ECCS NATIONWIDE MOBILE LABORATORIES

EPA METHOD 8095
AN ALTERNATIVE TO 8330

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Your Partner in the Lab

Your Partner in Success

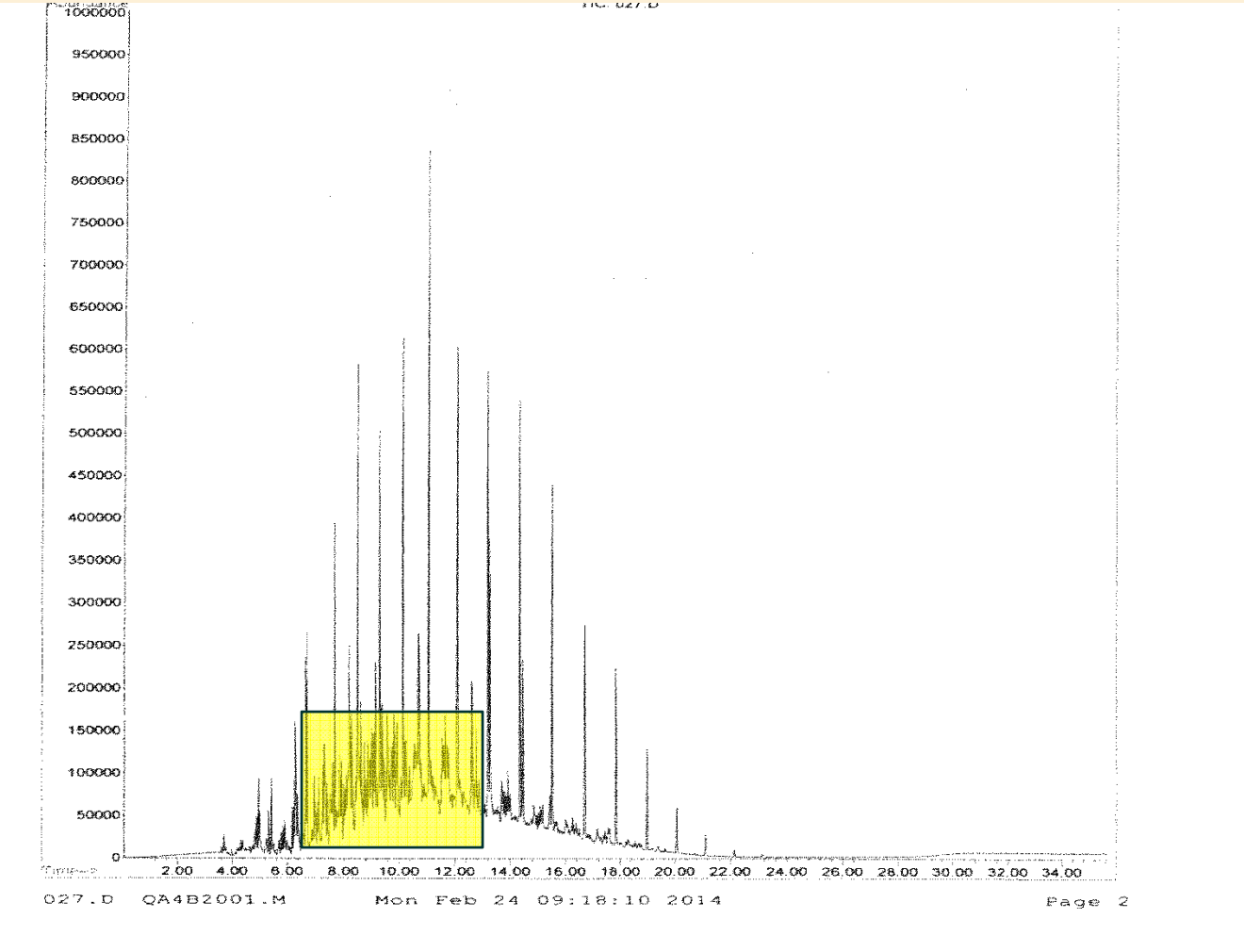
Presentation Overview

- Introduction
- ECCS 8095 Method Overview
- Advantages and Disadvantages vs. 8330
- Case Studies
- Conclusion

