From:	Brian
To:	UTC DL Records Center
Subject:	Comments on PSE"s 2017 IRP Docket: UE-160918 and UG-160919
Date:	Tuesday, February 20, 2018 7:46:23 PM
Attachments:	PSE IRP 2017 comments.pdf

To whom it may concern,

Attached are my comments regarding the inadequacy of PSE's electrical energy resource planning as stated in PSE's 2017 IRP.

Brian Elworth
Olympus Homeowners Association

Docket: UE-160918 and UG-160919

Brian Elworth
8605 129th CT SE Newcastle 98056

Title: Chapter 8 of PSE's Integrated Resource Plan and WUTC's role in citizen protection

PSE is a large foreign owned monopoly. PSE is a not only a geographic monopoly over a large service area but also a vertical monopoly through all the layers of electrical generation, transmission, and distribution. At a time long ago, a monopolized utility may have been in the best interest of the citizens of the Puget Sound region. But that advantage has long since passed. Now the PSE monopoly has a virtual stranglehold to lock out competition and innovation.

The WUTC is the only protection that citizens in the Puget Sound region have against the dirty, dangerous, unsound, and unnecessary practices of PSE. Rather than standing up to protect us, it appears that over recent history the WUTC is withdrawing and is abdicating its duty and responsibility. The WUTC should be the fundamental source of protection for citizens against the danger and waste imposed by PSE's proposed Energize Eastside project. By standing aside, the WUTC has not only denied the citizens of WUTC resources and backing, it has removed all obligations for PSE to be honest and transparent in dealing fairly and openly with citizens.

The WUTC should be proactive in the pursuit of safety. Rather than just reactively issuing findings and fines after a disaster such as the gas explosion caused by PSE in the Seattle Greenwood area in 2016, the WUTC should be proactive and reject PSE's planning where based on unmitigable safety risks. PSE's Energize Eastside project to collocate 230kV transmission lines supported by tall steel towers (essentially lightning rods) within a few feet of high pressure hazardous liquid petroleum pipelines through neighborhoods is one example of the extreme dangers and threats hidden in PSE's planning. In its current form, the draft EIS for Energize Eastside whitewashes several safety issues with provably incorrect assumptions and calculations, and completely ignores many significant safety risks. The WUTC should not accept any portion of PSE's Integrated Resource Plan (IRP) submitted November 2017 that is dependent on exposure of people, families, and communities to these enormous safety risks.

Numerous studies and reports have indicated the region is woefully underprepared for the predicted magnitude of potentially imminent earthquakes. One of the largest shortfalls is in safety and reliability of infrastructure. The WUTC should aggressively address this issue. The WUTC should reject any IRP that does not lay out an approach to mitigate safety issues and improving earthquake survivability. PSE's IRP shows PSE to be a major impediment to rectification of these problems. Two very significant concerns are 1) the colocation of the Energize Eastside 230kV transmission lines (an extremely high energy ignition source) with the Olympic high pressure hazardous liquid petroleum pipeline (an extremely high energy fuel source); and 2) PSE's unreliable backbone-oriented electrical transmission architecture versus a resilient grid-oriented fault tolerant electrical transmission architecture.

The Olympic high pressure hazardous liquid petroleum pipeline provides the energy for our regional transportation systems including international travel via SeaTac airport. Compromising the safety, integrity, and operation of the pipeline through colocation of Energize Eastside 230kV transmission is beyond irresponsible. PSE, already a player in causing the pipeline to be shutdown (6500 block 128th Ave

SE Bellevue, year 2011), proposes through its Energize Eastside project to induce accelerated pipeline corrosion and induce dangerously high voltages on the pipeline.

PSE refers to the Energize Eastside project as the backbone of the electrical transmission system. As documented in the PSE controlled safety report from DNV-GL which is contained in the Energize Eastside draft phase 2 EIS, the proposed transmission lines are unsafe to operate in the N-1 state due to very high induced voltage on the Olympic high pressure hazardous liquid petroleum pipeline. Therefore, PSE's claimed improvement actually degrades reliability. Instead of a backbone electrical transmission architecture with its inherent single point failure weaknesses as PSE is planning, we need a more homogeneous and resilient grid including better management, localized energy storage, and the ability to harvest waste capacity.

PSE's IRP appears to be written for an audience of lesser intelligence. A number of sweeping generalization and assertions made by PSE in the IRP fall apart under the most cursory scrutiny. Fundamentally, PSE fails to address resource planning from the standpoint of customer needs for safe, reliable, sustainable, and environmentally sound electrical energy generation and transmission. Page count is no substitute for quality content.

Section 8 subsection 2 states:

> "PSE's delivery system is responsible for delivering natural gas and electricity through pipes and wires safely, reliably and on demand. We are also responsible for meeting all regulatory requirements that govern the systems. To accomplish this, we must do the following[1].
>
> • Operate and maintain the system safely and efficiently on a year-by-year, day-by-day and hour-by-hour basis."

Footnote 1 of subsection 2 page 8-4 cited above states:

> "Obligations defined by various codes and best practices such ... FERC Order 1000..."

PSE is stating that their plan is driven by FERC order 1000. But United States of America Federal Energy Regulatory Commission issued Docket No. EL15-74-000 on October 21, 2015. Paragraph 62 on pages 24-25 states"

> "Paragraph 62 of The record before us shows that the Energize Eastside Project is located completely within Puget Sound's service territory, that it was included in Puget Sound's local transmission plan to meet Puget Sound's reliability needs, and that neither Puget Sound, nor any other eligible party, requested to have the project selected in the regional transmission plan for purposes of cost allocation;114 therefore, the project is not subject to the Order No. 1000 regional approval process, and is instead subject to the Order No. 890 transmission planning requirements."

PSE is very misleading in making broad generalization about regulatory obligations when in fact those obligations don't exist, i.e., the non-applicability of FERC order 1000 to PSE's proposed Energize Eastside project.

To paraphrase PSE statements above: '[PSE] must…operate and maintain the system…efficiently on a…hour by hour basis.' But on an hour by hour basis, PSE's transmission system is grossly inefficient.

There is an extremely large amount of wasted energy transmission capacity that could be harvested. Likewise, there is a large amount of wasted zero-carbon off peak generation capacity that also could be harvested. This can be accomplished through local and distributed energy storage. PSE completely fails to address this inefficiency. PSE obscures this by stating peak demand values but hiding the fact the peaks are of short duration. The cold weather scenario often cited by PSE occurs less than 1% of the year based on local NOAA weather records from the last 40 years. Further, the peak demand occurs only during short periods during those days. For this next-to-never occurrence PSE wants to install extremely tall lightning rod like towers adjacent to a high pressure hazardous liquid petroleum pipeline through school and residential areas as part of their proposed Energize Eastside project. PSE has complete disregard for the dangers of accelerated rate of corrosion of the aging pipeline induced by electromagnetic coupling between the high-power transmission line and the pipeline. The WUTC should weigh in heavily on the danger and waste incurred by this project.

If PSE was truly obligated to pursue best practices as they claim, they should embrace the DOE initiatives on grid efficiency and resiliency such as grid storage. Many cost-effective, state of the practice solutions are in operation across the country and around the world. It seems odd that in such a high technology corridor we have a most backwards utility monopoly dictating our energy future.

The WUTC could and should be the pivotal force and a counterbalance against PSE's monopolistic strong-arming. The WUTC should be engaged in the process. The WUTC should align its policies with the visions and pursuits by the State of Washington and its citizens towards clean and sustainable energy. The WUTC should use that intent as one of the yard sticks to measure the adequacy of PSE's IRP. Cleary PSE's IRP comes up short.

PSE is the dirtiest electrical utility in the State of Washington according to recent fuel mix reports. PSE operates one of the dirtiest coal fired electrical generation plants in the United States according to the Environmental Protection Administration. PSE pollutes the air with carbon dioxide. PSE pollutes the air with mercury and other air toxics. PSE pollutes ground water with coal ash residue. The elected leader of Washington State has championed the cause for reducing carbon footprint and other negative environmental impacts. In that spirit, the WUTC should help establish the future direction of the energy generation and transmission sector. That means making a close and comprehensive examination of any departures from the proper direction and taking corrective action against those departures.

The number one objective in documenting an IRP is to convey the basis, analysis, and completeness of resource planning. This planning should be centered around the needs of the citizens. The IRP fails to provide the transparency necessary to assess adequacy of elements of planning and therefore should be rejected.

Background: Review of Energize Eastside draft phase 2 EIS safety, environmental, and needs issues

The draft phase 2 energize eastside EIS is grossly defective in that it fails to address significant environmental impacts of the proposed energize eastside project, particularly in regard to safety. In some cases, it identifies the gaps but otherwise ignores them. In other cases, it hides, obscures, or otherwise masks them. Further, the draft phase 2 EIS relies heavily on the error saturated and uncorrected draft phase 1 EIS. Properly, the draft phase 1 EIS should be corrected and completed first. Then the drafting of the phase 2 EIS should begin.

