

September 30, 2021

VIA ELECTRONIC FILING

Public Utility Commission of Oregon
Attention: Filing Center
201 High Street SE Suite 100
PO Box 1088
Salem, Oregon 97308-1088

Re: UM 1900: NW Natural's Annual Oregon Safety Project Plan in Compliance with OPUC Order No. 17-084

Northwest Natural Gas Company, dba NW Natural (NW Natural or Company), hereby submits its 2022 Safety Project Plan in compliance with Commission Order No. 17-084 entered March 6, 2017. Please note, NW Natural changed the naming convention of this report last year from using the current year to using the upcoming year. This 2022 report reflects the upcoming year's plan.

Please address correspondence on this matter to me with copies to the following:

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Sincerely,

/s/ Rebecca T. Brown

Rebecca T. Brown
Regulatory Consultant

Enclosure



2022 SAFETY PROJECT PLAN

OREGON

September 30, 2021

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1. Introduction

In compliance with the Oregon Public Utility Commission (“Commission” or “OPUC”) Order No 17-084 (“Order”) in Docket UM 1722, this 2021 Safety Project Plan (SPP) outlines NW Natural’s safety project investments for 2022. The SPP includes updated capital and O&M projects and programs and projects that carry over from 2021.

This SPP demonstrates NW Natural’s commitment to pipeline safety by providing insight into NW Natural’s safety activities and identifies NW Natural’s response to regulatory changes that may drive safety program priorities or modify existing programs. In the future if NW Natural seeks approval for a Safety Cost Recovery Mechanism (SCRM), this SPP is intended to expedite the review process of safety investments.

Safety is a core value at NW Natural and we appreciate the opportunity to present this information to the Commission.

2. Background Information

NW Natural is a regulated natural gas utility conducting business in Oregon and southwest Washington. The Company serves ~770,000 customers and owns and operates ~660 miles of natural gas transmission pipeline, and ~14,000 miles of distribution pipelines. In addition, NW Natural operates three energy storage facilities in Oregon – Portland and Newport LNG Plants and Mist Underground Storage.

NW Natural’s pipelines and storage facilities are governed by:

- 49 CFR Part 192 – Minimum Safety Standard – Transmission & Distribution Systems
- 49 CFR Part 193 – LNG Safety Standards
- 49 CFR Part 196 – Protection of Underground Pipelines from Excavations Activity
- Additional OARs (OAR 860-024 – Safety, OAR 860-031 – Pipeline Inspections), and ORSs such as ORS 757.039 – Regulation of hazardous substance distribution and storage operations, and ORS 757.542-993 – One call notification.

In addition to the federal and state regulations identified above, NW Natural’s safety program considers the findings of Oregon House Resolution 3 (HR 3, 2011) which directed the Oregon Seismic Safety Policy Advisory Commission to prepare the Oregon Resiliency Plan with the purpose of identifying recommendations for how Oregon’s critical energy infrastructures could be made seismically resilient against a Cascadia subduction zone earthquake. Upon completion of that work on February 28, 2013, the Oregon Senate passed Senate Bill 33 (SB 33, 2013), which established the Governor’s Task Force on Oregon Resilience Plan (“ORP”) Implementation (“Task Force”). In October 2014, the Task Force issued a report recommending that the Commission require regulated energy providers to conduct seismic assessments of regulated facilities and recommended that the Commission allow cost recovery for prudent investments related to assessments and mitigation of vulnerabilities identified during those assessments. In October 2018, Governor Kate Brown presented the “Resiliency 2025” plan,

titled “Improving Our Readiness for the Cascadia Earthquake and Tsunami” (“Resiliency 2025 Plan”). The Resiliency 2025 Plan follows the 2013 ORP, and outlines six key strategies for the State of Oregon. Its vision is to “protect all Oregonians by ensuring we are prepared to survive and recover from the expected 9.0 magnitude Cascadia earthquake and ensuing tsunami.” The key strategy of the Resiliency 2025 Plan to improve the energy infrastructure is to “develop a plan for the Critical Energy Infrastructure Hub to prevent and mitigate catastrophic failure and ensure fuel supplies and alternate energy sources are available to responders and the public.”

3. Threat Identification

NW Natural’s four highest ranking threats, as identified in the DIMP Plan are:

3.1 Excavation Damage

Excavation damage continues to be the principal threat to NW Natural’s gas distribution system, comprising approximately 86 percent of all recorded leak repairs. Excavation damage is a system-wide threat brought on predominantly by improper excavation practices. NW Natural’s efforts to reduce excavation damages are described below.