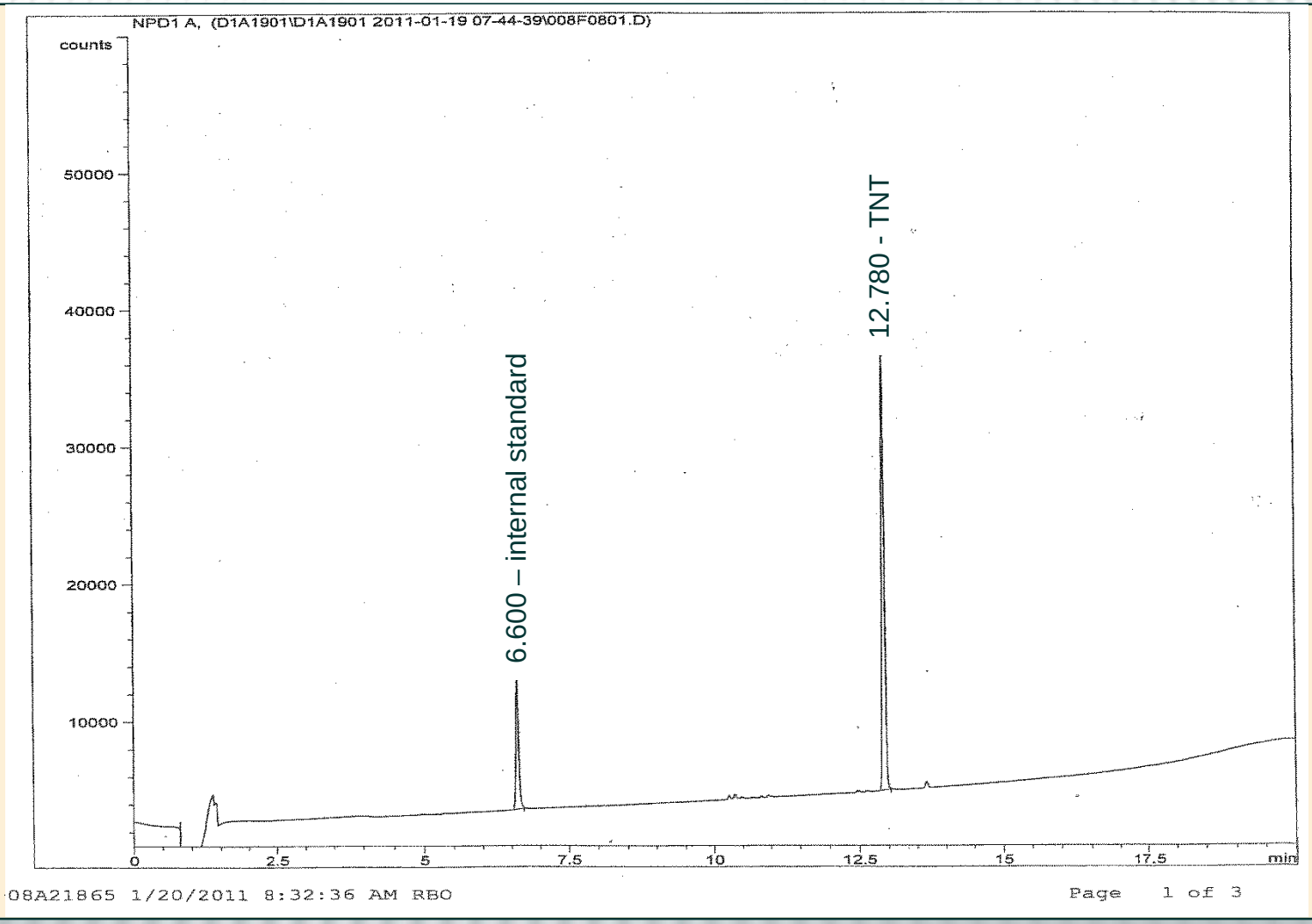
Introduction

- **ECCS Nationwide Mobile Laboratories**
  - **22 years in mobile laboratory business**
  - **1,300 project sites in 38 states and 2 international locations**
- **Pesticide experience with GC/NPD and ECD systems**
- **History of ECCS Method 8095**
- **Why GC/NPD? HIGHLY SELECTIVE**

