BEFORE THE STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL

In the Matter of Application No. 96-1

Olympic Pipe Line Company

Cross Cascade Pipeline Project

PRE-FILED TESTIMONY OF LOIS N. EPSTEIN

ISSUE:
ASSESSMENT OF REGULATORY OVERSIGHT OF HAZARDOUS LIQUID PIPELINES AND OLYMPIC'S LEAK AVOIDANCE AND LEAK DETECTION EFFORTS

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Would you please state your full name, present position, and business address?

My name is Lois N. Epstein. I am a Senior Engineer with the Environmental Defense Fund, a non-profit environmental research and advocacy organization with nearly 300,000 members nationwide. EDF has six U.S. offices plus one project office, and approximately 160 employees. My business address is 1875 Connecticut Avenue, NW, Suite 1016, Washington, DC 20009.

Can you briefly describe for the record your educational and professional background?

I have a Masters degree in civil engineering, with a specialization in environmental engineering and science, from Stanford University. Before attending Stanford, I received a Bachelor of Arts degree in English from Amherst College and a Bachelor of Science degree in mechanical engineering from the Massachusetts Institute of Technology as part of a 5-year liberal arts/engineering program. I spent three years prior to graduate school working for two environmental consulting firms on both public and private contracts, and a summer after graduate school working for the U.S. Environmental Protection Agency in San Francisco. I have been a licensed Professional Engineer in Maryland since 1989.

I have been an engineer at the Environmental Defense Fund (EDF) for more than 11 years, and am now a Senior Engineer. My responsibilities at EDF consist of developing, advocating, and implementing scientifically and economically defensible policies and practices that protect the environment, with expertise particularly in the oil, auto assembly, iron and steel, and the lithographic printing industries. At EDF, I have written numerous technical and non-technical publications, testified before Congress on six occasions, spoken to many different audiences on environmental issues, and participated in several collaborative projects with industry and government. I serve on a number of governmental and non-governmental advisory committees, including the U.S. Department of Transportation's Technical Hazardous Liquid Pipeline Safety Standards Committee. My expertise includes extensive experience on underground and aboveground storage tank and attached piping technical issues, where many of the environmental, petroleum, and leak detection issues are similar, though not identical, to those associated with hazardous liquid pipelines. For more information about my background, please see my attached resume (Exhibit LNE-1).

You stated that you are a member of the Technical Hazardous Liquid Pipeline Safety Standards Committee. What is that?

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The Technical Hazardous Liquid Pipeline Safety Standards Committee is an advisory committee to the U.S. Department of Transportation's Office of Pipeline Safety whose formation was required under Section 204 of the Hazardous Liquid Pipeline Safety Act of 1979. The Committee makes recommendations to the Department on new regulations, and serves as a "peer review" panel for cost-benefit analyses of new regulations, a role given the Committee when the law covering pipeline safety (49 U.S.C., § 60101, et seq.) was reauthorized in 1996. The current law requires that the Committee be composed of 15 members, five from federal, state, or local government, five from the hazardous liquid pipeline industry, and five from the general public. I was appointed to the committee by the Secretary of the Department of Transportation.

What is the purpose of your testimony?

I will describe current deficiencies in the federal oil pipeline program that can and do result in environmental contamination from oil pipeline releases. These deficiencies are important to keep in mind when deciding whether and where to site a pipeline, and what protective conditions need to be imposed. Also, I will discuss particular aspects of Olympic's proposal based on my review of portions of its Revised Application. My perspective on these issues is based on analysis of the federal statute and regulations covering hazardous liquid pipelines which includes petroleum and petroleum product (or oil) pipelines, research on the oil pipeline industry's release data and its causes, discussions that occurred while serving on the Technical Hazardous Liquid Pipeline Safety Standards Committee, discussions with Office of Pipeline Safety staff, and examination of portions of Olympic's Revised Application.

What information can you provide us with concerning releases from hazardous liquid pipelines?

According to Office of Pipeline Safety (OPS) release data available from the Internet,[1] during the period January 1, 1990 through December 31, 1998, an average of 6.3 million gallons of hazardous liquids were released from pipelines annually (analysis by EDF). The vast majority of these releases were oil releases and not other types of hazardous liquids like anhydrous ammonia. Note that pipeline operators are not currently required by federal regulations to report

[1] The OPS accident database contains estimates of release size from those reporting the incidents. This database contains both under-reporting and over-reporting of accidents (the latter through redundant reports).

