BEFORE THE WASHINGTON

UTILITIES & TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION,

Complainant,

v.

AVISTA CORPORATION d/b/a AVISTA UTILITIES,

Respondent.

DOCKET NOS. UE-200900 and UG-200901 (*Consolidated*)

PAUL J. ALVAREZ AND DENNIS STEPHENS

ON BEHALF OF THE
WASHINGTON STATE OFFICE OF THE ATTORNEY GENERAL
PUBLIC COUNSEL UNIT

EXHIBIT PADS-7

Avista Response to Public Counsel Data Request No. 251

April 21, 2021

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	WASHINGTON	DATE PREPARED:	03/17/2021
CASE NO.:	UE-200900 & UG-200901	WITNESS:	David Howell
REQUESTER:	UTC Staff	RESPONDER:	David James
TYPE:	Data Request	DEPT:	Wildfire Resiliency
REQUEST NO.:	PC-251	TELEPHONE:	(509) 495-4185
		EMAIL:	dave.james@avistacorp.com

SUBJECT: Wildfire

REQUEST:
Please refer to Avista's Response to Public Counsel Data Request No. 182, which states "We know from experience, for example, that wood crossarms are the primary source of spontaneous pole fires due to contaminates on the wood that create electrical tracking."
a) Provide any evidence other than speculation that electrical tracking on wooden cross arms is causing pole fires on the Avista system.
b) Provide any evidence other than speculation that electrical tracking on cross arms is a result of the wood composition of the cross arm and not due to contamination on the cross arm by dust, mag-chloride or other conductive contaminants.
c) Provide evidence that contamination on other compositions of cross arms (for example, fiberglass etc.) will not also result in pole fires.

RESPONSE:

It is known throughout the electric utility industry that wood crossarms are susceptible to contamination and deterioration that can lead to pole fires. This is a well-known phenomenon. This is not just speculation. This issue is well documented as shown in the sample of sources below. As stated in the definition of this issue in the next paragraph (from a neutral source), it is the wood composition of the crossarm in combination with contamination sources such as dust that creates the environment conducive to pole fires. Many of these same references specifically describe the use of fiberglass crossarms in reducing or eliminating pole fire risk and indicate a sampling of utilities who have publicly acknowledged converting to fiberglass crossarms for this reason. Knowing that there is a risk of wood crossarms leading to fire, it is simply best practice to replace them with fiberglass as the standard in order to protect customers and infrastructure. Knowingly ignoring a known risk would be irresponsible and unacceptable.

See below:

Steve Torres, project engineer for Colorado Springs Utilities in Colorado, states "Pole fires are common challenges among electricity providers where contaminations such as coal dust, salt, airborne pollution or dust build up on insulating equipment followed by a weather event. A light misting rain, for example, can combine with contaminants on the insulating hardware and create a bond between the contaminants. Contaminated water droplets then begin to form and establish paths from the energized overhead conductor to the crossarm. This provides an electrical path for tracking to occur. When tracking occurs from the energized conductor to the surface of the crossarm, small arcs are generated between the wood and the through-bolt that is used to attach the crossarm to the pole. The crossarm through-bolt is a common area for a pole fire to initiate because of the minimal surface area contact and high electrical resistance. Also, this area tends to be dry, which can cause it to ignite more easily." Source: Amber Reed,

"Reducing the Risk: Fiberglass Crossarms Used to Combat Utility Pole Fires," Utility Products Magazine, October 18, 2013, https://www.utilityproducts.com/safety/article/16002849/reducing-the-risk

Other sources for information about wood crossarm susceptibility to fire can be found at:

Michael Lynch, "Methods Utilized for the Prevention of Wood Structure Fires Caused by Leakage Currents," IEEE, https://ecoelectrical.com/pdf/IEEE_Paper_Templ_v1f.pdf Describes the process by which contamination creates leakage currents causing fire on wood poles with wood crossarms.

Paul M. Ross, "Burning of Wood Structures by Leakage Currents," IEEE Study published in Transactions of the American Institute of Electrical Engineers, https://ieeexplore.ieee.org/document/5059441 States: "Laboratory tests conducted on approximately 200 specimens indicate that a coincident occurrence of dry wood and selective wetting of pole and crossarm surfaces by a light rain or fog, wind directed, which leaves a dry wood area in series with the leakage path, can result in a fire of a pocket type [burning event]." More details available in the report.

