AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	WASHINGTON	DATE PREPARED:	06/18/2021
CASE NO.:	UE-200900 & UG-200901	WITNESS:	DiLuciano/La Bolle
REQUESTER:	Public Counsel	RESPONDER:	Larry La Bolle
TYPE:	Data Request	DEPT:	Transm Ops/System Planning
REQUEST NO.:	PC – 367	TELEPHONE:	(509) 495-4710
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SUBJECT: Economic End of Life

REQUEST:
Please refer to Avista's response to Public Counsel Data Request No. 341, which identifies a guideline which Avista believes supports it position that economic end-of-life age should be used to determine when to replace assets currently operating safely and reliably.

a) Provide any asset management standard, guide, manual, or other documentation from the electric distribution utility industry which recommends that Economic End-of-Life age should be used to replace an asset currently fulfilling its intended function safely and reliably. Quote and cite the specific passage Avista considers to constitute the recommendation.

b) Provide any asset management standard, guide, manual, or other documentation from any industry which indicates that an Economic End-of-Life age should be used to replace an asset currently fulfilling its intended function safely and reliably. Quote and cite the specific passage Avista considers to constitute the recommendation.

c) Identify any U.S. utility of which Avista is aware which uses economic end-of-life age to determine that equipment currently operating safely and reliably should be replaced.

RESPONSE:

Although most electric system assets replaced by Avista have failed in service or have functionally failed,[1] we do replace certain equipment based on an age threshold, which application delivers the lowest lifecycle cost for our customers. A good example of a replaced asset "fulfilling its intended function safely and reliably," is provided in the Company's Grid Modernization program, which updated financial analysis for transformer replacements is shown in the table below.[2] Even to the untrained eye, it's easy to discern that our customers are better off financially and otherwise when the Company replaces transformers, aged 1980 and older, during a feeder rebuild, compared with the alternative of reinstalling them and allowing them to run to fail in service later, as repeatedly advocated by Public Counsel.

[1] Avista has determined, as discussed in our online meeting with Public Counsel on June 7, 2021, that a wood pole that fails strength testing, even though it is still standing and holding the conductor in the air, has reached the point of "functional failure." This designation reflects the fact that the pole is no longer capable of meeting the range of service conditions, such as high winds, experienced on our system. We have likewise determined the same for transformers that are leaking oil or have been damaged; they no longer meet our service requirements because they are prone to imminent failure. The same is true for broken insulators, insulators and components that are damaged, or where failing polymer material lacks the impedance to meet standards of avoiding flashover.

[2] Please see these financial results, including the underlying financial analysis provided in response to PC-DR-348.

Transformer Alternative	**Range in Customer Internal Rate of Return**[3]		
Wood Pole Management Program			
Run to Fail	-1.01%	to	0.68%
Avista's Current Practice - Replacement based on Condition	**14.46%**	to	**15.91%**
Grid Modernization Feeder Rebuild			
Run to Fail	1.46%	to	2.88%
Avista's Current Practice - Replacement at age 1980 or Older	**10.62%**	to	**12.47%**

The Company has demonstrated that a great majority of its assets are replaced based on condition, which supporting analysis is based on failures and functional failures of assets, using for example, the discussion below on wood pole replacements from our response to PC-DR-362, a part of which was also presented in PC-DR-319 and PC-DR-221.

As Avista has demonstrated in numerous responses to Public Counsel, the majority of the poles replaced by the Company each year are based on condition determined by inspection and testing, and not age. Also, as explained in response to PC-DR-358, PC-DR-360 and PC-DR-361, Avista does not include wood poles in any failure rate determination, which are replaced in a feeder rebuild project based on unsuitability such as class, or based on the Economic Optimum of 60 years and older. As noted in Exh. JD/LL-1T, page 36, in the subject example provided, which table is excerpted below, only 4.2% of the poles designated in this Grid Modernization feeder rebuild were replaced based on age alone (using the 60 year Economic Optimum for a feeder rebuild).

Number of Poles on Feeder	427
Average Pole Age in Years	36.4 (1984)
Year of Oldest Installed Pole	1946
Poles install between 1920-1929	0 (0%)
Poles install between 1930-1939	0 (0%)
Poles install between 1940-1949	1 (0.2%)
Poles install between 1950-1959	16 (3.7%)
Poles install between 1960-1969	91 (21.1%)
60 Year Replacement Criteria	18 (4.2%)
Yellow Tagged Poles (Re-enforceable)	23 (5.4%)
Red Tagged Poles (Replace)	1 (0.2%)
Average Pole Height	41.5
Average Pole Class	4.0
Class 4 Poles or Smaller	311 (72.8%)
Class 5 Poles or Smaller	101 (23.7%)
Estimated Total Pole Replacements	332 (77.8%)

We also noted in response to PC-DR-319 that even when including all poles replaced in Grid Modernization feeder rebuilds, replaced for all reasons such as shown in the table at right, that the great majority of poles we replace are determined by results of inspection and testing. Results are provided in the table below from PC-DR-319 part (a), for wood poles replaced in Washington for the years 2011-2020.

