PRESENTATION TO THE COMMERCE COMMISSION

On

Regulation of Electricity Lines Businesses

Development of a Handbook for Optimised Deprival Valuation of Electricity Lines Business System Fixed Assets.

Prepared by

Gerry Pallo
Consultant
to
Kerslake & Partners

14 November 2003

1.0 Introduction

This submission is made in response to the invitation contained in the Commerce Commission Issues Paper dated 11 September 2003.
As I am an Independent Consultant addressing the matter of the relevance of the application of the Handbook to Lines Businesses generally, there are some questions I will not address, where they may require specific Line Business input.

The comments included in this submission, are the result of knowledge acquired in the use and application of the existing Handbook, since involvement in its development in 1992. Subsequently, I have been involved each year, in either the auditing or assistance of preparation of ODV's for a number of Line Businesses in both the North and South Islands.

2.0 General Comments Regarding Standard Asset Classes, Replacement Costs and Lives.

2.1 Issue Para 20.

2.1.1 The present Handbook already covers classes of assets that represent the most significant value of a Line Businesses Fixed Assets. The main exclusion at present is that relating to easements/rights-of-way, or access rights for cables and/or overhead lines.
As the basis for settlement of value of each case will be governed by a multitude of factors individual to the location involved, the only logical way to value them is from the actual agreements.
Another item relating to the cost of line construction is that of safety compliance costs. Where lines (overhead or underground) are being constructed in areas accessible by the public, and especially on public highways, there are significant safety compliance costs involved. These are not identified separately in the present Handbook and are not by my calculations, included in the values for lines in Table B1.
This tends to affect Line Businesses in Provincial Areas more than those in the Metropolitan areas.

2.1.2 If the present method of defining the maximum value of an overhead line on a per km basis is retained, I do not consider that an increase in the number of asset classes would produce a cost effective benefit to the ODV accuracy. If however the methodology allowed the valuation of lines based on the sum of the individual components, then it would be logical to include a different schedule to cover these; e.g. poles, crossarms for suspension, angle or strain positions, insulators for these at different voltages, braces, etc. Further comment is made on this concept later in this submission.

2.1.3 The present Handbook Table B1 lists maximum values for most of the asset items shown, with only one really significant exception, that being for assets under the class "Zone Substations".
To place maximum values on items is this class would in my opinion, mean setting a value, which could not accurately fulfil its intention for other than the average case. Take the components with the potentially most significant value.

- Site and buildings
- Transformers
- Switchgear & protection
- SCADA and communications.

Site and Buildings.

Sites vary enormously in value, depending on their location in urban, provincial or rural areas. Similarly for the substation buildings. The cost is largely dependant on the environmental conditions imposed by the site. The building in a remote rural area has quite a different specification from one in the middle of a quiet suburban area, requiring high levels of acoustic attenuation, visual screening of all plant and a visual impact comparable with adjacent domestic residences. This is further impacted by variations in construction costs in different parts of New Zealand.
My view is the only realistic approach is to use actual costs.

Transformers

There are significant variations in the prices of transformers (of the same rating) from different sources. The 'lowest initial cost' does not always provide the most cost effective investment long term, and may not be the Manufacturer of first choice. There can be further hidden costs when buying from some low-cost suppliers. These include a far more detailed purchase specification, more rigorous factory inspections both during manufacture prior to testing, followed by further inspection post delivery, prior to installation.

Some Line Businesses may not possess the resources to undertake this level of inspection and supervision regime and would prefer to enter into a purchase agreement with their more traditional suppliers with whom they have over a period, established a confidence in the quality of the product offered. The prices in these situations is often higher than the 'lowest initial cost' option, but may be cost effective overall long term for the purchaser.

Staying with a previous supplier is sometimes dictated by the need to ensure the new transformer has 'identical' characteristics to some already in service and to meet the security criteria for the network. Matching could be required so as to ensure a correct balance of load within the network, or so the unit can be used as a replacement in a back-up situation.

