SFMO Forensic Arson Laboratory

7915 Cameron Road
Austin, Texas 78754

02/07/2012

02/07/2012

About the Forensic Arson Laboratory:

The Forensic Arson Laboratory of the State Fire Marshal's Office, Investigations, was established in January 1993 and relocated to its current Cameron Road location in July 1998. Laboratory services are free and the analysis turnaround -- from receiving the evidence to creating the analysis report -- averages 6 business days.

As of September 1, 2005, analysis of evidence must be performed by an accredited laboratory for it to be admissible in a criminal case. The Forensic Arson Laboratory has been accredited by the American Society of Crime Laboratory Directors (ASCLD) since 1996, and is currently accredited through October 2015. The laboratory has also received accreditation from the Texas Department of Public Safety.

The laboratory performs specialized forensic work in the chemical analysis of fire debris evidence. This work includes:

- Accepting evidence involving fire investigations in suspected criminal cases submitted by law enforcement or fire service investigators
- Conducting laboratory instrumental analysis
- Classification, comparison, and identification of ignitable liquid residue
- Documenting, interpreting data, and preparing technical reports of scientific examination results, and
- Testifying as a scientific expert witness in court

The American Society of Crime Laboratory Directors

Laboratory Accreditation Board

declares to all Advocates of Truth, Justice and the Law
that the management, personnel, procedures, and facilities of the

Texas Department of Insurance
Texas State Fire Marshal's Arson Laboratory

7015 Cameron Road
Austin, Texas

have been found to meet or exceed the standards and requirements of the 2008 version of the ASCLD/LAB Accreditation Manual, and therefore the Board of Directors grants this

CERTIFICATE OF ACCREDITATION

in the discipline of

Trace Evidence (fire debris only)

Certificate number
146
effective date
12th day of October, 2010
expires on the
11th day of October, 2015

Meet the laboratory staff….

From left to right:

Jim Swindall: Forensic Scientist/Chemist

Bobbi Johnson: Evidence Technician

Emerald Nazareno: Lab Manager, Forensic Scientist/Chemist

Eric Steinberg: Forensic Scientist/Chemist

Forensic Arson Lab Staff

Emerald Nazareno, Forensic Scientist/Lab Manager

- (512) 305-7970
- emerald.nazareno@tdi.state.tx.us

Jim Swindall, Forensic Scientist

- (512) 305-7971
- jim.swindall@tdi.state.tx.us

Eric Steinberg, Forensic Scientist

- (512) 305-7972
- eric.steinberg@tdi.state.tx.us

Bobbi Johnson, Evidence Technician

- (512) 305-7974
- bobbi.johnson@tdi.state.tx.us

LABORATORY FAX (512) 305-7973

Evidence Handling and Analysis
Role of the State Fire Marshal's Arson Laboratory

A. Receiving evidence from law enforcement officers
   1. Methods of submission
   2. Types of evidence
   3. ASCLD/LAB accreditation

B. Maintaining chain of custody while in the laboratory
   1. Documentation of items
   2. Storage of evidence

C. Analyzing evidence
   1. Preparation
   2. Instrumentation
   3. Techniques
   4. Daubert v. Merrell Dow

D. Reporting conclusions
   1. Reports
   2. Chain of Custody affidavit

Fundamental Concerns

Evidence will be accepted on criminal matters only from law enforcement and fire service.

<u>Only acceptable offense wording:</u>

- Arson
- Undetermined Fire
- Any other criminal offense (use DPS codes)
  - Prohibited Weapon
  - Criminal Mischief
  - Homicide, etc.

Fundamental Concerns

Non-criminal cases:

The only non-criminal case that the Forensic Arson Lab will accept are quality control checks on evidence cans.

Quality Control Check

- This is when an agency sends the lab an exemplar can from their ordered stock of evidence collection cans to test it for possible contamination.
- The lab runs an analysis similar to running actual case work cans to determine whether or not that particular stock is suitable for use in evidence collection.

Procedure for submitting evidence cans, Quality Control Check *only*

- Utilize the Evidence Can Quality Check Form found at: **http://www.tdi.texas.gov/fire/fmlab.html**
- Send in one empty can from each (new) lot of cans, identifying it by size & lot #
- Follow instructions as listed on form
- Submit similar to criminal case: with proper seal across lid of can
- Send separately from criminal case submissions

Quality Control Check

- The empty cans will undergo the same analysis as regular casework cans
- The expected result is negative (e.g. no peaks, flat lines) in order for the can to be eligible for evidence use
- The quality check form will then reflect whether the can is approved for evidence use or not
- This is either emailed or faxed to the agency of origin, along with the chromatograms showing the analysis results

Evidence Can Quality Check Form

Texas Department of Insurance
State Fire Marshal's Office – Forensic Arson Laboratory
Shipping Address: 7915 Cameron Road • Austin, Texas 78754-3803
Telephone (512)305-7974 • Fax (512)305-7973 • www.tdi.texas.gov/fire/fmlab.html

Evidence Can Quality Check Form

Date: _____

Send Report to:

Name _____ Agency _____

Phone _____ Email Address _____

Fax _____ Mailing Address _____

Cans being evaluated:

	Can Size	Lot #	Results (Lab Use Only)
1.	☐ 1 gallon ☐ 1 quart ☐ 1 pint ☐ other*:____		
2.	☐ 1 gallon ☐ 1 quart ☐ 1 pint ☐ other*:____		
3.	☐ 1 gallon ☐ 1 quart ☐ 1 pint ☐ other*:____		
4.	☐ 1 gallon ☐ 1 quart ☐ 1 pint ☐ other*:____		
5.	☐ 1 gallon ☐ 1 quart ☐ 1 pint ☐ other*:____		

*Other: please indicate exact size of can if not one of those listed
Sizes of metal cans typically available: 1-gallon, 2-gallon, 5-gallon, 1-quart, 1-pint

PLEASE NOTE:

Seal all cans being evaluated as if they contain evidence following proper seal protocols of a firmly seated lid, evidence tape across entire lid overlapping onto can sides with date and initials written on evidence tape. Please write lot # on side of can.

Evidence Can Quality Check Form
SFM-AL-16 Rev.00 (08/15/2011)

Texas Department of Insurance
State Fire Marshal's Office – Forensic Arson Laboratory
Shipping Address: 7915 Cameron Road • Austin, Texas 78754-3803
Telephone (512)305-7974 • Fax (512)305-7973 • www.tdi.texas.gov/fire/fmlab.html

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*Other: please indicate exact size of can if not one of those listed

Sizes of metal cans typically available: 1-gallon, 2-gallon, 5-gallon, 1-quart, 1-pint

PLEASE NOTE:

Seal all cans being evaluated as if they contain evidence following proper seal protocols of a firmly seated lid, evidence tape across entire lid overlapping onto can sides with date and initials written on evidence tape. Please write lot # on side of can.

Methods of Submission

In Person at the lab...

7915 Cameron Rd
Austin, TX 78754

Receiving hours:
8:30 a.m. to 4:30 p.m.

If you're going to come see us…

Especially if it's a long trip…

Call first!!!

