King County Department of Transportation

Roads Maintenance Section

Street Waste Alternative Program (SWAP)

2006

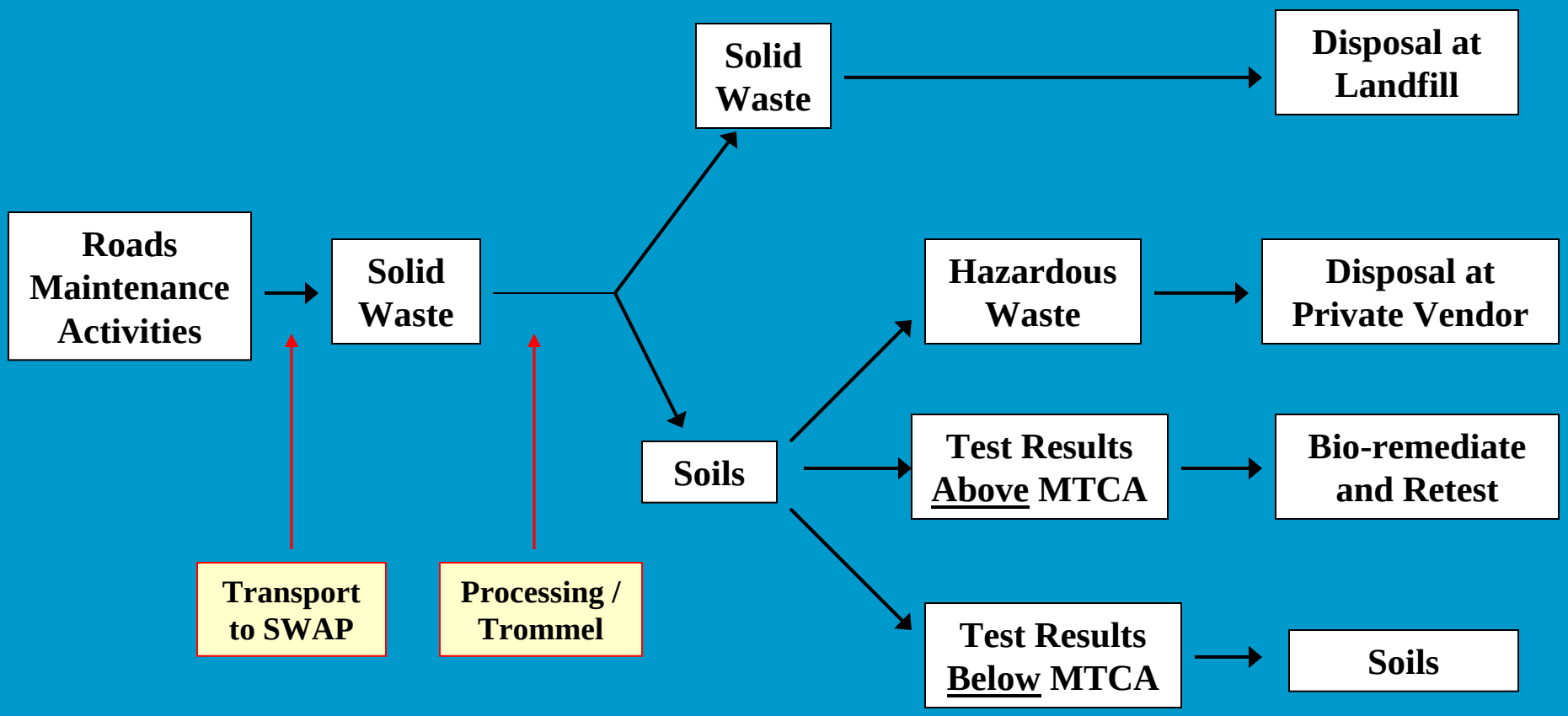
Purpose of SWAP

- To <u>dispose</u>, <u>reuse</u>, and/or <u>recycle</u> soils generated by routine Roads Maintenance activities
- In an efficient, cost effective, and environmentally protective process

Overview

- The Process
- Regulatory Environment
- Infrastructure
- Sampling
- Findings
- Summary

SWAP PROCESS



Regulatory Environment

- **Solid Waste Fraction**

  Washington State Solid Waste Handling Standards, Chapter 173-350 WAC.

