brisbane and TPS/TN/WPS/Meandu
Attachments: powerbar.jpg; greenbar.jpg; image001.jpg

Hi all

There is no access and travel between Brisbane and Wivenhoe Power Station, Tarong Power Station, Tarong North and Meandu. Heavy rainfall has closed the following roads: Shull Road North

- Brisbane Valley Highway is closed and flooded south of Fernvale near Splityard Creek – this means there is no road access to Wivenhoe Power Station or to TPS/TN/Meandu via the Brisbane Valley Highway **(Esk route)** or Wivenhoe Somerset Rd
- D'Aguilar Highway is closed at Kilcoy Post Office Creek due to flooding by the Stanley River **(D'Aguilar Highway/Kilcoy route)**
- The D'Aguilar Highway is also closed between Blackbutt and Moore after a landslip at the top of the Range.

With the rain expected to continue, it is likely access between our sites will remain closed for the next day or so. Further updates will be emailed and on the TarongNet homepage.

Please delay all non-essential travel and if you are aware of colleagues who were planning to travel between our sites, please advise them of the road closures.

Kind regards
[redacted]

From: [redacted]
Sent: Sunday, 9 January 2011 8:41 PM
To: SB Road Closures and Flood Warnings; Tarong Energy - Tarong North; Tarong Energy - Tarong Power Station
Cc: Tarong Energy - Meandu Mine
Subject: Wet weather - Access Monday 10th

All,

With the rainfall today and road damage which has occurred we cannot be sure there will be a route open for site access in the morning. Many of the district roads are affected presently.

At present our best hope of general site access for Kingaroy and Nanango personnel is via Nanango - which would require Sandy Ck to go down to enable such access. From Kingaroy there is damage to roads on Kingaroy - Cooyar Road near the airport and Goodger which has closed this road as well as the potential for Middle Ck, Barkers Ck at Brooklands and Oakey Ck to be over as well.

Our shift personnel have managed to changeover via Nanango -Brooklands Road by meeting either side of the road closure near Major Road. The council have indicated that this road is still closed to all vehicle traffic at the location of the road failure.

We cannot be sure of current road and flood info in the morning yet and it will depend on overnight rainfall so please take care on the roads if travelling - discuss with your Supervisor / Coordinator the need to attend work or alternative work arrangements which may be suitable.

Thanks

[redacted]
Health & Safety Manager
Generation Operations

ATK-9(11)

[redacted]

From: [redacted]
Sent: Monday, 10 January 2011 10:38 AM
To: Tarong Energy
Subject: IMPORTANT: Travel restrictions and road closures between TE sites
Attachments: image001.jpg; image002.jpg

Further to our notification this morning about road closures between Brisbane and the power station sites, **Tarong Energy employees or contractors are advised not to travel between Brisbane and Wivenhoe Power Station, Tarong Power Station, Tarong North and Meandu Mine until further notice.** This is to ensure your safety due to the road closures (see below), unsafe travel conditions and poor weather.

- Brisbane Valley Highway is closed and flooded south (north) of Fernvale near Splityard Creek – this means there is no road access to Wivenhoe Power Station or to TPS/TN/Meandu via the Brisbane Valley Highway **(Esk route)**
- D'Aguilar Highway is closed at Kilcoy Post Office Creek due to flooding by the Stanley River **(D'Aguilar Highway/Kilcoy route)**
- The D'Aguilar Highway is also closed between Blackbutt and Moore after a landslip at the top of the Range.

We will continue to update you if road closures or travel warnings change via email and the TarongNet homepage.

Brisbane employees – we will provide updates throughout the day if localised flooding affects travel between the city and home. If you do expect to have issues travelling home, please speak to your manager to make arrangements to leave early/ work from home. Please monitor the following websites for the latest information:

- www.translink.com.au
- http://highload.131940.qld.gov.au/

TPS/TN/Meandu employees – at this stage access to site is limited to Mill Flat via Nanango. Road conditions may change with continuing rain so please check with your Supervisor / Coordinator before travelling to site.

WPS employees – please liaise directly with [redacted] regarding road closures and travel.