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spills or leaks of less than 2,100 gallons, releases where estimated property damages are less than $50,000, and leaks that pollute groundwater rather than surface water. Thus, the figures provided above likely are underestimates of the actual quantities of hazardous liquids released from pipelines.

OPS data also show that reported property damage from hazardous liquid pipeline releases averaged over $39 million in the 1990s, with an average property damage cost per incident of over $194,000 (median cost is $20,000). Based on an analysis by Battelle National Laboratory (Ref. 1), and EDF's analysis of OPS accident data for 1990-1998, it appears that no more than 18-30% of hazardous liquid pipeline releases are caused by "outside forces," or entities sometimes beyond the control of pipeline companies. The most common causes of releases from hazardous liquid pipelines are corrosion, operational incidents, and material defects.

EFA Technologies, Inc., a pipeline industry consultant, analyzed U.S. Department of Transportation hazardous liquid pipeline accident reports from 1982-91 and concluded that (Ref. 2):

- α σηορτ το μοδερατε λενγτη πιπελινε (ε.γ., 50 μιλεσ) ωιλλ ηαϖε α ρεπορταβλε αχχιδεντ ωιτηιν α 20 ψεαρ περιοδ, ωιτη τηε προβαβιλιτ ψ οφ συχη αν αχχιδεντ εξχεεδινγ 58%;
- α λονγ πιπελινε (ε.γ., 1000 μιλεσ ορ μορε) ωιλλ ηαϖε α ρεπορταβ λε αχχιδεντ δυρινγ ανψ ψεαρ; ανδ
- τηε χοστ οφ αχχιδεντσ το πιπελινε χομπανιεσ ισ σιγνιφιχαντλψ ηιγηερ τηαν τηε προπερτψ δαμαγε στατεδ ον τηε αχχιδεντ ρεπορτσ.

What information do you have on the hazardous liquid pipeline industry's environmental record?

Figure 1 shows "Annual Releases to the Environment from Hazardous Liquid Pipelines" from 1990 through 1998 using OPS accident data. As noted above, these data show that over 6.3 million gallons of oil and other hazardous liquids are reported released from pipelines on average each year, more than half the amount released from the Exxon Valdez disaster. Note that Figure 1 shows that since 1995, the amount released to the environment has increased each year.

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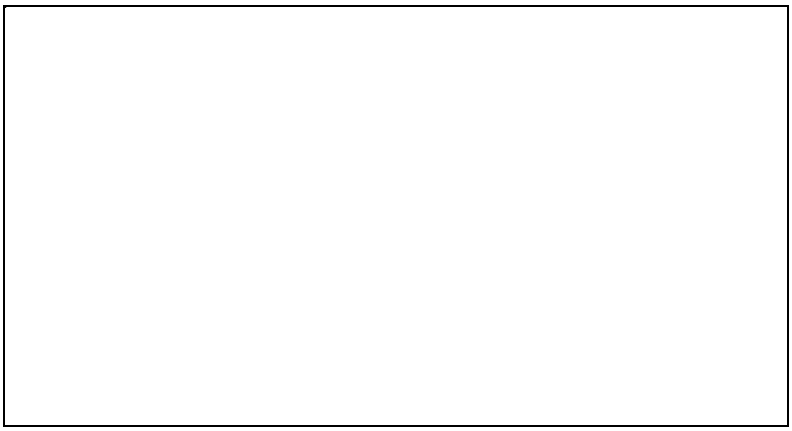
Figure 2 shows that the amount of oil and other hazardous liquids released per incident has been increasing since 1993, indicating that releases may be becoming more serious over time. The average amount released in 1998 was over 45,000 gallons. Annual reporting in the 1990s ranges from 170 to 236 incidents per year, with an average of 200, meaning that there is a pipeline release of tens of thousands of gallons approximately every other day.