Introduction



Introduction



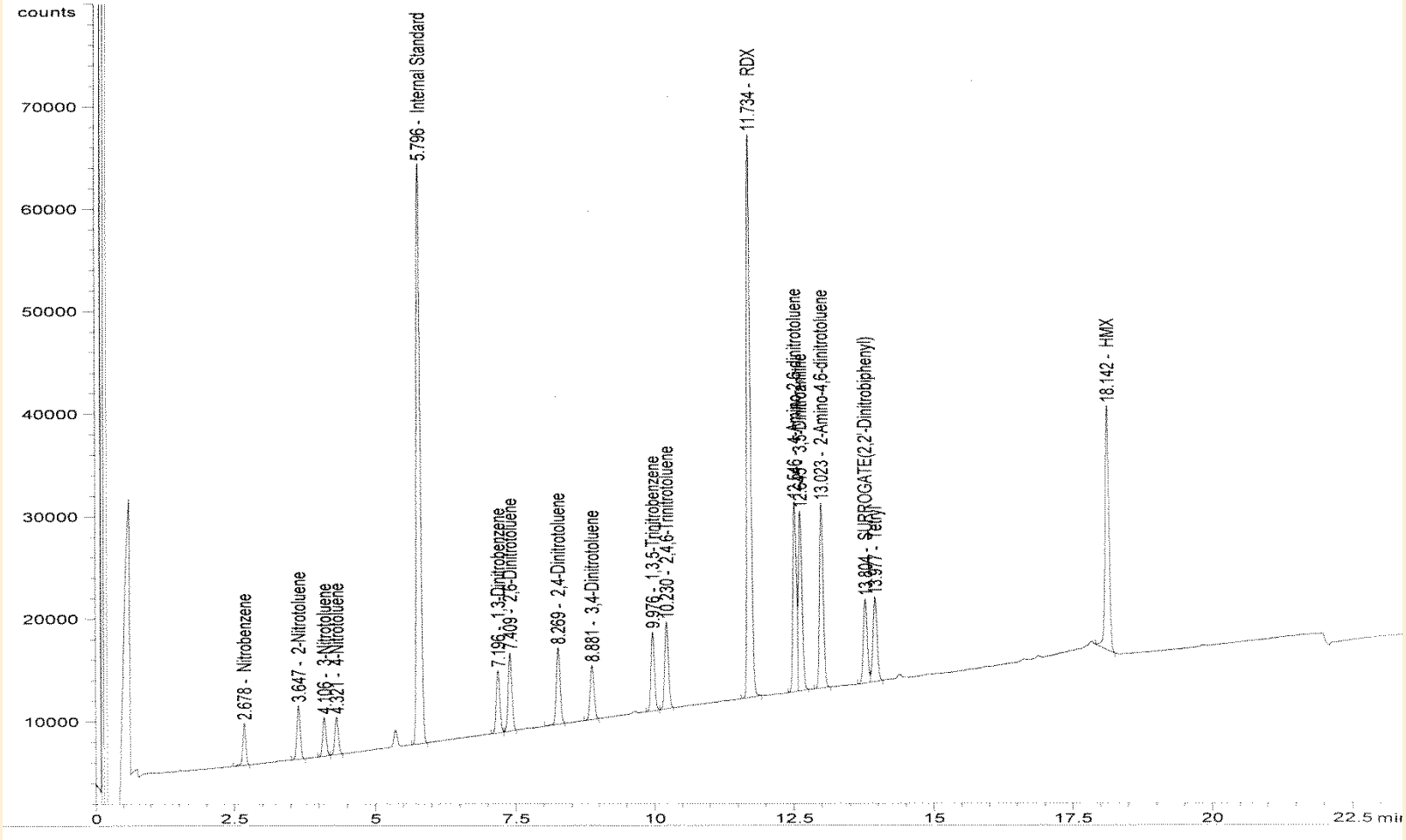
ECCS Method 8095 SOP Overview

- GC/NPD or GC/ECD
- RTX-TNT – primary, 6 m x 0.53 mm ID, 1.0 µ film
- RTX-440 – confirmation, 6 m x 0.53 mm ID, 0.5 µ film
- On column or splitless injection options
  - Restek 4 mm cyclosplitter liner for splitless
- Internal standard quantitation technique
- Agilent Power Regression® (ln ln linear)
- GC/NPD allows 3+ orders of magnitude linear range for most compounds, 0.01- 10 µg/mL is typical ICAL
- 22 minute cycle time with HMX, 17 minutes without