3.1.1 Excavation Training and Education:

NW Natural actively engages in training and education for contractors, general public, and other utilities, to promote safe excavation procedures and practices. These efforts include classes on Oregon dig laws, displays at public events, and the use of media including print, radio, television, and internet to promote safety, best practices, and the use of 811.

NW Natural’s Damage Prevention Department works to reduce the number of excavation damages through investigation, cause analysis, and proactively works to identify and support contractors engaging in high-risk construction activity.

3.1.2 One-Call Notification Practices:

NW Natural actively participates in local and state-level Utility Coordinating Councils as well as the One Call Utility Notification board. A primary function of these organizations is to reduce damages to underground utilities through excavation best practices, public awareness, and the use of the Oregon one call system (811).

NW Natural also maintains a robust Public Awareness Program which includes advertising, direct mailing, and public event outreach to increase this awareness.

3.1.3 Locating Practices:

NW Natural is an active member of Oregon’s one call system and responds to all locate requests. Due to the high volume of locate requests this work is contracted. All locating is performed by NW Natural qualified personnel and oversight is performed by Company contract management personnel. In addition, locating activity is included in NW

Natural's Quality Assurance program to minimize the incidences of errors, mismarks, and missed due dates.

3.1.4 Incorrect Facility Marking:

Incorrectly marked facilities may be due to underground interference, equipment issues, inaccurate facility maps, or procedural issues. Locating personnel responsible for a mismark receive additional training and are required to re-qualify prior to being allowed to locate gas facilities. Review of mismarks are conducted by supervisor or other qualified personnel and the results are used to identify deficiencies, correct maps, and ensure the facility can be reliably located.

3.2 Material, Weld or Joint Failure

Material, weld, or joint failure is the second largest threat to the NW Natural gas distribution system, comprising approximately 9 percent of all recorded leak repairs. NW Natural is proactive in its efforts to reduce these occurrences, as described below.

3.2.1 Plastic Pipe Installed from 1960s to 1980s:

NW Natural makes every effort to identify all pre-1982 plastic pipe installations, analyze leak histories, evaluate any conditions that may threaten integrity of the pipe, and take appropriate remedial action, including replacement, to mitigate risks to public safety.

3.2.2 Acrylonitrile-Butadiene-Styrene ("ABS"):

NW Natural used ABS in the 1960s to reline or renew existing steel services. These services have been identified for replacement. NW Natural's use of ABS was limited to ½" pipe inserted into existing steel service lines mitigating the industry-identified risk of rock impingement and slow crack growth related to unsuitable backfill material and construction practices.

3.2.3 Plexco Service Tee Celcon Caps:

NW Natural is aware of industry issues regarding Plexco Service Tee Celcon Caps possibly leaking when over-tightened during installation. These caps exist within the gas distribution system and are replaced as found and scheduled for replacement if leaks are identified.

3.2.4 Polyethylene ("PE") Fusion Failure:

NW Natural has a robust training and Quality Assurance/Quality Control program in place to ensure proper PE fusion quality. This program includes testing, biannual qualification, and ongoing training. All PE fusions are visually inspected, and pressure tested prior to being placed in service.

3.2.5 Flat Back Risers:

In 2012 NW Natural identified a type of riser stop valve, internally known as a "Flat Back Riser," that contained components prone to atmospheric corrosion in the coastal areas

of NW Natural's service territory. NW Natural identified that corrosion failure on a retaining pin could result in a hazardous leak. NW Natural developed an Accelerated Action Plan to replace these valves in coastal areas.

3.3 Corrosion

Corrosion is the third largest threat to the NW Natural's gas distribution system, comprising less than 2 percent of all recorded leak repairs. NW Natural's efforts to reduce these occurrences are described below.

3.3.1 Pipe Replacement:

The primary driver for external corrosion system-wide is steel pipe. At this time NW Natural's distribution system is approximately 51% coated and cathodically protected steel and 49% polyethylene. During all pipe replacement projects consideration is given to replacing existing steel pipes, valves, and fittings with polyethylene to mitigate the threat of corrosion. In 2015 NW Natural completed the replacement of all known uncoated bare steel buried pipe eliminating the single largest corrosion threat.

3.3.2 Pipe Casings:

Steel casings are primarily used to protect or facilitate the installation of mains and services underground and are fitted with seals to prevent water intrusion, spacers to prevent contact between the casing and gas carrying pipe, and vents.

NW Natural inspects steel casings annually to identify problems such as contact between the casing and gas pipe, or water intrusion. If a "short" or other anomaly is identified a work order is created to address the concern.