As hazardous liquid pipeline releases can and do contaminate drinking water supplies, crops, and residential lands; generate greenhouse gases; kill fish; and cause deaths and injuries from explosions and fires, these two upward trends in aggregate annual releases and release size are troubling. The following table lists some of the most serious releases from hazardous liquid pipelines and their tank farms in recent years:

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While undoubtedly some pipeline companies do better than others, OPS accident data show that the industry as a whole is lagging. This situation is analogous to the environmental protection efforts by non-transportation companies, e.g., petrochemical companies, in the 1960s, prior to passage of the Clean Air Act, the Clean Water Act, and the Resource Conservation and Recovery Act in the 1970s. It took passage of these laws and subsequent development of regulations by the U.S. Environmental Protection Agency to "raise the bar" for environmental protection across entire industrial sectors. Because OPS has not yet developed environmental protection regulations, the oil pipeline industry as a whole still has a very poor environmental record, as discussed above.

With the enactment of the Oil Pollution Act of 1990 (OPA 90), Congress ensured significant improvements in tanker and barge transport of petroleum, through mandatory design and reporting standards and release liability and cleanup provisions. U.S. Environmental Protection Agency data show that spills over 200,000 gallons have been reduced by over 60% since OPA's enactment (Ref. 3). Similar federal statutory and regulatory changes are needed to ensure

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that the pipeline industry provides the same level of environmental protection as its tanker and barge competitors.

What are the principal causes of leaks from hazardous liquid pipelines?

According to the Battelle National Laboratory analysis of OPS data referred to above, the causes of hazardous liquid pipeline spills and leaks are:

- Ουτσιδε φορχε ορ τηιρδ–παρτψ δαμαγε – 18%
- Οπερατιοναλ ινχιδεντσ (ινχλυδινγ οπερατορ ερρορσ ανδ φιρεσ) – 45%
- Χορροσιον – 20%
- Ματεριαλ χονστρυχτιον δεφεχτσ – 16%

This study showed that the largest proportion of hazardous liquid pipeline spills was operational incidents, including dispatcher errors which can result in major releases.

Note that different analysts of hazardous liquid pipeline accident reports filed with the U.S. Department of Transportation might have somewhat different percentages for the causes of releases depending on how in-depth the analyses are on the causes of the accidents. Thus, if those filing the reports are contacted for more information and/or information clarification, the statistics may be different than from a file review because of inherent problems in the accident report form.

In another analysis of data reported to OPS, the National Transportation Safety Board, the independent federal agency that oversees U.S. Department of Transportation operations for airlines, highways, pipelines, etc., examined in detail the reports of releases caused by outside forces (Ref. 4). In 135 of 151 outside force releases (89%) caused by "others" and 19 of 27 releases (70%) caused by the pipeline "operator or its contractor," damage prevention programs such as a "one-call" system, which assists excavation contractors in locating pipelines to avoid damaging them, were in place. Notably, in 62% of the outside force releases attributed to damage by "others," the location of the pipeline was not marked, which means that pipeline owners bear some responsibility for these accidents.

In your opinion, what safety and environmental protection deficiencies exist in the federal program covering hazardous liquid pipelines?

As background, oil pipelines can create the following environmental problems through either fast or slow releases of petroleum: contamination of drinking water supplies, fish kills, loss of cropland, fires/explosions, physical injuries, air

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pollution, loss of recreational opportunities, and property devaluation. Unfortunately, once contaminated with petroleum, underground aquifers (i.e., groundwater) generally cannot be fully restored to their pre-contamination state.

The National Transportation Safety Board has identified the following needed changes for the existing OPS pipeline hazardous liquids program, based on its investigations of hazardous liquid pipeline accidents (Ref. 4):

- ρεθυιρε ηαζαρδουσ λιθυιδ πιπελινε οπερατορσ το ασσεσσ τηε α δεθυαχψ οφ τηειρ πιπελινεσ το οπερατε ατ μαξιμυμ αλλοωαβλε οπερα τινγ πρεσσυρεσ *on a periodic basis* (emphasis added);
- ρεϖισε ηαζαρδουσ λιθυιδ πιπελινε ρεγυλατιονσ το ινχλυδε χριτ ερια σιμιλαρ το τηε ρεγυλατιονσ ιν–πλαχε φορ νατυραλ γασ πιπελινεσ το εϖαλυατε τηε αδεθυαχψ οφ χατηοδιχ προτεχτιον (ι.ε., α χομμον τψ πε οφ χορροσιον προτεχτιον) σψστεμσ φιρστ ρεχομμενδεδ βψ ΝΤΣΒ ι ν 1987 ανδ αγαιν ιν 1998 αφτερ τηε δεατησ οφ τωο τεεναγερσ ιν Τεξασ ι ν 1996;
- μοδιφψ τηε ηαζαρδουσ λιθυιδ πιπελινε αχχιδεντ δατα χολλεχτε δ ιν α μαννερ τηατ ωουλδ αλλοω ΟΠΣ το περφορμ μετηοδολογιχαλλψ σουνδ αχχιδεντ τρενδ αναλψσεσ ανδ το εϖαλυατε πιπελινε οπερατορ περφορμανχε υσινγ νορμαλιζεδ αχχιδεντ δατα.