Any value selected for use in the valuation process needs to incorporate these issues to represent the true replacement cost.

Again, my opinion is the true replacement cost should be obtained for the actual costs.

Switchgear & Protection

While it is possible to establish a price range for a circuit breaker, this can be affected by the fault rating at the substation. Hence at a substation in a large industrial area and near a Transpower point of supply, the demands on the switchgear are far more onerous than for one in a rural area remote from a significant Transpower point of connection. The value of protection installed on any switchgear panel will vary significantly depending on the function of the switch, where the substation is in the network and the agreed level of security of supply to be met. As with other plant, purchase of switchgear and protection may be influenced by the need for operational compatibility and maintenance interchangeablilty.

My opinion is that the most representative replacement costs are the actual costs.

SCADA and Communications

As the level of investment is heavily dependant on the size and complexity of the substation, the complexity of the network and the level of sophistication of automation of control, my opinion is that these items are best valued using actual cost.

2.2 Issue Para 22

2.2.1 I believe it is quite appropriate and have no disagreement will the Commissions intention to update the Tables in the Appendices from time to time where necessary.

2.2.2 Regarding the setting of "normally expected" lives for assets, I believe this needs to be done taking recognition of the lives of certain fixed assets (e.g. concrete poles) where asset remaining lives can be established and managed by field serviceability tests and analysis.

2.2.3 I agree it is appropriate to modify the Handbook so costs and lives are the same for the same equipment under either the distribution businesses or Transpower.

2.3 Issue Para 23

2.3.1 The present Handbook listing of asset categories defines the unit for lines as "km", meaning they are valued at the rate of $per km. The actual cost per km however can vary significantly (sometimes from one km to the next) depending most significantly on the number of poles per km, and also on the difficulty of the terrain being followed. The multipliers available in Clause B8 of the Handbook are therefore used to try to make allowance for these matters. Their use still requires the application of some judgement, utilising essential information from the distribution business, including the nature and extent of difficult terrain, and the precise quantities of lines defined as urban or rural.
As an alternate process, if the value of a line was based of the cumulative total of each individual asset in that line, the need to apply multipliers to allow for different numbers of various components disappears.
The need to account for added costs for underground cables in hard ground and to account for the difficulties in laying in congested CBD areas still remain.

2.3.2 Factors which do require recognition in whichever system of costing adopted, are the costs of OSH compliance for work on roads/highways and the costs of easements/rights of way and resource consents as referred to in 2.1.1 earlier. While these costs may in the past have been treated as "other business costs", they are usually specific to a particular line and hence should be considered as part of the lines fixed assets.

2.4 Issue Para 24

While it is logical to periodically review and update asset classes, replacement costs and lives in the Handbook, it is expected that the Commission being mindful of the significant costs borne by distribution businesses in preparing their ODVs, will be prudent in how often this may occur and how soon after such a review distribution businesses would need to revalue their system fixed assets.

3.0 Reponses to Questions regarding Standard Asset classes, Replacement Costs and Lives.

Q 1. Generally the present asset classes capture the significant value in any network. Hence I do not believe there is a need to alter the classes of assets unless there is a move to a different methodology of valuation.
Reference has already been made to this in response to Issue para 20.

Similarly, reference to assets pertaining to zone substations has been dealt with in response to Issue para 20.

Q 2. I do not see any real benefit can be gained by trying to fully integrate the Handbook standard asset classes for distribution businesses and Transpower. Generally Transpower's assets are different, but where the asset classes are the same such as in the areas of sub transmission and distribution, then values and lives for directly comparable equipment should be the same. Note that an 11kV switch panel in a Transpower substation may be different from one of the same nominal rating in a distribution business substation, due to different fault ratings.

Q 3. The requirement to respond to the existing Disclosure Regulations, already imposes the need for distribution businesses to maintain a comprehensive database of their system fixed assets. How Businesses choose to utilise the information from their databases, or the processes they use to generate the necessary returns, would I believe be a matter for management to decide.