[redacted]
Internal Communications Manager
People & Communications
Tarong Energy Corporation

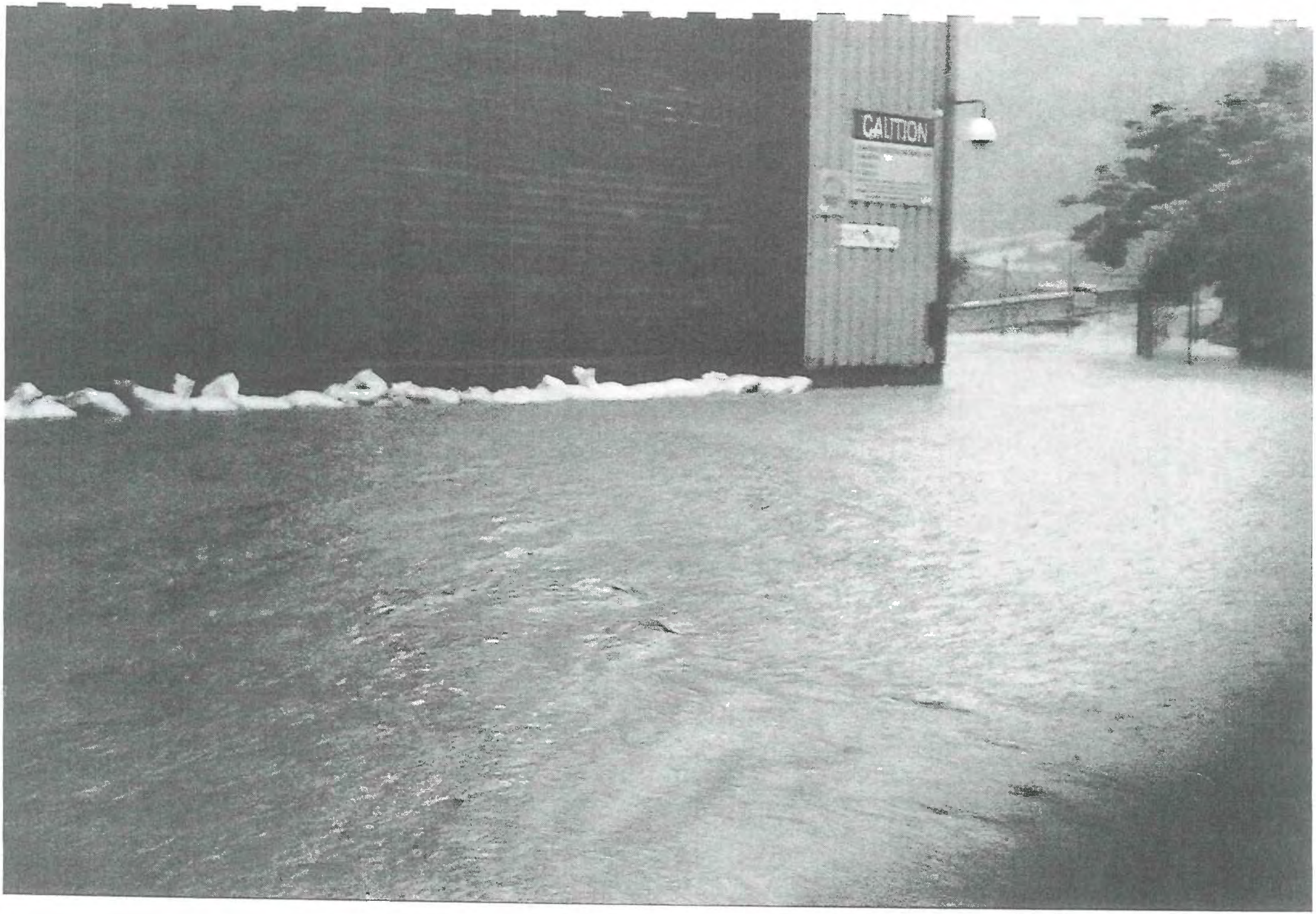
Tel (07) [redacted]
GPO Box 800, Brisbane, QLD 4001
www.tarongenergy.com.au
www.tarongenergy.com.au/careers

ATL-9(iii)

[redacted]

From: [redacted]
Sent: Tuesday, 11 January 2011 10:33 AM
To: [redacted]
Subject: Wivenhoe Hydro unaccessible - road cliffs collapsed - road drains blocked with rubble and trees - station floding from carpark - we're holding ground
Attachments: photo (3).JPG

photo (3)


