



Avista Utilities

Two-Year Plan for Managing Replacement of Select Pipe in Avista Utilities' Natural Gas System in its Washington Service Area

April 2023

Introduction

On December 31, 2012, the Washington Utilities and Transportation Commission (Commission) issued a policy statement related to the accelerated replacement of natural gas pipeline facilities with elevated risk.¹ This policy statement requires each natural gas company to file with the Commission, for approval, a pipe replacement program plan consisting of the following:

1. *A “master” plan for replacing all pipes with an elevated risk of failure;*
2. *A two-year plan that specifically identifies the pipe replacement goals for the upcoming two-year period; and*
3. *If applicable, a plan for identifying the location of pipe that presents elevated risk of failure.*

Avista has previously filed with the Commission, in connection with this plan, its Master Plan for the two types of pipe in its system that exhibit elevated risk of failure: 1) select vintages of Aldyl-A pipe manufactured by DuPont, and, 2) steel pipe isolated from cathodic protection. In January 2022, Commission Safety Staff acknowledged that Avista had satisfied the terms of the policy statement, completing the Master Plan and program for steel isolated from cathodic protection. Since the Master Plan for Aldyl-A pipe has not materially changed since the initial filing with the Commission (e.g. scope, schedule, risk, timeline, priority, etc.), it constitutes, as previously filed, the Company’s only current Master Plan for the replacement of natural gas pipeline facilities with elevated risk. In accordance with the Commission’s policy statement, the plan discussed herein is Avista’s Two-Year Plan for Managing Pipe Replacement for Aldyl-A pipe, for the two-year reporting period commencing June 1, 2023.

Additionally, in response to item number 3 above, less than 0.01 percent of the natural gas piping in Avista’s distribution system in Washington is of unknown material (e.g. plastic, steel, etc.). Avista is continuing its process of verifying these unknown segments and currently has 21 feet of unknown piping in its system remaining to be assessed. Until this

¹ Commission’s Policy on Accelerated Replacement of Pipeline Facilities with Elevated Risk – Docket No. UG-120715.

pipings has been classified, each unknown segment is being managed as if it does in fact, pose an elevated risk of failure. This conservative approach ensures any potential risk associated with these unknown segments is properly accounted for in Avista's management of its natural gas facilities. In consideration of these facts, and consistent with the previous two-year reporting period, the Company is not preparing or filing a plan for identifying the location of pipe with an elevated risk of failure.

Two-Year Plan for Managing Pipe Replacement

I. Avista's Priority Aldyl-A Pipe Replacement Program

Avista is continuing its planned 20-year program to systematically remove and replace select portions of the DuPont Aldyl-A medium density polyethylene pipe in its natural gas distribution system. The Company's Master Plan for this program, titled "Protocol for Managing Select Aldyl-A Pipe in Avista's Natural Gas System," provides the background on this pipe, the vintages and type of pipe slated for replacement, as well as the rationale for the proposed 20-year replacement program. None of the subject pipe is "high pressure main pipe," but rather, consists of distribution mains at maximum operating pressures of 60 psi and pipe diameters ranging from 1¼ to 4 inches. As part of this program, Avista has also completed rebuilding thousands of transition fittings used to connect Aldyl-A service piping (one-half and three-quarter inch diameter) to steel tees that are welded to steel main pipe (service tee transitions). This Aldyl-A sub-program is known as the Service Tee Transition Rebuild (STTR) program.

The Gas Facilities Replacement Program (GFRP) is the operational entity at Avista responsible for managing the Aldyl-A Pipe replacement activities throughout Avista's service territories.

Nature of the Safety Risk – Early vintages of Aldyl-A pipe produced for natural gas service from the 1960s through the early 1980s are subject to "premature brittle-like cracking." This failure process results from a premature loss of 'ductility' or flexibility in the pipe material. Ductility is a fundamentally important property of polyethylene piping, and its

loss allows small cracks to form on the inner wall of the pipe, which eventually propagate through the pipe wall, resulting in failure. Unfortunately, early industry tests did not diagnose these failures as resulting from this loss in ductility, so the phenomenon was poorly understood for many years. This tendency for brittle-like cracking renders the pipe more susceptible to failure over time than newer-generation polyethylene pipe, and this tendency to fail increases with time.

Completed Replacement Activities – Under guidance of the Master Plan, Avista began replacing select Aldyl-A piping in its Washington service territory in 2011. The Company’s actual progress and investment in Washington for the period 2011 through 2022 is summarized in Table 1.