- **Hazardous Waste Fraction**

  Washington State Dangerous Waste Regulations, Chapter 173-303 WAC

- **Soils Fraction**

  Stormwater Management Manual for Western Washington, Volume IV, Appendix G, Recommendations for Management of Street Wastes.

  Washington State Solid Waste Handling Standards, Chapter 173-350 WAC.

Regulatory Environment

- Regional Health Departments or Districts

- The Model Toxic Control Act (MTCA) Clean-up Regulation, Chapter 173-340 WAC

Municipal NPDES Permit

Special Condition

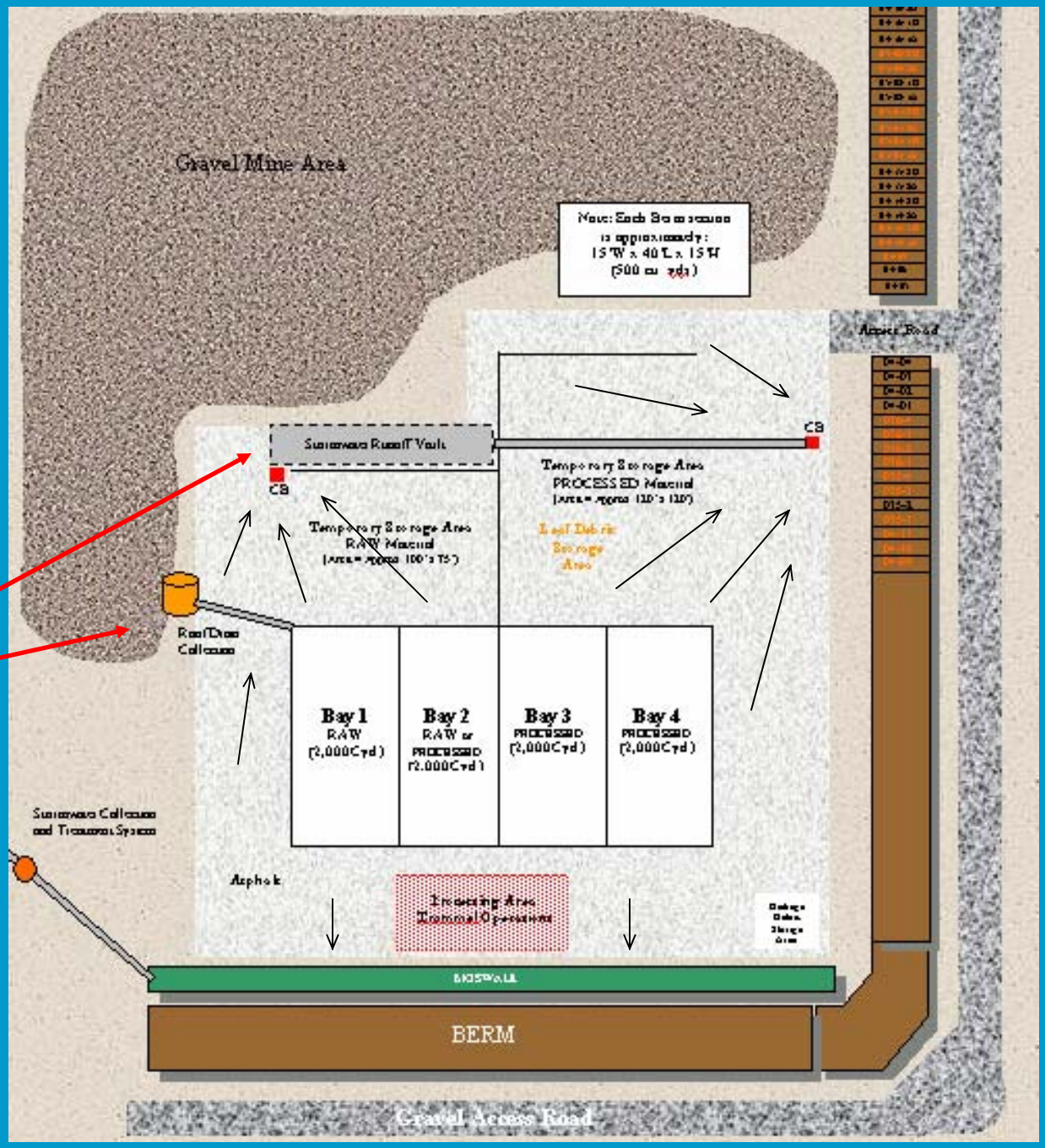
S5.C.9.a – Operations and Maintenance Program

"The SWMP shall include a program to regulate maintenance activities and to conduct maintenance activities by the Permittee that prevent or reduce stormwater impact."

