
Applying the New Capital Expenditure Criteria to Expansions of the Mid West and South West Gas Distribution Systems

A report prepared for WAGN

20 April 2010

Marsden Jacob

A s s o c i a t e s

<http://www.marsdenjacob.com.au>

Marsden Jacob Associates

Financial & Economic Consultants

ABN 66 663 324 657

ACN 072 233 204

Internet: <http://www.marsdenjacob.com.au>

E-mail: economists@marsdenjacob.com.au

Perth office:

Level 6, 731 Hay Street, Perth
Western Australia, 6000 AUSTRALIA

Telephone: +61 (0) 8 9324 1785

Facsimile: +61 (0) 8 9324 1751

Melbourne office:

Postal address: Level 3, 683 Burke Road, Camberwell
Victoria 3124 AUSTRALIA

Telephone: +61 (0) 3 9882 1600

Facsimile: +61 (0) 3 9882 1300

Brisbane office:

Level 5, 100 Eagle St, Brisbane
Queensland, 4000 AUSTRALIA

Telephone: +61 (0) 7 3229 7701

Facsimile: +61 (0) 7 3229 7944

Author: Alex Marsden, Dr John Williams

This report may be cited as: *Applying the new capital expenditure criteria to expansions of the MWSWGDS*, Marsden Jacob Associates 2010.

This report has been prepared in accordance with the scope of services described in the contract or agreement between Marsden Jacob Associates Pty Ltd ACN 072 233 204 (MJA) and the Client. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Client. Furthermore, the report has been prepared solely for use by the Client and Marsden Jacob Associates accepts no responsibility for its use by other parties.



Copyright © Marsden Jacob Associates Pty Ltd 2006

TABLE OF CONTENTS

	Page
1. Introduction.....	4
2. Rule 79(2) of the <i>National Gas Rules</i>.....	6
2.1. Rule 79	6
2.2. Rule 79(2)(a)	7
2.3. Rule 79(2)(b)	8
2.4. Rule 79(2)(c)	8
2.5. Rule 79(2)(d)	9
2.6. A hierarchy of tests	9
3. Overview of the investment.....	10
4. Applying Rule 79(2) to the new capital expenditure for expansions of the Mid West and South West Gas Distribution Systems expansions	12
4.1. Applying Rule 79(2)(c): safety, integrity, compliance with regulation, or maintenance of capacity	12
4.2. Applying Rule 79(2)(b): present value of the expected incremental revenue to exceed the present value of the capital expenditure	13
5. Conclusions	17

1. Introduction

In responding to the energy requirements of an expanding Western Australian economy, a number of customers sought additional gas distribution capacity in the Mid West and South West Gas Distribution Systems (MWSWGDS).

As the result of these requests, WA Gas Networks (WAGN) undertook a capital investment program over the period from 2005 to 2009 to increase the capacity of the MWSWGDS. A second program is planned for the period from 2010 to 2014. These investments are summarised in Table 1.

Table 1: Summary of expansions

Stage	Expenditure (\$ million, 2009 real)	Connections Created
2009-2009 Expansion	\$182.79	100,057
2010-2014 Expansion	\$226.33	80,936

The MWSWGDS is a covered pipeline for the purposes of the access regime of the *National Gas Law* (NGL) and the *National Gas Rules* (NGR). This access regime has been implemented in Western Australia through the *National Gas Access (WA) Act 2009*.

The NGR allow pipeline expansion investment (“new capital expenditure”) to be added to the capital base of a covered pipeline at the commencement of each new access arrangement period, and recovered via regulated reference tariffs, if the capital expenditure is conforming capital expenditure under Rule 79 of the NGR.

As set out in Rule 78, the projected capital base for a particular period is:

(a) the opening capital base;

plus:

(b) forecast conforming capital expenditure for the period;

less:

(c) forecast depreciation for the period; and

(d) the forecast value of pipeline assets to be disposed of in the course of the period.

As set out in Rule 77, the opening capital base is:

- (a) *the opening capital base as at the commencement of the earlier access arrangement period . . . ;*

plus:

- (b) *conforming capital expenditure made, or to be made, during the earlier access arrangement period;*

plus:

- (c) *any amounts to be added to the capital base under rule 82, 84 or 86;*

less:

- (d) *depreciation over the earlier access arrangement period . . . ; and*
- (e) *redundant assets identified during the course of the earlier access arrangement period; and*
- (f) *the value of pipeline assets disposed of during the earlier access arrangement period.*

WAGN has asked Marsden Jacob Associates to assess whether the capital expenditures on are justifiable with reference to the criteria of Rule 79(2) and may therefore be conforming capital expenditures under the NGR.