At NW Natural the installation of casings has been largely replaced by HDD (Horizontal Directional Drilling) installation. During pipeline improvement projects existing casings are evaluated for replacement by HDD or alternatives.

3.3.3 Atmospheric Corrosion:

NW Natural's system includes facilities such as risers, regulators, station piping, bridge crossings and other above ground facilities that are susceptible to atmospheric corrosion.

NW Natural's atmospheric corrosion mitigation plan includes replacement of facilities when appropriate as well as protective coatings such as epoxies, paint, wax, other corrosion resistant materials, and enhanced inspections in locations with an elevated risk of corrosion.

3.3.4 Exposed Pipe Inspections

During normal operations when a buried pipeline is exposed crews inspect the pipe and protective coating for evidence of corrosion, or coating anomalies that can lead to

future corrosion. Coating repairs or pipe replacements are completed before the pipe backfilled and placed back in service.

3.4 Equipment Failure

Equipment Failure is the fourth largest threat to the NW Natural gas distribution system, comprising approximately 1 percent of all recorded leak repairs. NW Natural's efforts to reduce these occurrences are described below.

3.4.1 Valves:

Valves are vital to the safe operation of a gas distribution system. NW Natural has in place a key operating valve inspection and maintenance program to ensure key valves are operable and available for use. Valves that are found to be inoperable, inaccessible, and/or paved over are identified and remediated as necessary.

3.4.2 Pressure Control / Relief Equipment:

NW Natural has an established inspection and maintenance program in place for pressure control/relief equipment to ensure reliable and safe operation.

3.4.3 Mechanical Couplings:

Pipe may pull out from compression couplings due to tensile forces including excavation damage, cyclic fatigue from changes in the temperature of natural gas as a result of the Joule-Thomson effect, ground movement from earthquakes or after heavy rains. Mechanical fitting failures are investigated, tracked, and reported per PHMSA and OPUC requirements.

In the past as an alternative to welding small diameter steel fittings, mechanical couplings were sometimes used to install valves and service tees. These types of fittings may develop leaks through the elastomer seal between the coupling and the pipe. NW Natural replaces these fittings with welded steel fittings or polyethylene as discovered during routine operations and maintenance activity.

3.4.4 Other:

Other types of material or equipment failure may occur in the gas distribution system. Failure reports are reviewed to detect trends or patterns that may affect the distribution system.

Many of the safety projects identified in this plan are in direct response to the above threats, and to maintain compliance with safety codes and regulations.

4. Safety Activities Performed by NW Natural

Safety activities at NW Natural can be divided into categories:

4.1 Prescriptive Regulatory Actions – Includes actions which must be performed to meet minimum federal safety standards.

49 CFR 192 includes multiple prescriptive activities, intended to safeguard public safety, and fall into broad categories such as “operations” (Subpart L) and “maintenance” (Subpart M). Most of these activities require inspections at prescribed intervals to confirm that a facility or asset is meeting operational requirements prescribed by federal code. These activities provide the baseline data for other performance-based activities and include, but are not limited to:

- Atmospheric corrosion surveys
- Leakage surveys
- Cathodic protection surveys
- Right of way (“ROW”) patrols
- Valve maintenance
- Water crossing inspections
- Odorization
- Odorometer Reads
- Line Marking
- Pressure Regulation Inspection
- Large Meter Inspections
- Record Keeping
- Control Room Management
- Bridgeline Inspections
- Equipment Calibration
- Houseboat Inspections
- Transmission Integrity

The safety activities from this category are prescriptive in nature and are not driven by risk analysis alone. Because these activities are required, they are not discussed further in this SPP, which instead focuses on projects and/or programs identified by NW Natural as essential to enhancing safety and reliability.

4.2 Proactive, Performance-Based Actions

Other sections of 49 CFR 192 include more proactive performance-based risk reduction activities, such as Subpart O – Transmission Integrity Management Program (“TIMP”) and Subpart P – Distribution Integrity Management Program (“DIMP”), Damage Prevention, and Public Awareness. These programs focus on mitigating pipeline safety risk.

4.2.1 Transmission Integrity (TIMP)

Transmission Integrity refers to 49 CFR 192 Subpart O-Gas Transmission Pipeline Integrity Management. This federally mandated program covers natural gas transmission pipelines located in High Consequence (HCA) and Moderate Consequence (MCA) areas. NW Natural exceeds code requirements in TIMP to address conditions outside of HCA and MCA's

Activities in this category include baseline assessments and reassessments of transmission lines using in-line inspection ("ILI") and other direct assessment methods. They may also include pipeline replacements and modifications in compliance with integrity management rules, best practices, and relocation of facilities to mitigate threats posed by natural forces such as flooding, land movement, and erosion.