Commercial Couriers

United Parcel Service

DHL

Federal Express

Lonestar

****Do not use US Postal Service or air services, ground only.**

Types of Evidence

Non-Liquid Fire Debris

- Soil
- Concrete
- Paper (all types)
- Porous material, such as carpet and padding, wood, upholstery, and clothing
- Glass
- Shoes

****Note: we do NOT analyze human tissue due to biohazard issues**

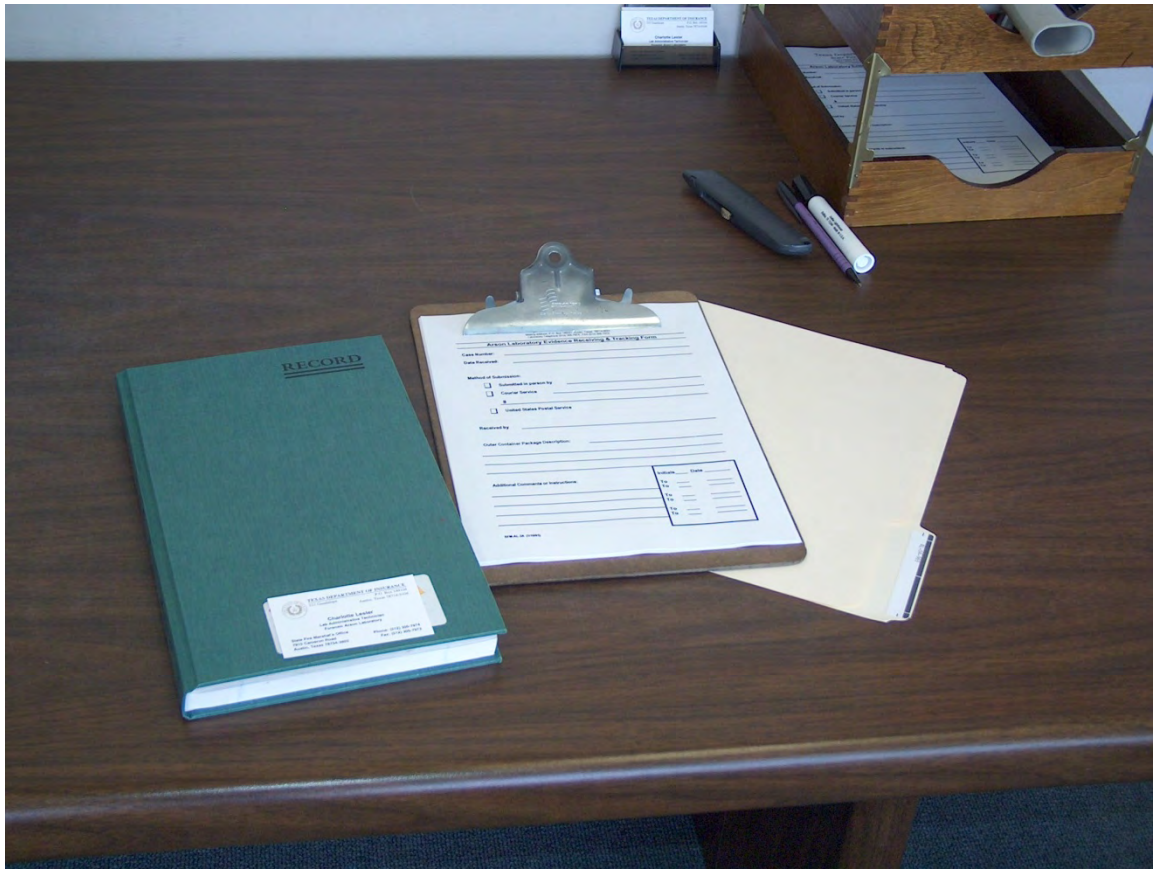
Liquid

- Found in cans, bottles, or various other containers
- Wrung out from porous items
- Sheen on puddles
- Found in Molotov cocktails

*When submitting liquids, a gauze swab of the liquid is preferred.
Too much liquid = possible contamination

DOCUMENTATION OF ITEMS TO MAINTAIN CHAIN OF CUSTODY AND INTEGRITY OF EVIDENCE

Items are documented and assigned a unique case number. (Format: AL-YY-####)



Documentation, Documentation, Documentation

For the Investigator

- Use most current submission form (found on website: **http://www.tdi.texas.gov/fire/fmlab.html**
- Use proper evidence packaging procedures
- Always use quality controlled metal cans for evidence

SFMO Arson Lab Submission Form

Texas Department of Insurance

State Fire Marshal's Office – Forensic Arson Laboratory

Shipping Address: 7915 Cameron Rd, Austin, TX 78754-3803
Laboratory Telephone (512) 305-7974 Fax (512) 305-7973
www.tdi.texas.gov/fire/fmlab.html

Lab Case #

For Laboratory Use Only

Laboratory Submission Form

Agency Case Number _____

Offense _____

Date of Offense _____

County of Offense _____

Submitting Official:

Name _____

Signature _____

Phone _____

Email Address _____

Send report to:

Agency _____

Contact Name _____

Mailing Address _____

Suspect	Victim	Name (First Middle Last)	Race	Sex	Age

Please Note: All negative arson samples will be destroyed unless otherwise indicated.

☐ Please check and initial here _____ if evidence needs to be returned regardless of results.

Description of Evidence Submitted

	Item #	Description of Evidence	Origin	Exam Requested
1.				
2.				
3.				
4.				
5.				

Have any items in this case been previously submitted to the Forensic Arson Laboratory? ☐Yes Case # AL - ___ - ___

Was a SFMO K-9 used to identify any exhibits? Yes No Which K-9? _____ Which exhibits? _____

Include any pertinent information:

Texas Department of Insurance

State Fire Marshal's Office – Forensic Arson Laboratory

Shipping Address: 7915 Cameron Rd, Austin, TX 78754-3803
Laboratory Telephone (512) 305-7974 Fax (512) 305-7973
www.tdi.texas.gov/fire/fmlab.html

Lab Case #

For Laboratory Use Only

Laboratory Submission Form

Agency Case Number _____

Offense _____

Date of Offense _____

County of Offense _____

Submitting Official:

Name _____

Signature _____

Phone _____

Email Address _____

Send report to:

Agency _____

Contact Name _____

Mailing Address _____

_____

Suspect	Victim	Name (First Middle Last)	Race	Sex	Age
☐	☐				
☐	☐				
☐	☐				
☐	☐				

Please Note: All negative arson samples will be destroyed unless otherwise indicated

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Description of Evidence Submitted

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2.				
3.				
4.				
5.				

Have any items in this case been previously submitted to the Forensic Arson Laboratory? ☐Yes Case # AL - ___ - ____

Was a SFMO K-9 used to identify any exhibits? ☐Yes ☐No Which K-9? _____ Which exhibits? _____

Include any pertinent information:

Note: Need extra initials to retain evidence with negative results. If one sample is positive, the entire case is positive & all evidence will be mailed back to agency.

