Exhibit No. ______________
Docket No. TR-100127
Witness: Ronald F. Poulsen

BEFORE THE WASHINGTON STATE
UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION, Petitioner, v. CENTRAL PUGET SOUND REGIONAL TRANSPORTATION AUTHORITY; and CITY OF LAKEWOOD, Respondents.	DOCKETS TR-100127, TR-100128, TR-100129, and TR-100131 *(Consolidated)*

WRITTEN DIRECT TESTIMONY OF

Ronald F. Poulsen

VICE PRESIDENT/PROJECT DIRECTOR
HDR ENGINEERING, INC.

April 16, 2010

RONALD F. POULSEN testifies as follows:

I submit this testimony in support of the Washington State Department of Transportation's petitions in the above-referenced dockets.

Q. Please describe your educational and professional background that qualifies you to testify in this case.

A. My current position is Vice President/Project Director at HDR Engineering, Inc. (HDR). I have more than 40 years of practical engineering experience with the Union Pacific Railroad Company, Amtrak, Northwestern Pacific Railroad, the Kansas City Southern Railway Co., and as a consultant. I have worked in all phases of railroad engineering from surveying, cost estimating, drafting, designing, planning and scheduling, maintenance and construction of track, right of way, and bridges, to directing construction projects and system wide railroad operations. I earned my Bachelor of Science degree in Civil Engineering from California State University at Los Angeles and have been a member of the American Society of Civil Engineers since 1979. I have also been a member since 1975 and have served on the board of the American Railway Engineering and Maintenance-of-Way Association.

I have been in my present position with HDR Engineering, Inc. since October 2006. HDR serves as a consultant to the Washington State Department of Transportation (WSDOT) on the Point Defiance Bypass Project. For more detailed information about my work history and experience, please refer to my professional resume which is attached hereto as Exhibit RFP01.

Q. What has been your role on the Point Defiance Bypass Project?

A. My role in the Point Defiance Bypass Project has been (1) to review the constructability of the track portion of the project as designed, and (2) to review and perform the quality control checks of the track portion of the plan set and specifications. As part of the quality control (QC) review of the railroad design plans, I also reviewed the type of signal warning systems that exist at the crossings and that are planned for installation and the general traffic designs that may affect the railroad and railroad operations.

Q. How are you qualified to evaluate the safety of the proposed crossing modifications in this case?

A. I have dealt with railroad at-grade roadway crossings and trying to improve crossing safety throughout most of my railroad and consulting career. My experience includes layout or civil design of railroad grade crossings, construction oversight of actual crossing installations, and direct and indirect maintenance oversight of existing railroad crossings. I have observed hundreds of crossings from the very unsafe to the relatively safe. I have also been involved with the review of statistical observations and predictions of the relative safety of crossings as the initiator of crossing diagnostic teams. As Vice President and Chief Engineer of the Kansas City Southern Railway Co. (KCS), I had the ultimate responsibility to oversee the planning, design, construction, and maintenance of hundreds of railroad at-grade roadway crossings. During my time at KCS, my public projects personnel worked with KCS risk management to develop a program in conjunction with the State of Mississippi to reduce the number of crossing incidents and to reduce KCS's risk. In addition to this work, I have also been involved in the development of start up commuter operations on existing freight corridors both as Director of Engineering at Amtrak and as a consultant.

Thus, I am very familiar with a broad range of railroad crossing configurations and the nature and relative magnitude of the risks that they pose as well as the benefits of upgrades to crossing warning systems. In addition to my personal observations over my 40-year career as to the benefits of improved crossing warning devices, the Federal Highway Administration (FHWA) uses risk analysis formulas to provide percentage reduction in incidents with the addition of various types of crossing warning systems such as those proposed on the Point Defiance Bypass Project. *See* Exhibit RFP02, p. 156 (Table 44) attached.

Q. Do you have any experience with the type of crossing modifications being proposed in this case that demonstrates such improvements can reduce the risk of a collision?

