Application of contingencies in cost estimating

March 2011

Envestra

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A+ GRI Rating: Sustainability Report 2009

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11 March 2011

Mr Ralph Mignone
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Envestra
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Sent via email - Ralph.Mignone@envestra.com.au

Dear Ralph

Application of contingencies in cost estimating

As requested, PB has undertaken an independent review of the information relating to Envestra's application of contingencies to cost estimates, and this letter sets out our opinions and findings in relation to this matter.

1. Background and scope

In October 2010 Envestra lodged its proposed Access Arrangements and supporting Access Arrangement Information (AAI)[1] documents with the Australian Energy Regulator (AER) in accordance with Rule 52 of the National Gas Rules (NGR). The AER, and its consultants Wilson Cook, undertook a review of Envestra's proposals and in February 2011 the AER issued its Draft Decisions[2] rejecting Envestra's access arrangement proposals. Amongst other matters, in its Draft Decisions the AER rejected Envestra's application of contingencies to cost estimates. Envestra has until 23 March 2011 to respond to the matters raised in the AER's Draft Decisions.

Envestra has determined that it will respond to the AER's Draft Decisions seeking to clarify and further support its use of contingency amounts. Envestra has engaged PB to conduct a thorough review of the information relating to the application of contingencies and provide Envestra with an independent view of the AER's concerns regarding this matter.

1 Envestra. 1 October 2010, *South Australian Access Arrangement Information Public Version.* Envestra. 1 October 2010, *Queensland Access Arrangement Information Public Version.*

2 Australian Energy Regulator. February 2011, *Draft Decision, Envestra Ltd, Access arrangement proposal for the SA gas network, 1 July 2011 – 30 June 2016.* pp. 40-41. Australian Energy Regulator. February 2011, *Draft Decision, Envestra Ltd, Access arrangement proposal for the Qld. gas network, 1 July 2011 – 30 June 2016.* pp. 33-34.

2. Context - the AER's findings

In its Draft Decisions the AER recognised that capex estimating is not an exact process and that contingencies may be appropriate in some circumstances. In particular, drawing upon the Australian Competition Tribunal's decision in relation to an application by East Australian Pipeline Limited (EAPL)[3], the AER expressed the view that inherent risks and some contingent risk could form part of the base estimate. In expressing this view, the AER added that EAPL's contingency was based on the provision of significant design details, cost estimate details, and specific network knowledge and experience. The AER further added that in its opinion the EAPL project was '… likely to have significantly greater cost uncertainties and risks than the capital projects proposed by Envestra …'[4].

The AER concluded that Envestra did not provide details justifying its proposed contingencies, and that Envestra's capex estimates should contain minimal cost omissions given the business' substantial experience in the construction, installation and estimation of its capex activities[5]. Citing Wilson Cook's reviews, the AER agreed that Envestra's forecasting and budgeting processes are '… sound, refined periodically and capable of producing estimates that prove, in the event, to have been accurate'[6].

Further, the AER expressed the view that contingency allowances may be symmetrical with consequent forecast expenditure deductions, and noted that without a detailed analysis, such symmetries cannot be identified. Hence the AER concluded that a general contingency allowance based purely on estimates will not account for this[7].

On the basis of its analysis, and the findings of Wilson Cook, the AER considered Envestra's proposed contingency allowances with respect to capex to be excessive, and therefore not meeting the requirements of r. 79(2)(c) of the NGR[8]. In section 8 of the Draft Decisions the AER also applied this view to its consideration of the application of contingencies to certain opex estimates[9]. Consequently, under the Draft Decisions the AER requires Envestra to remove the contingency allowance from all capex and opex estimates.

3. Wilson Cook's findings

In its report to the AER, Wilson Cook noted Envestra's application of contingencies to cost estimates, and expressed the view that non-specific contingency allowances are not appropriate in regulatory submissions as such allowances are effectively a provision, and while they may be called upon in some

3 *ibid.* (SA) p. 40, (Qld.) p. 33.
4 *ibid.*
5 *ibid.*
6 *ibid.* (SA) p. 41, (Qld.) p. 34.
7 *ibid.*.
8 *ibid.*.
9 *ibid.* (SA) p. 128-167, (Qld.) pp. 118-154.

instances, they are unlikely to be called upon generally, or to their full extent[10]. Wilson Cook also drew a distinction between a contingency and a provisional sum, expressing the view that provisional sums for specific matters that will arise but cannot be quantified are a separate matter and should be addressed on their particular merits[11].

Based on its analysis of the information provided by Envestra, Wilson Cook concluded that a general contingency, or other such general allowance, that has not been established as necessary, should not be supported.

4. PB's review of Envestra's estimating approach

PB has reviewed Envestra's estimating approach and held discussions with Envestra specifically regarding the application of contingency amounts.