Packaging

Proper Seal

Documentation

Shipping

Texas Department of Insurance

State Fire Marshal's Office – Forensic Arson Laboratory, Mail Code 302-FM
7915 Cameron Road • Austin, Texas 78754-3803
Lab Telephone (512)305-7974 • Fax (512)305-7973 • www.tdi.texas.gov/fire/fmlab.html

As of September 1, 2005, analysis of evidence must be performed by an accredited laboratory in order to be admissible in a criminal case. The State Fire Marshal's Arson Laboratory has been accredited since 1996. **Your submission did not meet one or more of the following accreditation criteria concerning viability, contamination and security of evidence:**

- ☐ Evidence cans were NOT properly sealed. The Forensic Arson Laboratory's preferred method is **both initials and date** written on evidence tape that has been applied across the *entire* lid of the evidence can. *Note: the initials/date should be written in such a way that they appear partly on the evidence tape AND on the can itself.
- ☐ Plastic bags, paper bags and glass jars are **not** acceptable containers (due to contamination issues).
- ☐ Do not ship MULTIPLE cases in a single box; package cans/samples of only the same case # in the same box.
- ☐ Do not ship the SAME case in multiple boxes; if the cans/samples have the same case #, they must be packaged in a single box. Use a larger box if needed (to avoid confusion and in order to prevent assignment of multiple Lab case #'s for the same agency case). If you must use separate boxes label them 1 / 2, 2 / 2, etc.
- ☐ Seat lid firmly on can.
- ☐ Cans must **not** be more than 1/2 full.
- ☐ Limit amount of liquid submitted (moisten gauze and place in can).
- ☐ Do not use U.S. Mail for shipping (use a **ground** courier service like UPS, FedEx, or Lone Star Overnight).
- ☐ Do **not** enclose exam gloves in can (to prevent contamination).
- ☐ Use current submission form (attached) and available online at: http://www.tdi.texas.gov/fire/fmlab.html
- ☐ Use evidence can quality check submission form for non-criminal offense quality can testing.
- ☐ Other:

Thank you for your cooperation.
Following these guidelines will help ensure that your evidence will yield the best possible results.

Most common submission errors:

- Improper seal (no hinge seals!)
- Incorrect packaging
  - o(Metal cans only!)
- Cans too full
- Items labeled incorrectly
- Wrong submission form included
- Use of US Postal Service or Air

Take the time to fill out submission form COMPLETELY AND CORRECTLY!

*agency case number
*OFFENSE & OFFENSE DATE
(ASCLD/LAB requirement)
*signature (or indicate return negatives)

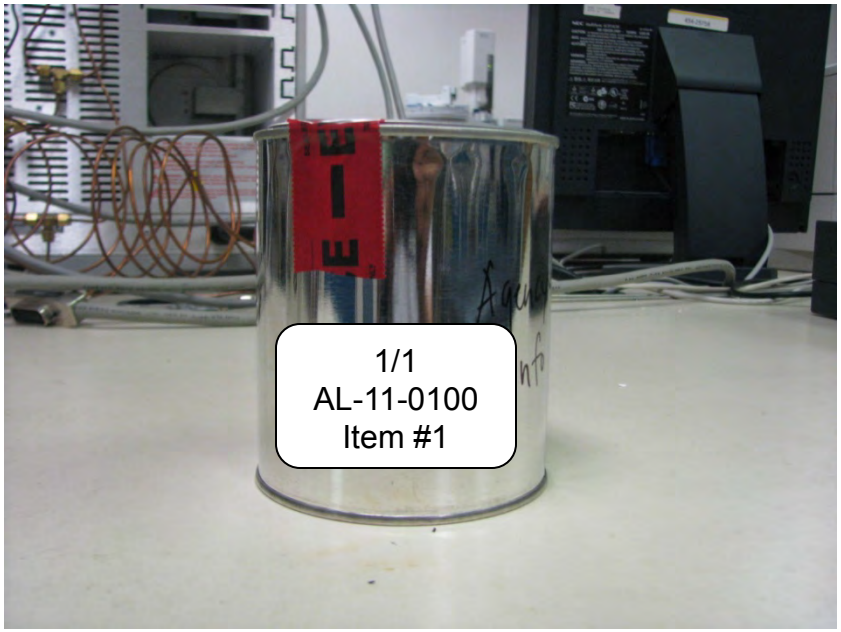
Tape across top seal of container with evidence tape so that the tape will tear if the seal is broken.

Write identifying marks across the tape and onto the container.

What’s wrong
with these cans?

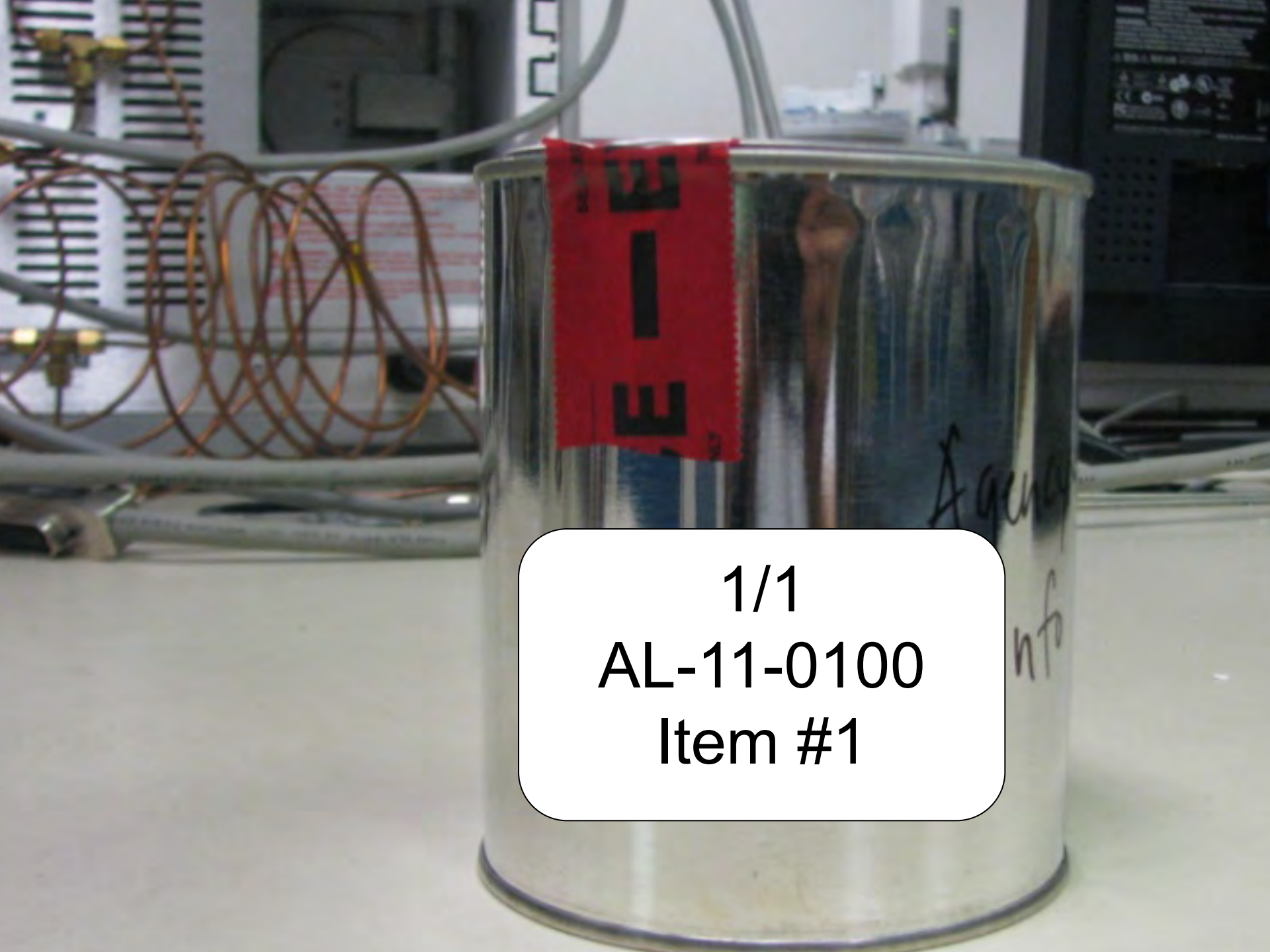
ASCLD/LAB minimum requirements for a proper seal. →