4.2.2 Distribution Integrity (DIMP)

Distribution Integrity is outlined in 49 CFR 192 Subpart P- Gas Distribution Pipeline Integrity Management. This federally mandated program requires operators to create a written Integrity Management Program that takes into consideration: system knowledge, threat identification, evaluation and risk ranking, identification, and implementation of measures to address risk, measurement of results, and reporting.

Activities in this category include projects warranting Accelerated Action ("AA") to address a system integrity risk. These AA projects are identified through risk modeling, industry identified threats, and by subject matter experts within the Company, and include:

- Replacement of vintage plastic services,
- Relocation of facilities under structures,
- Replacement of valves and fittings susceptible to leakage,
- Protection of above grade gas facilities,
- Crossbore investigation, and
- Relocation of distribution gas lines to mitigate threats posed by natural forces such as:
 - Flooding
 - Land movement, and
 - Erosion.
- Enhanced EFV Installation – installation of EFVs on services that were installed prior to the EFV rule issued in 2006
- Dithiazine – a sulfur compound found in natural gas that has been known to cause equipment failure especially in district regulators.

4.3 Safety Policy and Practices

NW Natural also implements risk reduction activities not explicitly required by the federal code. These actions have been identified as prudent safety practices intended to enhance public safety, improve system reliability, and maintain the safe operation of NW Natural's

above and below-ground facilities including LNG Plants and underground natural gas storage facilities. These risk reduction actions include:

- Seismic vulnerability assessments of LNG Plants, the Mist Underground Storage Facility, and Transmission Pipeline System as recommended by SB 33 (2013) and consistent with the Governor’s Resiliency 2025 Plan
- Accelerated replacement of vintage materials
- Transmission inspection outside of high and moderate consequence areas.
- Development of a PSMS (Pipeline Safety Management System)
- Proactive EFV installation
- Locate ticket risk modeling
- Natural forces assessments of NW Natural’s transmission system as part of NW Natural patrol and surveillance programs.

5. Projected and Preliminary Costs Presented in this Plan

The 2022 Capital and O&M costs presented in this plan are projected based on current expenditures for each of the identified projects through the end of the year. Costs presented for the significant safety initiatives are preliminary for planning purposes and do not include NW Natural overhead costs. Costs for safety projects under consideration will be presented in future SPPs.

6. 2022 Capital Safety Investment

In 2022, NW Natural estimates it will invest \$12 MM in capital to comply with DIMP, TIMP, and other regulations. Significant projects in this category include:

6.1 Springfield Transmission (ILI) (2021-22 estimate of \$1.2 MM):

This project involves transition of the Springfield transmission line from direct assessment to ILI. The Springfield transmission line is the primary feed to downtown Springfield and large industrial customers in the area. This pipeline is approximately 3 miles and routed along Harlow Road, which is a major thoroughfare between the cities of Eugene and Springfield. Work on this project occurred in 2021 with planned completion in 2022.

6.2 Pro-active EFV Installations (2022 estimate of \$600,000):

On October 14, 2016, the U.S. Department of Transportation’s (“DOT’s”) Pipeline and Hazardous Materials Safety Administration (“PHMSA”) adopted code requiring the installation of EFVs or shut-off valves on all new or replaced branched service lines (Docket No. PHMSA-2011-009). While the code requires EFV installations be installed in all new or replaced branched service lines, it did not require retrofitting EFVs on existing services.

NW Natural believes a proactive EFV installation program is a prudent action that can mitigate the consequence of a gas release resulting from excavation damage to a gas service line. NW Natural is implementing a policy to retrofit EFVs on existing gas service lines when

the buried portion of the service line is exposed and the work involves the interruption of gas service.

This pro-active EFV program was initiated in 2020 and will continue to be a safety program.

6.3 McMinnville/Lafayette ILI (2022 estimate of \$2.6MM):

This project involves the transition of the McMinnville/Lafayette transmission line from ECDA to ILI assessment. The McMinnville/Lafayette transmission line is a 6" transmission main that connects to the Central Coast feeder near Amity, OR and runs north 13 miles to serve the residential and industrial customers of McMinnville. The transmission main terminates in the town of Lafayette north of McMinnville. Design work to modify the pipeline will begin in 2021 with construction starting in 2022; cleaning and ILI assessment, data analysis, and remediation activities will continue through 2022.