PB notes that in its AAI documents, Envestra states that projects are allocated a contingency amount to account for uncertainties in the project scope or execution, noting further that the amount of contingency is determined from a matrix (the matrix) based on the 'Association for the Advancement of Cost Engineering International Recommended Practice 17R-97 – Cost Estimate Classification System TCM Framework 7.3 – Cost Estimating and Budgeting'[12]. It is understood from discussions with Envestra, that in developing the matrix applied to its estimates, Envestra followed the AACE methodology.

From our review, PB understands that the estimates used in Envestra's access arrangement submission, employ baseline cost estimates developed from the partially complete project definitions available at the time of estimating. As the project definitions are only partially complete, Envestra has added a percentage contingency to its baseline estimates to account for specific cost items that will arise, but which are not yet quantifiable due to the incomplete nature of the project definitions. The particular percentage contingency employed in this process is established from the matrix after assessing the level of completeness of each project definition. We also understand that the intention of this process is to "close the gap" (as it were) between the baseline estimates derived from incomplete project definitions, and the baseline estimates that would be derived if completed project definitions were available. That is:

Expected project outturn cost = baseline estimate (from an incomplete project definition) + contingency

That is, the contingency 'closes the gap' between the between the baseline estimate derived from the incomplete project definition and the baseline estimate derived from the completed project definition. PB

10 Wilson Cook & Co. 17 December 2010, *Review of Expenditure of Queensland & South Australian Gas Distributors: Envestra Ltd (South Australia) (Draft).* p. 37.
11 *ibid.* p. 37.
12 Envestra. 1 October 2010, *South Australian Access Arrangement Information Public Version.* pp. 95-96. Envestra. 1 October 2010, *Queensland Access Arrangement Information Public Version. pp. 90-91 .*

notes that this is consistent with the AACE practice which assesses project estimate accuracy for various classes of project definition completeness against the corresponding baseline estimate plus contingency.

Through our enquiries, Envestra has advised PB that at this stage of design/planning the "gap" between the estimates based on incomplete project definitions (available at the time of estimating) and the estimates based on completed project definitions involves a range of specific issues. In particular, establishing completed project definitions requires[13]:

- undertaking a front end engineering design (FEED) study to complete the project scope and enable project controls to be defined
- obtaining details of underground services from various utilities to establish specific design details to enable coordination with other utilities, route particulars and protection arrangements
- preparation of draft environmental and traffic management plans to identify environmental and traffic issues and determine design requirements and working practices
- obtaining non binding cost estimates from at least one contractor to establish relevant rates within the prevailing market and taking account of specific hazards identified (e.g. confined space, etc) and working arrangements required (e.g. night work to address traffic management requirements, etc).

It is understood that without addressing these issues, Envestra cannot quantify certain costs that will be incurred and applies a contingency to cover these uncosted items.

In its advice, Envestra also expressed that view that accurately estimating the cost of projects that have a high degree of uniqueness, based on preliminary design/planning information, and up to 6 years in to the future, is completely unrealistic. Envestra further added that many of the projects are unique; citing the fact that replacement of mains in the CBD has not been undertaken for over 5 years.

Given the considerable amount of work needed to complete the project definitions, PB sought to identify the cost items that are provided for through the application of the contingency amounts. Envestra advised that the contingency is expected to make provision for a range of cost items not fully identified but including such costs as[14]:

- coordination works to accommodate the underground services of other utilities (electricity, telecommunications, water, etc) during detailed design, works planning and construction
- working constraints on major roadways. For example night works, restrictive work practices, specific traffic control requirements, etc)

13 Envestra. ND, SA *& Queensland Draft Access Determination Position Paper (Draft).* p. 2.

14 Envestra. ND, SA *& Queensland Draft Access Determination Position Paper (Draft) – with additional comments.* pp. 2-3.

- accommodating environmental & cultural heritage issues during planning and construction. For example, dust management, waste management, noise abatement, protection and management of any items of cultural heritage value that are identified through the detailed design phase

- additional work required when trenching in close proximity to buildings, trees, street furniture, or other structures. For example, this would include costs to undertake additional works to protect structures, avoid or protect footings, or to deviate from the footpath into the carriageway

- relocation or upgrade of various types of services impacted by the works

- contractor loadings associated with undertaking various volumes/types of works as well as location loadings/allowances and loadings for specific hazards involved (e.g. working in confined spaces, etc)

- relocating or “slabbing” any shallow mains (i.e. below statutory levels of cover) – experience indicates that cover erosion due to other works in the area (e.g. road works, footpath reconstruction, building works, etc) will necessitate additional works to achieve minimum cover

- volume, size and type of trunk/supply main replacement has been based on an assumed pipe size and type based on a pressure regime. Additional works will be required if a lower pressure, larger diameter steel pipe is required as opposed to poly

- upgrading of existing LP poly pipe to HP. Envestra has based its estimates on an assumption that a certain grade of poly pipe can be upgraded to operate at higher pressures, this is unknown, as are the specific associated upgrade costs (e..g meter relocations, regulators, etc)

- additional project controls (e.g. project management, quality assurance, stakeholder liaison) associated with replacement of mains in the CBD. It is anticipated that a higher level of quality assurance, liaison and project management will be required within the CBD environment