Affix descriptions on the body of the can, not the lid.



*Leave space for Arson Lab info.

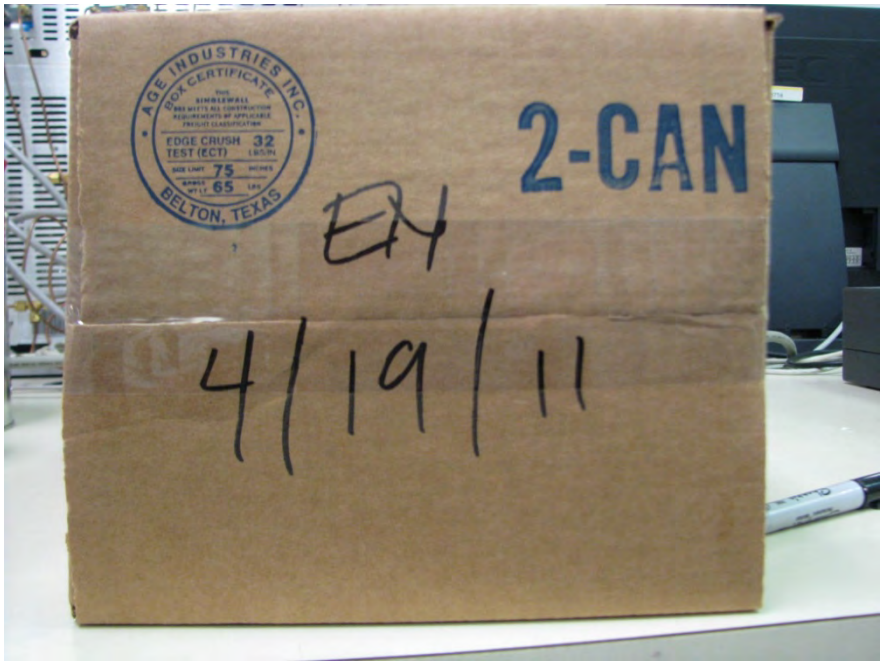
FORENSIC ARSON LAB • TX FIRE MARSHAL'S OFFICE
EVIDENCE TAG
02-1959
1
Carpet & padding
living room


1/1
AL-11-0100
Item #1

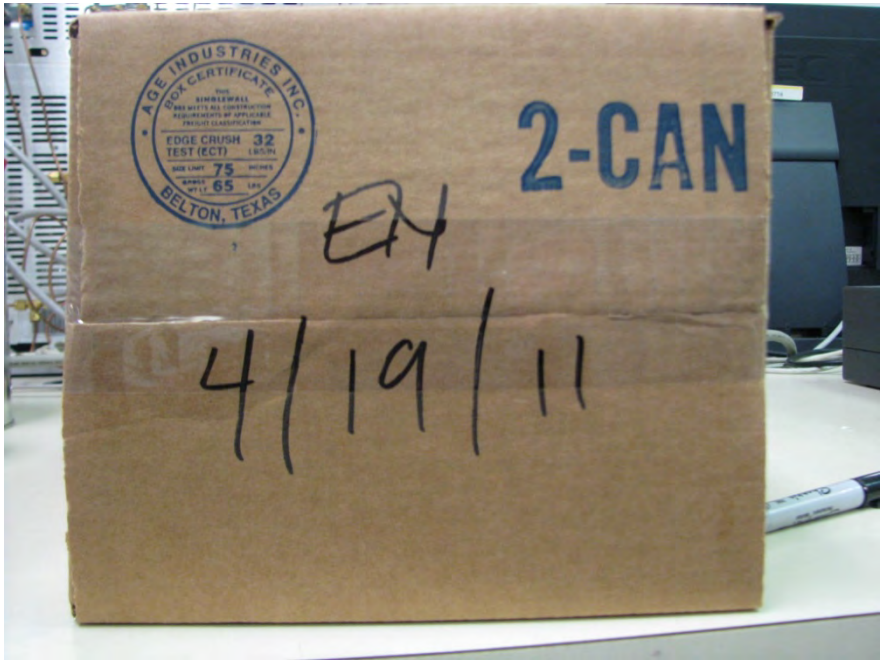
PACKING CANS:

- Place all cans from one case in one box
- Do not use popcorn or shredded paper – use bubble wrap or cardboard
- Box becomes part of the chain of custody – properly seal the outside of the box

Which of these are acceptable?



When sending evidence through the mail, this is acceptable. →



STORAGE OF EVIDENCE

After it has been properly checked in and assigned a unique lab case number, evidence is transferred to the laboratory and stored in the laboratory vault.

↑ Secure lab entrance
Secure lab vault →

Evidence is removed from the vault only at the time of analysis.

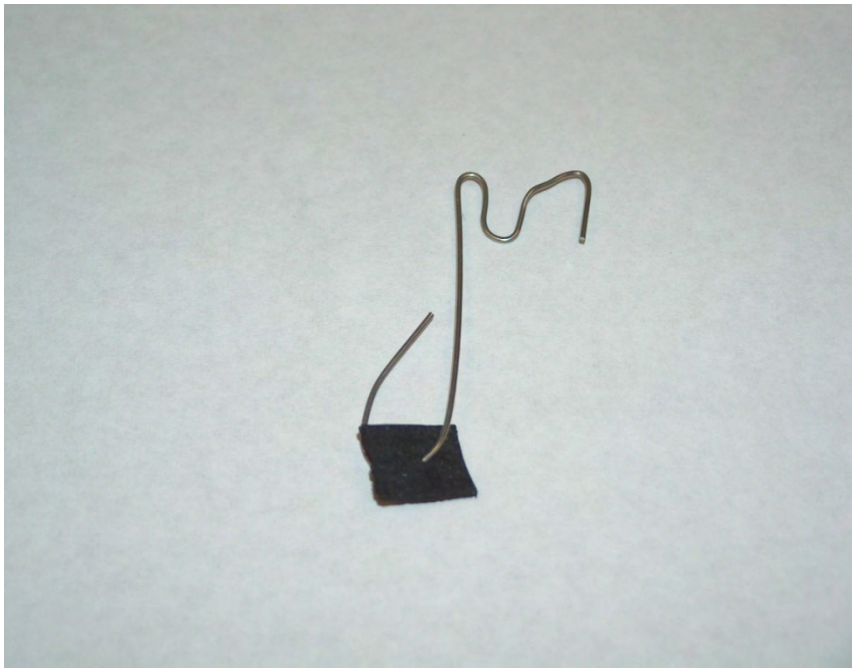
Evidence will be re-placed into the vault after analysis is completed.