Table 1 - Summary of Avista’s Priority Aldyl-A Replacement Program in Washington, 2011 – 2022 (Replacement miles via construction)

Year	Miles of Main Pipe	Number of Tees	Investment
2011	7.4	0	\$2,507,715
2012	8.6	3	\$3,333,986
2013	12.4	912	\$8,759,459
2014	10.7	1,941	\$8,349,427
2015	10.57	2,655	\$10,011,674
2016	10.23	1,860	\$10,924,878
2017	14.62	0	\$8,961,009
2018	15.30	0	\$10,288,541
2019	19.10	0	\$10,048,740
2020	13.2	0	\$9,363,482
2021	12.98	0	\$13,145,221
2022	17.67	96	\$17,136,569
Total	145.55	7,467	\$112,827,701

While the GFRP has been directly responsible for removing 145.55 miles of Aldyl-A main through construction activity, Avista’s System of Record indicates an additional 63.1 miles

have been removed for a total of 209 miles completed. The additional mileage of main pipe removed can be attributed to a combination of routine system repairs, mapping corrections, municipal road projects, Aldyl-A opportunity projects, and the Odessa project which occurred in 2011 prior to the formation of the GFRP. As of 2022, 59% of the original 355 miles are now complete.

Identification of Sections of Unknown Pipe – In 2011, the Company identified 734 segments of installed service pipe in its Washington service area that were of unknown material, with a cumulative length of 6.3 miles. Avista has been systematically identifying these unknown segments through the review of as-built service cards, exposed piping reports, and field employees noting mapping corrections. The number of segments properly identified each year are shown below in Table 2.

Table 2 - The Number of Unknown Pipe Segments Identified in Washington from 2011-2022

Washington Unknown Pipe Segments		
Year	Identified Segments	Miles
2011	112	0.7
2012	266	2.2
2013	60	0.6
2014	82	0.8
2015	53	0.6
2016	69	0.8
2017	8	0.1
2018	41	0.4
2019	22	0.1
2020	2	0.01
2021	3	0.07
2022	0	0.00

Currently, there are 3 segments (21 feet) of unknown service piping in the Company’s Washington natural gas system. Avista will continue to identify these remaining unknown segments through the ongoing course of operations by the means described above.

In addition to unknown pipe, the GFRP has actively worked to validate Aldyl-A pipe vintages prior to commencing construction activities. This is done by utilizing pre-construction pipe verification in combination with map corrections. From 2017 through 2022, 17.77 miles of pipe have been verified as not needing to be replaced. Due to these proactive efforts, the GFRP estimates avoided construction costs of more than \$12.4M

Program Goals for 2023 and 2024

During the next two-year period, the Company will focus on: 1) continuing its replacement activities in accordance with its Master Plan; 2) continuing to optimize its use of specialized contract crew resources; 3) continuing to refine its processes for project prioritization and detailed work planning; 4) continuing to evaluate and employ alternative construction methods and technologies to minimize expensive pavement restoration; and, 5) incorporating any changes to the overall program that might be identified through the work of Avista's Asset Management Department, and integrating emerging priorities that may be identified in the Company's Distribution Integrity Management Plan (DIMP).

Current Actions under the Program

Efficient Construction Resources – Avista's GFRP continues to complete the majority of its Aldyl-A replacement using contract crews and equipment. The work effort is specialized, subject to seasonal constraints, additive to the normal workload and staffing levels associated with the Company's ongoing natural gas operations, and consequently is much more cost efficient. In its previous two-year plans Avista reported on its competitive selection of the NPL Construction Company² (NPL) to perform its primary Aldyl-A main pipe replacement and rebuilding of service tee transitions for a 5-year term. NPL's proven expertise of specialized construction techniques has been a real asset in our efforts to complete the work on time and effectively manage costs. As discussed later in this report, the Company continues to work with NPL to refine its use of specialized construction technologies that allow us to be more efficient and cost effective.

² NPL Construction Company, formerly known as Northern Pipeline Construction Company, has a national reputation for safe, high quality and cost-effective construction services, including the installation or replacement of over ten million feet of pipe and other underground facilities each year.

Managing the Unit Costs of Replacement – At the time the Company developed its Aldyl-A Master Plan, its experience with the cost of main pipe installation was almost exclusively with new construction. Avista has since gained several years’ experience in our jurisdictions with the actual costs of pipe replacement. By its nature, replacement is substantially more complex than new construction because it most frequently takes place in established municipal areas and neighborhoods with existing paved roadways, sidewalks, landscaping, and other underground facilities.

In addition to the added cost of installing the pipe, the pavement cutting and remediation policies of local jurisdictions have had a significant impact on the scheduling, logistics, operational methods, extent of the area to be repaved, and the ultimate cost of pipe replacement. In Avista’s experience, there appears to be a continuing trend among jurisdictions to enforce restrictive moratoria on cutting in newer arterials and streets, to require more expansive requirements for backfill and compaction, and for patching or repaving of streets cut for pipe replacement. These requirements include rules on the export and import of trench backfill materials, significant soil compaction, and the width of pavement restoration, which averages 4 feet and can range from 2 feet up to 8 feet along segments of the project.