Marsden Jacob Associates' assessments are set out in subsequent sections of this report.

Section 2 of the report sets out the criteria in Rule 79(2) which must be satisfied if capital expenditure is to be added to the capital base. Section 3 summarises the capital expenditures made in the expansions of the MWSWGDS. Whether the criteria of Rule 79(2) are satisfied by these expenditures is assessed in section 4.

2. Rule 79(2) of the *National Gas Rules*

The NGR set out criteria which must be satisfied if new capital expenditure is to be added to the capital base of a covered pipeline for recovery via future reference tariffs.

2.1. Rule 79

In accordance with Rule 77(2), only conforming capital expenditure made during an earlier access arrangement period can be added to the opening capital base for the next access arrangement period. Rule 78 then outlines that the projected capital base is the opening capital base plus forecast conforming capital expenditure for the period. Conforming capital expenditure is capital expenditure that conforms with the criteria of Rule 79(1):

- the capital expenditure must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services; and
- the capital expenditure must be justifiable on a ground stated in Rule 79(2).

Capital expenditure is justifiable, under Rule 79(2), if:

- the overall economic value of the expenditure is positive (Rule 79(2)(a)); or
- the present value of the expected incremental revenue to be generated as a result of the expenditure exceeds the present value of the capital expenditure (Rule 79(2)(b)); or
- the capital expenditure is necessary:
 - to maintain and improve the safety of services (Rule 79(2)(c)(i)); or
 - to maintain the integrity of services (Rule 79(2)(c)(ii)); or
 - to comply with a regulatory obligation or requirement (Rule 79(2)(c)(iii)); or
 - to maintain the service provider's capacity to meet levels of demand for services existing at the time the capital expenditure is incurred (as distinct from projected demand that is dependent on an expansion of pipeline capacity) (Rule 79(2)(c)(iv)).
- the capital expenditure is an aggregate amount relating in part to incremental services which are justifiable under Rule 79(2)(b) and the remainder relates to expenditure outlined in Rule 79(2)(c), such as to maintain the integrity of services.

2.2. Rule 79(2)(a)

The first criterion of Rule 79(2) – a requirement that the overall economic value of new capital expenditure be positive – appears to be a broadly based economic cost benefit test. The term “economic value” is not defined but, in his second reading speech on the *National Gas (South Australia) Bill 2008*, the South Australian Minister explained:

The initial Rules will now include a "positive economic value" test for investment in existing pipelines designed to capture net increases in producer and consumer surpluses in upstream and downstream gas markets, whilst also capturing the system security and reliability benefits that were considered by regulators to constitute system-wide benefits.

The intention to establish an economic cost benefit test is clearly indicated by the Minister’s reference to the capture of net increases in producer and consumer surpluses. However, the test is not broadly based. Rule 79(3) limits its scope, requiring that, in deciding whether the overall economic value of capital expenditure is positive, consideration be given only to economic value directly accruing to the service provider, gas producers, shippers, and users of gas.

The Australian Energy Regulator’s *Access Arrangement Guideline* provides a similar interpretation of the meaning of the overall economic value:

The overall economic value test does require some form of cost-benefit analysis. However, this does not need to be a comprehensive test. The overall economic value test will not address whether a different option to expand a pipeline may provide greater benefits. Rather, the test is a positive benefits test: it should focus on the task of whether there are sufficient benefits to meet, or exceed, the cost of the proposed facility.¹

The *Guideline* also indicates the types of benefits that should be taken into account in the assessment:

- the net value to end users in being able to purchase additional supplies of gas;
- the net value to gas producers of being able to sell additional quantities of gas, and
- the net value to retailers (or aggregators) of being able to offer their services across a greater volume of gas sold.²

The transitional provisions of clause 7 of Schedule 1 to the NGR govern the application of Rule 79(3) in Western Australia until the end of the second access arrangement period commencing after the date of transition. Clause 7(2) states:

¹ Australian Energy Regulator, *Access Arrangement Guideline*, March 2009, page 58.

