Scoping the Potential for Hazard to Human Life and Property Due to a Significant Increase in Heavy Rail Traffic to the Proposed Gateway Pacific Terminal in Proximity to Cascadia Natural gas Transmission Pipeline Through Wetland and Flooded Soil Areas of the Custer Spur.

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Since 1997, Whatcom County, and Bellingham notably, has experienced two significant pipeline ruptures with loss of life and or property damage[1]. It is with this in mind that pipeline safety and security requires careful consideration when development is proposed in proximity to high pressure transmission pipelines. As an environmental scientist (MS, Environmental Systems) and a neighbor of the Custer Spur, I am concerned about the potential for a pipeline loss of containment event resulting from rail traffic mishaps in close proximity to the natural gas pipeline operated by Cascadia Gas in the context of greatly increased number of very heavy coal trains, a result of development of the Gateway Pacific Terminal at Cherry Point. There are a number of independent factors that, each on their own, may have greater or lesser potential for a pipeline loss of containment, but in combination could present a hazard tipping point. The Whatcom County Planning Commission has stated that while they cannot regulate pipelines (preempted by Federal Natural Gas Act), they can regulate development in proximity to pipelines (Whatcom County Planning, 2001)[2], which should include the Cherry Point and Custer Spur development aspects of the Global Pacific Terminal proposal. If a hazard analysis, as part of the EIS, were to reveal significant hazard due to proximity of heavy rail traffic to an existing natural gas pipeline, and rerouting of the rail or pipeline is not feasible, the permitting agencies may be compelled to deny a permit to proceed with the project that would create the hazard.

The pipeline.

The Natural Gas Association estimates that 59% of the natural gas pipeline accidents since 1995 resulted from excavation or other external force[3] (such as train derailment). The Pipeline in question is one of several crisscrossing the western part of Whatcom county serving residential as well as industrial uses. This pipeline, operated by Cascadia Gas is a pressurized natural gas transmission pipeline runs parallel to the tracks of the Custer Spur from Ham Road all the way to Cherry point. Proximity to the tracks poses a potential loss of containment hazard if heavy rail cars were to to derail in such a ways as to

[1] A pipeline rupture in Everson, the result of a landslide. The second rupture being the gasoline pipeline rupture in Whatcom Creek, which resulted in the tragic deaths of three people, tow of them children.
[2] NATURAL GAS AND HAZARDOUS LIQUID PIPELINE BACKGROUND REPORT Whatcom County, Washington October, 2001, Whatcom County Planning Northwest Annex, 5280 Northwest Road ,Bellingham, WA 98226
[3] http://www.aga.org/Kc/aboutnaturalgas/consumerinfo/Pages/CausesofNGPipelineAccidents.aspx

dmage the pipeline. Such a derailment by a train and attempts to remove the cars caused a petroleum pipeline rupture and explosion in San Bernardino[4] in 1989.

A particularly troubling aspect of this issue is an action by Washington State UTC in the form of a complaint[5] against the pipeline operator, Cascadia Gas. This complaint was a follow up to an overpressure incident experienced by Cascadia gas. the follow up investigation revealed numerous violations of pipeline safety including lack of proper records, emergency plans, location of valves, and corrosion inspections. Among other thing s the complaint stated: " If the allegations are proven, this indicates Cascade has an overall lack of compliance, an overall lack of accountability, an overall lack of quality control, and an overall lack of interest in and/or attention to the details of compliance with gas pipeline safety laws and rules." Cascadia Gas settled this complaint with a fine of $425,000 in 2011.

The Geography

- Critical areas[6] The Whatcom county planning department discusses the hazards of damage to pipeline in what it terms critical areas. Wetlands and flooded areas are considered critical areas. While those areas are not inherently a problem for pipeline security in and of themselves, adjacent activities such as industrial activities can pose a hazard to pipeline security. The addition of a second parallel track and the addition of 18 additional heavy coal trains per day constitute, in my view, such a hazard and

typical pipeline/rail proximity. Pipeline marked with yellow tags. Note standing water.

[4] ern Pacific Transportation Company Freight Train on May 12, 1989 and Subsequent Rupture of Calnev Petroleum Pipeline on May 25, 1989, San Bernardino, California, PB90-916302 NTSB/RA-90/02

[5] http://www.utc.wa.gov/docs/Pages/DocketLookup.aspx?FilingID=110443

[6] "Critical areas include the following areas and ecosystems: (a) wetlands; (b) areas with a critical recharging effect on aquifers used for potable water; (c) fish and wildlife habitat conservation areas; (d) frequently flooded areas; and (e) geologically hazardous areas. (GMA Definition) Some of these critical areas seem to be of more importance than others, as a frequently flooded area may not matter to the system so long as the integrity of the structure is maintained."

should be taken into account when evaluating the feasibility of this project. If development adjacent to the pipelines of the area constitutes and unacceptable risk, the County has determined it has the right to deny a permit for such development[7]. The photo shows a section of the area of concern, curve in tracks and pipeline proximity through wetland soils- pipeline marked with yellow posts. The pipeline is, at some points, as little as 25' from the tracks.