6.4 North Eugene Industrial Trans (2022 estimate of \$2.1M)

This project involves the transition of the North Eugene Industrial transmission line from ECDA to ILI assessment. The North Eugene Transmission line is a 5 mile long 6" and 8" transmission line primarily serving the residential and industrial customers located along the Randy Pape Beltline highway. The line terminates at the Northwest Expressway. Design and preliminary construction work coordinated with City of Eugene public works projects will be done in 2021. Cleaning and ILI assessment activities will continue through 2022 with data analysis and remediation/repairs completed in 2022.

6.5 Underground Storage – Well Integrity (2022 estimate of \$3.0 MM)

PHMSA has issued an Interim Final Rule incorporating by reference American Petroleum Institute ("API") Recommended Practice 1171 referred to as the Functional Integrity of Natural Gas Storage in Depleted Hydrocarbon Reservoirs and Aquifer Reservoirs by reference. NW Natural developed a Mist UGS Risk Management plan and has begun work on the program. Work in 2022 will involve assessments of the production casings of 6 storage wells. The assessments will include downhole wireline logging of the production casing strings using both multi-arm caliper and magnetic flux tools to identify deformations and metal loss features.

6.6 Other safety projects and programs (2022 estimate of \$2 MM):

Pipeline Replacement due to Seismic/Natural Forces

Portions of NW Natural's distribution and transmission system cross through landslide faults, seismic faults, sensitive areas, and waterways. Due to significant weather events or the passage of time, the integrity of these pipelines may become at risk. When identified during patrols, routine maintenance, or other stakeholders, the Integrity Team develops plans to remediate these at-risk pipelines as they are identified.

Valve Isolation Plans

NW Natural is working to develop a strategy for identifying and installing additional valves in the distribution system to assist in the isolation of portions of the distribution system in case of an emergency or third-party damage.

Meter Protection Installation

NW Natural will continue installation of guard posts adjacent to meter sets that are determined to be at risk of damage due to vehicle or equipment contact.

Pipeline Modification due to ROW Encroachment

Patrols of NW Natural Pipelines may discover structures or other encroachments built over or adjacent to pipelines that can impact the safe operation of or access to a pipeline. This program works with landowners to remediate these encroachments.

Pipeline Material Identification (PMI)

At selected transmission pipeline anomaly remediation sites, NW Natural has instituted a process using technology to non-destructively test and acquire data regarding pipe material properties. In addition, when the Transmission Integrity rule went into effect over twenty years ago, NW Natural began keeping short (18"-24" long) sections of pipe for future reference. These spools will be destructively tested to obtain pipe material properties that were not required as part of the original installation documentation. The material data obtained through this program will be stored in the permanent record for each pipe segment.

6.7 ASV/RCV Installation (2022 estimate of \$700k)

To assist in the timely and efficient closure of valves on the transmission system, NW Natural is continually identifying locations where ASV/RCV valves can reasonably be installed, or existing valves retrofitted, in order to facilitate isolation of the transmission system.

6.8 Historical Capital Expenditure - Safety Project Plan (System Integrity)

The Historical Capital Expenditures below are actual expenditures for each of the presented years.

<u>Year</u>	<u>Expenditure</u>
2015	\$17,190,356*
2016	\$ 7,772,763
2017	\$ 5,925,409
2018	\$ 9,699,814
2019	\$10,231,431
2020	\$ 8,900,000
2021	\$ 8,200,000

*Final year of known bare steel main replacement

Historical capital expenditures include:

- Work to modify pipelines to accept inline inspection devices, including removal or replacement of non-piggable fittings and facilities required to launch and receive inline inspection devices.
- Pipeline relocation to mitigate threats including outside forces and natural forces. This work does not include relocations due to utility conflicts, or third-party improvement projects.
- Pipe replacements and testing in compliance with federal and state regulations.
- Ongoing DIMP AA programs/projects such as Vintage Plastic, Guardpost installations, Proactive EFV installations, etc.

7. 2022 O&M Expenditures

In 2022 NW Natural expects to spend \$5.15MM in O&M to address and comply with DIMP, TIMP, damage prevention, and public awareness.

Activities that reflect expenditures in this category include costs for supplies (office/field), reference materials, education (conferences/workshops), vendor and contract costs associated with transmission assessments, sewer crossbore investigations and remediation, public awareness program materials, advertisements and mailings, and natural forces investigation and remediation. Additionally, this category covers the development, initiation, and execution of studies and consulting fees related to integrity requirements, such as class location studies and third-party geotechnical site evaluations to address and mitigate risk.