² Australian Energy Regulator, *Access Arrangement Guideline*, March 2009, page 58.

In making a relevant decision under rule 79(3) on whether the overall economic value of capital expenditure is positive, the AER [regulator] must consider not only economic value directly accruing to the service provider, gas producers, users and end users (as required by rule 79(3)) but also material economic value that is likely to accrue directly to electricity market participants and end users of electricity from additional gas fired generation capacity.

Clearly, clause 7(2) extends the scope of Rule 79(3) by allowing consideration of the economic value accruing to electricity market participants and to users of electricity generated from gas, in addition to the economic value accruing to the service provider, gas producers, shippers, and users of gas, in deciding whether the overall economic value of capital expenditure is positive.

2.3. Rule 79(2)(b)

Rule 79(2)(b) is an incremental revenue test. The test compares the present value of expected net incremental revenue with the present value of new capital expenditure. The new capital expenditure can be added to the capital base only if the present value of net incremental revenue expected to be generated is greater than the present value of the expenditure.

The incremental revenue test of Rule 79(2)(b) requires, essentially, that the new capital expenditure provide positive economic value to the service provider if it is to be added to the capital base.

Rule 79(4) guides the application of the test in determining the present value of expected net incremental revenue:

- a tariff is to be assumed for incremental services based on (or extrapolated from) prevailing reference tariffs;
- incremental revenue is to be the gross revenue expected to be derived from the incremental services less incremental operating expenditure; and
- the discount rate to be used is to be the rate of return implicit in the reference tariff.

2.4. Rule 79(2)(c)

New capital expenditure is justified in accordance with the third part of Rule 79(2) if that expenditure is necessary for safety, to maintain the integrity of services, to comply with regulation, or to maintain capacity to meet existing demand for services.

2.5. Rule 79(2)(d)

Finally, Rule 79(2)(d) outlines that the capital expenditure is justified where it is divisible into 2 parts, one referable to incremental services and the other referable to system maintenance or some other purpose referred to in paragraph (c), and each element of the expenditure is justified under the relevant section.

2.6. A hierarchy of tests

The new capital expenditure criteria of Rule 79(2) provide, in effect, a hierarchy of tests for whether prudent new capital expenditure can be added to the capital base of a covered pipeline.

- If the expenditure is necessary for safety, to maintain the integrity of services, to comply with regulation, or to maintain capacity to meet existing demand for services, it may be added to the capital base (Rule 79(2)(c)).
- If the expenditure is not necessary for any of the reasons listed in the previous point, but yields positive economic value to the service provider (the expected incremental revenue exceeds the present value of the expenditure), it may be added to the capital base (Rule 79(2)(b)).
- If the expenditure is not necessary for any of the reasons listed in the first point, and does not yield positive economic value for the service provider, it may be added to the capital base if the overall economic value of the expenditure for the service provider, gas producers, shippers and gas users is positive (Rule 79(2)(a)).

In addition, Rule 79(2)(d) allows that where expenditure is a combination of system maintenance and incremental capacity, each element of the expenditure is considered under the relevant test of Rule 79(2)(b) and Rule 79(2)(c).

3. Overview of the investment

WAGN undertook a capital investment program over the period from 2005 to 2009 to increase the capacity of the MWSWGDS. As there are a large range of funding sources for this program the allocation of costs is set out in detail in Table 2, below.

Table 2: Capital expenditure for the 2005-2009 expansion program (\$m, real Dec 2009)

		2005	2006	2007	2008	2009
Demand	\$m	0.69	1.94	5.67	2.17	6.65
User initiated	\$m	27.38	33.48	30.56	24.45	22.80
Asset replacement	\$m	0.01	0.51	0.02	5.98	5.92
Performance	\$m	0.48	0.43	0.40	4.37	8.88
	\$m	28.56	36.36	36.65	36.96	44.25
Less: capital contributions	\$m	0.24	2.71	1.35	1.28	0.07
		28.32	33.65	35.30	35.68	44.18

Capital expenditure to be assessed against Rule 79(2)(b)

Demand	\$m	0.69	1.94	5.67	2.17	6.65
User initiated	\$m	27.38	33.48	30.56	24.45	22.80
	\$m	28.07	35.42	36.23	26.61	29.45

Less: capital contributions	\$m	0.24	2.71	1.35	1.28	0.07
	\$m	27.83	32.71	34.88	25.33	29.37