Q 4. This is for the businesses to respond.

Q 5. The only change I believe necessary is for "distribution lines" 11kV O/H Heavy. The maximum value of $24 per km is grossly undervalued with a more appropriate value being $32 per km. Details are shown on the attachment Appendix A. The main difference comes from the conductor value, which for the heavy conductor is around three times the cost of a light conductor. Heavier hardware also contributes to the cost increase for this item. The Handbook value at $24 per km does not truly reflect the cost of this item.

Q 7 The most significant change is that of the lives of concrete poles. From studies carried out over a significant portion of the Powerco network, tests showed that for prestressed concrete poles and some reinforced concrete poles away from coastal areas, lives well in excess of 60 years will be achieved. A full submission was made to the Ministry of Economic Development in May 2000 on this issue.

Q. 8 My comments on maximum standard replacement costs for zone substation equipment has been covered in response to Issue para 20. I have no comment in regard to the lives of zone substation equipment as given in the Handbook.

Q 9. Provided the database accurately records the asset quantities, margins of error are not likely to be of significance. Where the application of multipliers requires some judgement, variations in value may occur between different valuers. The variation however is unlikely to be significant. Other factors have already been referred to in response to Issue para 20.

Q 10 As already noted, the use of multipliers for overhead lines could be eliminated by the adoption of valuation from the "pole up" approach rather than the "per km" basis at present. It depends on a good data base of all the asset components, but then not only allows for accurate costing of any line (without judgment calls on multipliers), but also enables accurate depreciation of any line (or part of line) over time, irrespective of any subsequent maintenance that may be undertaken. Each component is separately valued and depreciated, so when a component is changed, the value and depreciation of that component is recalculated into the line. This ensures a true value and depreciation allowance for

any line irrespective of the changes, upgrades, or refurbishments that have occurred, since the values are made up from the sum of the individual parts. To arrive at the same value using a per km rate and average standard life is an approximation since values are averaged.

Q 11 My comments on updates have been covered in response to Issue para 22 & para 24.

4.0 Reponses to Questions regarding ODV Methodology

Q 20 Systems fixed assets that are in service as part of any network, are contributing to the ability of the network to generate revenue and therefore have value, irrespective of the extent of their depreciation. If this situation still exists when the asset is fully depreciated, it still has value and this should be recognised. It is logical to use the basis of assessed remaining life in placing a value on such items.

Q 21 The age of a pole for valuation purposes should be the actual age of the pole. This can be done if the "pole up" approach to valuations is adopted. Using averages is then no longer required.

Q 22 If the "pole up' approach to valuing lines is used, the issue of refurbishment of lines is no longer relevant, since component replacements are incorporated at the age they each possess.
The issue then centres on single equipment items, e.g. transformers, & switchgear. An experienced valuer could be used to establish the expected remaining life, where the issue is "refurbishment" and not just "maintenance e.g. detanking a distribution transformer, drying the windings, checking the connections and replacing in a new tank, would effectively restore the life to that of a new one. This is the sort of decision the valuer would need to make based on his inspection.

Q 23 The issue of how refurbishment work should be reflected in the valuation can be viewed from different angles.
It is my believe that for most utility networks, they are being maintained in perpetuity, therefore work done whether under the label of "maintenance" or "refurbishment" is largely irrelevant, since it is expenditure towards maintaining the value of the asset over time.
Where true refurbishment occurs and an extended life as assessed by the valuer is ascribed to the asset, then the effective increment in value will flow through to the ODV. Routine maintenance does not engender an extension of life, and hence no value is reflected for the work in the ODV, despite such work contributing to maintaining the value of the asset. There seems to be an anomaly here.
Regarding the refurbishment of towers and foundations, if the same approach as in the "pole up" was used, all components can be valued according to their true age and worth.