The EIS masks many unbounded safety risks and provides absolutely no management of those risks. If safety risks are not managed, mitigations cannot be established. If mitigations are not established, impact assessments can't be made. This is plain and simple common sense.

The energize eastside EIS website (http://www.energizeeastsideeis.org/phase-2-draft-eis.html) states:

> "The phase 2 Draft EIS is a project-level evaluation. It includes details of the proposed development at specified geographic locations with detailed analysis of potential environmental impacts. "

But the EIS mostly fails to meet the claim that it contains "detailed analysis of potential environmental impacts." The EDM Services Inc report in the EIS identifies gaps where information on the magnitude of the safety risks is not available. These gaps are essentially unbounded safety risks. The EIS fails to identify the safety risk mitigation for these unbounded safety risks. The EIS fails to address the impact of the mitigation of these unbounded safety risks. Again, Bellevue appears to equate ignorance with safety. Ignorance is the antithesis of safety. There is an expression "What you don't know may kill you." In this case, the more appropriate expression is "What you don't know may kill us."

The DNV GL 2016 report identifies a number of unmitigated safety risks. The EIS fails to address any of these safety risks, the safety risk mitigations, and the safety risk mitigation impacts. The validity of that report is based on unproven claims made by PSE and Olympic. There are very significant impacts that will result from the process of validating these PSE and Olympic claims both initially and continually. The EIS fails to assess these impacts.

The safety related information in the EIS appears to be a casual and incomplete dabbling on a scattering of safety issues. There is no evidence in the EIS that Bellevue is conducting the proper comprehensive safety analysis. A safety risk assessment must be comprehensive and follow a disciplined and documented approach. The safety risks must be managed. Mitigation solutions must be engineered. The impact of those mitigations must be defined.

There appears to be no plan to conduct a comprehensive safety analysis including the collocation safety risks, safety risks caused by inadvertent or unintentional errors, safety risks caused by mechanical failures, safety risks caused by intentional destructive acts, damage containment, and disaster recovery in the near term and through the entire life of operation of the proposed project.

A cursory review of FEMA and Homeland security guiding principles identifies "Long-Term Vulnerability Reduction" as a key "Mitigation Core Capability." The collocation of a 230 kilovolt high energy ignition source with a high pressure hazardous liquid petroleum pipeline fuel source in high population areas (R-

6 and higher zoning) is completely contrary to FEMA guiding principles. The EIS fails to identify the impact of compliance with this FEMA guidance.

The Department of Homeland Security Transportation Security Administration's Pipeline Security Practice Observations dated September 19, 2011 lists a number of applicable Pipeline Security Smart Practice Observations for Risk Analysis.

There are many quality processes and methodologies such as Failure Modes and Effects Analysis (FMEA), Hazard and Operability Analysis (HAZOP), and Anticipatory Failure Determination (AFD) which could be employed by a true safety engineer to assess the safety risks of the proposed energize eastside project. Tossing a couple of consultant reports in the EIS is not a methodology. It is little more than a smoke screen obscuring very significant, high impact, and unbounded safety risks. As evidenced in the EIS, Bellevue appears to reject any formal process to assess safety risks.

Safety is a topic subject to evolution and of forward thinking. Automobile seat belts were not required until 1968, three years after the first pipeline was installed in the corridor. Child safety seats didn't exist back then. Bicycle helmets did not exist back then. Although known to be a persistent toxic pollutant in the 1940s, DDT wasn't completely band until the time the second pipeline was installed. The dangerous effects of electrical transmission line induced AC corrosion of hazardous liquid pipelines were not understood until the 1970s after the second pipeline was installed. Until the Bellingham Olympic Pipeline explosion (June 10 1999) the hazardous liquid pipeline safety standards were ineffective, incomplete, and left up to the operator to comply with or ignore:

> "Olympic, Equilon and several employees faced a seven count indictment after the investigation in 2002. The companies pleaded guilty to several of the charges, leading to a $112 million settlement, a record at the time. This was the first conviction against a pipeline company under the 1979 Hazardous Liquid Pipeline Safety Act."
> https://en.wikipedia.org/wiki/Olympic_Pipeline_explosion.

A lot has been learned over the last half century regarding a variety of safety issues. Contrary to PSE's demonstrated beliefs, past ignorance is not a justifying precedent. Looking forward from a safety perspective, what is the wisdom of collocating of a 230 kilovolt high energy ignition source with a high energy hazardous liquid petroleum pipeline fuel source in high population areas? Without the necessary safety risk mitigations, there is none. The risks are greatly compounded by PSE incompetence and disregard for safety.

On March 9, 2016 at 1:40 AM, PSE single-handedly destroyed a large portion of a block in the Greenwood district. PSE caused $3,000,000 of destruction. PSE destroyed or damaged 12 businesses. PSE destroyed livelihoods. PSE caused the injury of 9 firefighters. PSE planted that time bomb 12 years prior to the explosion. This is undeniable gross incompetence by PSE. This is undeniable gross disregard for property and human safety by PSE. This is not a rare oversight. The WUTC discovered there are over 40,000 more similar ticking time bombs planted by PSE. This is undeniable systemic incompetence by PSE. These dangers are inflicted on Puget Sound communities by a foreign owned monopoly.

(Mike Siegel/The Seattle Times)

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Examples of PSE's disregard for safety

PSE was fined $1,500,000 for 17 violations of pipeline safety regulations (https://www.pipelinelaw.com/wp-content/uploads/sites/19/2016/10/WUTC-Investigation-Report.pdf). This was a small slap on the wrist for a company with more than $3,000,000,000 annual revenues.

> "…PSE called the fines 'disappointing and excessive' and reiterated that the pipe was damaged by people in a space where they were not supposed to be." (Seattle Times Mar 28, 2016).

PSE was quick to whine and quick to play blame game for their incompetence. This clearly shows that, besides incompetence, PSE has no moral compass, and no ethical standards.

PSE made the following statement as part of the public record to Newcastle City Council and Planning Commission meeting, February 2, 2016 (one month prior to PSE's explosion):

> "First of all, we should all remember that there are significant Federal standards that guide us both on pipeline work and on high voltage electric work. Those standards specify how pipelines have to operate with great detail including their safety procedures testing their pipes to make sure aging hasn't worn them so that they're safe, solid, and secure for all of us."

http://newcastlewa.gov/UserFiles/Servers/Server_4026035/Media/Audio/Council_Meeting/2016/City_Council_Meeting_2016.02.02_LEVELED.mp3

PSE's actions speak much louder (explosively louder) than their words. Evidenced by the destructive force unleashed by PSE on Greenwood, PSE is not interested in following the law, is not interested in public safety, and is not interested in the publics best interest. Therefore, the danger in PSE's systemic technical incompetence in electrical engineering on PSE's proposed energize eastside project is compounded by their systemic incompetence in pipeline safety. PSE's incompetence and untrustworthiness magnifies the numerous unbounded safety risks in PSE's proposed energize eastside project.

The Puget Sound region is home to a community of the world's smartest people in science, engineering, software, computers, medicine, aerospace, and manufacturing as well as many other fields. Professionals in the Puget Sound region are leading-edge problem solvers and whose many accomplishments are unrivaled anywhere else in the world.

In stark contrast, is the electrical utility, the PSE monopoly. PSE is so incredibly backwards and incompetent they can't forecast electrical need accurately, they are ignorant about any sort safety methodology, they have no sense of customer value, they are the dirtiest electrical utility in the entire

state of Washington, they operate one of the dirtiest electrical power plants in the entire United States, and worst of all is they have no cognizance or concern in regard to any of this. Washington is considered a green state and its policies are likewise aligned. In contrast to that mindset, we have PSE's coal fired energize eastside project.

2.1.2.2 Overview of the New 230 kV Transmission Lines page 2.13 states:

> "In addition to the height and diameter of the poles, the diameter of the conductor (i.e., wire) will also increase. The wire on the existing corridor is currently 1.063 inches in diameter; the wire diameter of the proposed new wires will be 1.545 inches to accommodate the increased voltage."

Bellevue puts up quite a bit of a smoke screen here. The required conductor diameter is dependent on the amount of current it is required to carry. Conductor diameter has nothing to do with the voltage contrary to Bellevue's misrepresentation. Per the DNV GL study, the worst case maximum current is 1315 Amps. However, PSE intends to replace the existing conductor with Falcon/ACSS which has working capacity of 2576 Amps. This conductor has almost twice the current carrying capacity as required to support the worst-case demand. The increased diameter of this replacement conductor adds significantly to the visual blight. There are many other choices in conductors that support the current carrying capacity requirements but are smaller diameter and therefore less of a blight than Falcon/ACSS.

This clearly indicates that PSE is scaling the capacity of their proposed energize eastside project well beyond the requirements they state for the project. Energize eastside appears to be PSE's cover story for its undisclosed agenda. Bellevue is directly responsible for propagating a misrepresentation of the facts and obscuring rather than highlighting the discrepancy between PSE's planned conductor sizing and actual need.

