EXHIBIT NO. ___(DAH-1T)
DOCKET NO. UG-110723
WITNESS: DUANE A. HENDERSON

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY, INC.,** **Respondent.**	**Docket No. UG-110723**

PREFILED DIRECT TESTIMONY (NONCONFIDENTIAL) OF DUANE A. HENDERSON ON BEHALF OF PUGET SOUND ENERGY, INC.

SEPTEMBER 2, 2011

PUGET SOUND ENERGY, INC.

PREFILED DIRECT TESTIMONY (NONCONFIDENTIAL) OF DUANE A. HENDERSON

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PUGET SOUND ENERGY, INC.

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I. INTRODUCTION

Q. Please state your name, business address, and present position with Puget Sound Energy, Inc.

A. My name is Duane A. Henderson. I am the Manager, Gas System Integrity at Puget Sound Energy, Inc. ("PSE"). My business address is 10885 N.E. Fourth Street, Bellevue, Washington, 98004.

Q. Would you please provide a brief description of your educational and business experience?

A. Please see Exhibit No. ___(DAH-2).

Q. What is the purpose of your testimony?

A. My testimony provides background on PSE's past and current pipeline integrity efforts and an overview of the Pipeline Integrity Program ("PIP") that PSE is requesting in this docket. First, I discuss PSE's evolving and expanding natural gas pipeline integrity programs, including the federally mandated Distribution Integrity Management Program ("DIMP"). Second, I explain the Pipeline

Integrity Program that PSE has proposed in this tariff filing, including the enhanced safety and other benefits that will result from the program.

II. PSE'S EVOLVING NATURAL GAS PIPELINE INTEGRITY PROGRAMS

Q. Please explain what you mean by the term "pipeline integrity."

A. Pipeline integrity management is a comprehensive approach undertaken by a pipeline owner/operator to ensure the physical integrity and safety of its gas distribution system. There are many facets of pipeline integrity management. These include ensuring new pipe installations are designed and constructed to current standards, performing maintenance on existing pipelines, surveying for and repairing pipeline leaks, taking steps to prevent third party damage, providing corrosion control for wrapped steel pipelines, and replacing pipe that has demonstrated integrity issues.

Q. How does DIMP impact PSE's existing integrity management practices?

A. The DIMP final rule was issued in December 2009 by the Pipeline and Hazardous Materials Safety Administration (PHMSA) and required gas pipeline companies, including PSE, to develop and implement a Distribution Integrity Management Program by August 2, 2011. The purpose of DIMP is to enhance safety by identifying and mitigating pipeline integrity risks. DIMP requires an operator to: understand the threats to its system; mitigate risks; measure performance; and adjust its mitigative measures as necessary based on performance.

Prior to the DIMP rule, PSE historically embraced risk management methodologies comparable to DIMP, such as the cast iron and bare steel programs. More recently (but prior to DIMP), PSE developed other risk models including the wrapped steel service assessment program, older polyethylene ("PE") pipe assessment and replacement, and assessment and replacement of wrapped steel mains. In short, DIMP formalizes many of PSE's existing practices.

Q. What is the status of PSE's implementation of DIMP?

A. PSE has developed and implemented its Distribution Integrity Management Program. This program includes a written distribution integrity management plan that documents the current and ongoing processes that PSE will follow to enhance the integrity of the gas distribution system using integrity management practices.

Q. Please describe how PSE's gas pipeline integrity programs have expanded over the past decade.

A. Over the past decade, PSE has worked to improve all aspects of the integrity of its gas distribution system. Some specific examples of new and expanded PSE integrity management initiatives include: completing the replacement of all cast iron pipe, expediting the replacement of all bare steel pipe, developing and implementing a risk ranking and remediation methodology for wrapped steel mains and service piping as well as older plastic pipe, remediating buried meters and risers, conducting increased leak surveys, enhancing the damage prevention

program, and implementing transmission and distribution integrity management programs. Exhibit No. __ (DAH-3) shows a comparison of the PSE's gas pipeline integrity programs in 2004 and in 2010 and further demonstrates how the scope of PSE's pipeline integrity program has expanded during the past decade.

