

Methanol, Amines, and Glycols Guidelines (MAGG) Project – Phase III

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Project Team

- Alberta Environment
 - Gordon Dinwoodie
- Industry
 - Mike Morden, Petro-Canada/CAPP/PTAC
 - Terry Rowat, Methanex
- Consultants
 - Natalie Feisthauer, Stantec Consulting Ltd.
 - James Sevigny, Iridium Consulting Inc.
 - Miles Tindal, Axiom Environmental Inc.

Funding

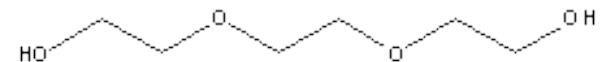
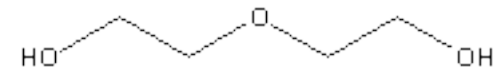
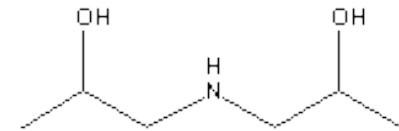
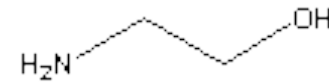
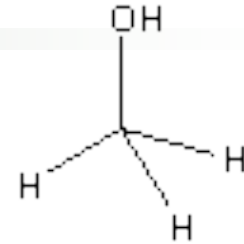
- PTAC
- AENV
- Methanex

Project Rationale

- Process chemicals detected in environmental soil samples
- Currently no soil quality guidelines (SQGs) for some of these chemicals
- AENV/PTAC/CAPP project to develop SQGs

Chemicals Included

- Methanol
- Alkanolamines
 - Monoethanolamine (MEA)
 - Diethanolamine (DEA)
- Glycols
 - Diethylene Glycol (DEG)
 - Triethylene Glycol (TEG)



Project Overview

- Phase 1 (Sept 2004 – Feb 2005)
 - Literature review and compilation
 - Identify data gaps
- Phase 2 (Sept 2005 – Dec 2006)
 - Additional toxicity testing
- Phase 3 (2007)
 - Develop guidelines