A. Yes, again at KCS, working with the Mississippi Department of Transportation, using the American Association of Railroads-Department of Transportation (AAR-DOT) databases, and implementing crossing diagnostic teams, we assessed and prioritized KCS crossings jointly with the State. The prioritization was based upon the existing and varying levels of crossing warning devices ranging from passive warning systems such as RR crossbucks and stop signs to more active warning systems such as Flashing Gates and Lights. Based upon our studies and using funds available from the KCS, state, local, and federal budgets, an annual, prioritized grade crossing program was established to improve safety on the KCS/Mississippi railroad corridor. This corridor is the KCS Meridian Subdivision which runs east and west through Mississippi. The corridor project started in 2003 and addressed 78 public at-grade crossings on the subdivision which is approximately 143 miles long. Since the start of the program, 15 crossings have been closed, 46 crossings have been improved by the addition of flashing lights and gates, 1 crossing was upgraded from flashing lights to flashing lights and gates, and 4 crossings with crossbucks have been upgraded to meet the new 2009 Manual of Uniform Traffic Control Devices standards. The results of this program show the following safety improvements:

Average Number of Collisions Per Year	Time Period
12	1999-2003
9.6	2004-2006
6.5	2007-2008
0	2009-Present (last 17 months)

Q. Have you been involved with any other railroad projects similar to the Point Defiance Bypass Project that contribute to your knowledge and expertise on rail safety?

A. Yes. As the Director of Engineering for Amtrak West and as a consultant, I worked on a number of passenger service developments of this kind using existing freight railroad tracks. One of the many that I am familiar with is Metrolink or Southern California Regional Rail Authority (SCRRA) which is an example of how high speed passenger trains can be added successfully to a freight railroad corridor. Specifically, the corridor from Los Angeles to San Bernardino was a Southern Pacific freight line prior to start up of the Metrolink service. This freight line had minimal freight traffic (about 1 train per day and mostly local service), similar to the present Point Defiance Bypass corridor in this case. Prior to Metrolink taking over this line, Southern Pacific (now Union Pacific) had had 16 crossing incidents during the 10-year period from 1985 to 1994. In the 10-year period from 1995 to 2004, Metrolink experienced 11 crossing incidents and Union Pacific had 4 crossing incidents. Even though the daily train count increased from one 10 mph freight train to 40 high speed commuter trains, there has been a slight decrease in the average annual number of crossing incidents. This is due largely to the improvements in the crossing warning systems and to the Operation Life Saver efforts toward public information and education.

The same standard of care that was used in this now successful passenger and commuter railroad services has been applied to the roadway at-grade crossings in the Point Defiance Bypass Project. It has undergone the same diagnostic team studies and completed the exercises required to evaluate the safety or risk of the crossings within the design.

Q. How will the increase in rail traffic at these crossings affect public safety?

A. Statistically, the majority of collisions at crossings involve freight trains; the additional rail traffic at these crossings will come almost exclusively from passenger trains. Data from the Federal Railway Administration (FRA) indicates that in 2004 over three-quarters (76 percent) of the collisions at public crossings involving motor vehicles also involved a freight train. Fewer than 9 percent of collisions during that same period involved passenger or commuter trains. *See* Exhibit RFP02, p. 43 (Table 12) attached. Freight trains typically have longer stopping distances and move more slowly than passenger trains. Vehicles more often attempt to "beat the train" when they are dealing with a freight train. Passenger trains typically move through and clear crossings more quickly (as they are faster and shorter) thereby reducing the impatience of the vehicle's driver.

The Point Defiance Bypass Project increases train traffic from about 1 freight train per day to 11-15 trains per day; the additional traffic will come almost exclusively from passenger trains. Again, statistically, the FRA shows little difference in the number of crossing accidents on a national basis between these train traffic levels as indicated in Exhibit RFP02, p. 43 (Figure 2) attached.

Q. Based on your extensive experience, what are the safety and engineering factors to be considered for a project like this that involves existing grade crossings?

A. The safety and engineering factors to be considered in the start up of a new passenger and commuter service such as the Amtrak, Cascade, and Sound Transit service on the Point Defiance Bypass corridor are:

- Number and speed of vehicles crossing the railroad tracks;
- Number and speed of trains crossing the at-grade crossing;
- The geometry at the crossing (the crossing angle, elevations at and away from the crossing, width of the crossing surface, surface type, number of tracks);
- Sight distance at the crossing both for train and vehicle operators; and
- For existing grade crossings, collision data which is included within the analysis.

The levels of at-grade crossing warning systems available to the designer range from simple RR crossbucks, stop signs, stop signs with flashing lights, warning pavement markers, up to elaborate median divided roadway approaches with flashing lights and gates.