- **New Municipal NPDES Permit to be issued in Sept. – Dec. 2006.**

SWAP Facility Map

Stormwater Collection



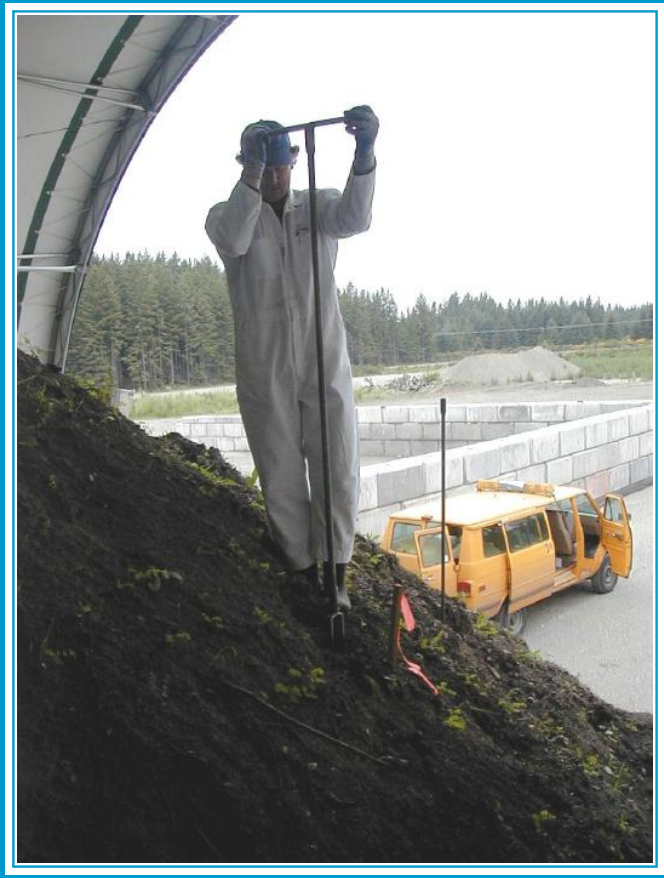
SWAP Bays

Sampling and Testing

Two Factors:

1) **How to make the piles more efficient?**

2) **What parameters should be tested?**



Sampling and Testing

Ecology's Recommendations:

- Metals
- pH
- BETX
- NWTPH-G
- NWTPH-Dx
- Total Solids
- Total Organic Carbon

METALS

- Aluminum
- Arsenic*
- Barium
- Beryllium*
- Cadmium*
- Calcium
- Chromium*
- Copper*
- Iron
- Lead*
- Magnesium
- Manganese
- Mercury*
- Molybdenum
- Nickel*
- Potassium
- Silver*
- Sodium
- Zinc*

* Priority Pollutant Metals

Metals Data

Parameter	Min. (mg/Kg)	Max. (mg/Kg)	Avg.	# Samples <MDL
Aluminum	3.5	22200	11281	97*
Arsenic	2.8	25.2	7.2	83
Barium	27.2	350	70	6
Beryllium	0.075	0.41	0.21	92
Cadmium	0.17	1.9	0.40	86
Calcium	20.7	14100	4626	102*
Chromium	7.71	158	28.4	86
Copper	9.49	143	28.9	87
Iron	6030	23800	15430	141*
Lead	0.083	905	57.6	2

* Safe concentration requirement has not been established yet. See Chapter 173-340-7492(2)(c) WAC

Metals Data - continued

Parameter	Min. (mg/Kg)	Max. (mg/Kg)	Avg.	# Samples <MDL
Magnesium	1000	7970	4776	111*
Manganese	167	970	314	119
Mercury	0.019	0.421	0.053	60
Molybdenum	1.4	3.4	2.2	214
Nickel	0.27	42.5	23.3	101
Potassium	0.21	1300	686	96*
Silver	0.21	2.41	0.62	209*
Sodium	66	691	302	113
Zinc	23.8	290	83.9	117

* Safe concentration requirement has not been established yet. See Chapter 173-340-7492(2)(c) WAC

Groundwater Monitoring Program

- Four Groundwater Monitoring Wells
  - Monitor Changes Over Time
  - Flow Direction