Q. Please describe PSE's on-going programs beginning with the bare steel replacement program.

A. The bare steel replacement program is a program to systematically identify and replace all bare steel and wrought iron pipe, including mains and service piping, located in PSE's natural gas distribution system. This includes replacing more than 200 miles of main and associated service piping as well as any individual bare steel services. This type of pipe has the highest number of leaks per mile and consists of most of the oldest vintage pipe remaining in PSE's distribution system. This program is to be completed by December 31, 2014.

Q. Is the bare steel replacement program a part of PSE's proposed PIP?

A. No. While PSE included the bare steel replacement program in its original proposal, the Company has since removed it from the PIP proposal.

Q. Please describe PSE's Wrapped Steel Service Assessment Program ("WSSAP").

A. This program evaluates the risk of older (pre-1972) wrapped steel service piping and develops appropriate mitigation, including replacement, of the service piping

identified as highest risk. The program was initiated in 2006 and uses a risk model to categorize approximately 100,000 wrapped steel service lines into four mitigation categories: Priority Replacement, Scheduled Replacement, Increased Leak Survey, and Standard Mitigation. These categories specify the appropriate mitigation to apply. The risk model is updated annually with current operating history and performance information and new risk scores are calculated for each service address. Based on these risk scores, each service line is placed into one of the four mitigation categories and mitigation measures are implemented as appropriate. As of 2011, the approximately 91,000 remaining service lines are distributed amongst the four mitigation categories, as follows:

Mitigation Category	Priority Replacement	Scheduled Replacement	Increased Leak Survey	Standard Mitigation	Subtotal
2010 Model Results	91	303	22,731	67,658	90,783

Q. Please describe the progress PSE has made in replacing the wrapped steel services and the future plans for this program.

A. PSE has remediated more than 9,000 services since the program began in 2006 and continues to update the risk model on all remaining services each year as additional data on service piping is obtained. This includes information from the condition of the pipe and coating as well as leakage information. This program is different from bare steel in that PSE is not operating under a deadline to replace

all wrapped steel services. PSE performed inspections and tests on over 1,000 services in the lower risk categories to determine whether changes were needed to the risk model and to validate or identify changes needed to the mitigative measures. Based on this investigation and analysis of the data, PSE determined that much of the remaining service piping is in good condition and will continue to reliably and safely provide natural gas service for many years. PSE will continue to gather additional risk knowledge on the remaining service lines and will replace service lines based on the annual risk ranking.

Q. Has PSE estimated how many wrapped steel services need to be remediated?

A. No. PSE will continue to gather data on wrapped steel services to improve our risk knowledge and identify characteristics that indicate which service lines should be replaced. PSE will also continue to monitor the performance of the remaining WSSAP service lines to confirm whether the current actions are sufficiently mitigating the risks or whether additional actions such as increased leak survey and/or additional replacements are warranted.

Q. Please describe PSE's wrapped steel main assessment program.

A. This program evaluates the risk of older (pre-1972) wrapped steel mains and develops appropriate mitigation, including replacement, of those identified with the highest risk. The pre-1972 wrapped steel mains adjacent to WSSAP services categorized as "priority" and "scheduled" replacement service lines have been reviewed to determine if there is evidence of corrosion and whether these mains

should be replaced. Additional pre-1972 wrapped steel mains that are not adjacent to WSSAP services categorized as "priority" and "scheduled" replacement service lines are also being reviewed to determine if there is evidence of corrosion and whether replacement or other mitigation is appropriate.

Q. Please describe the findings from PSE's review of these mains.

A. The majority of the wrapped steel mains are performing very well and we expect they will continue to reliably provide gas service for years to come. However, the review identified several locations where the main and associated services warrant replacement due to leakage and/or coating and pipe condition.

Q. Please describe the progress PSE has made in replacing the wrapped steel main and the future plans for this program.

A. The wrapped steel main assessment program was begun in 2010. In that year, PSE replaced approximately one mile of wrapped steel mains and associated services. PSE is targeting to replace approximately 3.5 miles of wrapped steel main in 2011 and four miles in 2012. PSE will continue to gather additional risk information on wrapped steel mains and associated service piping, and will continue to evaluate opportunities to improve the risk model as well as identify segments and systems for replacement based on a combination of the risk model and engineering review.