EIS Pipeline Safety EIS Appendix I-5 Section 1.1.2 Page 8 indicates a breach in the hazardous liquid pipeline induced by AC current from energize eastside can continuously spew over 26,000 gallons of toxic and flammable petroleum per hour (8% of the 333,000 gallons per hour flow rate) while meeting federal leak detection standards. In a residential area, this is completely unacceptable.

Further, the EIS fails to state how much toxic and flammable liquid continues leaking from corrosion perforations caused by induced AC current from PSE's proposed energize eastside project after leak detection is triggered. Is it the 372,162 gallons or some other value? The EIS is defective, in that it ignores the impact of a sustained but undetected leak caused by induced AC current from PSE's proposed energize eastside project.

Pipeline Safety EIS Appendix I-5 Section 1.1.3 Page 9 states:

> "OPL did not provide specific details regarding the precise type and location of their mainline block valves and related facilities within this segment. OPL treats these data as confidential information which is not available for public disclosure due to potential security risks"

In other words, the risk is so high Bellevue cannot be trusted and is not allowed to access the information to assess it. Bellevue cannot determine the sufficiency of pipeline control needed for safe collocation of the energize eastside project. This is no excuse to ignore this safety issue. The EIS is defective, it ignores the criticality of this impact. There is no assessment in the EIS regarding pipeline

shutoff requirements or alternative mitigations that would be necessitated by the corrosion stress and electrical fault stress induced by the transmission lines and structures in PSE's proposed energize eastside project. The collocation of the energize eastside project with the hazardous liquid pipeline is a continuous and unmitigated danger to our community.

Pipeline Safety EIS Appendix I-5 Section 1.1.4 Page 9 states:

> "OPL considers specific details regarding OPL's emergency response procedures as confidential information not available for public disclosure due to potential security risks."

In other words, the risk is so high Bellevue cannot be trusted and is not allowed to access the information to assess it. This is no excuse to ignore this safety issue. The EIS is defective, it ignores the criticality of this impact.

Bellevue fails to address the enormous safety risks involved in emergency response such as fire protection posed by the collocation of the 230 kilovolt transmission lines, supporting conductive metal towers, and the high-pressure petroleum pipelines.

BPA warns of the danger of fire under, or adjacent to, transmission lines:

> "Smoke and hot gases from a large fire can create a conductive path for electricity. When a fire is burning under a power line, electricity could arc from the wire, through the smoke and to the ground, endangering people and objects near the arc. BPA does not permit burning within the right-of-way. Field burning and other large fires in and around power lines can damage power lines and cause power outages. Water and other chemicals used to extinguish those fires should never be directed toward a power line."
> https://www.bpa.gov/news/pubs/generalpublications/lusi-living-and-working-safely-around-high-voltage-power-lines.pdf

During the North Cascades fires that started in August of 2015, the National Association of Conservation Districts stated:

> "The smoke from the fire was so thick that the particles in the air were conducting electricity."
> http://www.nacdnet.org/resources/forestry/featured-stories/washington-doing-its-part-to-calm-fires

Seattle City Light spokesman Scott Thomsen explains:

> "You would have an arc of electricity that you could see bright flashes and sparks coming off the line as the electricity is trying to get to ground and it's trying find a faster path to get to ground than going down the metal wire. So, if there's enough material around it that can conduct electricity and gives it a shorter path to where it wants to go, it will follow that path."
> http://www.opb.org/news/article/wildfire-shuts-down-hydropower-on-the-skagit-river-what-you-need-to-know/

Great River Energy CoOp (Minnesota) safety rules state:

- Fires should not be started under a power line. Smoke and hot gases from fires can create a conductive path for electricity.

- It is possible that the power line could flash to the ground through hot air and smoke, which is a serious safety hazard.
  http://www.swce.coop/operations/documents/safetyaroundpowerlines.pdf

Electrical Safety Handbook for Emergency Responders revised fifth edition 2013 (New Mexico Public Regulations Commission)

> Intense fire and dense smoke enable electricity to jump to the ground
>
> Approach limits must be increased because of arc-over hazard and dangers of step potential
>
> In proximity to a fire, the arc-over hazardous zone is 50 feet on either side of 230 kilovolt power lines
>
> Arc over can be through the tower or directly to the ground

~~Also~~Also, from the handbook, foam cannot be used on electrical equipment since it's conductive

http://www.nmprc.state.nm.us/transportation/pipeline/docs/Electrical_Safety_Handbook_for_Emergency_Responders_2013.pdf.

Foam is the one and only effective way to suppress a petroleum fire. But since foam is conductive, the mere presence of a PSE collocated 230 kilovolt transmission line prevents any viable attempt at safely suppressing a pipeline fire. As shown in Figure 1, the PSE collocated 230 kilovolt transmission lines straddling the pipeline creates an electrocution zone of death extending 50 feet from the 230 kilovolt transmission lines and supporting structures. When a catastrophic rupture of the hazardous liquid (petroleum) pipeline occurs, PSE's collocated 230 kilovolt transmission line could prevent any subsequent disaster recovery.

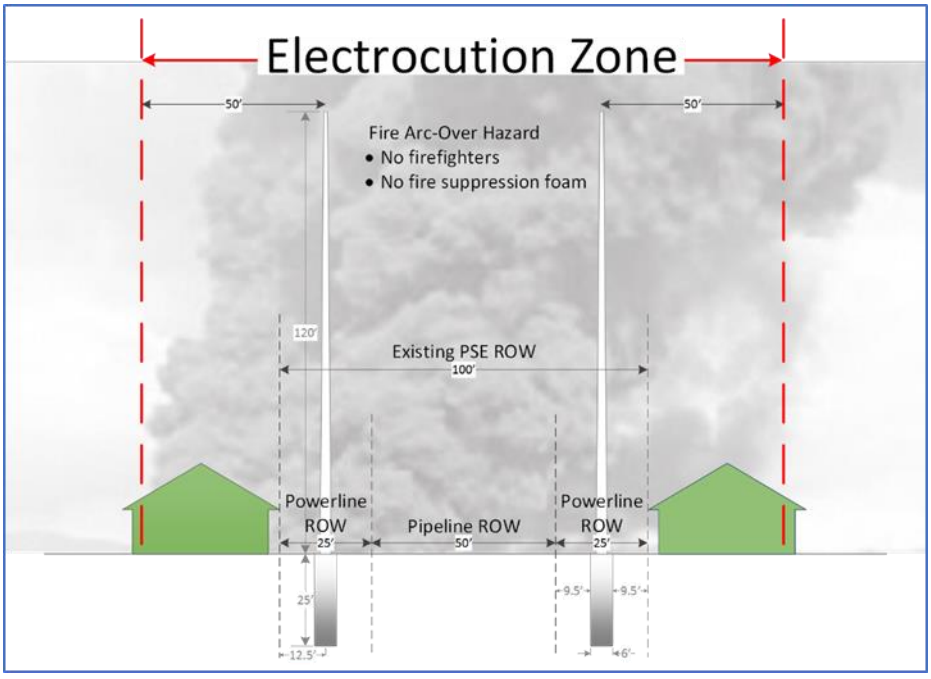

Figure 1 PSE's Electrocution Zone

Since PSE is the sole design authority, safety risk is unbounded. On March 23, 2016, PSE threatened Newcastle that if setbacks for the towers from the pipeline corridor were required, PSE would zigzag the six high voltage conductors across the collocation corridor, crossing both hazardous liquid pipelines in multiple locations. PSE stated:

"And so, for example, if a 50-foot setback is adopted, then non-standard designs would be necessary. So, under this scenario, if existing transmission lines that are behind City Hall now were to meet such a standard, then we'd have about 20 houses that we'd need to condemn. And we'd zigzag throughout the corridor to make that happen."

http://newcastlewa.gov/UserFiles/Servers/Server_4026035/Media/Audio/Planning_Commission/2016/Planning_Commission_Meeting_2016.03.23.mp3

This would be at the worst case dangerous crossing angle. No rational person on planet earth would ever suggest such a dangerous configuration. But this is exactly what PSE stated on record they will do if we try to establish safe margins to protect ourselves in Newcastle. This is another mark of PSE's complete incompetence, disregard for safety, and disregard for the public's best interests. The DNV GL 2016 report does not address this very dangerous configuration. Bellevue's EIS also does not address this very dangerous configuration. Bellevue has done insufficient research into the options that PSE's considers viable. Bellevue's EIS is deficient in not identifying the safety risks, safety risk mitigations, and the safety risk mitigation impact of the options PSE may pursue.

Pipeline Safety Appendix I-5 Section 1.4 Page 12 states:

"…there have been a few significant pipeline incidents. Five (5) of these incidents have resulted in changes, and proposed changes, to the Federal pipeline regulations which should further improve pipeline safety."