Classified as "Performance" in WAGN Submission

Mandurah lateral	\$m	0.00	0.00	0.21	1.72	4.05
DBNGP gate station	\$m	0.00	0.00	0.00	0.00	1.46
	\$m	0.00	0.00	0.21	1.72	5.51

Assignment of costs for Mandurah lateral and DBNGP gate station

Portion for system integrity (75%)	\$m	0.00	0.00	0.16	1.29	4.13
Portion to be assessed against Rule 79(2)(b)	\$m	0.00	0.00	0.05	0.43	1.38

Capital Expenditure to be assessed against Incremental Revenue test	\$m	27.83	32.71	34.93	25.76	30.75
--	------------	--------------	--------------	--------------	--------------	--------------

A second capital expansion program for the MWSWGDS is planned for the period from 2010 to 2014. This is summarised in Table 3.

Table 3: Capital expenditure for the 2010-2014 expansion program (\$m, real Dec 2009)

		2010(1)	2010/11	2011/12	2012/13	2013/14 ³
Demand	\$m	1.24	9.89	7.20	6.74	10.75
User initiated	\$m	10.10	21.42	23.85	26.71	30.66
Asset replacement	\$m	4.06	9.46	15.75	7.84	8.27
Performance	\$m	12.87	4.76	3.23	9.26	2.29
		28.27	45.52	50.03	50.54	51.97
Less: capital contributions	\$m	0.20	0.41	0.45	0.49	0.53
		28.07	45.12	49.58	50.05	51.44

Capital expenditure to be assessed against Rule 79(2)(b)

Demand	\$m	1.24	9.89	7.20	6.74	10.75
User initiated	\$m	10.10	21.42	23.85	26.71	30.66
		11.34	31.30	31.05	33.44	41.41

Less: capital contributions	\$m	0.20	0.41	0.45	0.49	0.53
		11.14	30.90	30.60	32.95	40.88

Classified as "Performance" in WAGN Submission⁴

Mandurah lateral	\$m	9.37	0.00	0.00	0.00	0.00
DBNGP gate station	\$m	2.01	0.42	0.00	0.00	0.00
	\$m	11.38	0.42	0.00	0.00	0.00

Assignment of costs for Mandurah lateral and DBNGP gate station

Portion for system integrity (75%)	\$m	8.54	0.32	0.00	0.00	0.00
Portion to be assessed against Rule 79(2)(b)	\$m	2.85	0.11	0.00	0.00	0.00

Capital Expenditure to be assessed against Incremental Revenue test	\$m	13.98	31.00	30.60	32.95	40.88
--	------------	--------------	--------------	--------------	--------------	--------------

³ WAGN Submission, 29 January 2010, Tables 30 and 34

⁴ 29 January 2010, Tables 29 and 31

4. Applying Rule 79(2) to the new capital expenditure for expansions of the Mid West and South West Gas Distribution Systems expansions

In this section of the report, we consider the application of the new capital expenditure criteria of Rule 79(2) to the expansions of the MWSWGDS.

We assume that, for each stage of expansion, the investment is prudent in accordance with the requirements of Rule 79(1)(a). We have been asked to assume that WAGN's expansion planning for the MWSWGDS, its contracting strategy, and its construction methods, are those of a prudent pipeline service provider acting efficiently, in accordance with accepted good industry practice, and should allow it to provide gas distribution services at the lowest sustainable cost.

As set out in Rule 79(2)(d), where expenditure is a combination of system maintenance and incremental capacity, each element of the expenditure is considered under the relevant test of Rule 79(2)(b) and Rule 79(2)(c). As both the 2005-2009 and 2010-2014 expansion programs are aggregate amounts divisible into 2 parts, one referable to incremental services and the other referable to safety, integrity, compliance with regulation, or maintenance of capacity we consider the appropriate allocation of these costs.

4.1. Applying Rule 79(2)(c): safety, integrity, compliance with regulation, or maintenance of capacity

WAGN advise that within the 2005-2009 and 2010 -2014 expansion programs there are two elements that were undertaken in part due to safety, integrity, compliance with regulation, or maintenance of capacity.

WAGN advise that both the construction of the Mandurah lateral and the DBNGP gate station were undertaken for the purpose of maintaining system pressure in order to maintain the service provider's capacity to meet levels of demand for services existing at the time the capital expenditure is/was incurred and so are justifiable under Rule 79(2)(c)(iv).