Q. Has the Company estimated how many wrapped steel mains need to be remediated?

A. No. As described above, and consistent with DIMP methodology, this is an ongoing effort to collect information, evaluate performance and define mitigation strategies to improve performance.

Q. Please describe PSE's older plastic pipe replacement.

A. This program identifies and replaces older vintages of PE pipes that have exhibited performance characteristics that are not equivalent to more modern installations. Some segments of older (defined as pre-1986) PE pipe were manufactured from pipe resin that is inferior to the newer resins, which has led to an increased risk of pipe failure. In 2008, PSE significantly improved its material failure analysis processes focusing on obtaining as many failed parts as possible. This has provided more data that has enhanced our ability to identify pipe failures on older PE pipe, especially the HDPE DuPont pipe that is most susceptible to these types of failures. In 2009, PSE developed a risk model for DuPont pipe segments that prioritizes the replacement of these pipes based on their failure history.

Q. Please describe the progress PSE has made in replacing the PE pipe and the future plans for this program.

A PSE replaced approximately two miles of older PE pipe in 2010 and is on target to replace approximately four miles of older PE pipe in 2011. PSE continues to evaluate risk on over 100 additional segments comprising more than 98 miles of older PE pipe. PSE will continue to gather additional risk information on older vintage PE mains and service piping, and will continue to evaluate opportunities to improve the risk model as well as identify segments and systems for replacement based on a combination of the risk model and engineering review.

Q. Has PSE estimated how much older PE pipe needs to be remediated?

A. No. PSE is in the process of implementing a Geographic Information System that will provide better inventory and pipe location data for all its pipe. PSE purchasing records indicate that approximately 1000 miles of the HDPE DuPont pipe has been installed, all of which is older vintage PE pipe.

Q. Have you analyzed PSE's pipeline replacement program capital costs by year and program type?

A. Yes.

Q. Please provide an analysis of the pipeline replacement program costs.

A. The table below shows the actual capital costs for PSE's pipeline replacement program from 2003-2010 as well as budgeted program costs in 2011 and planned

program costs in 2012-2015. I have included the bare steel program to show the full extent of the capital investments even though this program is excluded from the current PIP proposal. These costs generally maintain the current level of spending and do not reflect the additional pipe PSE expects to replace if the PIP tariff is approved. With the PIP tariff in place, PSE would begin meeting with stakeholders in the summer of 2012 to review proposed projects for 2013 and establish the target replacements with that input; however, the 2011 and 2012 budgeted amounts are not likely to change as these projects have already been planned and are being designed and/or constructed.

PIPELINE REPLACEMENT PROGRAM CAPITAL COSTS

		Bare Steel	Wrapped Steel Mains	WSSAP Services	Older PE
Actual	2003	$ 5,700,000	-	-	-
Actual	2004	$ 5,200,000	-	-	-
Actual	2005	$ 4,900,000	-	-	$ 500,000
Actual	2006	$ 8,600,000	-	-	$ 400,000
Actual	2007	$ 13,900,000	-	$ 1,400,000	$ 900,000
Actual	2008	$ 21,700,000	-	$ 7,600,000	$ 1,000
Actual	2009	$ 23,500,000	-	$ 12,000,000	$ 1,500,000
Actual	2010	$ 18,600,000	$ 1,000,000	$ 5,800,000	$ 2,400,000
Budget	2011	$ 24,700,000	$ 3,700,000	$ 1,600,000	$ 4,200,000
Planned	2012	$ 33,000,000	$ 4,700,000	$ 1,700,000	$ 5,000,000
Planned	2013	$ 34,200,000	$ 5,000,000	$ 1,900,000	$ 5,600,000
Planned	2014	$ 14,900,000	$ 5,100,000	$ 1,900,000	$ 5,500,000
Planned	2015	-	$ 5,300,000	$ 2,000,000	$ 5,600,000

Q. Has PSE reviewed these pipeline replacement programs with Commission Pipeline Safety Staff?

A. The bare steel and WSSAP risk models and resulting mitigation matrix was developed with input and review of Pipeline Safety Staff at the time of creation.