Rail traffic to the Terminal

BNSF track ballast and coal dust. BNSF realizes the hazard to their trains of buildup of coal dust in the ballast of the rail bed and blamed two derailments on this precise issue. In a paper by Tutumluer [8] discussion of the effect of coal dust on the porosity of ballast is examined. Results of this study suggest that fine coal dust fills the spaces between the rock ballast. This not only limits drainage of water, but can actually disrupt the integrity of the mechanical bonds of the ballast as coal dust becomes wet and moves in a plastic manner. As a result of the effects of coal dust on track ballast, BNSF has attempted to collect a surcharge[9] on the basis of extra maintenance to the tracks to prevent derailments due to coal dust buildup. Accumulation of dust along the Custer Spur could increase likelihood of a derailment in proximity to the natural gas transmission line operated by Cascadia Gas. A noteworthy paper by Connel Hatch in Australia[10] examines coal dust emissions from trains and regarding the dust deposition from unloaded cars on their way back to the mines states:

> " Some of this coal will fall into the wagon above the Kwik-Drop doors and if emitted will fall through the gap in the doors. As discussed above, the coal that falls through the Kwik-Drop doors is likely to remain in the ballast"

This is particularly pertinent and worrisome in view of BNSF's own concerns about ballast contamination by coal dust. This becomes compounded when climatic conditions include abundant precipitation which combined with coal dust can destabilize the ballast.

In Australia:

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[7] IBID, NATURAL GAS AND HAZARDOUS LIQUID PIPELINE BACKGROUND REPORT

[8] Erol Tutumluer, Ph.D. et al *Laboratory Characterization of Coal Dust Fouled Ballast Behavior*, Civil and Environmental Engineering Department, University of Illinois at Urbana Champaign, Newmark Civil Engineering Laboratory, 205 North Mathews Avenue, Urbana, Illinois 61801, Draft Manuscript Submitted for the AREMA 2008 Annual Conference & Exposition, September 21-24, 2008, Salt Lake City, UT

[9] http://www.nreca.org/press/CoopStories/Pages/ShippersWininCoalDustCase.aspx

[10] Interim Report *Environmental Evaluation of Fugitive Coal Dust Emissions from Coal Trains*, Goonyella, Blackwater and Moura Coal Rail Systems, Queensland Rail Limited31 January 2008,Reference H_327578Revision

""Coal fouling reduces the re-ballasting cycle from a normal 12 to 15 years down to around six years," said Mr Dall. "As a result, we have to do around 100 kilometres of coal foul removal every year from our 1700kms of track."
This costs QR around $30m directly per year, with derailments and delays further crimping export volumes and income."[11]

Custer Spur

The Custer spur rail tracks parallel to the Cascadia Natural gas transmission line. Pipeline and rail spur were undoubtedly designed taking into consideration wetland and flooded soils with current rail traffic and composition. The SSA terminal proposes an increase of many times current rail activity requiring construction of an additional rail line, as well as much heavier trains than are using the Spur currently. A hazard assessment should be conducted to determine risk of pipeline damage due to heavy train traffic increases adjacent to the pipeline . Further, both BNSF and the cited Australian sources confirm a higher risk of derailments from coal dust infiltration into track ballasts, at the coal loading source, but also empty rail cars leaving the coal export terminal. Scoping this sort of hazard to pipelines because of proposed rail traffic has precedent in EIS studies such as the Hong Kong, Tai Wai to Ma On Shan EIA [12] proposal where a risk to pipeline security from a proposed light rail project was deemed sufficient to require careful evaluation.

Conclusion and Remediation options

The prudent response here is to examine the original design assumptions of co-placement of the rail line and the natural gas transmission pipeline on the Custer Spur, determine whether or not these assumptions are valid under current regulatory guidelines, and how these design assumptions relate to the addition of a second rail line and a large increase in both frequency and gross weight of trains to conclude whether a hazard exists. If a hazard is shown to exist with sufficient probability of a significant pipeline loss of containment event to require remediation, the options may be limited to finding an alternate route for rail service to Cherry Point, moving the tracks a sufficient distance from the pipeline to no longer constitute a danger, moving the pipeline , or limiting the rail traffic to present day levels. Charles Rhodes, P. Eng., Ph.D. of Xylene Power ltd, Ontario Canada in an exhaustive discussion of pipeline rupture events suggests that, for safety, natural gas pipelines should be located in dedicated Energy Transmission Corridors with a 200 meter setback[13]. If it is concluded that a hazard exists and the remedies are not technically, legally, or financially feasible, then the County would necessarily exercise its permitting authority and deny construction of the terminal which would resolve the increased rail traffic hazard issue on the Custer Spur.