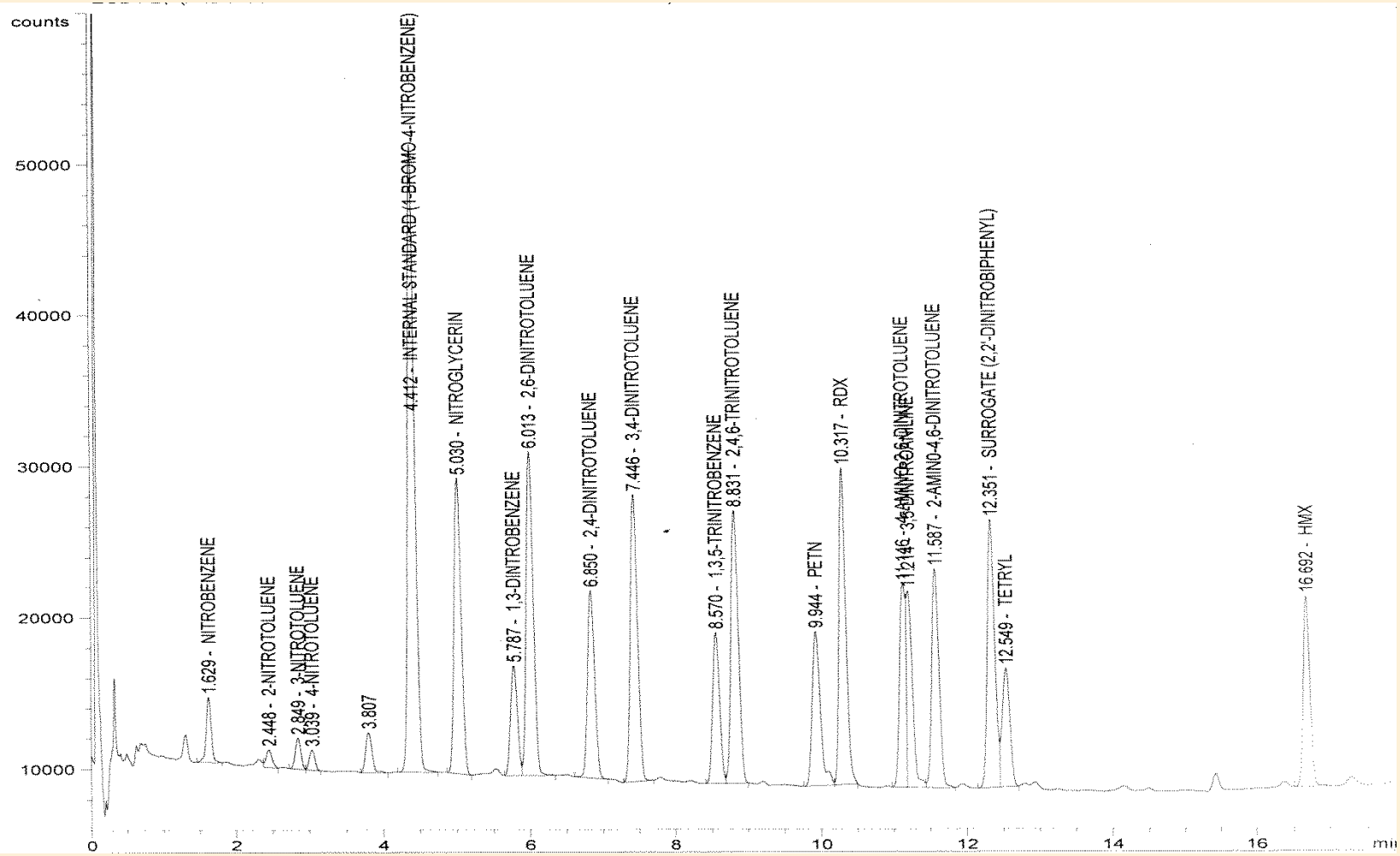
Method 8095 DLs, LODs, LOQs

Compound	NPD (µg/kg)			ECD (µg/kg)		
	DL	LOD	LOQ	DL	LOD	LOQ
Nitrobenzene	11	20	40	0.71	2	4
2-Nitrotoluene	6.8	20	40	1.6	4	4
3-Nitrotoluene	8.1	20	40	2.4	4	4
4-Nitrotoluene	7.3	20	40	0.71	2	4
Nitroglycerin	NA	NA	NA	0.83	2	4
1,3-Dinitrobenzene	7.7	20	40	0.75	2	4
2,6-Dinitrotoluene	7.7	20	40	0.78	2	4
2,4-Dinitrotoluene	5.6	20	40	0.95	2	4
3.4-Dinitrotoluene	7.6	20	40	1.1	2	4
1,3,5-Trinitrobenzene	5.1	20	40	0.81	2	4
2,4,6-Trinitrotoluene	4.7	10	40	0.96	2	4
PETN	NA	NA	NA	1.9	4	4
RDX	5.0	20	40	0.82	2	4
4-Amino-2,6-dinitrotoluene	4.8	10	40	1.0	2	4
3,5-Dinitroaniline	6.4	20	40	2.6	4	4
2-Amino-4,6-dinitrotoluene	4.6	10	40	1.1	2	4
Tetryl	5.2	20	40	0.87	2	4
HMX	6.6	20	40	0.97	2	4
2,2’-Dinitrophenyl (Surr)	4.7	10	40	1.3	2	4

RTX-TNT - NPD Chromatogram



RTX-TNT - ECD Chromatogram



Advantages Compared to 8330

- Few interferences due to high selectivity of NPD
- GC has inherently better compound identification
- All targets resolved, no co-elution, other 3 DNTs will also separate
- Typically shorter run time
- Lower DLs

Disadvantages Compared to 8330

- GC techniques have inherently slightly higher maintenance costs
- 8330 is more rugged for nitro-amines, especially HMX

Project Examples

Volunteer Army Ammunition Plant (TNT manufacturing)

- 80-175 samples/day for 6½ months