O&M also includes some non-capital internal labor in support of NW Natural's system integrity program ("SIP"). These costs include the Integrity Management staff (7 FTE), damage prevention specialists (4 FTEs) involved in damage prevention/investigation, and a public information officer for safety outreach, training, and program administration. The Integrity Management group may also utilize other internal resources in support of SIP activities which includes GIS analysts, Customer Service, Construction, and other subject matter experts. Significant O&M projects include:

7.1 Sewer Crossbore Inspections (2022 estimate of \$1.6MM):

The sewer crossbore program involves the visual inspection of sanitary sewers for incidences of gas line crossbores. In installations where trenchless technology was used to install polyethylene pipe, there exists the possibility the gas line was bored through a sewer main or lateral. NW Natural's policy is to expose all foreign line crossings when performing trenchless work. Sewer crossbores typically occur when facility owners fail to locate their pipe, creating a situation where NW Natural is unable to expose facilities during construction. This is an industry-wide threat. Although sewer crossbores are not isolated to gas operators, the consequence when gas lines are involved can be high. This program identifies existing trenchless polyethylene installations and inspects the sewers in the vicinity to identify crossbores.

7.2 Transmission Inline and Direct Assessment Reassessment and Remediation (2022 estimate of \$1.3MM):

This work includes the federally prescribed seven-year reassessment of transmission pipelines in HCAs and is comprised of both inline inspection and direct assessment of transmission assets and associated repairs.

7.3 Natural Forces (2022 estimate of \$300,000):

Where the threat of natural forces can be mitigated without pipe replacement or rerouting, NW Natural may choose to address the threat through site work. This option is necessary in situations where a reroute is not feasible due to environmental restrictions or where a pipeline serves a critical customer or provides a single feed to a distribution system. Work may include armoring of slopes, re-grading of sites, culvert improvements, and retaining structures to address land movement and drainage issues.

7.4 Damage Prevention (2022 estimate of \$800,000):

In compliance with DIMP regulations, and to address the single largest threat to gas facilities, NW Natural maintains a damage prevention department. The department consist of a supervisor and 4 FTE damage prevention specialists whose responsibilities include damage prevention through high risk locate ticket intervention, training, attendance at pre-construction meetings, participation in Utility Coordinating Councils, and support of the 811 One-call system. Damage prevention specialists are also responsible for the investigation, enforcement, and contractor training related to excavation and third-party damage.

7.5 Public Awareness (2022 estimate of \$1,050,000):

NW Natural's Public Awareness program meets the requirements mandated in API RP 1162, adopted by reference by PHMSA into Part 192.616(a), (b), and (c). This program promotes public safety through communication and outreach focused on educating customers and the public about natural gas safety. The program includes customer correspondence, mailers, advertisements, community events, mobile phone applications, and brochures to excavators, contractors, public officials, residences and businesses along pipeline rights-of-way and in high consequence areas, floating homes, and schools.

The Public Awareness Plan utilizes television and radio advertising, bill inserts, social media, and events to promote natural gas safety awareness. Targeted outreach and public awareness materials are provided annually to customers near transmission pipelines, as well as contractors, excavators, and first responders within NW Natural's service territory.

7.6 Right-of-Way Encroachments (2022 estimate of \$100,000):

Pipeline patrols are used to identify changes in site conditions. An example of such a change is the installation of structures over pipelines, and inside dedicated pipeline rights-of-way, or easements. In some instances, the remediation may involve the relocation of structures and other non-gas facilities.

7.7 Historical O&M Expenditure - Safety Project Plan (System Integrity):

The historical O&M expenditures below are actual expenditures for each of the presented years (not including PSMS, damage prevention or public awareness expenditures).

<u>Year</u>	<u>Expenditure</u>
2015	\$4,034,218
2016	\$4,889,618
2017	\$4,771,267
2018	\$4,000,000
2019	\$3,052,000
2020	\$3,100,000
2021	\$2,900,000

Historic O&M expenditure included:

- Regulatory transmission assessments including the investigation and remediation of identified anomalies resulting from inline inspection and external corrosion direct assessment (ECDA).
- Sewer crossbore inspection program.
- Investigation and remediation of natural forces including landslides, flooding, erosion, etc.
- Buildover remediation where structures encroach into pipeline right-of-way.
- Digital conversion of historical facility records to facilitate system knowledge.
- Remediation of difficult to operate valves.
- Maintenance of Integrity Risk model as a result of geographical and system changes.