EDF research has identified several additional significant deficiencies in the hazardous liquid pipeline program which likely result in unnecessary environmental contamination. At a minimum, OPS needs to:

- εσταβλιση περφορμανχε στανδαρδσ φορ λεακ δετεχτιον σψστεμ σ (ινχλυδινγ α μινιμυμ λεακ δετεχτιον τηρεσηολδ, ανδ τηε νεεδ φορ ρε δυνδαντ σψστεμσ τηατ δετεχτ διφφερεντ τψπεσ οφ ρελεασεσ ιν σομε ορ αλλ ινστανχεσ), σο τηατ εαχη ηαζαρδουσ λιθυιδ πιπελινε υτιλιζεσ αδ εθυατε λεακ δετεχτιον;
- αδδρεσσ πιπελινεσ τηατ τρανσπορτ λιθυεφιεδ γασεσ (ρατηερ τη αν τηε οιλ τηεψ πρεϖιουσλψ χαρριεδ), ινχλυδινγ νοτιφιχατιον το ΟΠΣ ανδ τηε πυβλιχ οφ τηε χηανγε ιν σερϖιχε ανδ αππροπριατε δεσιγν ανδ οπερατινγ στανδαρδσ;
- ρεθυιρε ρεπορτινγ οφ σπιλλσ ορ λεακσ οφ ατ λεαστ ονε βαρρελ (42 γαλλονσ) ρατηερ τηαν 50 βαρρελσ, ρελεασεσ ωηερε εστιματεδ προ

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περτψ δαμαγεσ αρε ατ λεαστ ∃5,000 (ασ ωασ τρυε ιν τηε παστ) ρατηερ τηαν ∃50,000, ανδ λεακσ τηατ πολλυτε γρουνδωατερ ιν αδδιτιον το τηο σε τηατ πολλυτε συρφαχε ωατερ; ανδ,

- ρεθυιρε τηατ πιπελινε βρεακουτ τανκσ, ωηιχη στορε ηαζαρδου σ λιθυιδσ ανδ αρε αν ιντεγραλ παρτ οφ τηε τρανσπορτατιον οφ ηαζαρ δουσ λιθυιδσ βψ πιπελινεσ, βε δεσιγνεδ ανδ οπερατεδ ιν α μαννερ τηατ πρεϖεντσ χονταμινατιον οφ τηε ενϖιρονμεντ (ε.γ., ρεθυιρινγ χορροσιο ν προτεχτιον φορ αλλ βρεακουτ τανκσ ανδ ατταχηεδ πιπινγ, ανδ δουβλ ε–βοττομσ φορ νεω βρεακουτ τανκσ ανδ α πηασεδ–ιν υπγραδε σχηεδυ λε το δουβλε–βοττομσ φορ εξιστινγ βρεακουτ τανκσ το χονταιν λεακσ, ετχ.).

Are there any other reasons why you think the federal program covering hazardous liquid pipelines is deficient, and why Washington property owners should be concerned about the ability of the federal government to oversee our nation's hazardous liquid pipelines?

OPS's 105 person staff is quite small for a federal agency that oversees approximately 3,000 companies operating nearly 2 million miles of pipelines. This means that OPS has difficulty issuing regulations in a timely fashion, and does not have enough resources to adequately monitor compliance and enforce non-compliance. OPS has not met two Congressional deadlines (for 1994 and 1995) from the Pipeline Safety Act of 1992, to identify areas "unusually sensitive to environmental damage," and to develop regulations requiring periodic inspections of pipeline infrastructure in such areas to ensure they have adequate integrity to continue operations. Moreover, since the 1996 reauthorization of the pipeline safety law, enforcement has decreased, and OPS has spent extensive amounts of its limited resources on a demonstration program (the Risk Management Project program), covering few pipeline companies and minuscule pipeline mileage.