This is the typical after-the-fact response to preventable disasters. As is chronic of federal policy, no action is taken until after a disaster occurs. Those proposed changes may not ever be adopted. At best, they are some future state not the current state. Therefore, they are irrelevant to the currently proposed energize eastside project. There are many pending changes being considered by PHMSA to address incomplete and deficient safety standards regarding detection of defects and repair of pipeline defects. But again, they have no bearing at this time and are therefore irrelevant as regulatory controls for safety of PSE's proposed energize eastside project.

Because of this, preemptive safety mitigation must be applied down at the local level. The EIS is defective in that it ignores this issue. Collocation of a high energy ignition source with a high energy fuel source in a high population area is reckless. It is inexcusable that Bellevue does not conduct a complete fact-finding assessment of the safety issues. The draft phase 2 EIS continues down the same path of ignorance established by Bellevue in the draft phase 1 EIS in which page 1-32 states: "Risk to the public is not likely from constructing or operating the project near pipelines due to extensive safety policies and regulations." That statement is, in essence, completely meaningless since is it is completely unsupported. The Bellingham disaster occurred 5 years after the initial pipeline damage. The project leading to the Bellingham disaster was very closely monitored. A cursory review of data from US DOT Pipeline and Hazardous Materials Safety Administration on hazardous pipeline shows numerous

incidents and the associated cost of damage while “extensive safety policies and regulations” were place:

ELECTRICAL ARCING FROM OTHER EQUIPMENT/FACILITY (06/12/2010 - 09/09/2015)

$68,772,650

THIRD PARTY EXCAVATION DAMAGE (01/09/1996 - 12/08/2015)

$144,702,203

UNSPECIFIED CORROSION (10/28/1997 - 11/19/2009)

$6,062,845

Miscellaneous

$160,674,585

Injuries and fatalities (02/27/1996 - 06/22/2015)

34 injuries (8 in 06/10/1999 Bellingham Olympic Pipeline disaster)

37 deaths (3 in 06/10/1999 Bellingham Olympic Pipeline disaster)

In Chapter 8 References Environmental Health – Pipeline Safety page 8-15, the EIS cites DNV GL 2015. Criteria for Pipelines Co-Existing with Electric Power Lines. Final Report No. 2015-04. Prepared for the INGAA Foundation. Prepared by S. Finneran. October.

But the EIS is grossly defective in it doesn’t apply the criteria. Per the reference:

Severity Ranking of HVAC Interference – High

Relative Severity of HVAC Interference – Very High

Relative Severity of HVAC Corrosion – Very High

Relative Severity of HVAC Collocation Length – High

Relative Severity of HVAC Crossing Angle – High

The EIS is defective, in that it ignores the criticality of the collocation safety risks and mitigation impact.

Using the criteria from the DNV GL 2015 report, a reasonable separation distance between the power line high energy ignition source and the pipeline high energy fuel source to meet a goal of a low or very low severity ranking would be 500 feet or greater. This separation would mitigate a substantial portion of the safety risks and would significantly reduce the time and expense required fully assess the safety risks, risk mitigations, and mitigation impacts that are otherwise mandatory for the collocation. This, or a provably equivalent safety margin must be provided. Bellevue’s EIS is defective in that it fails to establish adequate safety margins and fails to assess the impact of providing the safety margins.

In a perfect storm scenario, an arc to ground from a transmission line failure, weather, lightning or other event allows the hazardous liquid pipeline to be energized to the point of rupture requiring the pipeline to be shut down. But given the pipeline is energized at lethal potential, there is no automatic or manual

means to shut it down. This runaway situation is quite possible. The mitigation for this is physical separation. Other collocation issues:

Immediate or latent damage to the pipeline during construction.

Latent damage to the pipeline due to forces transmitted from the towers to the footing, and to the soil adjacent to the pipeline. The mitigation for this is physical separation.

Other immediate or latent mechanically induced failures

Immediate or latent electromagnetically induced failures

Damage to the pipeline cathodic protection insulation through heating caused by lightning strikes to towers conducted to the ground adjacent to the pipeline.

Collateral damage

Natural events

In regard to facilities sharing a corridor, The Corridor Concept Theory and Application by Charles H. Weir, C.L.S., P.E.N.G and June P. Klassen states:

“The disadvantages include: Increased Disaster Potential. Should a natural catastrophe, a subversive action, or major facility failure occur, the potential for multiple facility failure is increased due to proximity.”

It also states:

“The major conflict between power transmission lines and pipelines in corridors is an unavoidable result of proximity. Spacing between these two facilities should be in the range of 30 metres due to voltage and resultant current flows which may be induced in a pipeline from adjacent powerlines.”

The mitigation for this is physical separation. Clearly, the collocation of the energize eastside project with the hazardous liquid pipeline is a continuous and unmitigated danger to our community.

An article was published in the Newcastle News on Jan 6, 2017 titled: “Study: Energize Eastside, pipeline can safely coexist”. An excerpt from the article states:

“A recent study shows the Energize Eastside project can safely coexist in the same corridor that contains an Olympic Pipeline Co. channel carrying fuel to SeaTac Airport, according to a Puget Sound Energy news release. DNV GL, described as a national pipeline safety consulting firm, completed the PSE-commissioned study”

This report is referenced in the EIS as DNV GL 2016.

This article highlights PSE’s total incompetence regarding safety, its continued ignorance of safety issues, and its complete lack of any ethics and integrity with regard to protecting public safety.

A letter to the editor was published in the Newcastle News on Feb 3, 2017 titled:” Puget Sound Energy’s report on pipeline safety has holes”. The letter states:

“PSE bases its weak hypothesis on a report it cites from DNV GL. That report only addresses a subset of the electromagnetic safety issues regarding colocation of the proposed Energize Eastside project with the petroleum pipeline. Further, electromagnetic related safety issues are only a subset of the full spectrum of safety issues raised during the EIS process. The validity of the DNV GL report is dependent on information that was not independently verified and was provided by a very dubious source (PSE). The DNV GL report essentially concludes the safety risks cannot be completely assessed until the project is complete and operating.

To base their conclusion on so little information on such a small part of the overall safety risk created by the propose Energize Eastside project shows PSE’s systemic ignorance of the magnitude of the safety problem and the impact on the community, and points to a large gap in PSE’s technical competence.

Safety is something that must be proven, not assumed. Safety is something that must be analyzed and design in, not added on after something bad happens. All safety risks must be mitigated with adequate margin. PSE claims victory but Energize Eastside isn’t even at square one yet.

Newcastle News was fundamental in drawing local attention to the safety issues that resulted in Olympic Pipelines disaster in Bellingham on June 10, 1999. It’s unfortunate the attention was after lives were lost and the damage was done. Media and public pressure brought about many positive safety changes. For Energize Eastside, we need to do the same, but before the fact.”

The validity of the DNV GL 2016 report is predicated on a 75 mil (thousandths of an inch) coal tar pipe coating thickness and 100% integrity of the coating. Per the DNV GL 2016 report:

“Additionally, research has indicated the highest corrosion rates occur at ‘holidays’ with surface areas of one to three square centimeters.”

For the 20-inch diameter hazardous liquid pipeline within Newcastle, there is over 30 million square centimeters of surface for the 20-inch hazardous liquid pipeline (20 inch diameter x 3.14 x 1.2 mile x 5280 feet per mile x 12 inches per foot x 6.45 square centimeters per square inch ~ 30.7 million square centimeters).

This is over 30 million possible undetected failure points within Newcastle for the 20-inch hazardous liquid pipeline. The 16-inch hazardous liquid pipeline aggravates this problem with an additional 24.6 million points of potential disaster. In case it’s not obvious, a ‘holiday’ in this case is a bad thing, not a good thing. In total, there are over 55 million one-square-centimeter potential failure points within Newcastle alone, a failure at any single one square centimeter area would be disastrous. A single coating void or gap in any one of the 55 million square centimeters of pipe surface is an unbounded safety risk. For reference, the area of the face of a penny is about 2.8 square centimeters. The EIS is defective in that it fails to address critical safety issue of coating flaws, the mitigation for this issue, and the impact of this mitigation.

How will PSE initially and periodically assess the coating is intact and is no less than the stated thickness? The referenced DNV GL 2016 report states that allowable test voltage for holiday detection of a 75 mil coal tar coating is 10,825 volts. What is the impact of this initial and periodic assessment? The EIS is defective in that it does not address required frequency, methodology and impacts. What is Bellevue’s plan to address these tests and resulting impacts to conduct the tests?

The DNV GL report refers to NACE SP0188-2006 “Discontinuity (Holiday) Testing of New Protective Coatings” for the calculation that the coating on the hazard liquid pipeline should withstand 10,825 Volts. Since that value is for new coatings and the pipeline is 45+ years old, the calculation is worthless. It is essentially baseless pseudo-science.