Analysis of Evidence: Preparation

The cans are opened one at a time, and the contents are visually inspected.

Please do NOT place used “exam” gloves in can!!!

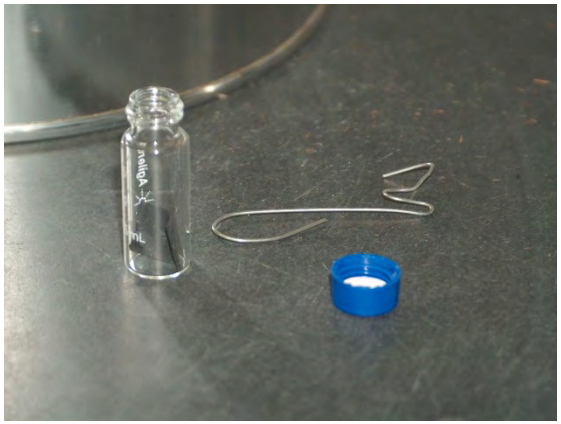
A carbon strip is suspended inside the can, and the can is resealed.



The can is placed inside the 80°C oven for two hours.

The can is removed from the oven and allowed to cool slightly.

The carbon strip is removed and placed into a glass vial.



Note: this vial containing the c-strip is retained with positive result evidence.

800 uL of pentane is added to the vial, the vial is capped and labeled with the case and item number.

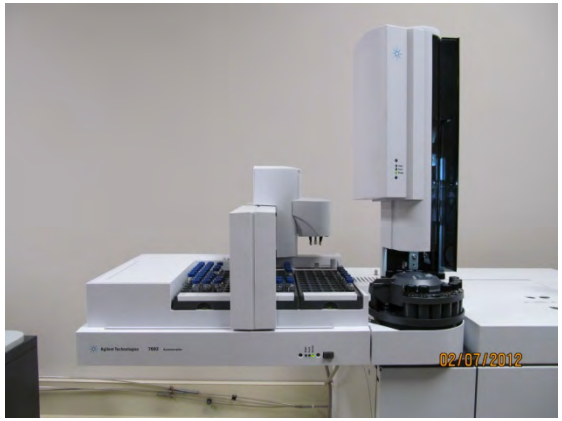
The vial is placed in the Gas Chromatograph tray and contents are injected into the GC for sample analysis.

Analysis of Evidence: Instrumentation

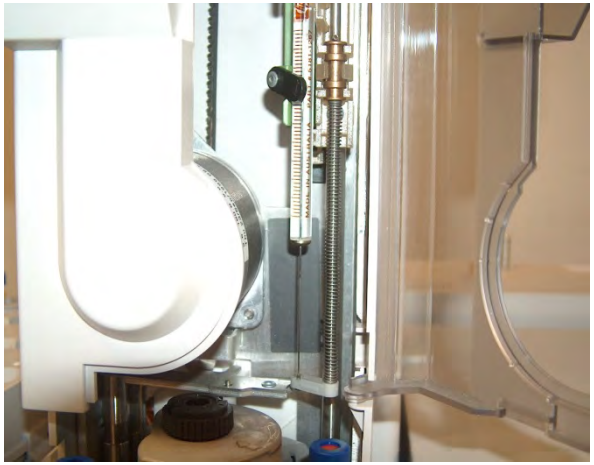
Gas Chromatography/FID

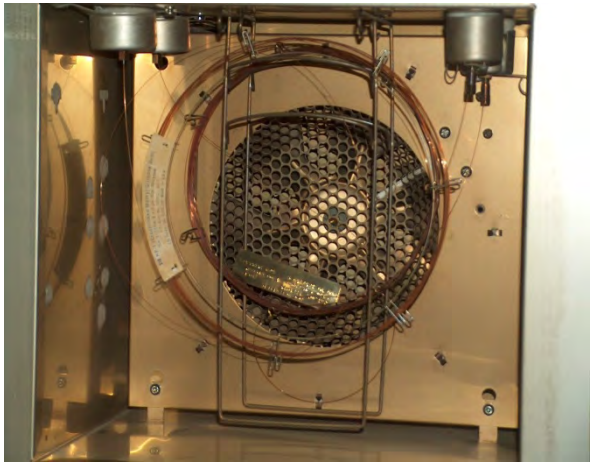
A method of separating the components of a mixture.

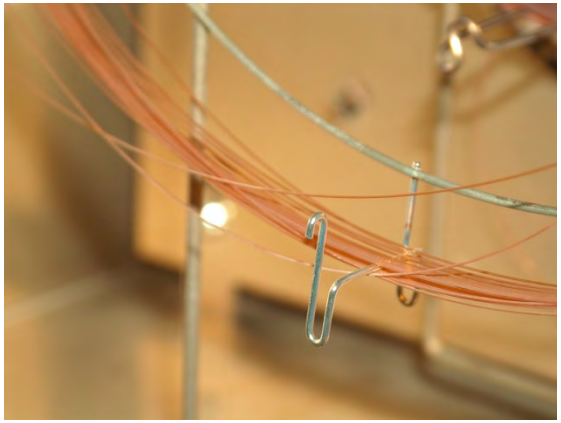
Gas Chromatograph



The sample is injected into the column and pushed through by Helium gas.

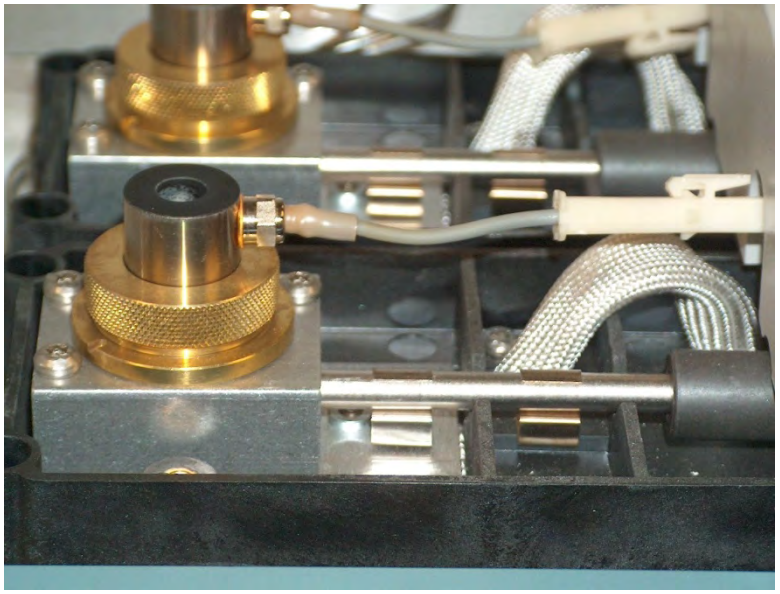






As the sample passes through the column, its components are separated through the column. Size, shape and mass are the factors that determine their speed.