WAGN have indicated that while these elements were required for system integrity, they were constructed at scale that allowed some level of further system expansion. The provision of expansion capacity required incrementally larger piping and valve sizes, than would have otherwise been necessary, but engineering estimates indicate that this represents a small portion of the budget.

WAGN have estimated that 75% of the costs are relevant to system integrity and so meet the requirements of Rule 79(2)(c). The remaining portion of these costs are considered under

Rule 79(2)(b) and are discussed in the following section. Under Rule 79(2)(d), we consider the remaining 25% of the costs for these capital expansion elements under Rule 79(2)(b).

4.2. Applying Rule 79(2)(b): present value of the expected incremental revenue to exceed the present value of the capital expenditure

We next assess the capital expenditure that relates to incremental services and consider whether the present value of the net incremental revenue from sale of the additional capacity provided by expansion exceeds the present value of the expansion capital expenditure. In undertaking this assessment, we consider the two stages of expansion separately.

In applying the incremental revenue test of Rule 79(2)(b), all dollar values have been converted to real, December 2009 values, consistent with the approach taken in preparing the proposed revisions to the Access Arrangement for the MWSWGDS which were submitted to the ERA on 29 January 2010.

Rule 79(4)(a) directs that, in determining the present value of expected incremental revenue, the tariff assumed is to be *based on (or extrapolated from) prevailing reference tariffs*. This opens the possibility that the tariff to be applied in determining the incremental revenues expected to be earned during future access arrangement periods is not the prevailing – that is, current – reference tariff, but the progressively declining reference tariff resulting from application of the building block method of total revenue determination in those future access arrangement periods.

From an extrapolation, in which the calculations made for the proposed revisions to the Access Arrangement for the WAGN were extended forward over a period of 50 years assuming no further investment in the pipeline, the total revenue was found to decline at approximately 1.8% annually. Based on this result, we assumed an annual 2% reduction in the reference tariff, after 2010. This calculation ignores replacement of short run assets, which if included, would boost capital expenditure and tariffs. In this case the decline would be less than the 2% we have assumed.

Rule 79(4)(c) further requires that the discount rate to be used in calculating the present values of net incremental revenue and capital expenditure be the rate of return implicit in the reference tariff. The rate of return used to determine the current - prevailing - reference tariff for the DBNGP was 6.78% (real, pre-tax). This rate has been used as the discount rate in applying Rule 79(2)(b).

The calculation of the incremental revenue for each of the expansion programs is based upon the following calculation:

New customers x (incremental revenue per customer – incremental cost per customers)

In calculating the incremental revenue and costs for the 2005-2009 and 2010-2014 expansion programs we have utilised inputs that are consistent with the WAGN Tariff model and other submissions to the ERA.

New customer numbers are consistent with the tariff model and are set out in Table 4 and Table 5.

Table 4: Incremental customer numbers 2005-2009 expansion program

Tariff class	2005	2006	2007	2008	2009
A1	2	1	1	2	1
A2	0	3	3	0	2
B1	23	26	27	43	57
B2	336	385	406	470	569
B3	19,635	22,357	20,466	18,251	16,991
Total	19,996	22,772	20,903	18,766	17,620

Table 5: Incremental customer numbers 2010-2014 expansion program⁵

Tariff class	2010(1)	2010/11	2011/12	2012/13	2013/14
A1	1	0	0	0	0
A2	2	3	3	3	3
B1	25	0	8	26	27
B2	150	0	48	249	264
B3	7,624	15,630	17,232	18,999	20,639
Total	7,802	15,633	17,291	19,277	20,933

Incremental revenue is calculated for each tariff class based on the existing tariff (adjusted, as discussed above) and the average volume for each tariff class, derived from the 2005-2009 period⁶.

The calculation of incremental costs per customer is derived from:

- avoidable operations cost estimates⁷ and,
- unaccounted for gas cost allocations to each tariff class⁸.

In order to apply the incremental revenue test, we have constructed a spreadsheet model of the revenues expected to be generated from pipeline expansion, and of the additional costs

⁵ WAGN Submission *Avoidable, stand alone and long run marginal costs*, 15 March 2010, Table 30

⁶ The total number of connections and volumes are derived from the WAGN tariff model

⁷ WAGN Submission *Avoidable, stand alone and long run marginal costs*, 15 March 2010, Table 3

⁸ WAGN tariff model

incurred. The tables and graphs below are outputs from model, which is provided with this report.