Per the Materials Performance Magazine article “Protecting a Pipeline When Its Coating Has Aged” dated March 1, 2107):

“Coatings are the main tools for protecting a pipeline against external corrosion, but they will weaken due to age and other factors. “All coatings have a service life,” says NACE International member Jeffrey L. Didas, a NACE-certified Specialist in coatings as well as cathodic protection (CP) and corrosion, and a senior corrosion engineer with MATCOR, Inc. (Chalfont, Pennsylvania). “Over time a coating will age and deteriorate due to soil stress, pipe movement, temperature changes of the pipe, and wet/dry, flood/drought conditions,” he adds. Didas notes that major pipeline construction from the 1940s to the 1960s mainly used coal tar enamel or asphalt enamel coatings for pipelines.”

http://www.materialsperformance.com/articles/coating-linings/2017/03/protecting-a-pipeline-when-its-coating-has-aged

Bellevue has an ethical responsibility to produce a factual Environmental Impact Statement. It is a complete betrayal of public trust to proliferate baseless pseudo-science in the EIS. The EIS is defective in that it does not address the critical safety issue of cumulative age effects and deterioration of the coating and the impact of mitigation.

The validity of the DNV GL report is predicated on peak current of 1315 Amps. How will this be continuously controlled and independently monitored and verified? What is the impact of providing this control and monitoring? The EIS is defective in that it does not address the critical safety issue of peak load limit enforcement and the impact of mitigation.

The DNV GL report does not address the existing condition of the high pressure hazardous liquid pipeline including discontinuities, patches, and other repairs. Since these discontinuities cause deviations in the induced current flow, they affect corrosion rates and patterns in the locality of the discontinuities and magnify localized corrosion stress points on the high pressure hazardous liquid pipeline. Welding repairs with dissimilar materials including the filler material and grain structure change due to heating, melting, and fusing of the materials lead to the potential of localized corrosion. The EIS is defective in that it does not address this critical safety issue and the impact of mitigation.

The referenced DNV GL 2016 report describes corrosion rates but not corrosion depth rate. The report fails to address the non-uniformity of current density and the high current density at flaws in the pipeline coating. The report states that below 20 Amps per square meter (meter2) current density, corrosion does not occur. This statement is extremely misleading in that it only applies to uniform current flow through the surface of the pipe. There are 10,000 square centimeters in a square meter (1 meter2 = 10,000 centimeter2). Where average surface current over a square meter is concentrated at a square centimeter coating flaw the current density is magnified 10,000 times. At 20 Amps per square meter, one square centimeter coating flaw per square meter of surface would result in a localized current density equivalent to 20,000 Amps per square meter at each coating flaw as shown in Figure 2. This concentration of current density at a coating flaw accelerates the rate of corrosion though the

hazardous liquid pipeline wall.

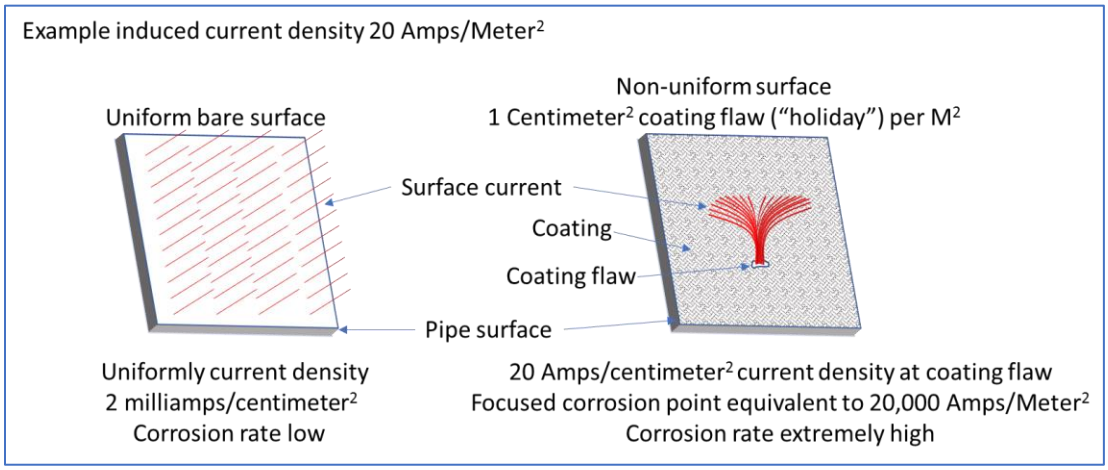

Figure 2 PSE's accelerated corrosion of the hazardous liquid pipeline at a coating flaw

Corrosion depth rate is a significant safety risk issue. Corrosion depth rate indicates how rapidly the high pressure hazardous liquid pipeline wall is penetrated and fails. Per the Journal of Research of the National Institute of Standards and Technology Volume 115, Number 5, September-October 2010 corrosion depth rates have been measured as high as 1 millimeter per year. Per section 1.1.2 of the EDM services report in the draft phase 2 EIS the 20-inch outside diameter pipeline "is constructed of API 5L X52 grade, 0.250-inch wall thickness." The section states:

"This pipeline was internally inspected using a high resolution deformation and high resolution magnetic flux leakage tool in April 2014. The next planned internal inspection is early 2019".

This is a five-year interval between inspections. During this interval, corrosion depth at a one square centimeter flaw in the pipeline coating could penetrate 5 millimeters (0.197 inches) into a 0.250 inch thick pipe wall. This leaves 0.053 inches (13 sheets of paper thickness) of corroding material holding back 500 PSI of toxic and flammable hazardous liquid. 79% of the pipeline wall thickness would be corroded away. That applies to a pipe that is in new condition with uniformly full wall thickness. The scenario is much worse for a nearly half century old pipe that isn't in new condition. This is a life-threating game of chance where PSE always wins and we lose.

The EIS is defective in that it does not address this critical safety issue and the impact of mitigation.

Induce AC corrosion examples from “AC Corrosion and Mitigation” Mike Ames Director Technical Operations Chapman Engineering Oct 20/21, 2015 KCC Pipeline Safety Seminar Manhattan, KS

The referenced DNV GL 2016 reports seems to imply that inspection is somehow equivalent to, and a substitute for, prevention. With the high corrosion stress on the pipeline caused AC current induced by PSE’s proposed energize eastside project, there is reasonable probability that neighborhoods will be deep in petroleum well before the inspection that might have prevented it.

The DNV GL 2016 report states:

“Considering the 230 kV/115 kV loading scenario, the maximum induced AC potential for OPL16 and OPL20 was approximately 17 volts and 19 volts, respectively, which is greater than the NACE 15 volt safety threshold. Based upon the model results, after the transmission lines are energized field monitoring and/or mitigation by the pipeline operator may be needed to confirm these AC potentials are less than the 15 volt safety threshold.”

This is complete irresponsibility by DNV GL to brush off violation of the NACE 15 volt safety threshold as a pipeline operator problem. It is a huge breach of ethics for Bellevue to ignore this.

Phase 2 EIS section 3.9.7.2 “Potential Mitigation Measures” states:

“Inform Olympic when loading scenarios are expected to be at their greatest to ensure that Olympic conducts field monitoring and/or mitigation for AC potential greater than 15 volt and AC current density greater than 20 amps per square meter throughout the project.”

Potentially informing the pipeline operator that someone may get electrocuted is not a mitigation. Bellevue’s general wishy-washy arm-waving approach that potentially maybe someone could maybe do something when something bad happens maybe is not a mitigation strategy and does not support determination of mitigation impacts. It is a huge breach of ethics for Bellevue to ignore serious mitigation issues. The EIS is defective in that it does not address this critical safety issue and the impact of mitigation.

Would anyone advocate someone designing and building a brand-new school bus, loading it with children and driving down the freeway to see if the steering and brakes work? Would anyone advocate someone designing and building a brand-new aircraft, loading it with passengers then going full throttle down the runway to see if it flies? If not, how can anyone possibly advocate PSE’s proposed energize eastside project given, per DNV GL “Final mitigation design, if necessary, should be based on field data collected after the system is energized”? By then, it’s much too late.

Phase 1 Draft Scoping Report, Attachment 1 states PSE’s objective for proposing their energize eastside project. On page 6 PSE states:

“M. Must address all relevant PSE equipment violations

PSE will only accept solutions that will solve any existing or future anticipated loading issues of PSE equipment. PSE’s normal and emergency thermal operating limits, and potential consequences of violating those limits, are discussed above.”

On page 2 of the same attachment PSE states:

“N-1-1 & N-2 Thermal and Voltage Performance – NERC and WECC standards

This refers to system performance with two contingencies in the system. This could be due to an emergency, as part of scheduled maintenance or system improvements, or a combination. The system must perform without violations of thermal and voltage limits with two contingencies occurring.”

Draft phase 1 EIS paragraph 2.2.1.1 “Applicable transmission planning standards and guidelines, including mandatory NERC and WECC standards” discusses power system reliability for various failure scenarios which would include single circuit failures. Those are the scenarios that should be fully analyzed and proven safe. But the PSE funded DNV GL study completely sidesteps those scenarios. Table 7 on page 18 of the DNV GL 2016 study referenced in the EIS does not include the 230/0 and 0/230 Winter Peak Load Scenarios on any segment of the entire Proposed EE corridor. That sleight of hand is a very devious omission.