CAUTION

ATIC -9(IV)

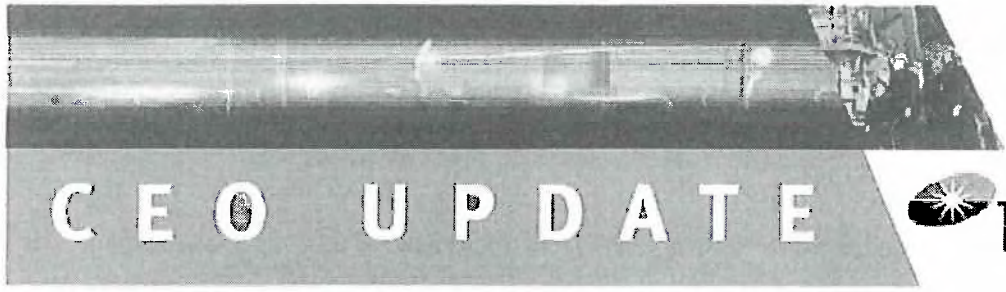
[redacted]

From: [redacted]
Sent: Tuesday, 11 January 2011 11:52 AM
To: [redacted] Krotewicz, Andrew
Subject: Wivenhoe Hydro 11:45, Apocalypse. One levy successful in diverting water away from machine hall. Hydro engineer piloting tractor. Unit 2 generating 150MW. Unit 1 Control System kaputt after lightning strike. Guys wet to the bone.
Attachments: photo (3).JPG

photo (3)


17/01/2011

ATK-9(vi)



TARONG ENERGY

11 JANUARY 2011

UPDATE ON WEATHER CONDITIONS – BRISBANE OFFICE TO CLOSE

Severe weather conditions are affecting access to our sites. Our number one priority is the safety of our people and we are advising employees to stay home.

This is a very difficult time for many of us and our thoughts are with those of you, families, friends and fellow Queenslanders who have been personally affected by these serious and severe conditions.

I will keep you informed on how the continuing rain and flooding affects us, and will provide further updates as more information is available.

Brisbane office to close
In the interests of our employees' safety, **Brisbane office employees are requested to leave the building as soon as they are able and in any event by 12.30pm today**. At this stage, it is likely the Brisbane office will remain evacuated until Friday 14 January 2011.

Due to the potential for localised flooding, Brisbane office employees are urged to travel directly home. Before leaving the office, please advise your line manager that you are leaving, provide a contact number to reach you and make sure you have their contact number. Please ensure you swipe off before leaving.

Brisbane employees - please contact [redacted] after 3pm today and as frequently as needed for recorded message of updated information.

If you have computer access at home, there are options to log into your email to keep in contact. See the attached instructions on accessing your Tarong Energy email through the internet.

Access to generating sites and mine
At this stage, access to Tarong Power Station, Wivenhoe Power Station, Tarong North Power Station and Meandu Mine is still cut.

Please contac[redacted] after 2pm today for a recorded update on when access will be open. If you have any concerns, please also contact your Supervisor / Coordinator.

Access to Wivenhoe Power Station is expected to continue to be cut in the coming days.

We have a small number of employees at each power station, and are working to ensure they have safe emergency access in and out of their sites.

Travel between sites
Employees are also directed not to travel between sites, as flooding has cut access between Brisbane and our generating sites and mine. Our number one priority is the safety of our people and I do not want anyone to risk their safety for work-related travel.

Payroll
Our site-based Payroll team is currently unable to access Tarong Power Station, but I am committed to ensuring employees receive their pay this week. I will provide more details this afternoon or on recorded phone messages about this week's pay run.

Generator Restructure employee consultation sessions cancelled this week
This week's employee consultation sessions about the generator restructure are cancelled. At this stage, consultation sessions will be held next week and additional sessions will be scheduled when employees are able to access sites

Further updates
You will receive further updates about access to your work sites via:

- Recorded phone message - [redacted] (Brisbane employees)
- Recorded phone message - [redacted] TPS, TN, WPS and Mine employees)
- Direct contact with your manager
- Tarong Energy email account, if you have internet access

[redacted]
Chief Executive Officer

ATK-9(VII)

[redacted]

From: [redacted]
Sent: Tuesday, 11 January 2011 5:32 PM
To: [redacted]
Subject: WPS ROAD CLEARED FOR 4WD ACCESS
Attachments: photo.JPG; ATT00001..txt

ATK-9(viii)

[redacted]

From: [redacted]
Sent: Wednesday, 19 January 2011 10:53 AM
To: [redacted]
Cc: Krotewicz, Andrew; [redacted]
Subject: RE: CMT Site Access Clarification / Update

[redacted], Wivenhoe Hydro access road is being cleared. Access has been restored and is available - with due consideration to the earthmoving equipment (3 crews, bobcats and excavator) as well as the local personnel shovelling/ clearing/ cleaning/ inspecting commitments.