The results from applying the incremental revenue test of Rule 79(2)(b) to the new capital expenditures for 2005-2009 and 2010 -2014 expansion programs are summarized in Table 6.

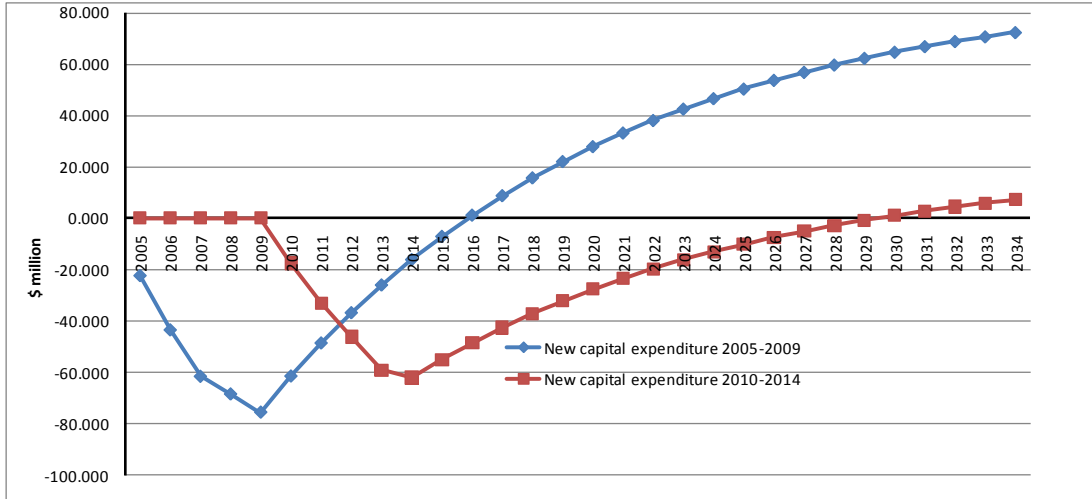
Table 6: Present value expected net incremental revenue less present value of capital expenditure for the 2005-2009 and 2010-2014 expansions of the MWSWGDS

Expansion Program	Net Present Value in 2030 (\$ million)	
	2005-2009	2010 -2014
PV(cumulative net incremental revenue)	\$190.16	\$92.08
PV(cumulative CAPEX)	\$125.40	\$89.21
PV(net incremental revenue) - PV(CAPEX)	\$64.76	\$2.87

For each of the expansion programs, the present value of the expected net incremental revenue is greater than the present value of the capital expenditure. For each program, the new capital expenditure is justifiable with reference to the criterion of Rule 79(2)(a). The total of the new capital expenditure for each of the stages of expansion is, therefore, conforming.

After 25 years (in 2030), the amount by which the present value of the expected net incremental revenue is greater than the present value of the capital expenditure for the 2005-2009 expansion program is approximately \$65 million (real, December 2009) and for the 2010 -2014 expansion program it is \$3 million (real, December 2009). The change in the incremental revenue test over time is clearly apparent from Figure 1.

Figure 1: MWSWGDs expansions: present value of expected net incremental revenue less present value of capital expenditure



As each capital expenditure for each of the of expansion programs is justifiable with reference to the criterion of Rule 79(2)(a), the combined program is also justifiable.

5. Conclusions

The principal conclusions of this report are:

- WAGN has undertaken two expansions of the capacity of the MWSWGDS (the 2005-2009 and the 2010-2014 programs) with a total capital expenditure of \$182.79 million and \$226.33 million respectively (real, December 2009 dollars);
- WAGN advise that a portion of each of these stages of expansion is justifiable under Rule 79(2)(c) of the NGR;
- the remaining elements of each expansion program is justifiable with reference to the criterion of Rule 79(2)(b) of the NGR;
- as both the expansion programs meet the requirements of Rules 79(2)(b) and 79(2)(c) we have not assessed them against Rule 79(2)(a), by considering the overall economic value generated; and,
- provided the expenditure on each of the three stages meets the prudence requirements of Rule 79(1), the capital expenditure for the two stages of expansion should be considered conforming capital expenditure which can be added to the projected capital base of the MWSWGDS for subsequent recovery via reference tariffs.