Operating Level Scenarios for Key Storages in South East Queensland

Project Meeting

1 February 2011

11 – 12 noon

Draft Agenda

1. **Introduction**
2. **Strategic Issues – feedback from other agencies, releases etc**
3. **Modelling Results to-date**
4. **Additional Modelling – time to reach 40% and 60%**
5. **Preparation of Report - progress**
6. **Other business**

D/11/001719

Example Framework for Consideration of the Impact on SEQ Water Strategy of Various Operating Levels for Wivenhoe Dam

Description	Base Case	Short Term Options			Intermediate (Ingenuity Option)	Long Term Option
		10% drawdown	30% drawdown	50% drawdown		
Security						
• Sufficiency	ok	ok	impacted	impacted		Impacted – demand management/ manufactured water required
• Demand/Supply Balance	ok	ok	ok	ok		Impacted – new infrastructure brought forward
Levers						
• Level of Service changed					Review	
• Policy					Review	
• Assumptions					Review	
• Other						
Input						
• Allocation	ok	ok	Impacted?	Impacted?		Impacted - Review required
• Yield	ok	ok	ok	ok		Impacted
• Demand	ok	ok	ok	ok		Potentially reduced
• Other						
Price						
	ok	ok	Grid operating costs / manufactured water triggered?	Grid operating costs / manufactured water triggered		Yes – new price path?

Note: above table is only an example – details are being assessed.

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Scenarios for Operation of Wivenhoe Dam January 2011

Preliminary Modelling results

Variation in Initial Wivenhoe Dam Level

An assessment of the risk criteria for three initial levels of Wivenhoe Dam was undertaken with the following assumptions:

- Initial levels of Wivenhoe Dam were 87.1%, 70% and 50%
- **All other storages were set at 100% initially.**
- No NPI2 for the duration of the modelling
- Simulation start was February 2011, with initial dam levels January 2011
- Price path 2010 – 2015 demands
- No Tugun desalination above 60% Key Water Grid Storages, full desalination below 60%

All scenarios passed the SOP risk criteria as shown below in the Table 1.

Table 1

SOP

Volume of water stored by all Key Water Grid Storages	Probability of reaching stored volume		
	1 year	3 years	5 years
40%	<.2%	NA	<5%
30%	NA	<.5%	<1%

Scenario - Wivenhoe 87% (Case 2)

Volume of water stored by all Key Water Grid Storages	Probability of reaching stored volume		
	1 year	3 years	5 years
40%	<.01%	NA	0.09%
30%	NA	<.01%	<.01%

Scenario - Wivenhoe 70% (Case 4)

Volume of water stored by all Key Water Grid Storages	Probability of reaching stored volume		
	1 year	3 years	5 years
40%	<.01%	NA	0.20%
30%	NA	<.01%	0.01%

Scenario - Wivenhoe 50% (Case 6)

Volume of water stored by all Key Water Grid Storages	Probability of reaching stored volume		
	1 year	3 years	5 years
40%	<.01%	NA	0.48%
30%	NA	<.01%	0.01%

Below in Table 2 are some of the results comparing the probability of reaching 40% for the scenarios run so far:

Table 2

Case	% Reduction Wivenhoe (from full supply)	Volume of Water Released from Wivenhoe Dam (ML)	%reduction of Grid 12 Storages (from full supply)	Probability of reaching 60% within 5 years (desalination trigger)	Probability of reaching 40% within 5 years (PRW trigger)
1	10	116,500	5.6		
2	12.9	150,285	7.3		.09%
3	20	233,000	11.3		
4	30	349,500	16.9		.2%
5	40	466,000	22.5		
6	50	582,500	28.1		.48%

Wivenhoe Dam initially at 50%, with varied initial Baroon Pocket and Hinze dam levels

An assessment of the effect on risk criteria of lower initial Hinze and Baroon Pocket dam levels was undertaken with the following assumptions:

- Initial level of Wivenhoe Dam 50%
- Baroon Pocket and Hinze Dam initial levels at 50%
- **All other storages were set at 100% initially.**
- No NPI2 for the duration of the modelling
- Simulation start was February 2011, with initial dam levels January 2011
- Price path 2010 – 2015 demands
- No Tugun desalination above 60% Key Water Grid Storages, full desalination below 60%

Both scenarios passed the risk criteria as shown in Table 3 below.