These above costs do not reflect those related to ongoing maintenance of facilities including right-of-way clearing, patrols, leakage, cathodic protection, and other ongoing routine O&M work.

8. 2022 Significant Safety Initiatives

8.1 Changes in TIMP Assessment Methodology

In 2022, NW Natural will extend the use of inline inspection (ILI) for integrity assessment of transmission pipelines assessed at seven-year intervals. Inline inspection tools have the advantage over direct assessment and pressure testing because they assess the entire pipeline maintaining constant contact with the inner wall providing data allowing for the identification of interacting anomalies such as pipe deformation and metal loss. In 2022, NW Natural will change the assessment methodology of the following pipelines.

The McMinnville/Lafayette Transmission line supporting the City of McMinnville and surrounding areas. The 13-mile-long pipeline is routed along Oregon Highway 99W.

The Springfield transmission line is the primary feed to downtown Springfield and large industrial customers in the area. The 3-mile-long pipeline is routed along Harlow Road.

The north Eugene Industrial Transmission line serving industrial, commercial, and residential customers in north Eugene. The 5-mile-long line pipeline is routed along the Randy Pape Beltline Highway.

8.2 Pro-active EFV Installations

NW Natural has installed EFVs on all new single-family residential services since February of 1999. In 2006, Federal Code was modified to require the installation of EFVs on all new residential and small commercial services. NW Natural will continue and expand the program installing EFVs on existing residential and small commercial services when the buried portion of the service line is exposed and service to the customer is interrupted. NW Natural believes proactive installation of EFVs is a prudent and pragmatic approach that can mitigate the consequence of an excavation damage to a service line.

9. Safety Projects/Programs Being Evaluated at this Time – Tracking and Traceability

NW Natural is developing a roadmap to meet the proposed requirements of the Plastic Pipe Rule (Docket No. PHMSA–2014–0098). The DOT has designated the Plastic Pipe Rule a “significant rulemaking” due to economic impact; compliance with the Plastic Pipe Rule will require new equipment, software, and process changes by NW Natural to meet tracking and traceability requirements.

When the final rule is issued and the impact of the rule on current operations is understood, the Company will develop a program that will be included in future SPPs.

In compliance with recent Regulatory Mandates involving material verification of steel transmission pipelines, NW Natural has implemented a non-destructive material verification program to collect material property data on transmission pipeline assets. This program involves material testing of in-service pipelines during planned work to collect material data including metallurgy that was not required at the time of installation.

NW Natural has also developed a program to destructively test segments of pipeline that were removed from past transmission projects to collect the material property information. Collecting material information from the in-service transmission mains and the destructive tests from the historical transmission mains will allow NW Natural to develop a library of material property data.

10. Cost Benefit Analyses & Alternative Analysis

The performance of a cost benefit analysis and alternatives analysis is difficult in the context of safety programs mandated by regulation. As a result, a cost benefit analysis has not been a

primary consideration in this report because these safety projects are mandated by CFR, dictated by industry best practices, or driven by operational requirements. The assigned risk and prioritization for implementing these projects are based on in-depth studies and analysis of NW Natural's transmission and distribution systems as well as plant and storage assets. Studies performed as part of normal operations provide measurable and continual feedback needed to perform safety related work for which there are few practicable alternatives.

Alternative analysis and in-depth studies are useful when they identify threats and risks that can be mitigated or eliminated through the application of performance-based best practices, engineering analysis, operational knowledge, and subject matter experts. Where the Code of Federal Regulations prescribe compliance activity or mandate programs, the use of cost benefit, or alternative, analysis is not warranted.

When a pipeline safety initiative requires a cost benefit or alternative analysis, NW Natural may select a qualified external resource to perform the analysis.

11. Legislative Update

11.1 Docket No. PHMSA-2011-0023 - the Safety of Gas Transmission and Gathering Lines

11.1.1 Rulemaking No. 1

Regulatory Mandate – involves MAOP reconfirmation, expansion of assessment requirements outside of high consequence areas, material verification, seismicity, reporting requirements, other related items. This rulemaking was published in October of 2019. NW Natural is in compliance with the rule at this time.

11.1.2 Rulemaking No. 2

Non-Regulatory Mandate – involves repair criteria, integrity management improvements, cathodic protection, and management of change, risk modeling requirements, external corrosion, internal corrosion, risk assessment requirements, safety of launchers and receivers, surveillance after weather events, and other related rules. This rulemaking is on currently on hold.

11.1.3 Rulemaking No. 3

Safety of Gas Gathering Pipelines – involves gathering lines. The rule is currently on hold.