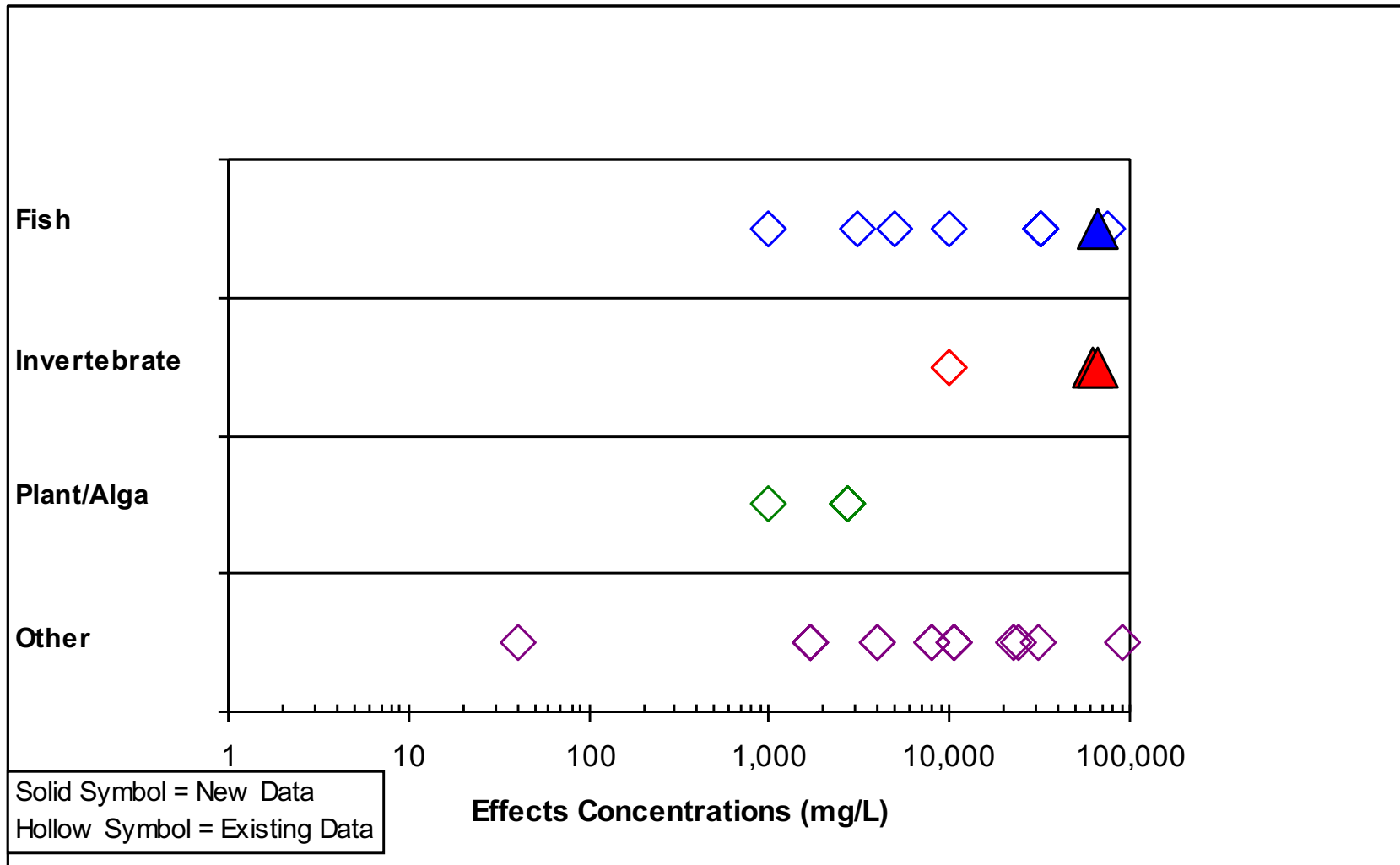
Phase 1 – Summary of Critical Data Gaps

	Additional Studies Required			
	Terrestrial		Freshwater Aquatic	
	Plant	Invertebrate	Fish	Invertebrate
Methanol	3	2	-	-
MEA	3	2	-	1
DEA	3	2	1	-
DEG	3	2	2	2
TEG	3	2	-	1

Phase 2 - Aquatic Toxicity Testing

- Provider:
 - Vizon Scitec (formerly BC Research)
- Test Battery
 - 1 Fish Species:
 - rainbow trout
 - 2 Invertebrate Species:
 - *Daphnia magna*, *Hyalella azteca*

DEG – Existing and New Aquatic Toxicity Data



Phase 2 - Terrestrial Toxicity Testing

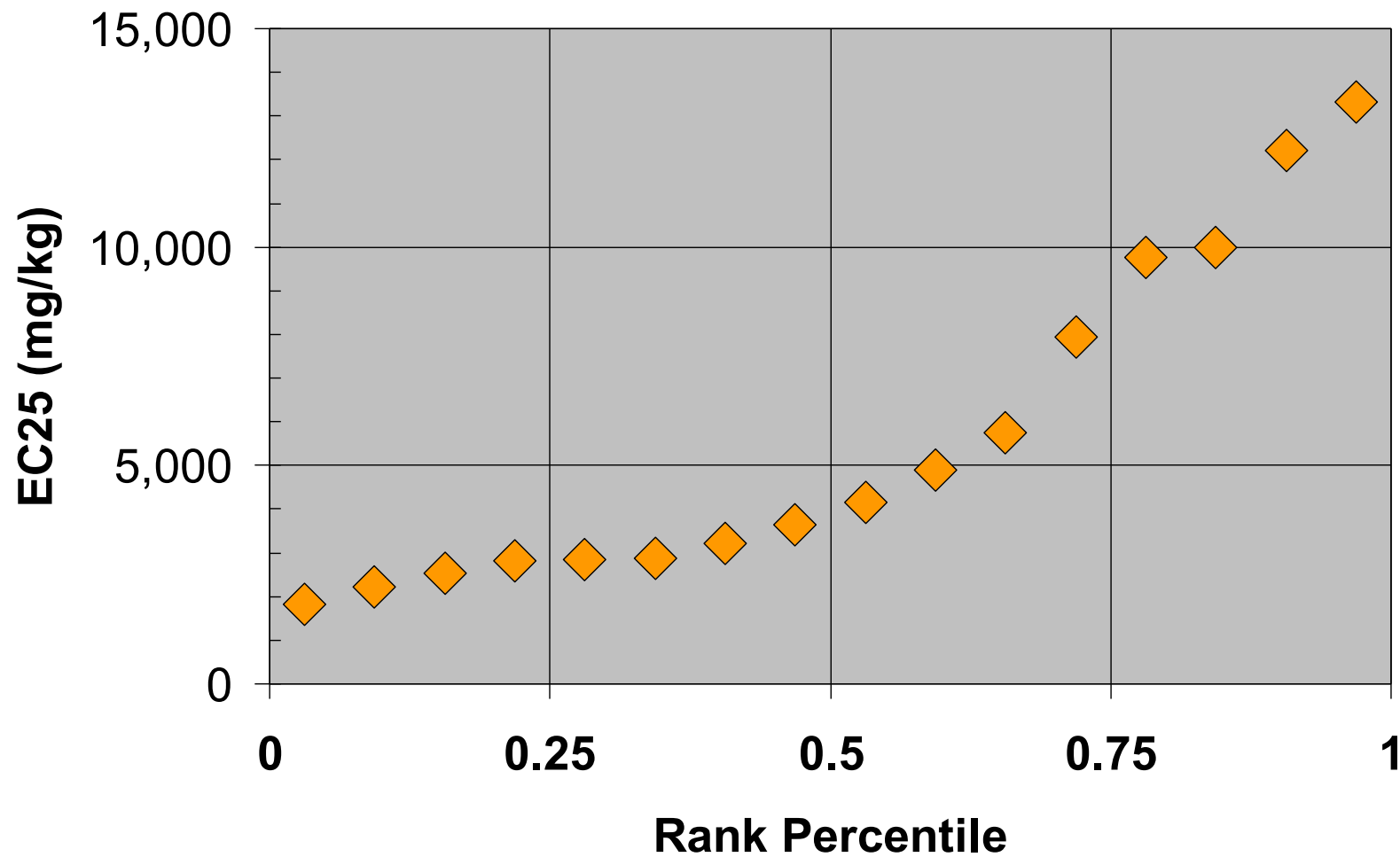
- Provider:
 - Stantec, Guelph ON
- Test Battery
 - Definitive plant growth tests:
 - northern wheatgrass, barley, alfalfa
 - Chronic invertebrate reproduction tests:
 - earthworm, springtail