The GFRP has been tracking project costs since its inception and recognizes that no two projects are alike. Each individual project has its own scope of work and a unique set of physical conditions that drive a variation on the cost per linear foot and total cost. Some primary scope variables include quantities such as, miles to be replaced, service tie-overs, main tie-ins, valves, and main pipe abandonment segments. Furthermore, each project has physical variables including, road surface type (paved/non-paved), surface obstructions, sub-surface obstructions, utilities, pipe routing, soil type, soil conditions, municipal restoration and inspection requirements, and installation methods employed. In prior projects, the Company has experienced a range of costs for replacing its Aldyl-A pipe. Projects with minimal road restoration have been reported to cost \$35 per liner foot, while other more complex projects with extensive road restoration can average as much as \$163 per linear foot. In 2021, the GFRP reported an average cost of \$151 per liner foot. In 2022

the GFRP reported an average cost of \$174 per liner foot, with a wide variation from \$55 per linear foot for pipe installed in Spangle, WA (0.97miles completed), to \$262 per linear foot in downtown Spokane & the lower South Hill of Spokane, WA (0.82 miles completed), which included extensive road restoration work and difficult ground conditions. For comparison, in 2022, Washington projects averaged a cost for replacement at \$174 per linear foot, Oregon projects averaged \$215 per linear foot and no projects were completed in Idaho in 2022. A comparison of average cost per foot for GFRP regions is listed in Table 3 below:

Table 3 - Average Cost Per Foot Comparison for GFRP Regions 2017-2022

<u>Average Cost Per Foot Comparison for GFRP Regions</u>						
Year	WA Average CPF	Miles Completed	OR Average CPF	Miles Completed	ID Average CPF	Miles Completed
2017	\$132	14.6	\$122	7.1	\$123	5.40
2018	\$105	15.3	\$153	9.2	\$115	7.54
2019	\$106	9.1	\$125	7.4	\$137	12.74
2020	\$159	13.2	\$257	2.6	\$123	8.45
2021	\$151	12.9	\$122	6.4	\$165	4.6
2022	\$174	17.67	\$215	7.68	\$0.00	0.0

It is important to note that projects subject to onerous municipal road restoration requirements simply cost more. Aldyl-A projects typically occur within the right-of way under paved surfaces and experience a road restoration range of 27% - 30% of the total project cost.

Optimizing Trenchless Technology – Given the high unit costs associated with open trenching and roadway restoration, the Company has continued to work with NPL to optimize the use of trenchless technologies. Where conditions are favorable, horizontal directional drilling can provide a cost-effective alternative to open trench construction. In 2021 and 2022, the Company was able to cost effectively maintain the use of horizontal drilling. In this period, drilling represented an average of 64% of all pipe replaced within the program. In some projects, like Spangle, WA in 2022, the successful use of horizontal drilling accounted for as much as 99% of the pipe replaced. Not all projects, however, are

suitable for the use of horizontal drilling or split and pull technologies. There are many instances where split and pull replacement cannot be performed, due to safety issues associated with joint-trench utilities, when the existing pipe makes a restrictive curve as in a cul-de-sac, or when the system has only one source of supply and downstream customers would lose their natural gas service. The latter case requires the coordination and logistics of an all-day customer outage, and the ability to perform the procedure within the time required to restore customer's service the same day. There are also conditions where horizontal directional drilling cannot be employed. Some of these include prohibitive subsurface conditions (solid rock or heavy cobble), or cases where there is not sufficient clearance along the pipe path to provide for adequate separation of utilities. Avista is committed to optimizing the utilization of trenchless technology whenever it is a feasible method of installation.

Continuing Annual Leak Survey – The Company has continued to conduct annual leak surveys on priority Aldyl-A main pipe since 2011, and on its Aldyl-A service tee transitions since 2012. The Company is planning to continue the annual survey of these facilities which much more costly than the required survey frequency of five years. This effort provides a prudent margin of added safety while these facilities are being replaced and rebuilt.

Heightened Risk Prioritization within High-Consequence Areas – A key tool developed by the Company for better managing the risk associated with its priority Aldyl-A piping, is its risk consequence model. The model predicts areas in the system where leaks are most likely to occur and then incorporates information on the density of development (high-consequence areas) to assess relative priorities for pipe replacement. In 2014, Avista updated its model to distinguish schools and daycare facilities from other types of development. These were identified as sites that would be difficult to evacuate in the event of a natural gas emergency. Though these sites were already included in designated high-consequence areas, this new designation provides them an additional layer of priority. The model highlights those instances where the Company has Aldyl-A facilities within 150 feet of the center point of the building or within 500 feet for larger properties, to encompass

outdoor play areas or other areas of congregation. Avista is continuing to list and map other potential sites to determine whether they might warrant this higher-level prioritization.