NW Natural will assess the full impact of all new or amended rules once published to understand the impact on operations and engineering practices. NW Natural will update programs and existing safety projects as needed to comply with new mandated requirements.

11.2 Docket No. PHMSA-2016-0016 – Underground Storage Facilities for Natural Gas

On February 12, 2020, the Final Rule incorporating API Recommended Practice 1171 referred to as the Functional Integrity of Natural Gas Storage in Depleted Hydrocarbon Reservoirs and Aquifer Reservoirs by reference was published. NW Natural developed a storage well integrity program in compliance with API 1171 incorporating all required provisions into operations at Mist. NW Natural's program is in compliance with the final rule as published.

12. Completed Projects

Below is the list of projects to be completed in the 4th quarter of 2020 and 2021:

12.1 Eugene Transmission (ILI) (\$3.3 MM - Actual):

This project involved the transition of the Eugene transmission line from direct assessment to ILI. The Eugene transmission line is the primary feed to downtown Eugene and the University of Oregon. This pipeline is approximately 4 miles and is routed along Coburg Road. Work on this pipeline was completed in 2021.

12.2 Underground Storage - Well Integrity (\$3.5MM – Actual)

This project involved the re-work and baseline assessment of seven wells in the Mist storage field. The 2021 projects are included in year three of NW Natural's well integrity baseline assessment work that includes down hole assessment of production casing and re-work of well tubing as at regular intervals. The program was developed to meet compliance with PHMSA's adoption of APR RP 1171 - Functional Integrity of Natural Gas Storage in Depleted Hydrocarbon Reservoirs and Aquifer Reservoirs. This is a multiyear project planned for completion in 2027.

12.3 South Eugene Transmission (ILI) (\$1.4 MM - Actual):

This project involved transition of the South Eugene transmission line from direct assessment to ILI. The South Eugene transmission line is a transmission line from the South Eugene gate that primarily serves the IP Springfield facility and is approximately 6.5 miles in length. Work including station upgrades was completed in 2021. The ILI assessment and remediation of any identified anomalies will be completed in 2021.

12.4 Seismic Vulnerability Assessment and Study of NW Natural's Transmission Line System (2021 estimate of \$1MM):

The performance of this assessment and study was completed in compliance with the recommendations of SB 33 (2013) published on October 1, 2014. SB 33 (2013) and in furtherance of the Governor's Resiliency 2025 Plan.

Results of the study will be used to identify projects to replace and/or fortify facilities determined to be vulnerable during events such as a Cascadia subduction zone earthquake. As identified and prioritized, these projects will be included in future SPPs. Future projects will complement existing TIMP mitigation programs, including but not limited to: installation

of automatic shut-off valves (“ASVs”) or remote control valves (“RCVs”), elimination of bridge crossings, natural forces mitigation work, system reinforcement, and valve installation.

12.5 Underground Storage Integrity – Mist Reliability (\$2.2MM - Actual):

As part of a Mist Reliability Study and in anticipation of PHMSA’s adoption of RP 1171, NW Natural performed inline inspection of four transmission pipelines that transport natural gas between storage wells at Mist into the NW Natural transmission system.

12.6 Labish Shallow Pipe Remediation (\$1MM - Actual):

As a result of NW Natural’s regularly scheduled patrols of the transmission system, a 1200’ long section of 12” transmission pipe north of Salem was identified as having insufficient ground cover. Due to the depth of the pipe and the farming activities in the area the pipe was replaced. Work was completed in the fall of 2020.

12.7 12” Willamette River Crossing (\$1.6MM - Actual):

In 2014 an inline inspection was performed on Pipeline S02 from Aurora to Tualatin. This pipeline was primarily 12” in diameter and included a 10” Willamette River Crossing. During the inspection at the river crossing the geometry of the 10” pipe damaged the inspection tool. This project replaced the unpiggable 10” section with a 12” river crossing allowing the line to be inline inspected. This crossing was installed, and successful ILI assessment completed in 2020.

13. Conclusion

This SPP provides an overview of NW Natural’s pipeline safety initiatives and commitment to the safe and reliable delivery of natural gas to the communities we serve. Through its more-than 160-year history, NW Natural has been committed to identifying threats to pipeline safety and taking steps to address and mitigate those threats. Looking forward to the role natural gas will play in our energy future, and as members of the communities we serve, NW Natural recognizes the trust placed on us by our neighbors and customers. NW Natural will continually work to ensure public safety and maintain the integrity of our natural gas system.