Per DNV GL’s conclusions:

“PSE should notify the pipeline operator when there are planned outages on the individual circuits, as the AC induction effects on the pipeline may be magnified when only one circuit (of the double circuit transmission lines) is energized.”

This is a slippery way of saying it’s dangerous to operate one circuit when the other not operating. Being unsafe to operate the single circuit, one failure cascades into two failures. Therefore, an N-1 failure is an N-2 failure. The message is 0/230 and 230/0 scenarios are a danger to the pipeline and its operation. Because of the danger in these scenarios, PSE’s proposed energize eastside project essentially reduces system reliability as compared to the existing system.

During at least part of the construction, safety precautions would require a 0/0 scenario. But that puts PSE in its claimed ‘blackout’ situation. Seems like PSE has created its own conundrum. Like trying to put bigger tires on a moving vehicle. There is no practical safe way to do that.

Draft phase 1 EIS paragraph 2.2.1.1.5 “Substation Planning and Security Guidelines” states:

“…In other words, based on security threats to the physical electric infrastructure, it is not reasonable or prudent to ‘put all your eggs in one basket.’”

PSE’s proposed energize eastside project does exactly that — “put all your eggs in one basket.” and violates the FERC order Bellevue claims is a mandate. A physical attack on one circuit prevents safe operation of the parallel circuit. This is effectively an N-2 condition and is driven by the safety risk of AC induction effects hazardous liquid pipeline from single circuit operation.

A very simple attack using a drone to lift and drag a conductor or dump conductive chaff to short a phase to the conductive tower jeopardizes the integrity of the hazardous liquid pipeline and disables power facilities to the point of unreliable operation. This same type of attack on the existing transmission lines is completely mitigated because an attempt to short a phase to a wood structure is relatively harmless.

The DNV GL 2016 report Table 7 does not reflect the pole configuration being proposed by PSE and therefore its conclusions are worthless.

The DNV GL 2016 report states:

"Considering the expected fault current of 25 kA and either an Alumoweld or OPGW shield wire on the transmission lines, the predicted coating stress voltage was well below the expected coating breakdown voltage for the coal tar coated pipeline segments. Additionally, the maximum arcing distance was calculated for the collocated pipeline segments, based upon the maximum single-phase-to-ground fault current returning to ground at a single pole. The maximum arcing distance was found to be 13 feet, considering an OPGW shield wire on the transmission lines."

DNV GL neglects to state how the arcing distance was derived but it appears inconsistent with the DNV GL 2015 Report.

Table 4 in the DNV GL 2016 report contains Bulk Soil Resistivity Data Summary

Pipeline Name	Minimum Resistivity (ohm-cm)	Maximum Resistivity (ohm-cm)	Average Resistivity (ohm-cm)	Average Pipe Burial Depth (ft.)	Bulk Resistivity Depth (ft.)
OPL16	6,607	402,174	101,251	4	5
OPL20	6,607	402,174	100,564	4	5

The DNV GL 2015 report provides the arc distance equation.

$$r_a = 0.08\sqrt{I_{ac} x \frac{\rho}{100}} \qquad \text{If } \rho \leq 100{,}000\ \Omega\cdot\text{cm}$$

$$r_a = 0.047\sqrt{I_{ac} x \frac{\rho}{100}} \qquad \text{if } \rho > 100{,}000\ \Omega\cdot\text{cm}$$

Where:

r_a= arc distance in m

ρ= soil resistivity in Ω·cm

I_{ac} = the fault current in kA

Applying this DNV GL 2015 documented equation indicates the arc distance based on the 25 kA fault current is 14.9 feet not 13 feet. But the circuit fault current is not the only concern. Lightning strikes can have median peak values of 34 kA. (http://www.techadvantage.org/wp-content/uploads/2014/03/4B_Mara.pdf). Using the lightning strike value as more representative of fault currents that must be tolerated with sufficient safety margin indicates the arc distance is 17.4 feet. Bellevue should at least perform a rudimentary sanity check on a consultant's data before dumping that data in the EIS.

As the high pressure hazardous liquid pipeline ages and is replaced, the location of the replacement may be anywhere within the defined pipeline corridor. That requires the transmission line towers nearest approach to the edge of the defined pipeline corridor is a minimum of 17.4 feet. This places the transmission line towers dangerously close to the edge of the transmission line corridor and within 5 feet of existing or future residential structures. Bellevue's EIS is defective in that it fails to identify this safety risk and fails to identify the impact of providing an adequate safety margin.

While performing an inadequate and shallow study of the proposed transmission line collocation with the high pressure hazardous liquid pipeline, Bellevue also completely ignores the dangers of collocation of the proposed power lines with residential utility infrastructure. Why does Bellevue ignore potential hazards of this collocation?

The DNV GL 2016 report does not address the increase in conductivity of soil when it becomes ionized. During a flashover, as the soil between the conductive transmission line support structure and the

hazardous liquid pipeline becomes ionized, the dissipation pattern of the arc energy becomes asymmetric and is directed to the pipe.

From A/C Interference Guideline Final Report JUNE 2014 (http://cepa.com/wp-content/uploads/2016/11/AC-Interference-Guidelines-Final-Report-FOR-PUB..pdf) on the risk of arcing:

> "If an arc develops between the faulted structure and the pipeline (sometimes called a flashover) or a lightning initiated arc to the pipe is sustained through the ionized soil path by the powerline voltage, then substantial damage can be done to the pipeline coating, pipe wall (through melting), and to pipeline facilities such as isolation fittings, bonding cables, transformer rectifiers, and monitoring equipment. There are a number of reported cases of pipeline rupture during powerline faults caused by melting of the pipe wall."

The current in a lightning stroke is not only greater than the current in a circuit fault it also has a much faster rise time of around 3 microseconds (0.003 milliseconds) versus 4 milliseconds for a circuit fault. The voltage drop across the shield wire is the inductance of the wire times the current rise time (Ldi/dt). Since the lightning stroke current rise time is about 1000x faster than the circuit fault current rise time, the shield wire impedance for a lightning stroke is about 1000x higher than for a circuit fault. The significance here is for a lightning strike directly on the conductive tower the shield wire is 1000x less effective at bleeding off current as compared to a circuit fault to the tower.

The replacement of the insulting wood transmission line support structure with tall conductive metal towers, essentially lightning rods grounded near the hazardous liquid pipeline, while removing the lightning dissipating natural tree canopy is a gross breach of safety common sense.

The DNV GL report does not address the failure or disruption impacts on the Supervisory Control and Data Acquisition (SCADA) system resulting from the current and voltage induced on the high pressure hazardous liquid pipeline by faults or lightning strikes in the transmission lines. Remote monitoring and control of the pipeline is completely lost when the SCADA is disabled which could occur at the time it is most needed.

To be a successful business, DNV GL must provide customer satisfaction. Customer satisfaction requires that DNV GL products meet the customer's criteria for quality. One important quality is that their products align with the customer's objectives. Failing to meet that criteria is contrary to any sound business strategy. So, it would be foolish to expect DNV GL to make a full disclosure where it may run counter to its customer's objectives. However, Bellevue does exactly that; it expects the DNV GL to be complete and truthful. In this case the customer is PSE and the product is a report: "AC INTERFERENCE ANALYSIS – 230 KV TRANSMISSION LINE COLLOCATED WITH OLYMPIC PIPELINES OPL16 & OPL20". The EIS references the DNV GL report created and tailored specifically for its customer, PSE. But sometimes it comes down to a question of profits versus ethics.

Is DNV GL above such lapse of ethical standards? Apparently not. From http://www.mlive.com/news/index.ssf/2017/06/dnv_enbridge_line_5_study_coi.html posted June 22, 2017:

> "The state of Michigan abruptly fired contractor Det Norske Veritas Inc (DNV GL) this week, saying the work the company had been doing since last summer was tainted by a conflict of

> interest and the appearance of improper influence on the outcome by Enbridge, which the state had tried to avoid."

Bellevue dumps or references reports from various services in the EIS without performing a critical review and comprehensive analysis of any of the reports to validate the stated claims. The DNV GL 2016 report is a notable example. Then hiring one service to gloss over the gloss-overs of another service adds pages but adds no value.

EIS phase 2 volume 1 Section 3.9.4 Major Risks to Public from Unintentional Pipeline Release states:

> "EDM Services (2017) used a number of reasonable assumptions and data inputs, including the estimated release rate and pipe contents of the Olympic Pipelines, to model a release and subsequent pool fire as described in Sections 7.1 and 8.3 of their report (see Appendix I). Based on these inputs, EDM Services estimated the following maximum release volume: 372,162 gallons."

There is no derivation of this quantity in the referenced sections. How was this value determined? A side note on spill release volume in the same section states:

> "For reference, the Bellingham incident of June 10, 1999 released about 237,000 gallons of gasoline. Because the release migrated along a waterbody, pool fire characteristics were different than the depiction in Figure 3.9-7."