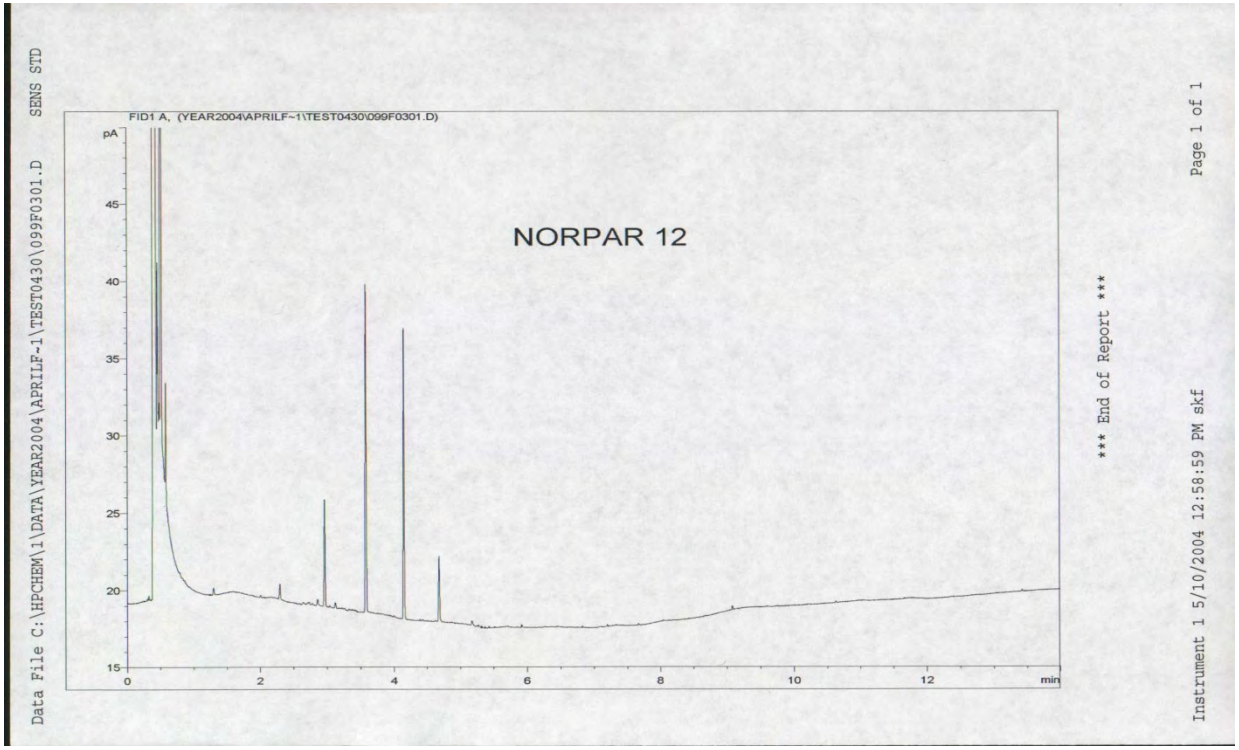
As the now-separated components emerge from the column, they pass over a flame ionization detector.



Flame Ionization Detector (FID)

It is a small hydrogen flame that changes the voltage between two electrodes when a compound emerges from the column.

This change in voltage is recorded as peaks on a graph. The size of the peak is proportional to the amount of compounds passing through the FID at a given time.



This graph is called a chromatogram.

The pattern formed by the distribution of peaks is analyzed to determine the presence of an ignitable liquid residue.

Analysis of Evidence: Other Techniques

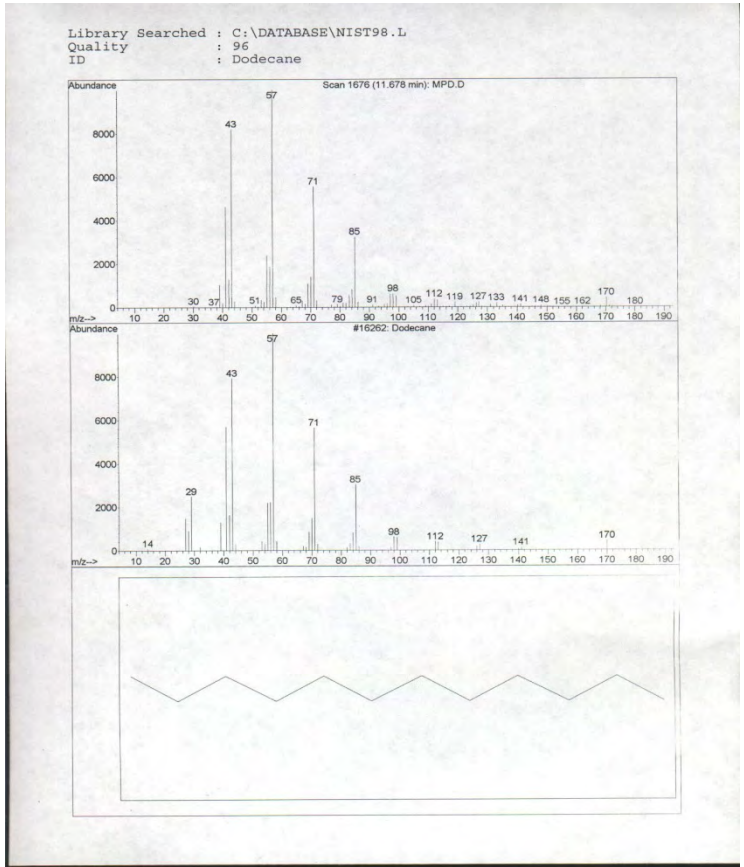
Mass Spectrometry

Agilent Technologies
7693 Autosampler
Agilent Technologies
5975C VL MSD
Agilent Technologies
7890A GC System
Agilent 7890A GC
A.01.11.1
Power on successful
02/07/2012