Table 3

SOP

Volume of water stored by all Key Water Grid Storages	Probability of reaching stored volume		
	1 year	3 years	5 years
40%	<.2%	NA	<5%
30%	NA	<.5%	<1%

50/50/50%

Volume of water stored by all Key Water Grid Storages	Probability of reaching stored volume		
	1 year	3 years	5 years
40%	<.01%	NA	0.49%
30%	NA	0.01%	.03%%

Table 4 compares the risk criteria for all scenarios.

Table 4

Wivenhoe/Baroon/Hinze levels	50/50/50	50/100/100	70/100/100	87/100/100	SOP
40% SEQ volume					
1 year	<.01%	<.01%	<.01%	<.01%	<2%
5 year	0.49%	0.48%	0.20%	0.09%	<5%
30% SEQ volume					
3 years	0.01%	<.01%	<.01%	<.01%	<5%
5 years	0.03%	<.01%	0.01%	<.01%	<1%

Storage behaviour curves for varying probabilities of exceedance are shown below in Figures 1 and 2.

Figure 1

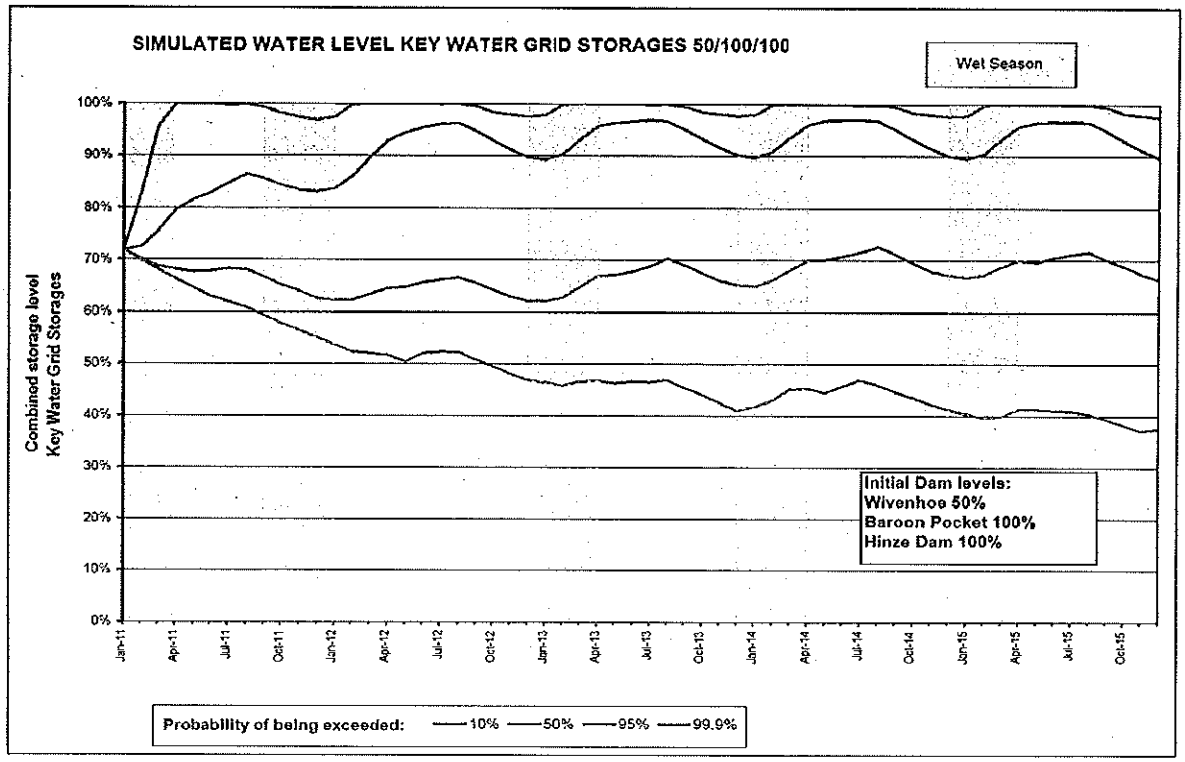


Figure2

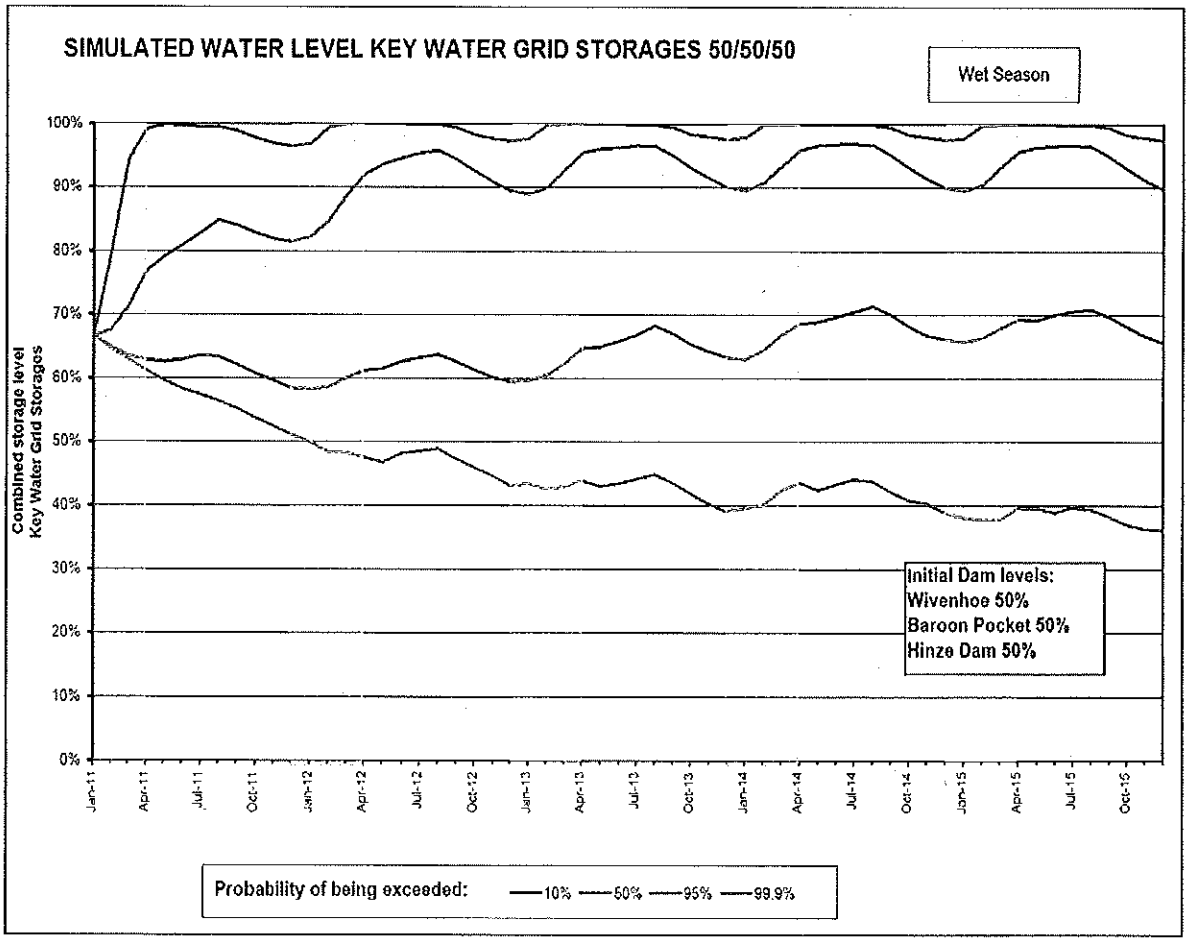


Figure 1: Water Balance

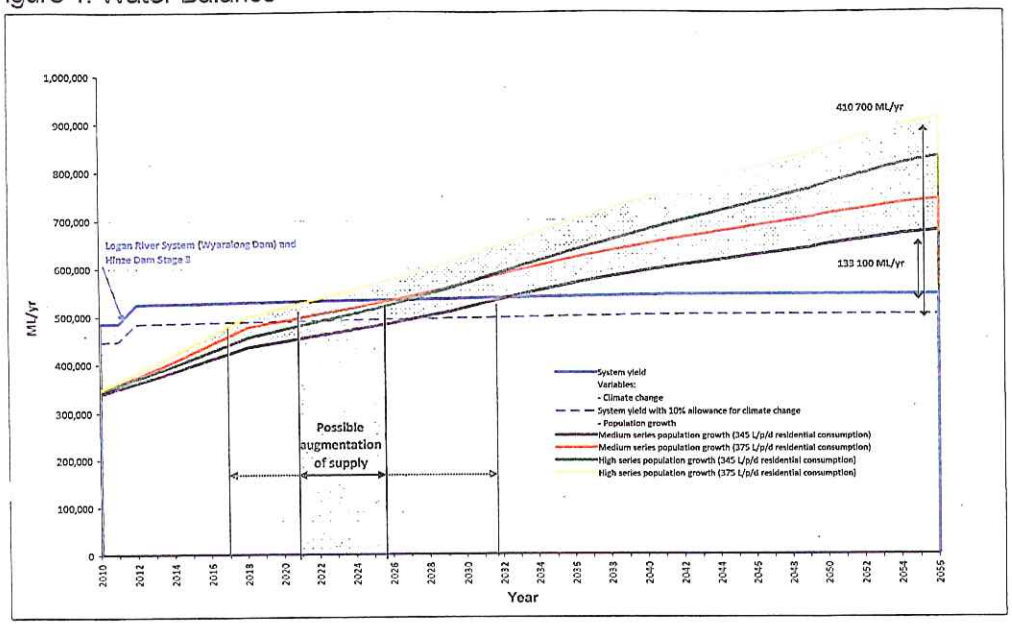


Figure 2: Storage Levels - "Grid 12"