[redacted]

-----Original Message-----
From: [redacted]
Sent: Wednesday, 19 January 2011 9:51 AM
To: Krotewicz, Andrew; [redacted]
Subject: CMT Site Access Clarification / Update

In the 9 am CMT meeting there was a request for site access updates

Can you please forward to me the latest information you have regarding site access information so that I can update the CMT

[redacted]
Sent from my iPad

AFK - 1d1

[redacted]

From: [redacted]
Sent: Thursday, 3 March 2011 5:28 PM
To: Rob Drury
Subject: Re: Severe Thunderstorm Warning - SE Qld 1 [SEC=UNCLASSIFIED]

This message has been archived.

Yes thank you Rob!

On 03/03/2011, at 16:03, Rob Drury <[redacted]> wrote:

> These I think are open to everyone which you may already get.
>
> Rob
>
> -----Original Message-----
> From: weather
> Sent: Thursday, 3 March 2011 4:01 PM
> To: DG-Ops Dam Levels; [redacted]
> Subject: FW: Severe Thunderstorm Wa

ATK-10(1)

[redacted]

From: [redacted]
Sent: Friday, 18 February 2011 9:30 AM
To: 'jtibaldi[redacted]'; 'tmalone[redacted] 'Rob.ayr[redacted]
Cc: [redacted]rdrury[redacted]
Subject: Wivenhoe Power Station Operations

This message has been archived.

Gents,

Tarong Energy operators will no longer be issuing notification of operating activities of Wivenhoe Power Station since the level of Wivenhoe Dam is less than FSL.

Should you require these notifications to be continued, please confirm by return e-mail.

Regards,

[redacted]
Lead Engineer - Hydro
Generation Operations - Production Wivenhoe
Tarong Energy Corporation

[redacted]
PO Box 38, Fernvale, QLD 4306
www.tarongenergy.com.au
www.tarongen

ATK - 10(iii)

[redacted]

From: [redacted]
Sent: Thursday, 3 February 2011 10:33 AM
To: Wivenhoe On-Call Officers
Subject: FW: Wivenhoe Power Station generation run 03/02/2011

From [redacted]
Sent: Thursday, 3 February 2011 9:58 AM
To: 'jtibaldi[redacted]; 'tmalone[redacted]Rob.ayre[redacted]
'john.ruffini[redacted]'dutysec[redacted]
Cc: [redacted]_Tarong Production Shift Coordinators and AOC's; [redacted]
Subject: Wivenhoe Power Station generation run 03/02/2011

Hello
Wivenhoe 2 unit will be generating from 12:00 midday until 18:00 today. Expected discharge from Splityard creek storage into Wivenhoe dam storage is 3700Ml.

Thanks
[redacted]
AOC
tarong Power Station

ATK-10(W)

[redacted]

From: [redacted]
Sent: Tuesday, 1 February 2011 11:39 AM
To: 'John Tibaldi:'; 'Terry Malone:'; 'Rob Ayre:'; 'John Ruffini:'; Wivenhoe On-Call Officers;
Cc: [redacted]
Subject: Wivenhoe Generate 1/02/2011

This message has been archived.

Hi All,

Approx 5000 Ml of water to be released today

ATK 10(v)

[redacted]

From: [redacted]
Sent: Thursday, 20 January 2011 1:29 PM
To: 'Rob Drury'; [redacted]
Cc: [redacted]

Subject: RE: Wivenhoe Hydro-power station
Attachments: image001.jpg; powerbar.jpg; greenbar.jpg

Gentlemen

We're back on line. This note comes a bit late, nevertheless...

Thank you for your cooperation during the event, both with the "escape route" below and helicopter landing clearance at your Mt Crosby site.