Stantec Plant Toxicity Test



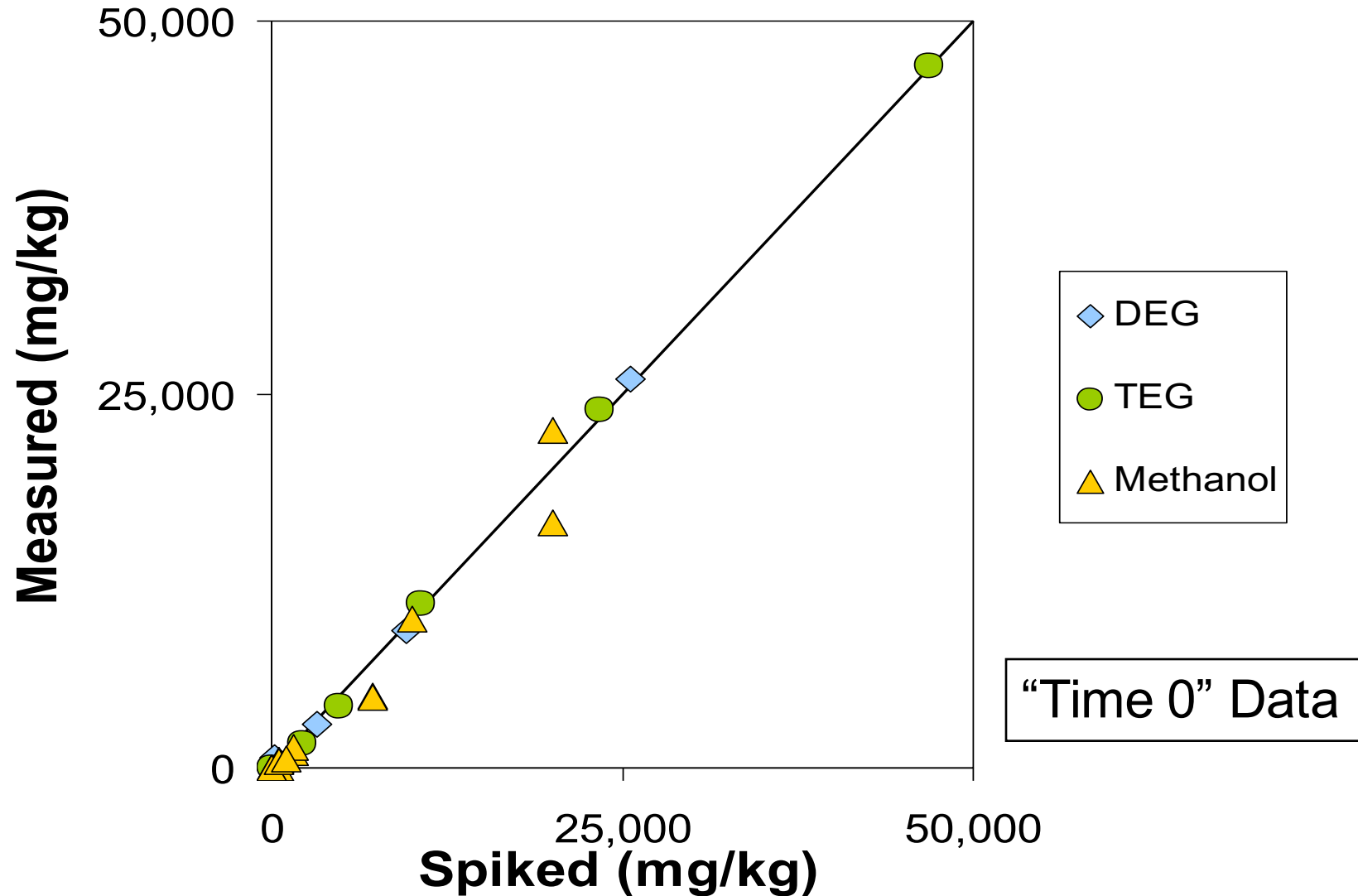
Photo Courtesy of Stantec Consulting Ltd.

