

Refining the Analytical Protocols for Methanol, Amines and Glycols

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Glycols are widely used in Alberta. The primary usage of glycols in the upstream oil and gas industry are as dehydration solutions, antifreeze solutions and heat transfer fluids. The glycol compounds most commonly used for these purposes include ethylene glycol (EG), diethylene glycol (DEG), and triethylene glycol (TEG). These compounds may be released to the environment in the vicinity of facilities where they are used.

Alberta Environment (AENV) and Petroleum Technology Alliance Canada (PTAC) are in the process of developing soil and groundwater quality guidelines for two glycol compounds, diethylene glycol (DEG) and triethylene glycol (TEG). Detection limits for analysis of these compounds in soil, quoted by environmental labs in Alberta, currently range from 6 mg/kg to 50 mg/kg. Draft proposed Tier 1 soil quality guidelines for DEG and TEG are of the order of 10 mg/kg for DEG and 0.2 mg/kg for TEG. Thus Tier 1 soil guidelines for these guidelines are lower than commonly-quoted detection limits at some or all Alberta environmental laboratories. It is anticipated

that many sites will end up being closed based on Tier 2 guidelines, however, it is, of course, desirable to have an analytical method which is able to determine whether a soil sample meets Tier 1 guidelines. To this end, CAPP intends to fund a study to explore the feasibility of developing a reliable and robust analytical method for quantifying these glycols in soil with detection limits appropriate to the anticipated Tier 1 guideline values.

Ultimately the goal of achieving sub-ppm detection limits for DEG and TEG was not realized. The scientific approach involved derivatizing the glycols to compounds that were more amenable to low level analysis. The process was successful under controlled laboratory conditions but the technology was not successful when applied to complex soil matrices. Supplementary work based on conventional GC/FID and GC/MS technology was successful at reaching glycol detection limits for DEG and TEG in the range of 5 to 10 mg/kg (ppm).

2009 Maxxam_ALKANOLAMINES Presentation

2008 Maxxam_ Development of an Analytical Method for Alkanolamines in Soil_Phase 3

2008 Maxxam_Method Development:Refinement for the Analysis of Glycol in Soil

2008 Axiom and Iridium_MAGG Presentation