The Figure 3.9-7 depiction is in no way representative of the terrain and waterways in Newcastle. The depiction does not address Lake Boren, Boren Creek, May Creek, and the storm sewer drains whose outflow goes into Lake Washington. All these are downhill from sections of the hazardous liquid pipeline that would be subject to the induce AC corrosion stress. The stated volume, 372,162 gallons, would cover almost 14 acres an inch deep in toxic and flammable liquid. Bellevue's EIS is defective in that it fails to identify the extreme damage potential and fails to assess the impact of providing and adequate safety margin. Although suppressed in the EIS by Bellevue, PSE's proposed energize eastside project places excessive and unnecessary stress on the hazardous liquid pipeline. Bellevue' gross misrepresentation and trivialization of the resulting impact of a breach in the hazardous liquid pipeline caused by the transmission line collocation is unacceptable.

The fault damage and arcing damage paragraphs on page 3.9-43 of volume 1 are complete fabrications. They state that fault damage and arcing damage through an essentially nonconductive wooden pole (no action alternative) is the same as through a conductive steel tower (alternative 1). The section is titled No Action Alternative but is muddied by a discussion of alternative 1. These sections make two incoherent conclusions:

> "Because no data were available from Olympic to estimate the coating stress voltages on the existing Olympic Pipelines within the existing 115 kV corridor, the existing pipelines were assumed to have the same coating stress voltages and potential for coating stress-caused pipeline releases as for Alternative 1,"

and

> "Because no data were available from Olympic to estimate the arc distances for the existing Olympic Pipelines within the existing 115 kV corridor, the existing pipelines were assumed to

have the same ground fault arc distances and potential for arc-caused pipeline releases as for Alternative 1."

Throughout the draft phase 1 and phase 2 EIS Bellevue dances around the subject of cathodic protection, interaction of induces AC current, and protection shortfalls but provides absolutely zero environment impact assessment.

PSE projects that electrical power demand will begin to exceed peak power capacity by the year 2017. PSE further projects demand will exceed capacity by approximately 10% by 2022. The key point emphasized by PSE is the projected demand is based on days where the air temperature is 23°F or lower.

The question is whether the occurrence of the conditions is so frequent that PSE's intended solution with its enormous impacts is warranted and there are no alternatives, or is there something being left unsaid that indicates less aggressive solutions may be viable?

The NOAA National Climatic Data Center has a database of daily minimum temperatures for Station GHCND:USW00024233 SEATTLE TACOMA INTERNATIONAL AIRPORT WA US. Figure 3 is a summary of 16170 daily minimum temperature measurements in a period between January 1, 1970 and April 9, 2014. The horizontal scale is the daily minimum temperature in one-degree Fahrenheit increments from the lowest measured value in the period (7°F) to 23°F. The vertical scale ranges from 0% to 100% and is the percentage of the period in which each minimum temperature was recorded.

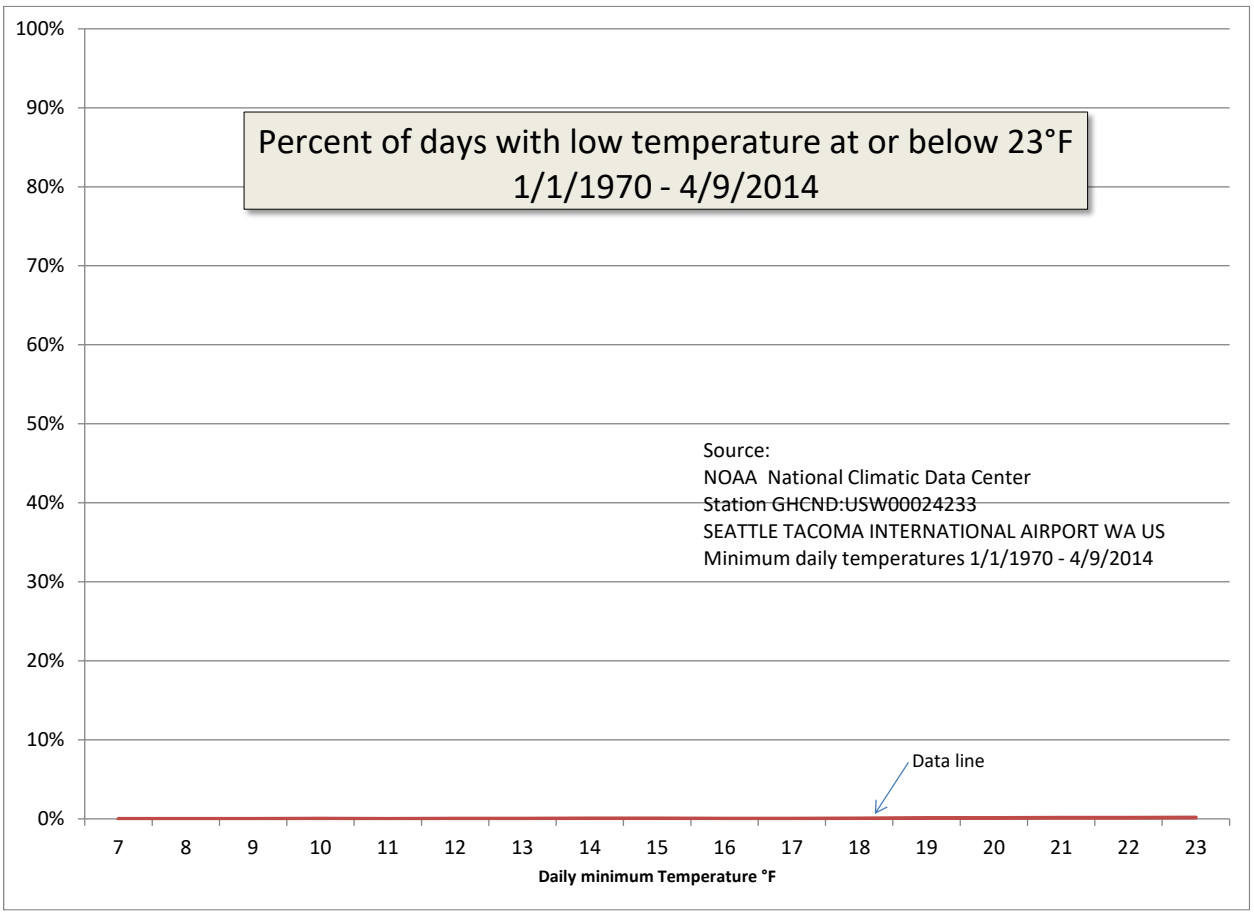

Figure 3 Annual minimum ambient temperature day history

Since the occurrences of 23°F and lower temperatures days are extremely infrequent an expanded view of the bottom 1% is provided in Figure 4.