Sampling and Testing

Non-PAH Testing

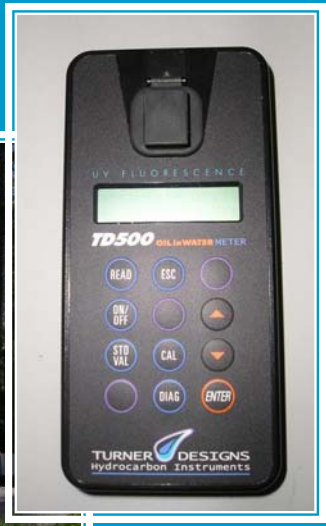
- **pH**
- **BETX**
- **NWTPH-G**
- **NWTPH-Dx**
- **Total Solids**
- **Total Organic Carbon**

PAH Testing

- PAH

SiteLAB's® TD500

TD500 Analyzer

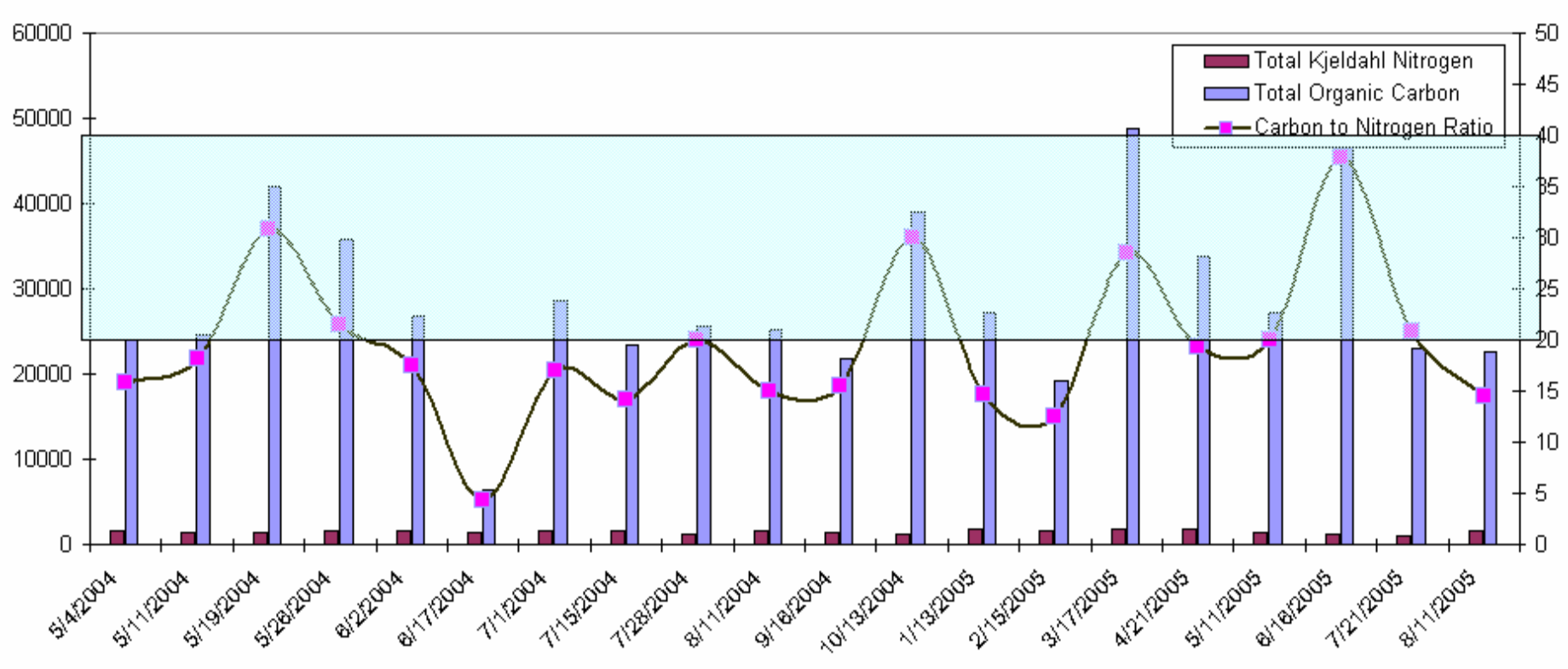


Sampling Methods

Pile Efficiency Studies

- Soil Type
- Aeration
- Moisture Content
- pH
- Pile Temperature
- Nutrients (TKN:TOC Ratio)