In addition, Rob's periodic phone updates were invaluable specially above Lake Wivenhoe EL70; our station got disconnected from the corporate network on the day of the deluge and remained isolated until yesterday.

Thanks again
[redacted]

[redacted]
Wivenhoe Power Station Manager
[redacted]
PO Box 38, Fernvale, QLD 4306
www.tarongenergy.com.au
www.tarongenergy.com.au/careers
TARONG ENERGY
Be green...read from the screen

From: Rob Drury [redacted]
Sent: Friday, 14 January 2011 11:34 AM
To: [redacted]
Cc: [redacted]
Subject: Re: Wivenhoe Hydro-power station

I have been discussing issues wit[redacted] and will call him back to advise it is okay.

From [redacted]
To: [redacted] Rob Drury; [redacted]
[redacted]
Cc: [redacted]
Sent: Fri Jan 14 11:26:02 2011
Subject: Wivenhoe Hydro-power station

Wivenhoe Hydro power station is asking permission to land a boat at the LWIC in emergencies when road access is not available. [redacted] has asked that 2 of the vehicles be allowed to be parked at the LWIC so that they are ready when needed.

I have indicated that this should be possible but that I would pass the request on.

Could [redacted] or Rob please try to make contact with [redacted] or myself to confirm that this is ok.

[redacted]
Wivenhoe PS Coordinator
[redacted]

[redacted]
Natural Asset Maintenance Planner
QLD Bulk Water Supply Authority *trading as* Seqwater

seqwater
WATER FOR LIFE

[redacted]
2470 Brisbane Valley Highway, via Fernvale QLD 4306
PO Box 37, Fernvale QLD 4306
Website | www.seqwater.com.au

ATK - 10(V1)

[redacted]

From: Rob Drury [redacted]
Sent: Friday, 14 January 2011 11:34 AM
To: [redacted]
Cc:
Subject: Re: Wivenhoe Hydro-power station
Attachments: image001.jpg

I have been discussing issues with Sorin and will call him back to advise it is okay.

From: [redacted]
[redacted]
Cc: [redacted]
Sent: Fri Jan 14 11:26:02 2011
Subject: Wivenhoe Hydro-power station

Wivenhoe Hydro power station is asking permission to land a boat at the LWIC in emergencies when road access is not available. [redacted] has asked that 2 of the vehicles be allowed to be parked at the LWIC so that they are ready when needed.

I have indicated that this should be possible but that I would pass the request on.

Could [redacted] or Rob please try to make contact with [redacted] or myself to confirm that this is ok.

[redacted]
Wivenhoe PS Coordinator
[redacted]

[redacted]
Natural Asset Maintenance Planner
QLD Bulk Water Supply Authority *trading as* Seqwater

seqwater
WATER FOR LIFE

[redacted]
2470 Brisbane Valley Highway, via Fernvale QLD 4306
PO Box 37, Fernvale QLD 4306
Website | www.seqwater.com.au

AJK-10(V1)

[redacted]

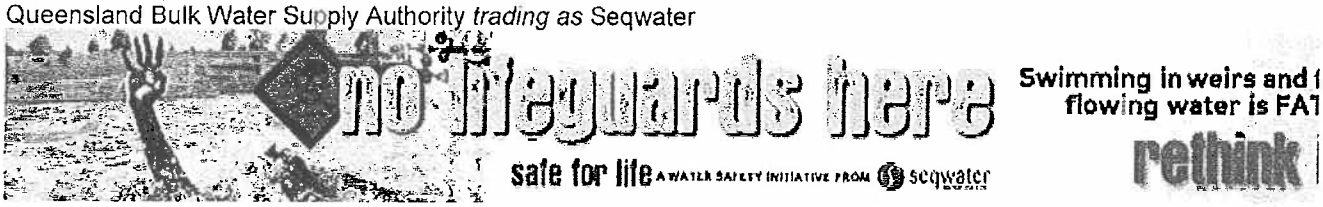
From: Rob Drury [redacted]
Sent: Tuesday, 11 January 2011 6:19 PM
To: [redacted]
Attachments: image001.jpg; image002.png

[redacted]

As we discussed we are at close levels at Wivenhoe and if there was any possibility of you not discharging into Wivenhoe, or preferably taking water back into your dam, it would assist greatly.