In addition, PSE has been providing periodic updates on the annual replacement plan and progress on the replacement efforts . These risk models have since served as the basis for the wrapped steel main and older PE programs that PSE has undertaken.

III. PSE'S PROPOSED PIPELINE INTEGRITY PROGRAM

Q. Please briefly describe how the Pipeline Integrity Program, if approved, would impact PSE's pipeline integrity efforts.

A. The proposed program will help PSE improve pipeline reliability, integrity and safety programs by providing for the timely recovery of the additional investments necessary to implement expanded and accelerated pipe replacement programs. With the current approach, PSE limits the scope of pipe replacements to the areas that are of the highest risk. With the PIP, PSE could expand the scope of these replacement activities to proactively replace larger segments of pipe that have similar characteristics as the highest risk facilities based on factors such as pipe material and operating environment. This would not only enhance pipeline integrity but would also provide greater flexibility to coordinate permitting and planning with the jurisdictions we serve, provide more flexibility in obtaining additional resources to accomplish the work, minimize neighborhood disruption, and maximize efficient use of resources improving overall cost of replacement. The end result will be accelerated replacement of pipe that will lead to enhanced safety of the system.

Q. Please explain the current process for determining what pipes need to be replaced.

A. Each year, PSE identifies pipe segments in each of the four facility types (i.e., bare steel, wrapped steel mains, wrapped steel services, and older PE pipe) on which to perform an integrity assessment. Segments are identified based on historical performance and other system data. Information is collected and entered into a risk model. Examples of the types of data entered into the risk model include leak history, number and location of active leaks, information on the condition of the pipe, and backfill and cathodic protection history. The risk model then calculates a risk score for each facility segment. PSE uses the risk score, in conjunction with its knowledge of public improvement projects that would limit the ability to replace facilities in future years, to determine which facilities are candidates for replacement. Through an iterative process, segment boundaries may be adjusted to achieve the greatest reduction in overall system risk. Through the annual budget process, PSE makes decisions as to how many of these replacements of older PE and pre-1972 wrapped steel systems can be accomplished each year. A flow chart depicting this process for each of the four facility types is presented below.

