Appendix III

Chemical Slipperiness Memo

Memorandum

TO: **Maintenance Engineers/ Superintendents**

THROUGH: Chris Christopher RC

FROM: **Tom Root** TR

SUBJECT: **Chemical Slipperiness**

Because of the potential for slippery conditions to be caused by misapplication of liquid anti- icing chemicals to roadway surfaces, the following guidelines should be utilized:

Applying anti-icing chemicals and humidity:

Applying liquid anti-icing chemicals to roadway surfaces can potentially cause a "slurry" phase during the drying process, which can result in slippery road conditions. This "slurry" phase generally occurs when the anti-icing chemicals transform from a liquid to a solid state or back from a solid to liquid state. This "slurry" phase takes place quickly and is generally short in duration. The greatest potential for a slipperiness problem is when road temperatures are in the 40's and the relative humidity is between 45-50%. Research shows the common denominator for most incidents investigated are road temperatures between 40^0 and 54^0 degrees F (most often at 46^0 F) and a relative humidity of approximately 45-50%. The slurry transition phase can also occur at relatively low humidity levels (below 35%). These conditions typically occur in the fall and generally involve an application of liquid anti-icing chemical prior to the first freezing event of the season. Therefore:

1) Users should not apply anti-icing liquids for a winter event if the air temperature is above **40 degrees** with a relative humidity of 45-50 % and above. <u>If these conditions exist, delay the application until temperature drops.</u>

2) If humidity is or expected to drop below 35%, application rates should be reduced. Using the WSDOT anti-icing chemical application guideline matrix, apply at the lowest recommended rate.

3) Most occurrences of slipperiness involved an application made between noon and 3:00 PM. If it is necessary to make an application during this time frame, temperature and humidity levels must be verified prior to making the application.

Applying anti-icing chemical after an extended dry spell:

When a liquid anti-icing application has been made after a long dry spell, the build up of oil-based residuals left from vehicles and the application of a liquid to the roadway can produce a slick surface. This is very similar to a light rain shower on a roadway surface after an extended dry spell. The chemicals used for anti-icing are heavier than water and may displace any petroleum-based residuals on the roadway surface. The chemical itself may not cause the slipperiness, but may be a contributing factor in a reduced friction surface.

Considering the risk of developing slick conditions, users should be cautious when applying anti-icing liquids after an extended dry spell. Additionally, using lower application rates may reduce the risk of slipperiness developing under these conditions. Using the anti-icing chemical application guideline chart, located in the October 2012 WSDOT Snow and Ice Plan, apply at the lowest recommended rate.

Multiple applications

If anti-icing liquid chemicals are being applied on multiple, back-to-back applications, the application rate should be reduced on subsequent applications. Reducing the application rate will prevent excess chemical buildup on the roadway. However, the rate should not be reduced if excess moisture or high traffic volumes have diluted the initial application.

If you have any questions, or need help with application rates, please contact
Jay Wells (360) 705-7863 or Jim Andersen (360) 705-7852 at Headquarters Maintenance.