TOC / TKN Study Graph

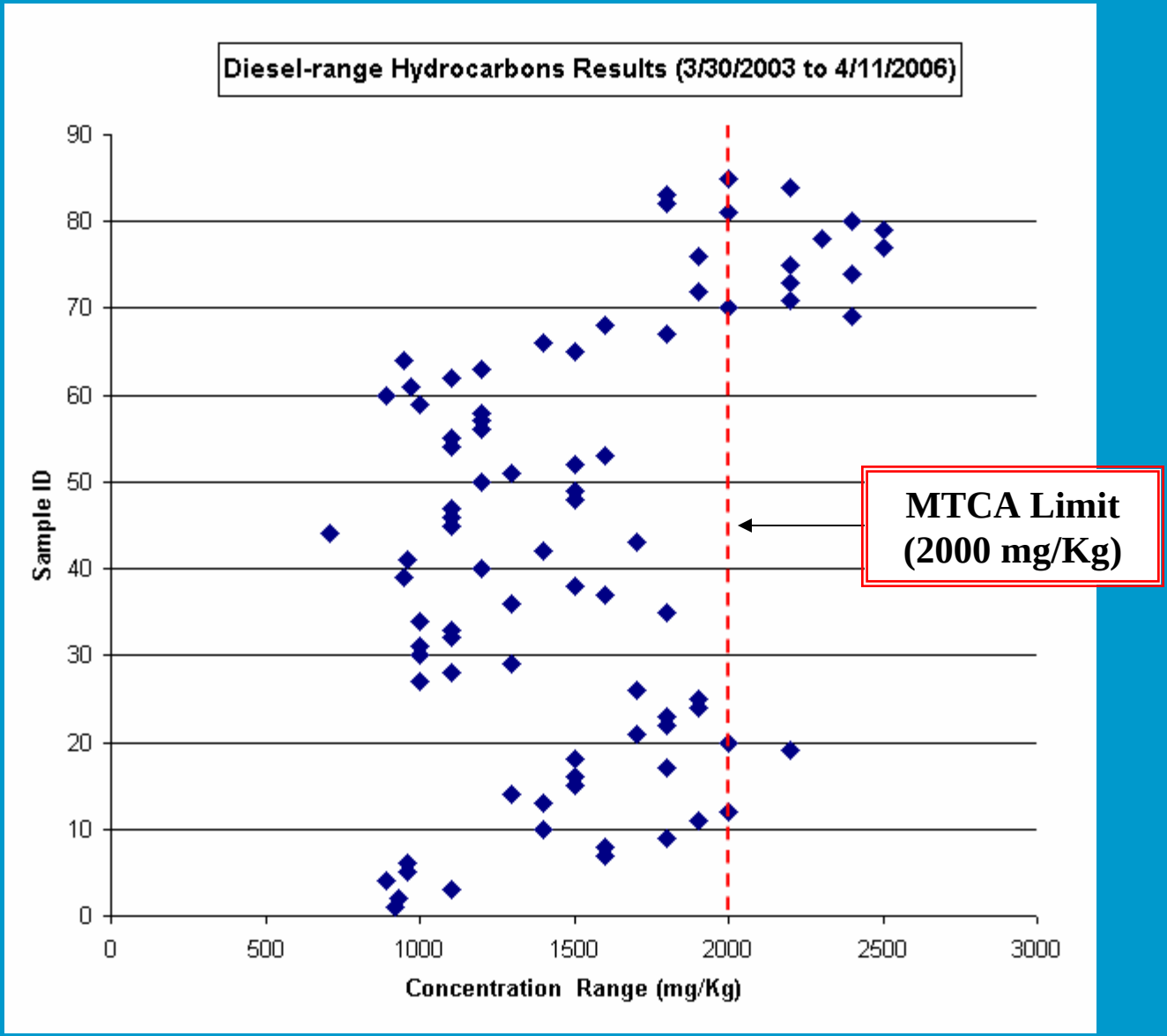


SWAP Data Summary

Parameter	# of Samples	MIN	MAX	AVG.	MTCA Limit
Total Solids (%)	114	65.5	91.3	79.6	----
TOC (mg/Kg)	79	12100	81900	33800	----
pH	79	7.58	8.37	7.96	----
NWTPH-G (mg/Kg)	79	5.9	43.0	13.0	100
NWTPH-D (mg/Kg)	85	710	2500	1500	2000
PAH (mg/Kg)	92	0.3	2.9	1.3	2.0
Toluene (ug/Kg) *	79	MDL	0.196		7.0

* BETX – All Benzene, Ethylbenzene, and Xylene samples tested below Minimum Detection Limits (MDL). Toluene had 16 samples with measurements above MDL, but well below MTCA limits.