US Patent US3344225A "It has been known for many years that leakage currents in transmission lines can do substantial fire damage to the wooden poles and cross-arms conventionally used in supporting electrical transmission lines. Because the majority of the medium voltage lines in the United States are supported on wood poles and cross arms **this constitutes a considerable problem**. The burn damage and in some cases fire which break out on the wood supporting structure are caused by power frequency leakage currents which flow over the surface of contaminated insulators and through the supporting wooden members. In some localities these fires may occur at infrequent intervals and are only an incidental nuisance. In other areas they occur frequently and may be of such a character as to result in a complete loss of the cross arm and pole so as to cause a prolonged service outage." https://patents.google.com/patent/US3344225A/en

John Lauletta, "The Industry's Most Definitive Pole Fire Fact Sheet," https://www.exacterinc.com/resources/uploaded/Brochures/Exacter%20Pole%20Fire%20Fact%20Sheet%20Final.pdf States that: "Wood shrinkage and cracking around bolt holes form a combustive-friendly cavity for leakage current to eventual combustion." Describes how wood in combination with contaminates creates voltage tracks for leaking and arcing current which dry out the wood, heats it, and eventually causes combustion and pole fire.

Sachin Pathak, "Leakage Current in Wooden Structures Used for Power Distribution," School of Electrical and Computer Engineering, RMIT University, https://core.ac.uk/download/pdf/15624502.pdf This thesis examines leakage current flow in wood poles and crossarms and states this current "imposes continuous stress and has caused numerous pole fires, not only in Australia but in many other countries." It goes on to describe this process in great detail.

Steve Torres, "Utility Extinguishes Risk for Pole-Top Fires," T&D World, https://www.tdworld.com/electric-utility-operations/tools-and-technologies/article/20963905/utility-extinguishes-risk-for-poletop-fires This article states: "The challenge with wood, like other biodegradable materials, is that it is susceptible to contamination and deterioration." It goes on to describe the process by which wood crossarms become contaminated and create fire potential then states "For that reason, some electric utilities are adding fiberglass crossarms to their electric transmission and distribution infrastructure as a way to reduce pole-top fires. Fiberglass crossarms are good electrical insulators and have a high mechanical strength-to-weight ratio."

Muhammad Tariq Nazir, PhD in high-voltage outdoor power line insulation and Research Fellow at UNSW in "Opinion: How to reduce pole top fires in Australia," https://www.theeducatoronline.com/he/news/opinion-how-to-reduce-pole-top-fires-in-australia/271592 States: "The timber cross arms where insulators sit should be replaced with steel or some highly flame retardant and electrically insulating composite materials."

Megan Headley, "Utilities Ready to Invest in FRP Solutions," http://compositesmanufacturingmagazine.com/2020/03/utilities-ready-to-invest-in-frp-solutions/ This article states: Fiberglass crossarms are stronger and more consistent than wood crossarms, resulting in less crossarm breakages and reduced likelihood of energized conductors dropping and starting fires in the first place," says Michael Schoenoff, vice president of engineering for FRP crossarm manufacturer Geotek. "Additionally, the smooth surface of a fiberglass crossarm is less likely to build up with contaminants and is therefore less likely to lead to arc tracking." Schoenoff notes that several utilities have reported a significant reduction in pole-top fires after switching to composite crossarms.

John Marks, "Overhead and Underground Distribution Trends," https://electricenergyonline.com/energy/magazine/6/article/Overhead-Underground-Distribution-Trends.htm This article states: "Fiberglass crossarms weigh less than wood and have excellent dielectric characteristics, about 155 kV BIL per foot." In other words, fiberglass crossarms provide insulating value and are thus less likely to provide a source of combustion.

SDG&E standards show all fiberglass crossarms. Page 159, https://www.sdge.com/mwg-internal/de5fs23hu73ds/progress?id=llI6qZViqGCcFxbTJ5QvYML9PWYIfJht_lSCc9lownA,

Southern Company standard is fiberglass crossarms, https://uploads-ssl.webflow.com/594d4ebb90aa3972821b2c55/5b296cd83fdf7e21b799e562_Ultravex_white_paper_April_Draft1.pdf

Crossarm flammability testing of wood versus fiberglass: https://emspartnersinc.com/wp-content/uploads/2019/06/PUPI%C2%AE-Technical-Information-PL010.pdf "crossarms highly loaded with fiberglass and other inorganic materials do not support combustion. Flames self-extinguished for all tests."