Based upon my review of the project, the effort in the design of the Point Defiance Bypass shows that each of the crossings has been designed with:

- An improved approach surface to the tracks for the traveling public (re-profiled roadway);
- New concrete crossing surfaces;
- Traffic median dividers;
- Flashing lights and gates crossing-warning systems;
- RR signal system tied with or preempting local traffic signals;
- New pavement markings; and
- New advance warning signage.

Q. How do these more active warning systems improve safety at grade crossings?

A. Much of the need for crossing warning systems is based upon human behavior. The operator of a vehicle at a grade crossing with a passive warning system is required to follow the directions of the passive warning device. For example, at a crossing with crossbucks and a stop sign, the driver of the vehicle is supposed to stop and look both directions before proceeding across the track. The risk here is that the driver either does not see the signs or does not obey the law. The addition of flashing lights on advance warning signs and pavement markers reduces the first risk of the driver not seeing the crossing signs but does not eliminate the risk of a driver disobeying the law. There is an added complication of drivers who constantly stop at crossings where little train activity is present becoming complacent and ignoring the passive warning signs.

Active warning devices allow vehicles to continue to travel across the railroad track unimpeded until a train approaches. Upon a train approaching, an active warning signal alerts the vehicle driver to the train and requires the driver to stop before entering the crossing. This is an improvement but still does not address the risk of the hurried or risk-taking driver who disobeys the law and tries to beat the train. The addition of gates that drop in front of vehicles prior to the arrival of a train at the crossing physically prevents vehicles from moving onto the grade crossing. This type of signal design provides that the flashing lights start, warning the traveling public of an approaching train, and requires the vehicle to stop before crossing the track, then the gates move down, blocking the movement of the vehicle through the crossing. The delayed timing from the start of the flashing lights to the gates descent allows for vehicles already starting into the grade crossing to clear it prior to the arrival of the train. However, this system still does not address the hurried, risk-taking driver who would drive around the lowered gates and try to beat the train through the crossing. The addition of highway medians[1] to this already active warning system prevents the risk-taking driver from driving around the gates. As can be seen, each incremental addition to the warning device system provides an incremental reduction of the risk of incidents.

Q. Are the proposed safety devices and roadway modifications the most appropriate means to address the risks posed at the crossings in this case?

A. Yes. In today's railroad industry, the only safer design would be to eliminate the at-grade crossing or construct a grade separation. Unfortunately, for the crossings involved in this hearing, separating grades or closing crossings may create more problems than are solved. Due to the proximity to Interstate 5 and to the short off ramps leading to these crossings, hundreds of millions of dollars would likely be needed to grade separate these crossings. In addition to the prohibitive cost for such an alternative, grade separation takes away surrounding property, and can interfere with local access to adjacent properties, and structures can divide the community.

The Clover Creek Drive SW crossing is presently protected only by railroad crossbuck signs. The proposed design modifies or improves the approach grades to and from the crossing. Divider medians and curb and guttering are designed to control traffic at the

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[1] See the testimony of Eugene "Buzz" Berger for a description of the medians proposed for use in the Point Defiance Bypass Project.

crossing. Flashing lights and gates are to be installed. According to the Federal Highway Administration's Railroad-Highway Grade Crossing Handbook, FHWA's Countermeasure improvements, the addition of flashing lights and gates at a grade crossing can lead to an 88 percent reduction in the possibility of collisions over crossbucks alone, 93 percent reduction in injuries over crossbucks and a 100 percent reduction in deaths over crossbucks (*see* Exhibit RFP02, p. 156 (Table 44)). This is certainly a significant safety improvement.

The other two crossings, North Thorne Lane SW and Berkeley Street SW presently have flashing lights with one cantilever at each crossing facing traffic approaching from the freeway. According to FHWA's Table 44 of Exhibit RFP02, p. 156, the addition of lights and gates over flashing lights alone provides a 44 percent reduction in the chance of collision and the addition of medians provide a further 80 percent reduction when combined with the two gate system.

Based on my 40 years of experience in railroad traffic safety and upon a review of the safety modifications proposed in the Point Defiance Bypass Project petitions, I believe the warning systems and crossing plans designed for each of the crossings in question not only meet present railroad and public safety standards but are the best warning systems available today that meet the local conditions.

Q. Does this conclude your testimony?

A. Yes, it does.

I declare under penalty of perjury under the law of the State of Washington that the foregoing is true and correct to the best of my knowledge.

DATED this 15th day of April, 2010, at Bellevue, Washington.

[signature]

RONALD F. POULSEN