Thanks
Rob

Robert Drury
Dam Operations Manager
Water Delivery
Queensland Bulk Water Supply Authority *trading as* Seqwater



seqwater
WATER FOR LIFE

Ph (07[redacted] | Fax (07[redacted] | E rdrury[redacted]
Wivenhoe Dam, Brisbane Valley Highway, via Fernvale Q4306 Australia
PO Box 37, Fernvale QLD 4306
Website | www.seqwater.com.au

ATK-1C(WII)

[redacted]

From: [redacted]
Sent: Monday, 10 January 2011 5:40 PM
To: John Ruffini [redacted] John Tibaldi [redacted]; Rob Ayre [redacted]; SEQ; Terry Malone [redacted] Wivenhoe On-Call Officers
Subject: FW: Tarong Energy Wivenhoe 1 Generation.
Attachments: image002.jpg; image001.jpg

Update on previous communications below:

12:30: Wivenhoe 1 Generation one unit at 180MW for an estimated 4.5 hours. 4ML/MWh (approx turbine water rate) x 180MW x 4.5 hours = ~ 3240 ML

[redacted]
Shift Co-ordinator
Generation Operations - Production A Shift
Tarong Energy Corporation
[redacted]
PO Box 15, Nanango, QLD 4615
www.tarongenergy.com.au
www.tarongenergy.com.au/careers
TARONG ENERGY
Be green...read from the screen

From: [redacted]
Sent: Monday, 10 January 2011 12:42 PM
To: John Ruffini [redacted] John Tibaldi [redacted] Rob Ayre [redacted]; Terry Malone [redacted] Wivenhoe On-Call Officers
Subject: Tarong Energy Wivenhoe 1 Generation.

Wivenhoe 1 Generation just started one unit at 180MW for an estimated 2.5 hours. 4ML/MWh (approx turbine water rate) x 180MW x 2.5 hours = ~ 1800 ML.

[redacted]
Shift Co-ordinator
Generation Operations - Production A Shift
Tarong Energy Corporation
[redacted]
PO Box 15, Nanango, QLD 4615
www.tarongenergy.com.au
www.tarongenergy.com.au/careers
TARONG ENERGY
Be green...read from the screen

ATK 10 (VII)

[redacted]

From: [redacted]
Sent: Monday, 10 January 2011 12:42 PM
To: John Ruffin[redacted]; John Tibaldi[redacted]; Rob Ayre[redacted]; Terry Malone[redacted]; Wivenhoe On-Call Officers
Subject: Tarong Energy Wivenhoe 1 Generation.
Attachments: image001.jpg; image002.jpg

Wivenhoe 1 Generation just started one unit at 180MW for an estimated 2.5 hours. 4ML/MWh (approx turbine water rate) x 180MW x 2.5 hours = ~ 1800 ML.

[redacted]
Shift Co-ordinator
Generation Operations - Production A Shift
Tarong Energy Corporation

[redacted]
PO Box 15, Nanango, QLD 4615
www.tarongenergy.com.au
www.tarongenergy.com.au/careers

Be green...read from the screen

From: Graham Keega[redacted]
Sent: Sunday, 9 January 2011 8:42 PM
To: [redacted]
Subject: FW: Wivenhoe levels

[redacted]

Current level at Wivenhoe Dam is EL 69.10m @ 2000hrs. Lake has been rising at approx .01m per hour for the past few hours. We have major floods in the upper-Brisbane and Stanley rivers.

The Flood Operations Centre is predicting a peak lake level of EL 72.5m AHD on Wednesday morning under current conditions and operations. This may change as conditions deteriorate.

Regards,

[redacted]
Engineering officer
Queensland Bulk Water Supply Authority *trading as* Seqwater

seqwater
WATER FOR LIFE

[redacted]
LWIC 2470 Brisbane Valley Highway, via Fernvale
PO Box 37, FERNVALE, Q., 4306.
Website | www.seqwater.com.au

From: [redacted]
Sent: Sunday, 9 January 2011 8:05 PM
To: Graham Keegan
Subject: FW: Wivenhoe levels

[redacted]
Operator Maintainer
Major Dams and Hydro
Queensland Bulk Water Supply Authority *trading as* Seqwater

seqwater
WATER FOR LIFE

[redacted]
2470 Brisbane Valley Highway, via Fernvale QLD 4306
PO Box 37, Fernvale QLD 4306
Website | www.seqwater.com.au
ABN 75 450 239 876

From: [redacted]
Sent: Sunday, 9 January 2011 8:05 PM
To: [redacted]
Subject: Wivenhoe levels

Hello Doug,

When it is convenient could you please email me the current Wivenhoe level, the rate it is rising and if possible what they believe the level may rise to. Tomorrow is an RDO at the hydro so there will only be 2 or 3 at work.