Prior Year Replacement Activities – In 2022, the Company replaced a total of 17.67 miles in Washington for Major Main projects. The project totals for last year are listed in Table 4 below.

Table 4 - Avista main pipe replacement projects completed in Washington in 2022

Completed 2022 Washington Major Main Projects			
Location	Miles	Start	End
Clarkston WNTR	1.02	January	March
WA Municipal Roads	0.86	March	April
South Hill (Ferris to High Dr.) Spokane 2020	4.55	March	October
West Spokane Valley 2022	3.81	March	October
Kettle Falls / Colville 2022	5.63	March	August
Downtown LWR South Hill 2022	0.82	April	September
Fall Softscape Spangle 2022	0.97	October	November
Total Miles	17.67		

In 2023, the Company is replacing main pipe in West Spokane Valley, Millwood, South Hill Spokane, Downtown Spokane, and various capital road projects throughout the city of Spokane for an expected total of approximately 17.38 miles. These current-year projects are listed in Table 5 below.

Table 5 - Avista current main pipe replacement projects in Washington for 2023

Planned 2023 Washington Major Main Projects			
Location	Miles	Start	End
WA Municipal Roads	0.50	March	April
South Hill (Ferris to High Dr.) 2020 Carry Over	1.03	April	June
Millwood 2023	5.33	April	October
West Spokane Valley 2022	8.61	March	November
Fall Softscape Spangle 2022	0.95	June	July
Downtown Segments (North of I-90), WA 2021	2.16	July	October
Total Miles	17.38		

Replacement Activities Scheduled for 2024 and 2025

The Company’s replacement projects for the next two-year planning period continue to be focused in the Spokane area along with increasing our efforts in outlying communities, including Kettle Falls and Goldendale, WA. In order to remain on pace to complete the program within a 20 year time frame, Avista plans to conduct 19 to 20 miles of pipe replacement per year. Currently, planned main pipe replacement projects for 2024 and 2025, are presented below in Tables 6 and 7, respectively.

Table 6 - Planned main pipe replacement projects in Washington for 2024

Planned 2024 Washington Major Main Projects			
Location	Miles	Start	End
Spokane Central 1	4.00	April	November
Spokane General	4.00	April	November
Downtown Spokane and Lower South Hill	5.10	April	November
West Spokane Valley	0.84	April	November
Goldendale/Stevenson	3.17	April	November
Clarkston/Colton	2.00	April	November
WA Municipal Roads	0.50	April	November
Total Miles	19.58		

Table 7 - Planned main pipe replacement projects in Washington for 2025

Planned 2025 Washington Major Main Projects			
Location	Miles	Start	End
Colville Kettle Falls	5.10	April	November
Spokane Central 1	2.29	April	November
Spokane General	4.00	April	November
Downtown Spokane and Lower South Hill	6.04	April	November
Clarkston/Colton	2.41	April	November
WA Capital Road Projects	0.50	April	November
Total Miles	20.34		

The Company’s currently-planned investments for Aldyl-A replacement in 2023, and for the planning period 2024 and 2025, are provided in Table 8 below.

Table 8 - Current and Planned Aldyl-A replacement costs in Washington for 2023-2025

Year	Miles of Main Pipe	Investment
2023	17.38	\$19,784,666
2024	19.58	\$21,398,937
2025	20.34	\$21,661,108
Totals	57.30	\$62,844,711

II. Avista’s Isolated Steel Identification and Replacement Program

Between the years of 2011 and 2021 Avista engaged in an “identification and replacement program” for sections of isolated steel pipe in its natural gas pipeline system. The genesis of this program was an agreement between Avista and the Safety Staff of the Commission that was aimed at reducing the risks associated with sections of isolated steel that may be ‘cathodically unprotected’ or otherwise unknown to Avista.³ The program objective was to identify and document isolated steel sections, including isolated risers, and to replace each riser or pipeline section within a specified timeframe after its identification. The program began in November 2011 and established the completion dates of November 2016 for the identification phase of the program and November 2021 for the replacement phase of the program. Avista received a closure letter from the Commission on January 10, 2022, acknowledging that the terms of the original 2011 agreement have been satisfied. All known segments of cathodically unprotected isolated steel pipe have been identified and replaced within our Washington service territory.

³ Docket No. PG-100049