Q 24 We should not confuse the 'business assets' with the system fixed assets. The system fixed assets are valued using the replacement costs of the various asset items and that is clear. Whether or not a capital contribution is made, does not affect the value of the assets, only possibly who has ownership. This in my opinion is a "business issue" not a valuation one.

Q 25 As noted earlier in response to Issue para 23, easements apply to particular lines and should be part of the value of those lines. They should be valued at actual cost.

Q 26 As part of the ODV methodology, it is appropriate that optimisation of components in the network should be examined. The philosophy applying to this would be to ascertain whether or not such assets would be installed by a competitor setting up in a green field situation, but still constrained by factors such as the location of the points of connection, the location and number of existing customers and the existing boundaries of the line business.

The capacity of equipment within a network and hence capital outlay cannot economically be adjusted annually or with every likely load change and therefore tends to follow step changes. Since the step increase in capacity initially implies a short term 'over capacity', realistic planning periods for load growth are necessary. Such situations would apply for both an incumbent line business and a potential competitor.
In my opinion, the planning periods in the present Handbook are adequate.

Most line businesses have accurate records of load demands for their sub transmission and zone substations, and as part of normal prudent planning would select plant and equipment appropriate for those loads together with forecasts in load growth. Optimisation therefore tends to occur naturally in the management of financial resources.
Optimisation of these primary assets as identified in the Handbook, is not considered an undue burden.

Because most plant and equipment comes in discrete size/capacity units, the asset capacity unit rarely matches the load demand and can be perceived as mismatched therefore justifying optimisation. This is particularly so with feeder lines from zone substations. Feeders (particularly those near substations) are often sized for 'voltage drop', making them appear oversized, when compared with the recorded maximum demand (current).
The calculations to verify the selections in these positions can be extensive and may not necessarily result in any change in conductor size. This is also influenced by the 'step change' in line capacity, when recognising that the changes in rating from light/medium/heavy, are 1/2.8/4.2. The feeder lines close to a substation which are most susceptible to this scrutiny under the present Handbook, are also those that need to have capacity to supply additional load as it grows further down the network. Constraint here is like strangling a tree at the trunk.

Optimisation of sub transmission lines and zone substation transformers as required in the existing Handbook appears to be appropriate. I do not believe it is cost beneficial to go beyond this to the substation feeders.

The present rules on optimisation of distribution transformers, imposes in my view a discrimination against line businesses with significant provincial or rural loads. The load patterns in these areas can be significantly different from those having largely urban, commercial, or industrial load and while to an extent may be seasonal, even here this can be unconventional. e.g. transformers supply wool sheds. These need to be sized to satisfy the maximum demand which may last two weeks per year. Transformers for irrigation pumps which may run for only 4-6 months of the year. These items tend to rate poorly when calculating the overall capacity utilisation of the network. The benefits gained from applying this sort of rule must be questionable.

Regarding the matter of how optimisation should be approached, I would not favour a more prescriptive approach. My reason is that for the prescriptive approach to be acceptable, it needs to be very well structured and the consequences of the steps thoroughly researched to determine how the actual situations may influence the ability to comply. If this is not right, anomalies will occur and solution fixes may be attempted to 'fill the gaps'. Inevitably more prescription is tried, which can compound the original problem. Regulations that are broad enough to cover the essential elements are therefore in my view far more acceptable and more appropriate than those being highly prescriptive.

Q 28 The ability to carry out the Economic Valuation (EV) has been complicated by the separation of the line and energy functions into separate operational entities. To carry out the EV requires information about the energy use of customers on the network and needs an information transfer from one to the other. In a competitive commercial environment, this is not always easy to achieve. At the end of the day the benefits gained from the EV analysis are barely significant.