End of Life Poles Replaced Based on Inspection and Testing in Grid Modernization and Wood Pole Management	End of Life Poles Replaced Based on Age and Other Feeder Rebuild Requirements	Total End of Life Poles Replaced
8,392	2,770	11,162

[3] Based on the results modeled for each of Avista's feeder classifications: Urban, Suburban and Rural.

a) Please see our response to part (b), below.

b) Lifecycle cost analysis, as properly performed by Avista, produces financial results that help an organization determine how to manage their assets in the least costly manner, while meeting a range of business-critical objectives. Whether it's when an asset fails, or it's worn out and fails testing, or it's reached a point in its service life when keeping it in service longer begins to add unnecessary costs, then the asset has reached the "End of Life," or "End of Useful Life," or "Economic Optimum," or "Economic End of Life," or "Lowest Lifecycle Cost." It doesn't matter what name or term you use to describe that point, it's simply the point where you remove the asset from service, because keeping it in service longer is wasting your money or your customers money.[4] The term "Economic End of Life" is used by Avista to help you understand how a cutout that is typically run to fail, with failure being the economic optimum in the default case, can have a different, lower-cost economic optimum if the default conditions, such as replacement cost or risk costs, that led to its initial designation, change. It's the Lifecycle Cost Analysis process that is paramount, not the terminology that an organization uses to describe the point of its lowest lifecycle cost.

   Following is a summary of the independent, professional organizations, etc., that endorse various elements of Lifecycle Cost Analysis in the manner performed by Avista.

   1. Avista follows the **Institute of Asset Management Subject Specific Guidance** manuals number 16, titled **"Reliability Engineering,"** and number 8, **"Lifecycle Value Realisation"** as the primary frameworks and guides for its lifecycle costs analyses, including its determination of economic end of life, and the other analyses we have presented to Public Counsel.

   2. These **Subject Specific Guidance** manuals comport with the **International Standards for Asset Management, PAS-55 and ISO 55000**, etc., which international standards the **Institute of Asset Management** was instrumental in leading and supporting in their development and implementation.

   3. **Subject Specific Guidance** manual number 8, **"Lifecycle Value Realisation,"** lists on page 10, the following statement: The 'end of life' can be determined in several ways, which three approaches are listed and briefly described in the image excerpt from that page, below.

   "Economic end of life" as defined by the Institute of Asset Management, which practices are congruent with the ISO and PAS international Asset Management Standards, and which has been defined and properly implemented by Avista, is a mainstream application of lifecycle cost analysis, used to determine the replacement strategy that allows us to deliver service to our customers at the reasonably lowest optimized cost.

   The 'end-of-life' can be determined in several ways, for example:

   - The technical: where 'useful' or functional life refers to the period of asset capability in relation to functional need.
   - The economic; where life is derived from an analysis of functional benefits (e.g. revenues) versus the costs and risks of ongoing ownership.
   - The book life; where there is often an accountancy or 'book' life that is calculated from generic depreciation and taxation treatments of the capital investment and its balance sheet impact.

   Institute of Asset Management, Subject Specific Guidance (SSG) Manual number 8, "Lifecycle Value Realisation," page 10.

[4] Even when there is remaining service life

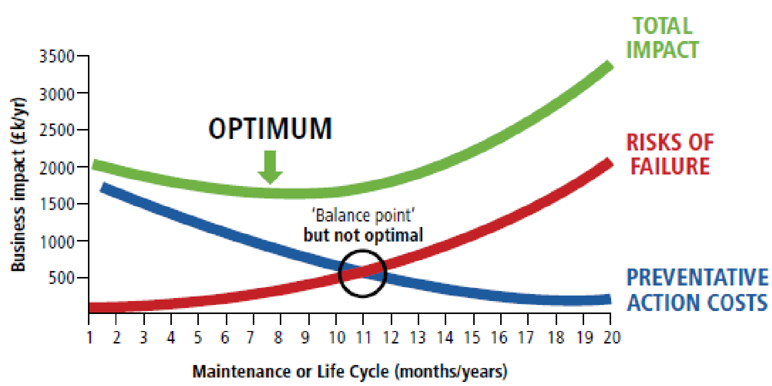
4. The **Institute of Asset Management** is widely recognized as the leading professional association advancing the policies, science and practices of asset management. **Avista has been a member** of the Institute of Asset Management since 2006.

5. The **Availability Workbench** application used by Avista is consistent with, and supportive of the IAM documentation for performing Failure Analysis and Comprehensive Lifecycle cost analysis, consistent with Avista's response to PC-DR-332.

6. Following is a clip from the Institute of Asset Management's "Reliability Engineering" Subject Specific Guidance Handbook – 16, illustrating Avista's practice of conducting lifecycle cost analysis, referred to in the manual as Cost Risk Optimization (CRO).

5.9.2 When is it used?

CRO is often used for long term investment planning activities to model the impacts of multiyear factors and look for optimal solutions as to when to repair, refurbish, or replace assets while maintaining an acceptable risk profile and balancing multiple constraints. These techniques can be focused on organisational processes (Bayesian approach) or specific assets, or groups of similar assets modelled together based on specific shared characteristics or individual asset characteristics.



c) Please see the Company's response to part (a), above.