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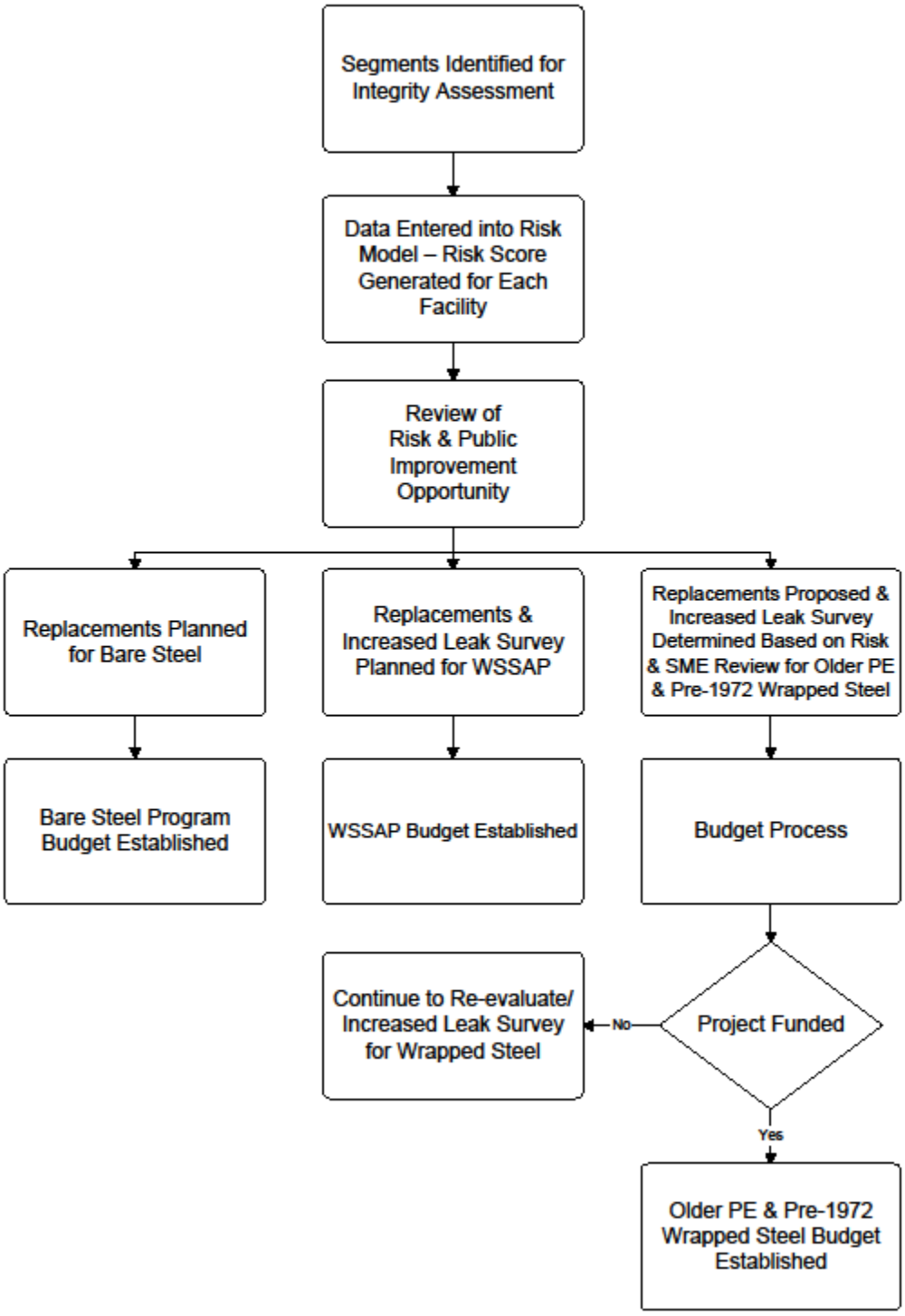
Annual Process



Q. Please explain how this process would change if the PIP is approved.

A. If the PIP is approved, the process I described would generally remain the same with the exception of the budget process. The amount of pipe to be replaced each year would be determined through discussions with Commission Staff and other stakeholders. The process for establishing segment boundaries would still be an iterative process focused on achieving the greatest risk reduction but would likely enable more proactive replacement of larger segments. With the PIP, rather than focusing narrowly on small segments with demonstrated failures, larger segments could be proactively replaced. For example, where one area has experienced failure, adjacent segments with similar characteristics could be proactively replaced before they reach the higher risk rating.

Q. What benefits, if any, will the PIP provide?

A. The PIP will allow PSE the ability, in consultation with Commission Staff and other stakeholders, to expand the scope of pipeline replacement initiatives beyond the level currently budgeted in any particular year. With the PIP review process, pipeline replacement funding that is included in the program would not have to compete in the PSE budget process for funding with all the other customer and business needs but would be determined by mutually agreed risk reduction objectives and by resource availability. This will benefit customers by enhancing safety through proactive replacement of pipe

Q. Are there other benefits?

A. Yes, in addition to enhancing the safety of PSE's system, PSE has the potential to operate more efficiently by replacing pipe in larger areas. For example during the PIP review process, stakeholders will discuss whether it makes sense to replace mains/service piping for an entire neighborhood rather than just mains/service piping of the immediate block that has demonstrated a history of poor performance. This means mobilizing crews in the neighborhood only one time rather than two, three, or four times if the work is done over time in multiple stages. Also, customers may benefit from only one disruption when larger segments of pipe replacement take place in one neighborhood.

Additionally, as discussed previously, customers and stakeholders will have an increased opportunity for participation in the process for determining pipeline replacement.

Q. Is PSE's natural gas system currently safe?

A. Yes, PSE's natural gas system is safe. The Company's overall system performance continues to improve as a result of the existing integrity programs, however, the system performance would benefit from expanding and accelerating pipeline replacement if the PIP is approved.