Regards

[redacted]
Wivenhoe Hydro
Tarong Energy

ATK - 10(x)

[redacted]

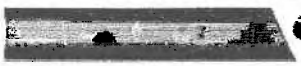
From: [redacted]
Sent: Monday, 27 December 2010 12:56 AM
To: 'jtibald[redacted]'tmalone[redacted]; 'Rob.ayr[redacted]
'john.ruffin[redacted] Wivenhoe On-Call Officers
Subject: Wivenhoe Pumping 27_12_10
Attachments: attd1ee3.jpg; attd1ee4.jpg

Hi all,
Wivenhoe has a pumping event tonight for 3 hours single pump which = 2160 ML. (approx)

Cheers,[redacted]

[redacted]
Assistant Operations Co-ordinator
Generation Operations - Production B Shift
Tarong Energy Corporation

[redacted]
PO Box 15, Nanango, QLD 4615
www.tarongenergy.com.au
www.tarongenergy.com.au/careers



TARONG ENERGY

Be green...read from the screen

ATK-10(X1)

[redacted]

From: _Tarong DOI
Sent: Friday, 24 December 2010 1:30 PM
To: _Tarong DOI Alert
Subject: DOI Alert - Operating Instruction for Wivenhoe Power Station ...

Author : [redacted]
Plant : Wivenhoe Power Station
From To : 29/10/2010 3:00:00 AM - 31/01/2011 3:00:00 AM Details : Please note the addition of dutyseq@uqconnect.net to the e-mail list. (Steve Gusthart)

A request has been received from SEQ Water to inform their Flood Engineers of any upcoming "movements" of water from Wivenhoe Power Station. Please follow the following protocol where notice to the below email addresses is necessary.
These water movements are important with Wivenhoe dam at 100% or greater then 100%, these movements may trigger a response from SEQ water to release water from the dam where levels rise or reduce releases based on fall of the dam level. Notification of actual water movement is an early warning of dam level movements for SEQ water.

Where pump or generate is required please email the entire list below with an estimate of the actual flows based on the examples provided by Sorin. The advice must only contain water quantites and not market information.

EMAIL LIST:
John Tibaldi: [redacted]
Terry Malone: [redacted]
Rob Ayre: [redacted]
John Ruffini: [redacted]
+ Wivenhoe On-Call Officers from Tarong Energy email listing.

Examples:

Example 1: upcoming pumping tonight for two hours, single pump. 0.2 ML/s (pump capacity) x 3600 sec/hr x 2 hours = ~1,500ML withdrawal from Wivenhoe Dam.
E-mail to to say only "1,500ML withdrawal tonight"

Example 2: generation just started, one unit at 200MW for an estimated 3 hours. 4ML/MWh (approx turbine water rate) x 200MW x 3 hours = ~ 2,400ML.
E-mail to read "2,400ML released" or "..... taken from Wivenhoe" (for pumping).

The actual times for pump and generate can be taken from the market pre-dispatch and will be accurate enough for this advice.
The process should be (1) the event (generated / pump) is initiated, (2) the duration is then taken / estimated from the predispatch, (3) the water volume is calculated and (4) an email forwarded to the above email address..

The volume of water under generate or pump conditions is only best estimate of the volume of water movement.

ATK-10(XII)

[redacted]

From: [redacted]
Sent: Friday, 24 December 2010 12:25 PM
To: Gusthart, Steve
Subject: RE: Wivenhoe Generate 24/12/2010

Copy that[redacted], ta.
[redacted]

From: [redacted]
Sent: Friday, 24 December 2010 12:04 PM
To: [redacted]
Subject: RE: Wivenhoe Generate 24/12/2010

[redacted]

When we sent out the water release figures yesterday, we received a request from Terry Malone (Principal Hydrologist Queensland Bulk Water Supply Authority Seqwater) to add the new e-mail group to future notifications.