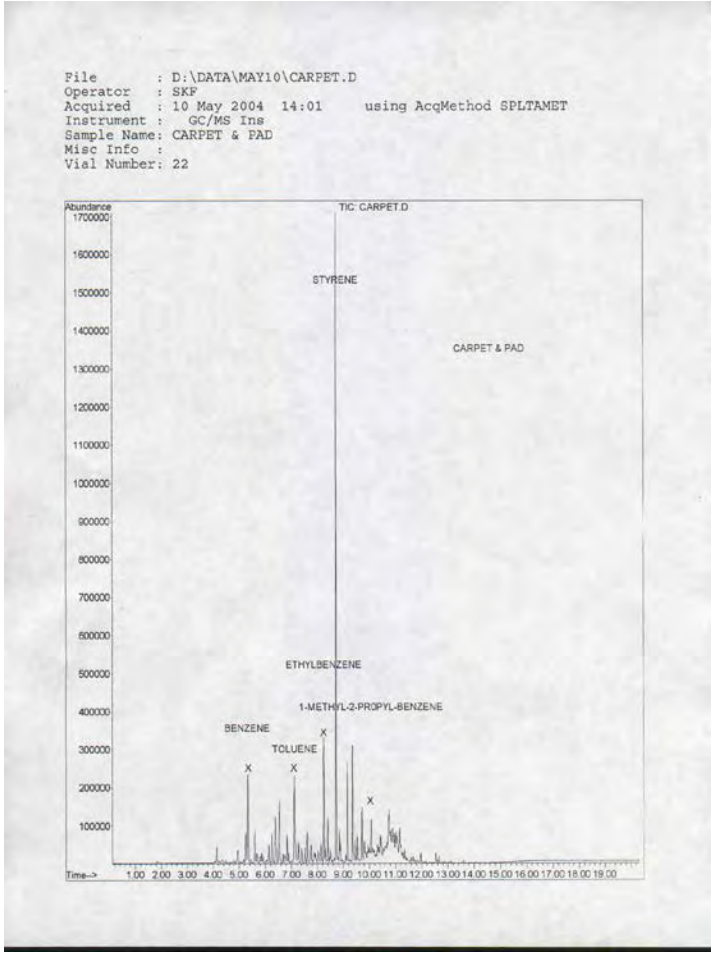
Mass Spectrometry

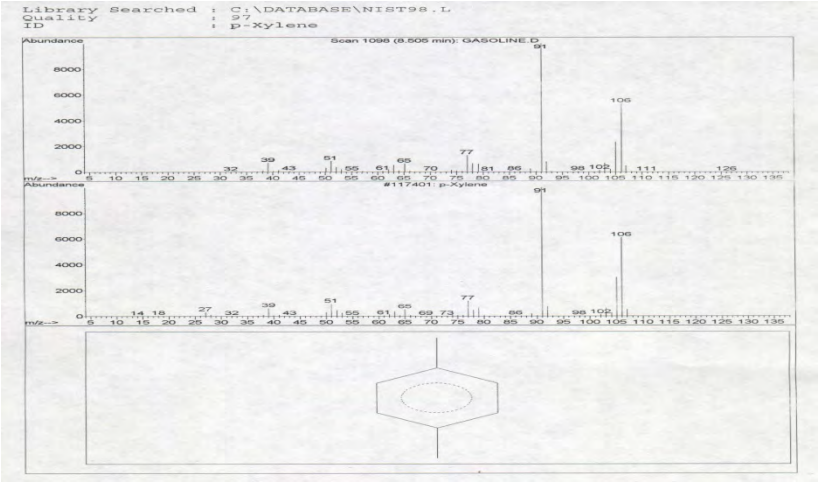
When only one component is present, or the pattern is obscured by extraneous peaks, a mass spectrometer is used. This detector uses a procedure in which the molecules of each separated compound are broken apart into pieces.

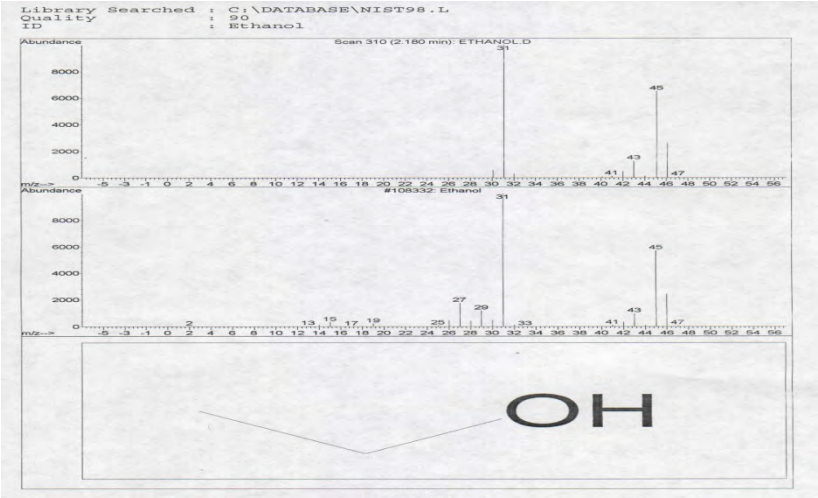
The compounds break in the same places each time, and the pattern those pieces form is compared to an extensive library.



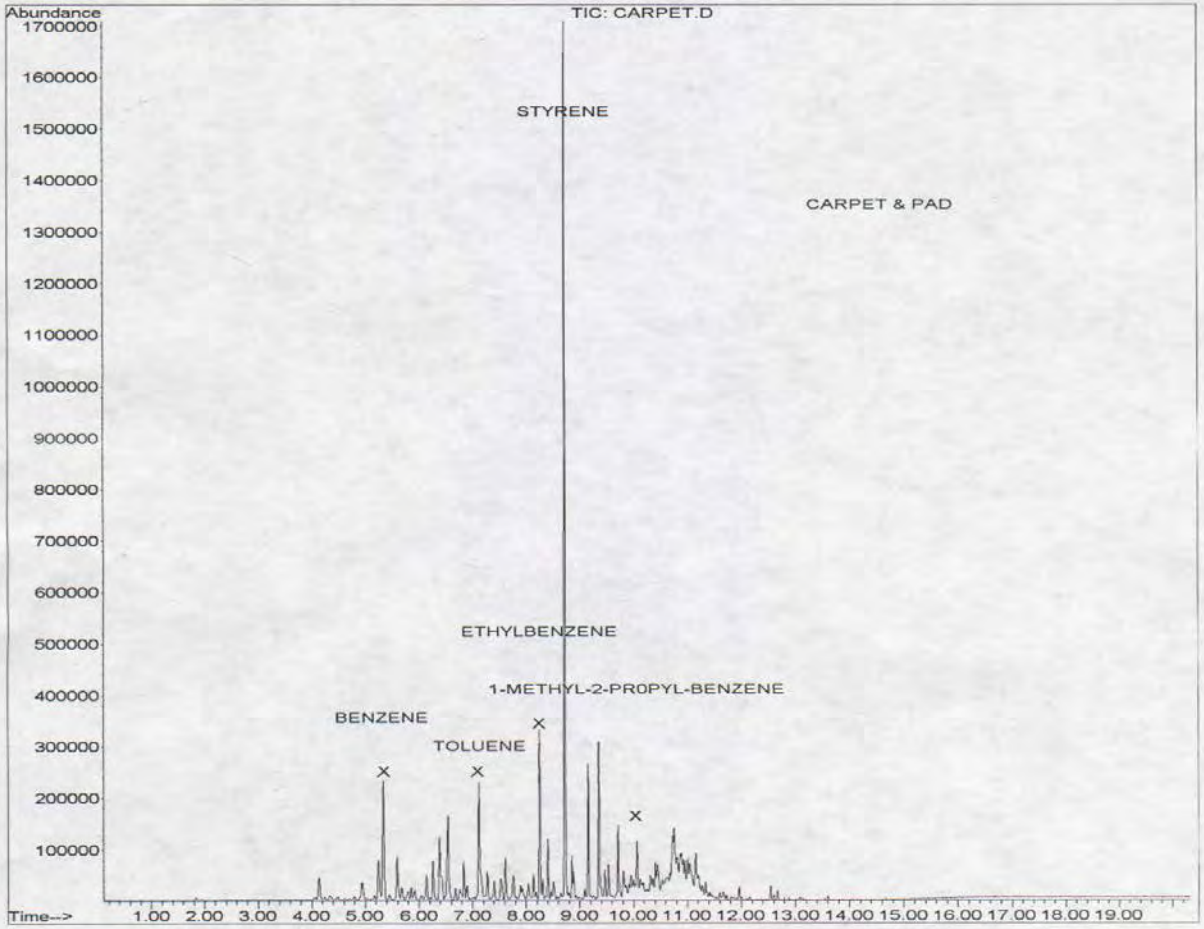
When a match is found, the compound can be identified.







```
File        : D:\DATA\MAY10\CARPET.D
Operator    : SKF
Acquired    : 10 May 2004  14:01      using AcqMethod SPLTAMET
Instrument  :   GC/MS Ins
Sample Name: CARPET & PAD
Misc Info   :
Vial Number: 22
```