Q. Why should the Commission approve the PIP if PSE's natural gas pipeline system is safe?

A. Approval of the PIP will enhance the safety and reliability of the pipeline system by providing greater flexibility in planning and implementing pipeline replacement of aging infrastructure. With the PIP approved, PSE would work collaboratively with Staff and other stakeholders to determine the appropriate risk threshold for pipe replacement and the scope of the pipe replacement projects. PSE anticipates that this process will result in: replacement of additional pipe segments; expansion of the scope of pipe replacement projects; lowered risk for the remaining segments; and improved pipeline integrity.

Q. Are these expanded and accelerated replacement programs already required by DIMP?

A. No, DIMP does not specify when risks must be mitigated or how risks are mitigated. DIMP requires an operator to understand the threats to its system, rank the risks, mitigate the risks, measure performance, and adjust mitigative measures as necessary based on performance. PSE's existing replacement programs in conjunction with increased leak surveys meet these requirements. However, the opportunity afforded by the PIP to expand and accelerate replacement programs will further reduce risk, minimize neighborhood disruption, and maximize efficient use of resources improving overall cost of replacement.

Although the accelerated replacement of pipe that is possible through the PIP is not required by DIMP, the PIP provides an efficient and collaborative method of implementing DIMP. The PIP provides an opportunity for additional input from stakeholders on risk mitigation and system performance and allows PSE to collaborate with stakeholders when determining an appropriate level of spending on pipeline safety.

Q. Does DIMP have specific dollar amounts, deadlines or other targets specified in it?

A. Operators were required to have a written distribution integrity management plan implemented by August 2, 2011. Other than that, there are no specific dollar amounts, deadlines or other targets specified. PSE has implemented a DIMP program as required.

Q. Are there additional revenues that will result from the pipe replacement?

A. No, the pipe that will be replaced as part of the Pipeline Integrity Program is pipe that is currently serving customers. There is no new revenue associated with this investment in replacement piping.

Q. Will the pipe replacement provide for increased capacity?

A. In areas where there are known capacity constraints or where capacity constraints are anticipated, pipe that has been identified for replacement due to integrity concerns may be replaced with larger pipe to relieve these capacity constraints.

Q. Are there safeguards in place to prevent PSE from "gold plating" its natural gas pipeline system?

A. Yes. Each year in August, PSE will meet with stakeholders and present the planned pipeline replacement for the upcoming year. If stakeholders do not believe that the planned replacements are appropriate and prudent, they can submit comments to the Commission when PSE submits its PIP filing in November. Stakeholders will also have a chance to review the actual expenditures in the following year's true-up filing and in the next general rate case when the plant is rolled into general rates. Additionally, the program is subject to a $25 million cap per year absent Commission approval to spend more, and is subject to an annual true up.

Q. If the Commission does not approve the PIP, how will PSE manage pipeline integrity?

A. If the PIP is not approved, PSE will continue to invest in pipeline replacement programs at a level that is supported in PSE's internal budgeting process and continue to maintain system integrity per the existing integrity management program. However, without the PIP, it will likely take significantly longer for PSE to replace the pipes identified as strong candidates for replacement but where replacement can be deferred.

Q. How would the funding of PSE's proposed Pipeline Integrity Program affect PSE's operations and maintenance spending?

A. There should be minimal if any impact on PSE's operations and maintenance expenses as a result of the PIP. While there is likely to be a decrease in leak repairs as new pipe replaces old pipe, PSE will still be required to perform ongoing inspections and surveys, such as leak inspections, of the new pipe. Also, there will be additional operations and maintenance related to construction expense that will be incurred with the pipe replacements. Moreover, any operations and maintenance expense savings will be reflected in subsequent general rate case filings.

Q. Please summarize the benefits approval of the PIP would provide.

A. There are many benefits to this program. By providing for more timely recovery of future investments in pipeline safety and reliability, PSE will be in a position to pursue more aggressive replacement efforts. PSE, Commission Staff, and other stakeholders will be able to collaborate more effectively and efficiently to respond to evolving pipeline integrity issues. Additionally, PSE and its customers will benefit from having a steady workforce consistently working on pipeline replacement.

IV. CONCLUSION

Q. Does this conclude your testimony?

A. Yes, it does.