We don't really know who this group encompasses as members.

Hope this is of some assistance.

[redacted]

From: [redacted]
Sent: Friday, 24 December 2010 11:48 AM
To: [redacted]
Subject: RE: Wivenhoe Generate 24/12/2010

Thank you[redacted]
Who's "dutyseq"?

[redacted]

From: [redacted]y
Sent: Friday, 24 December 2010 9:46 AM
To: 'John Tibaldi:'; 'Terry Malone:'; 'Rob Ayre:'; 'John Ruffini:'; Wivenhoe On-Call Officers; '[redacted]
Cc: [redacted]
Subject: Wivenhoe Generate 24/12/2010

Hi All,

Approx 3200Ml of water to be released today

AT K-10 (xiii)

[redacted]

From: [redacted]
Sent: Friday, 24 December 2010 11:49 AM
To: Graham Keegan
Subject: FW: Wivenhoe Generate 24/12/2010
Attachments: powerbar.jpg; greenbar.jpg

Graham, FYI

[redacted]
Wivenhoe Power Station Manager
Tarong Energy Corporation
[redacted]
PO Box 38, Fernvale, QLD 4306
www.tarongenergy.com.au
www.tarongenergy.com.au/careers

Be green...read from the screen

From [redacted]
Sent: Friday, 24 December 2010 9:46 AM
To: 'John Tibaldi:'; 'Terry Malone:'; 'Rob Ayre:'; 'John Ruffini:'; Wivenhoe On-Call Officers; [redacted]
Cc: [redacted]
Subject: Wivenhoe Generate 24/12/2010

Hi All,

Approx 3200Ml of water to be released today

ATK-10 (XIV)

[redacted]

From: [redacted]
Sent: Friday, 24 December 2010 9:46 AM
To: 'John Tibaldi:'; 'Terry Malone:'; 'Rob Ayre:'; 'John Ruffini:'; Wivenhoe On-Call Officers; [redacted]
Cc: [redacted]
Subject: Wivenhoe Generate 24/12/2010

Hi All,

Approx 3200Ml of water to be released today

AMK-10(XVI)

[redacted]

From: [redacted]
Sent: Friday, 24 December 2010 5:29 AM
To: Wivenhoe On-Call Officers; [redacted]
Subject: Fwd: SEQ Water Officer on site at splitwater creek dam. 23/12/2010

Begin forwarded message:

From: [redacted]
Date: 24 December 2010 1:11:17 AEST
To: [redacted]
Cc: [redacted]
Subject: SEQ Water Officer on site at splitwater creek dam. 23/12/2010

HELLO [redacted]

PLEASE BE INFORMED GRAHAM KEEGAN SEQ WATER OFFICER, DRIVING A WHITE FORD RANGLER UTE REGO [redacted] WAS AT THE SPLITYARD CREEK DAM TO CKECK THE WATER LEVEL. AT 19.28 HRS AND 20.30 HRS THURSDAY 23/12/2010.

[redacted]
Wivenhoe Security
Wivenhoe Power Station
Tarong Energy Corporation

Fernvale, QLD 4306
www.tarongenergy.com.au
www.tarongenergy.com.au/careers

AHK-10(xvi)

[redacted]

From: [redacted]
Sent: Friday, 24 December 2010 5:27 AM
To: [redacted]
Subject: Fwd: Wivenhoe Generate 23/12/2010

[redacted] please forward to Graham Keegan at SEQW.

Sent by [redacted] OK

Begin forwarded message:

From: [redacted]
Date: 23 December 2010 10:18:28 AEST
To: "'John Tibaldi:' [redacted], "'Terry Malone:'" [redacted], "'Rob Ayre:'" [redacted], "'John Ruffini:'" [redacted], Wivenhoe On-Call Officers [redacted]
Cc: [redacted]
Subject: Wivenhoe Generate 23/12/2010

Hi All,

Approx 3200Ml of water to be released today

ATK-10(XVII)

[redacted]

From: [redacted]
Sent: Thursday, 23 December 2010 10:18 AM
To: 'John Tibaldi:'; 'Terry Malone:'; 'Rob Ayre:'; 'John Ruffini:'; Wivenhoe On-Call Officers
Cc: [redacted]
Subject: Wivenhoe Generate 23/12/2010

Hi All,

Approx 3200Ml of water to be released today