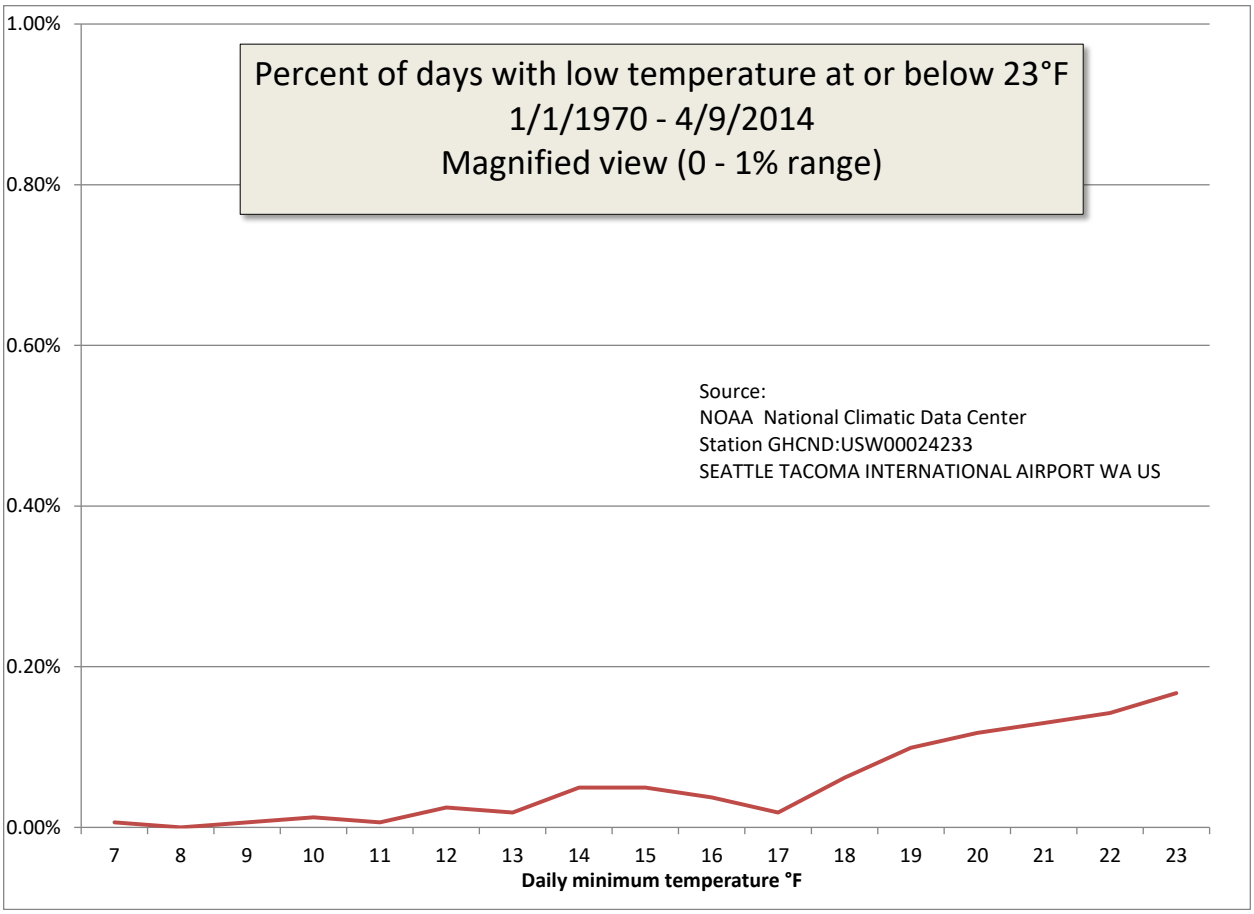

Figure 4 Annual minimum ambient temperature day history - Expanded view

As can be deduced from the charts, the extreme conditions identified by PSE are very infrequent. The total percentage of days with minimums at or below 23°F is 0.95% (less than 1% of the time, or 3.5 days per year) for the entire period. This suggests that the problem stated by PSE is potentially solvable within the realm of smart power management policies without resorting to the unnecessary options within PSE's narrow solution space. PSE has offered no defendable justification for excluding employment of a smart power management approach.

At less than one percent rate of occurrence, the number of days (that meet the conditions for which PSE claims this project is needed) over a ten-year period is 0.95% x 365 days per year x 10 years = 34.7 days. PSE claims the cost will be as high as $290 million. That cost spread across the number of occurrences in a ten-year period is $290 million / 34.7 days = $8.36 million per day for each low temperature day. PSE claims the periods of peak electrical demand are from 6:00 AM to 10:00 AM and from 5:00 PM to 9:00 PM. That is a total of 8 hours per day. Dividing $8.36 million by 8 hours leaves the consumers paying over $1 million dollars an hour. This is a very poor value to the customer and an unnecessary expense. PSE has offered no defendable justification for promoting such an expensive and limited value solution over lower cost, lower impact, and much higher value solutions.

PSE statements during CAG process and PSE documentation:

- PSE states peak demand shortfall under a transmission line failure condition is 55 Megawatts (MW)
- PSE projected demand is based on days where the air temperature is 23°F or lower
- PSE states peak demand occurs in two 4 hour periods (8 hours total per day)
- PSE intends to add 1407 MW (for N-1-1 conditions, two of four routes failed)
    - Replace 1620 Amp cable (Tern/ACSS/AW 795) with 2576 Amp cable (Falcon/ACSS/AW 1590)
    - 115 kV (line to line) / √3 = 66.4 kV line to neutral
    - 66.4 kV x 1620 Amp x 3 phases = 645 MW existing capacity
    - 230 kV (line to line) / √3 = 132 kV line to neutral
    - 132 kV x 2576 Amp x 3 phases = 2052 MW expanded capacity
    - 2052 MW – 645 MW = 1407 MW total increase from existing to expanded capacity under N-1-1 conditions

Background:

- NOAA National Climatic Data Center has a database of daily minimum temperatures for Station GHCND:USW00024233 SEATTLE TACOMA INTERNATIONAL AIRPORT WA US
- Summary of 16170 daily minimum temperature measurements in a period between January 1st 1970 and April 9th 2014 by NOAA indicates air temperature is at or below 23°F a total of 3.5 days on average per year

Analysis:

- PSE claimed need: 55 MW x 8 hours per day x 3.5 days per year = 1520 MW hours (MWh)/year
- PSE intended increase in capacity: 1407 MW x 24 hours per day x 365 day per year = 12,325,320 MWh per year
- Percent increase in energy capacity vs need: 12,325,320 MWh / 1520 MWh = 810,876%
- Conversely, percent increase energy needed vs capacity: 1520 MWh / 12,325,320 MWh = 0.0123%

Figure 5 shows the relative scale of PSE's proposed project versus PSE's statement of need during the CAG process. To be clear, the percent increase in capacity vs need as stated above is over 800,000 percent. An increase of this magnitude will never ever be needed in the PSE customer base area.

If the capacity were scaled to the height of the Space Needle (605 feet) the need could be represented by a stack of 15 pennies (0.895 inches). If those pennies were placed on the ground at the base of the Space Needle, they would be too small to see from the top.

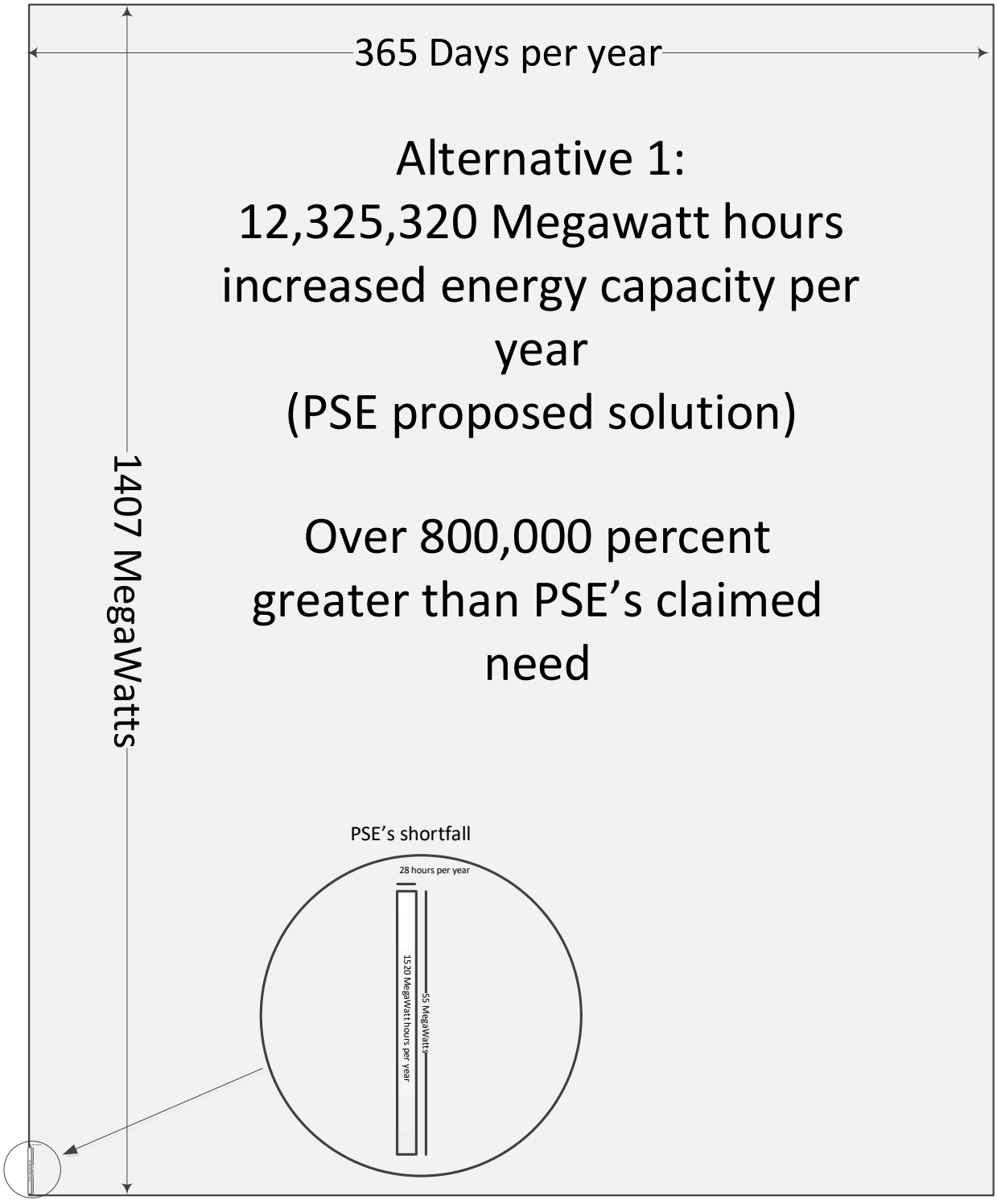

Figure 5 PSE's solution versus stated need in perspective