COSTING FOR OVERHEAD LINES

Appendix A

BASIC COSTS FOR TYPICAL LINE

1.0 Standard Pole (small and medium conductor)

Item		No of units	Unit rate	Value		
Concrete pole 105		1	$ 356.00	$ 356.00		
Opossum guard		1	$ 7.50	$ 7.50		
Insulators		3	$ 10.00	$ 30.00		
Crossarm		1	$ 19.00	$ 19.00		
Sundry hardware		1	$ 30.00	$ 30.00		
Subtotal					$	442.50
10% on materials						44.25
Subtotal					$	486.75
Labour	2 pers 4hrs	8	$ 35.00	$ 280.00		
Total					$	766.75

1.2 Angle Pole (small and medium conductor)

Item		No of units	Unit rate	Value		
Materials as for 1.0 above		1	$ 442.50	$ 442.50		
Pole block		1	$ 28.50	$ 28.50		
Insulators		3	$ 10.00	$ 30.00		
Crossarm		1	$ 19.00	$ 19.00		
Subtotal					$	520.00
10% on materials						52
Subtotal					$	572.00
Labour	2 pers 5hrs	10	$ 35.00	$ 350.00		
Subtotal					$	922.00
Stays etc.-labour & materials		1	$ 150.00	$ 150.00		
Total					$	1,072.00

1.3 Strain Pole (small and medium conductor)

Item		No of units	Unit rate	Value		
Concrete pole 10.5m		1	$ 356.00	$ 356.00		
Opossum guard		1	$ 7.50	$ 7.50		
Insulators		6	$ 10.00	$ 60.00		
Crossarm		2	$ 19.00	$ 38.00		
Sundry hardware		2	$ 30.00	$ 60.00		
Pole block		1	$ 28.50	$ 28.50		
Conductor dead ends		3	$ 36.00	$ 108.00		
Subtotal					$	658.00
10% on materials						65.8
Subtotal					$	723.80
Labour	2 pers 6hrs	12	$ 35.00	$ 420.00		
Subtotal					$	1,143.80
Stays etc.		1	$ 150.00	$ 150.00		
Total					$	1,293.80

1.4 Standard Pole (large conductor)

Item		No of units	Unit rate	Value	
Concrete pole 105		1	$ 356.00	$ 356.00	
Opossum guard		1	$ 7.50	$ 7.50	
Insulators		3	$ 67.32	$ 201.96	
Crossarm		1	$ 19.00	$ 19.00	
Sundry hardware		1	$ 70.00	$ 70.00	
Subtotal					$ 654.46
10% on materials					65.45
Subtotal					$ 719.91
Labour	2 pers 4hrs	8	$ 35.00	$ 280.00	
Total					$ 999.91

1.5 Angle Pole (large conductor)

Item		No of units	Unit rate	Value	
Materials as for 1.4 above		1	$ 654.46	$ 654.46	
Pole block		1	$ 28.50	$ 28.50	
Insulators		3	$ 67.32	$ 201.96	
Crossarm		1	$ 19.00	$ 19.00	
Subtotal					$ 903.92
10% on materials					90.392
Subtotal					$ 994.31
Labour	2 pers 5hrs	10	$ 35.00	$ 350.00	
Subtotal					$ 1,344.31
Stays etc.-labour & materials		1	$ 150.00	$ 150.00	
Total					$ 1,494.31

1.6 Strain Pole (large conductor)

Item		No of units	Unit rate	Value	
Concrete pole 105		1	$ 356.00	$ 356.00	
Opossum guard		1	$ 7.50	$ 7.50	
Insulators		3	$ 21.01	$ 63.03	
Crossarm		2	$ 19.00	$ 38.00	
Sundry hardware		2	$ 70.00	$ 140.00	
Pole block		1	$ 28.50	$ 28.50	
Conductor dead ends		3	$ 53.00	$ 159.00	
Subtotal					$ 792.03
10% on materials					79.20
Subtotal					$ 871.23
Labour	2 pers 6hrs	12	$ 35.00	$ 420.00	
Subtotal					$ 1,291.23
Stays etc.		2	$ 150.00	$ 300.00	
Total					$ 1,591.23