Diesel Distribution Chart



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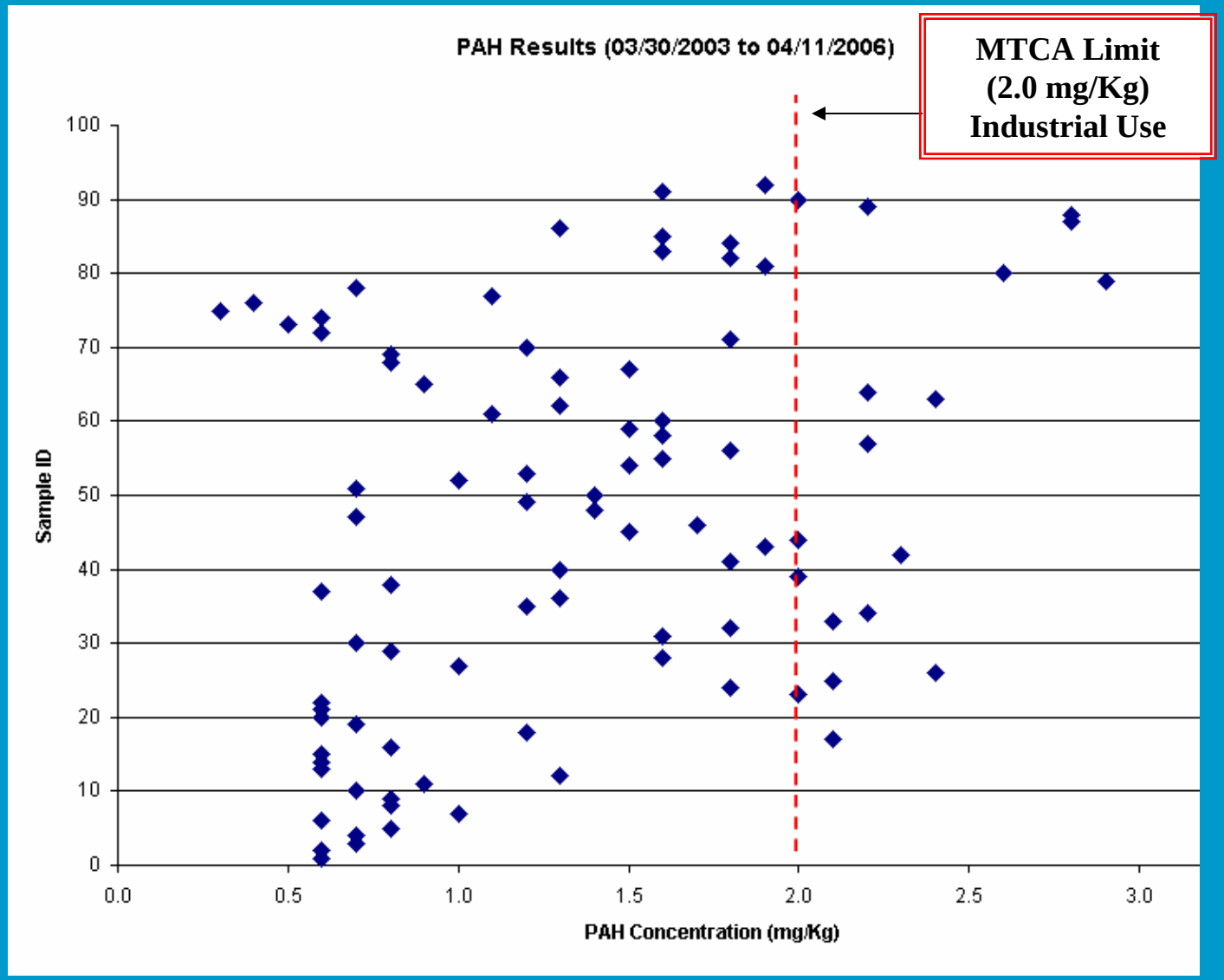
PAH Distribution Chart



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What We Have Learned

COSTS

RESULTS

REGULATORY ENVIRONMENT

THANK YOU!

Contact Information

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