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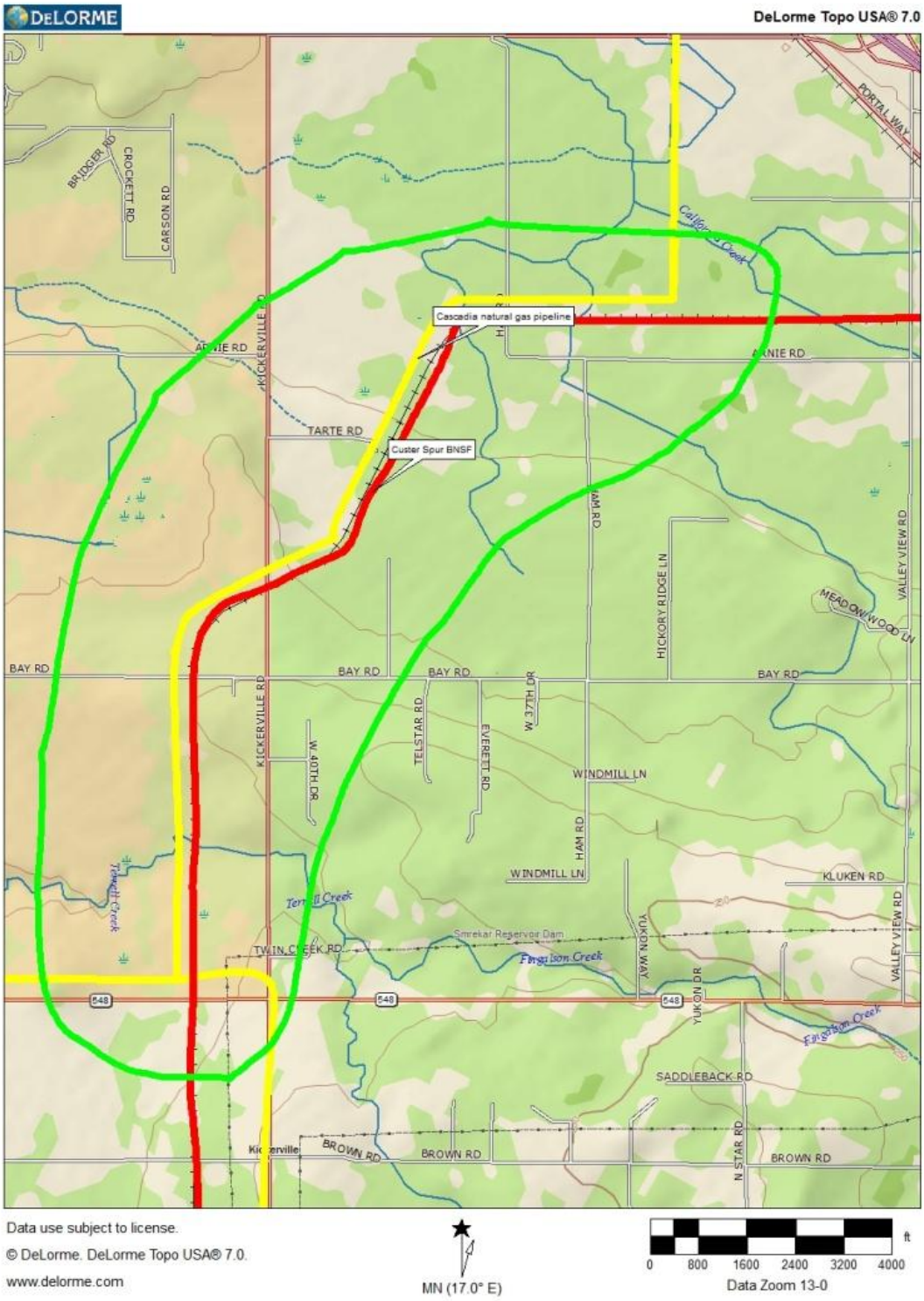
[11] **Australian Bulk Handling Review** http://www.bulkhandling.com.au/news/print-editions/january-february-2010/tackling-dust-from-coal-and-iron-ore-trains

[12] Hazard assessment of proposed rail line in proximity to natural gas pipelines, Hong Kong. http://www.epd.gov.hk/eia/register/report/eiareport/eia_02799/11.pdf

[13] http://xylenepower.com/Natural%20Gas%20Pipeline%20Safety%20Setback.htm

The map shows the Cascadia pipeline extending south (yellow line) and intercepting the Custer Spur rail operated by BNSF (red line)and extends in close proximity through three curves in the rail right-of-



way to Grandview Road (area circled in green). This area, Ham Road to Grandview is the area of concern.