Additionally, OPS is primarily a reactive rather than a proactive governmental agency. For example, though OPS has long known about the problems with Colonial's Texas to New Jersey pipeline, OPS only issued a hazardous facility order to Colonial requiring pipeline upgrades *after* several major spills occurred along that pipeline, the last a one million gallon diesel spill into a South Carolina river that killed 34,000 fish.

Since only 8% of the nation's pipeline system is made up of the approximately 160,000 miles of hazardous liquid pipelines, much of the inspection and other

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resources at OPS are directed to gas pipelines rather than hazardous liquid pipelines. OPS currently has approximately 58 inspectors -- if 8% of these inspectors cover hazardous liquid pipelines, then there are only 4.6 federal inspectors overseeing 160,000 miles of existing pipelines. The states have approximately 300 pipeline inspectors, which add roughly an additional 24 inspectors to the total overseeing hazardous liquid pipelines, or around 28.6 governmental inspectors of hazardous liquid pipelines. This translates into each governmental inspector covering almost 5,600 miles of existing hazardous liquid pipeline. Since field inspectors spend substantial time examining new pipeline construction, the ratio of pipeline miles per inspector is actually worse than 5,600 to one.

On the enforcement side, the OPS web-site shows that the civil penalties OPS proposes to collect in 1997 and 1998 are less than half what the office proposed to collect in 1994 ($0.5 million in 1997-8, down from $1.14 million in 1994). Because the penalties for violations and releases are likely to be so minimal, it frequently can be cheaper for pipeline companies to pay fines and cleanup costs than to prevent pollution.

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How much product is lost from a pipeline between the time a leak occurs and the time a dispatcher could begin to shut down a pipeline?

A 1995 U.S. Department of Transportation study of leak detection systems indicates that any remote system with standard metering devices and a few pressure transducers is able to recognize leaks greater than 5% of flow within approximately 5 minutes (Ref. 5). In the case of Olympic's proposed Cross Cascade Pipeline, which will have a maximum flow of 7,500 barrels per hour, if the remote leak detection system requires 5 minutes to work, over 26,000 gallons would be released before the dispatcher could begin to shut down the pipeline.

What are some of the limitations of internal inspection devices?

Internal inspection devices (or "smart pigs") are a method of remotely inspecting the physical condition of the inside of a pipeline in an effort to detect corrosion, cracks, and other defects. There are several types of "smart pigs" with varying capabilities and sensitivities. In the absence of a specification in Olympic's Revised Application of what type of "smart pig" is to be used, it is impossible to assess the efficacy of this inspection program.

Moreover, any internal inspection program is only as good as the frequency of its use. In the Revised Application, Olympic commits to using a smart pig only once every five years. Given that a crack that can become a small leak may be undetected until a smart pig is run through the pipe, the device should be employed as frequently as is reasonably possible, perhaps no less frequently than once every two years.

What is your conclusion about the ability of the federal and Washington hazardous liquid pipeline programs to protect the environment?

Unfortunately, as discussed above, the current federal pipeline program has serious deficiencies that have resulted in numerous large and small releases to the environment. Given that over half the amount of the Exxon Valdez spill is released annually by hazardous liquid pipelines (6.3 million gallons), causing over $39 million of property damage, it is clear that the industry and its overseeing agency have a long way to go to ensure adequate environmental protection.

In summary, the Washington state oil and gas pipeline industry is overseen by: a tiny, reactive federal agency that has not expeditiously developed necessary regulatory standards; an inadequate number of federal and state inspectors; and a

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state agency which has done nothing in the regulatory arena other than adopt by reference OPS's inadequate regulations. Furthermore, once serious environmental harm occurs such as contamination of a drinking water aquifer, it is difficult, expensive and sometimes essentially impossible to remediate to pre-contamination conditions. For these reasons, the Washington Energy Facility Site Evaluation Council should seriously consider whether Olympic's proposed Cross Cascade Pipeline serves a true public purpose, or whether it poses an unnecessary and undesirable risk of environmental harm.

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