- scope and volume growth is expected for a number of issues such as higher number of regulators requiring replacement or upgrading, more cavity inlets requiring replacement, additional requirements due to below ground valve and regulator chambers (i.e. configuration issues, condition, etc). Project volume estimates assumed minimal volumes and it is expected that these will be exceeded once detailed design is undertaken

- re-routing supply or trunk mains to improve security of supply to the broader network. Preliminary designs have assumed lengths based on existing routes. However, re-routing of mains is expected in a number of instances to provide a greater overall strategic benefit to the broader network performance

- route and location of replacement sleeve crossings, regulator vaults, and pressure surveillance equipment. Preliminary estimates have assumed that these assets can be replaced in the same

location. It is expected that relocation will be required in a number of instances once detailed design has been completed.

In PB's opinion, these are typical cost items that frequently arise in utility estimates, particularly in works planned for congested urban and CBD environments. As such, PB would anticipate many (if not all) of these specific cost items to be included in detailed estimates based on completed project definitions, or accounted for through provisional amounts in estimates based on less detailed project definitions. PB understands that Envestra's baseline cost estimates do not include any allowance for the specific items listed above. As it is reasonable to expect these cost items to be incurred, it would also seem reasonable that some additional amount above Envestra's baseline cost estimates is required in order to cover the "gap" between the baseline cost estimates derived from the incomplete project definitions, and the final estimates that will be determined from the completed project definitions.

Having considered the completeness of the project definitions supporting Envestra's estimates, as well as the range of specific cost items allowed for in the contingency, it is apparent to PB that this contingency amount actually represents an identifiable set of specific cost items that while not explicitly itemised within each estimate, are implicit within the contingency percentage. Hence, PB is of the view that Envestra is not adding a contingency in the strict sense of a contingent cost, being an amount to cover the cost of contingent risk, or even an amount of inherent risk; but rather, this contingency appears to be more correctly described as a provision for specific cost items that cannot be quantified due to the incompleteness of the project definitions, but which are expected to be incurred to their full extent.

However, after examining the specific cost items allowed for in the contingency amount, PB is not completely satisfied that all of the items identified are fully provisional in nature, and do not contain some contingent characteristics. For example, while it is likely that Envestra will incur additional costs to accommodate environmental issues, the extent of these additional costs are implicitly an unknown portion of the total contingency amount, and hence it is difficult to assess whether the amount included is reasonably the expected cost, or includes an allowance for more (or less) than the expected cost. Similarly, re-routing mains to improve security of supply could be seen as somewhat speculative in nature, and without specific demonstration of the likelihood of incurring such additional costs, this component of the contingency could at least in part be cast as a contingent amount.

Furthermore, examination of the matrix shows that even at the 'Extremely High' level of project definition completeness, application of the matrix requires a 5% contingency to be added to project estimates. This suggests that either there is still a need for provisional cost items (i.e. specific costs that cannot be quantified) within the essentially complete project definition, or that the matrix contingency percentage also implicitly includes some allowance for the cost of contingent risk. PB acknowledges that estimates based on a complete project definition may still include provisions for issues such as latent site conditions, authority approval conditions, etc. However, it is unclear from the matrix that the contingency amount associated with the 'Extremely High' level of project definition completeness fully relates to such provisions, or includes some allowance for contingent risk, or perhaps even inherent risk.

In summary, PB is of the view that the contingency added by Envestra is generally a provision for specific cost items that cannot be quantified but are expected to be incurred to their full extent. Furthermore, detailed examination shows that there is a basis for an additional amount to cover the "gap" between the baseline cost estimates derived from the incomplete project definitions and the final estimates that will be determined from the completed project definitions. However, in PB's opinion there is also reason to believe that the contingency amount may contain some allowance for contingent risk. Given that the matrix requires a 5% contingency at the 'Extremely High' level of project definition completeness, and recognising that even at this level of definition the estimate could still involve some genuine provisional costs, it seems reasonable to conclude that Envestra's contingency might contain an amount for contingent risk in the range of 0% - 5%. Hence in the circumstances where Envestra has applied a 20% contingency, the provisional component of this contingency may be in the range of 15% - 20%.

5. Conclusion

While in general PB agrees with the principles expressed by Wilson Cook and the AER in its analysis of the application of a contingency amounts (refer to sections 2 and 3 above), PB does not agree that the contingency applied by Envestra should not be supported. In our view, the so called 'contingency' is a legitimate part of Envestra's forecasts, and on detailed examination is more correctly characterised (at least in the main) as a provisional amount required to cover a range of specific cost items that cannot be quantified from the incomplete project definitions available at the time of estimating, but which is, expected to be fully expended. Consequently, we are of the opinion that Wilson Cook and the AER have incorrectly characterised Envestra's contingency, and in requiring its complete removal in the Draft Decisions, the AER is reducing the required opex and capex to a level below the reasonable estimate of Envestra's expected costs.

Yours sincerely

John Dyer
Strategic Consulting
Parsons Brinckerhoff Australia Pty Limited