- ~12,000 soil & 200 water samples analyzed
  - All samples had explosives (8 GC/NPDs - 4 GC/ECDs)
  - 75-80% TAL metals
  - Less PCBs and inorganic nitrogen
  - ~25,000 total analyses
- Self-contained extraction
- 5% split samples for explosives (8330A) and TAL metals for 2 months
- 24-48 hr TAT for all
- Average cost per test of $42

Project Examples

Project Examples

Project Examples

Volunteer Army Ammunition Plant (TNT manufacturing)

<u>Site Remediation</u>

- 90 >> 30 samples/day for 18 months
- Explosives by GC/NPD
  - All dried, ground, and sieved
  - TCLP for 2,4-dinitrotoluene
- Pb and As by ICP/MS

Project Examples

PETN Manufacturing Site

- **GC/ECD**
- **4 episodes**
  - site investigation
  - chemical remediation pilot tests
  - remediation of several SWMUs
  - site investigation of new SWMU
- **High levels of PETN requiring special handling and on-site analysis**

Nitroglycerin Manufacturing Site

- **GC/ECD**
- **Low level cleanup goal required during site remediation closure activities**

Conclusion

Method 8095 is a viable alternative to Method 8330 for many projects.

- GC/NPD for manufacturing facilities
- GC/ECD for nitroglycerine or PETN facilities or for projects with low detection limit requirements.
- RDX & Tetryl – no problem
- HMX - maybe

Additional questions?

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