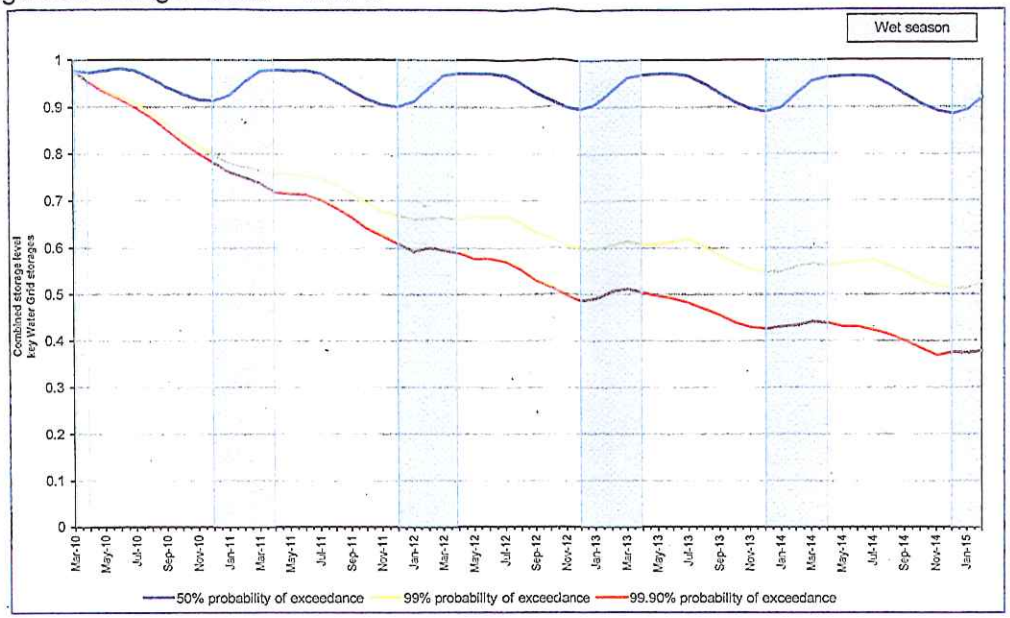


Figure 3: Drought Response Storage Trigger Points

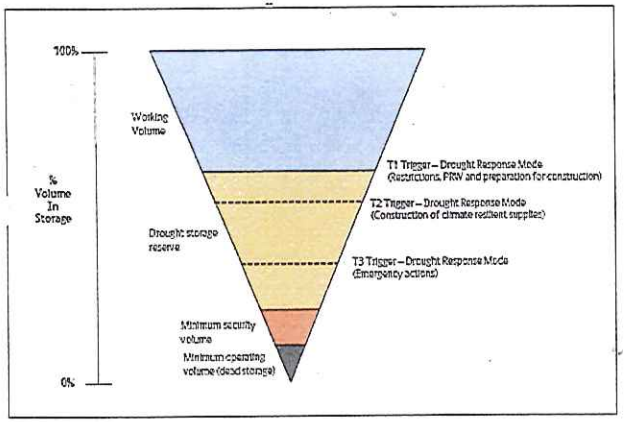
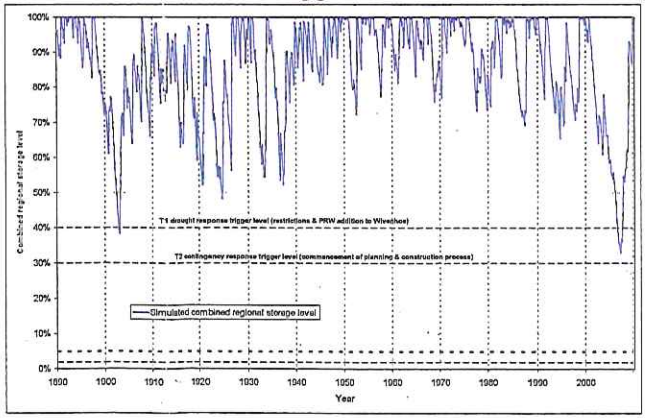


Table A: Impact of Reduced Consumption on the Timing of the Next Augmentation

Scenario	Regional average residential consumption	
	230 litres/person/day	200 litres/person/day
Earliest date with: • high population growth • provision for climate impact	2017	2022
Likely date with: • high population growth	2021	2027
Likely date with: • medium population growth • provision for climate impact	2020	2027
Latest date with: • medium population growth	2026	2032

Figure 4: Storage Levels with Drought Response Triggers



The next bulk water source will be required for a growth or drought trigger. Fig 1 shows likely timeframes for growth scenarios. Fig 2 shows that there is 1 in a 1000 probability that a drought trigger might occur in late 2014 requiring construction to commence in 2017. Fig 3 illustrates the relationship of drought triggers to storage levels while Fig 4 illustrates that the present grid is sufficiently robust that on present population and planning based demand levels of 230 l/p/d construction of drought response infrastructure would not have been required for the Millennium drought.