Species Sensitivity Distribution - Methanol



Phase 2 - Analytical Recovery

MeOH, DEG, and TEG



Methanol SQG – Coarse Soil

Pathway	Nat. Area (mg/kg)	Ag/Res (mg/kg)	Com (mg/kg)	Ind (mg/kg)
Human Soil Contact	---	11,000	17,000	80,000
Human Inhalation	---	100	1,200	1,200
Groundwater – Potable	<50	<50	<50	<50
Eco Soil Contact	2,400	2,400	3,400	3,400
Groundwater – FAL	<50	<50	<50	<50

Red text – limiting pathway if groundwater not applicable

Green Text – guideline value less than detection limit – under discussion with AENV

Methanol SQG – Fine Soil

Pathway	Nat. Area (mg/kg)	Ag/Res (mg/kg)	Com (mg/kg)	Ind (mg/kg)
Human Soil Contact	---	11,000	17,000	80,000
Human Inhalation	---	2,200	14,000	14,000
Groundwater – Potable	<50	<50	<50	<50
Eco Soil Contact	2,400	2,400	3,400	3,400
Groundwater – FAL	<50	<50	<50	<50

Red text – limiting pathway if groundwater not applicable

Green Text – guideline value less than detection limit – under discussion with AENV

DEG Soil Quality Guidelines

Pathway	Nat. Area (mg/kg)	Ag/Res (mg/kg)	Com (mg/kg)	Ind (mg/kg)
Human Soil Contact	---	11,000	17,000	80,000
Groundwater – Potable:				
Coarse	<50	<50	<50	<50
Fine	<50	<50	<50	<50
Eco Soil Contact	1,000	1,000	1,700	1,700
Groundwater – FAL:				
Coarse	730	730	730	730
Fine	1,000	1,000	1,000	1,000

Red text – limiting pathway if groundwater not applicable

Green Text – guideline value less than detection limit – under discussion with AENV

TEG Soil Quality Guidelines

Pathway	Nat. Area (mg/kg)	Ag/Res (mg/kg)	Com (mg/kg)	Ind (mg/kg)
Human Soil Contact	---	110,000	170,000	800,000
Groundwater – Potable:				
Coarse	100	100	100	100
Fine	90	90	90	90
Eco Soil Contact	4,900	4,900	7,000	7,000
Groundwater – FAL:				
Coarse	<50	<50	<50	<50
Fine	<50	<50	<50	<50

Red text – limiting pathway if groundwater not applicable

Green Text – guideline value less than detection limit – under discussion with AENV

MEA – Draft Guidelines based on Nominal Data

Draft

Pathway	Nat. Area (mg/kg)	Res (mg/kg)	Com (mg/kg)	Ind (mg/kg)
Human Soil Contact	---	1,600	2,500	12,000
Groundwater – Potable:				
Coarse	1.6	1.6	1.6	1.6
Fine	1.4	1.4	1.4	1.4
Eco Soil Contact	1,200	1,200	1,600	1,600
Groundwater – FAL:				
Coarse	<1	<1	<1	<1
Fine	<1	<1	<1	<1

Note: Guidelines not Applicable until/unless a Valid Analytical Method is Developed

DEA – Draft Guidelines based on Nominal Data

Draft

Pathway	Nat. Area (mg/kg)	Res (mg/kg)	Com (mg/kg)	Ind (mg/kg)
Human Soil Contact	---	440	670	3,200
Groundwater – Potable:				
Coarse	<1	<1	<1	<1
Fine	<1	<1	<1	<1
Eco Soil Contact	1,100	1,100	2,100	2,100
Groundwater – FAL:				
Coarse	<1	<1	<1	<1
Fine	<1	<1	<1	<1

Note: Guidelines not Applicable until/unless a Valid Analytical Method is Developed

Next Steps

- Resolve Guideline Issues with AENV:
 - Groundwater Guidelines below Detection
 - Analytical Method for Alkanolamines
- Formal Review by AENV
- Release of Guidelines
- Note – Guideline Values will Likely Change before Release