Engineer chargeout rate	50	
Labour rate per hour	35	

2.0 Typical Line (small and medium conductors) 75 Metre Span

Standard poles			11	$	766.75	$	8,434.25
Angle poles			2	$	1,072.00	$	2,144.00
Strain poles			1	$	1,293.80	$	1,293.80
Subtotal							$11,872.05
Conductor stringing	8 pers	12 hrs	96	$	35.00	$	3,360.00
Co-ord with LTA's etc.		mhrs	20	$	50.00	$	1,000.00
Survey,dwgs,eng etc.		mhrs	20	$	50.00	$	1,000.00
Total without conductors per km							$17,232.05

2.1 Typical Line (large conductors) 75 Metre Span

Standard poles			11	$	999.91	$	10,998.97
Angle poles			2	$	1,494.31	$	2,988.62
Strain poles			1	$	1,591.23	$	1,591.23
Subtotal							$15,578.82
Conductor stringing	8 pers	14 hrs	112	$	35.00	$	3,920.00
Co-ord with LTA's etc.		mhrs	20	$	50.00	$	1,000.00
Survey,dwgs,eng etc.		mhrs	20	$	50.00	$	1,000.00
Total without conductors per km							$21,498.82

TOTAL LINE COSTING **75 m span**

									Total line Cost
	Code	Area	Cond cost/km	Line cost/km			Pole+h'ware		
	Namu	20	396	$	1,188				
	Rango	50	980	$	2,940				
	Average					$	2,064	$ 17,232	$ 19,296
2.0	**MEDIUM CONDUCTOR**								
	Rango	50	980	$	2,940				
	Weta	150	2180	$	6,540				
	Average					$	4,740	$ 17,232	$ 21,972
3.0	**LARGE CONDUCTOR**								
	Cockroach	250	3365	$	10,095				
	Weta	150	2180	$	6,540				
	Butterfly	300	4227	$	12,681				
	Average					$	9,611	$ 21,499	$ 31,109

2.0	Typical Line (small and medium conductors)			40 Metre Span				
	Standard poles			20	$ 766.75	$ 15,335.00		
	Angle poles			4	$ 1,072.00	$ 4,288.00		
	Strain poles			2	$ 1,293.80	$ 2,587.60		
	Subtotal						$	22,210.60
	Conductor stringing	8 pers	20 hrs	160	$ 35.00	$ 5,600.00		
	Co-ord with LTA's etc.		mhrs	24	$ 50.00	$ 1,200.00		
	Survey,dwgs,eng etc.		mhrs	30	$ 50.00	$ 1,500.00		
	Total without conductors per km						$	30,510.60

2.1	Typical Line (large conductors)			40 Metre Span				
	Standard poles			20	$ 999.91	$ 19,998.12		
	Angle poles			4	$ 1,494.31	$ 5,977.25		
	Strain poles			2	$ 1,591.23	$ 3,182.47		
	Subtotal						$	29,157.83
	Conductor stringing	8 pers	24 hrs	192	$ 35.00	$ 6,720.00		
	Co-ord with LTA's etc.		mhrs	24	$ 50.00	$ 1,200.00		
	Survey,dwgs,eng etc.		mhrs	30	$ 50.00	$ 1,500.00		
	Total without conductors per km						$	38,577.83

TOTAL LINE COSTING **40 m span**

							Total line Cost
1.0	**SMALL CONDUCTOR**						
	Code	Area	Cond cost/km	Line cost/km		Pole+h'ware	
	Namu	20	396	$ 1,188			
	Rango	50	980	$ 2,940			
	Average				$ 2,064	$ 30,511	$ 32,575
2.0	**MEDIUM CONDUCTOR**						
	Rango	50	980	$ 2,940			
	Weta	150	2180	$ 6,540			
	Average				$ 4,740	$ 30,511	$ 35,251
3.0	**LARGE CONDUCTOR**						
	Cockroach	250	3365	$ 10,095			
	Weta	150	2180	$ 6,540			
	Butterfly	300	4227	$ 12,681			
	Average				$ 9,611	$ 38,578	$ 48,188