After analysis is completed, the positive samples are resealed and returned to the vault. The negative samples are set aside for destruction.

Daubert vs. Merrell Dow Pharmaceuticals

The Scientific Test:

- **Can it be tested?**
- **Has it been tested?**
- **What is the error rate?**
- **Has it been accepted in the scientific community?**

Gas Chromatography and Mass Spectrometry pass Daubert for Ignitable Liquid Residue

- Can be tested
- Has been tested—a plethora of literature is available
- Error rate is not applicable because ignitable liquid is either present or absent
- Accepted for many years in the scientific community

Submitting the same evidence for different analyses…

- DPS Crime lab policy
- Order of analysis
  - Other analysis may contaminate fire debris
    - Lose to evaporation
- Burned/unburned evidence

Emerald Nazareno - RE: evidence issues

From: "Mills, Brady" <Brady.Mills@dps.texas.gov>
To: "Saeun, Heidi" <Heidi.Saeun@dps.texas.gov>
Date: 9/24/2012 9:06 AM
Subject: RE: evidence issues
CC: Emerald Nazareno <Emerald.Nazareno@tdi.state.tx.us>

We don't have a policy written out regarding different testing on items that were at another crime lab.

Brady W. Mills
Asst. Laboratory Director
Texas DPS Crime Laboratory Service

From: Saeun, Heidi
Sent: Tuesday, July 24, 2012 10:02 AM
To: Mills, Brady
Cc: Emerald Nazareno
Subject: FW: evidence issues

Brady,

Do we have a policy that says we won't work an item for DNA or LP if it's already been to the Fire Marshalls Lab for any other analysis? I was thinking the policy was we would do the same analysis that another lab has done but other types of exams are fine.

Heidi

Types of Ignitable Liquid Residue reported by the laboratory

Alcohols

Ketones

Terpenes

n-Alkanes

Single Aromatics

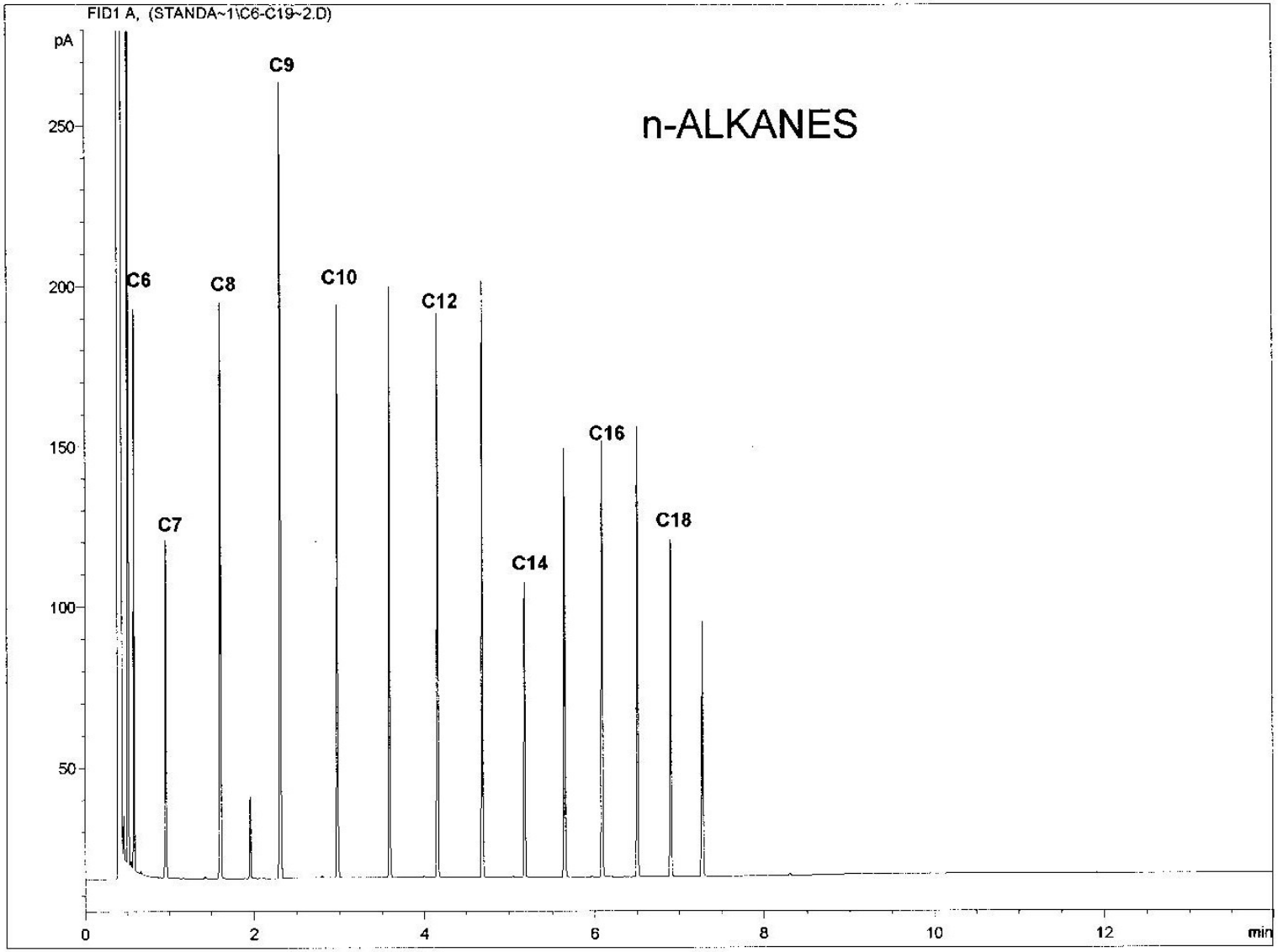
Petroleum Distillates

Petroleum Products

Major ASTM Classes of Ignitable Liquid Residue

Classes are determined by the range of n-alkanes in the sample

Data File C:\HPCHEM\1\DATA\STANDA~1\C6-C19~2.D Sample Name: n-alkane std

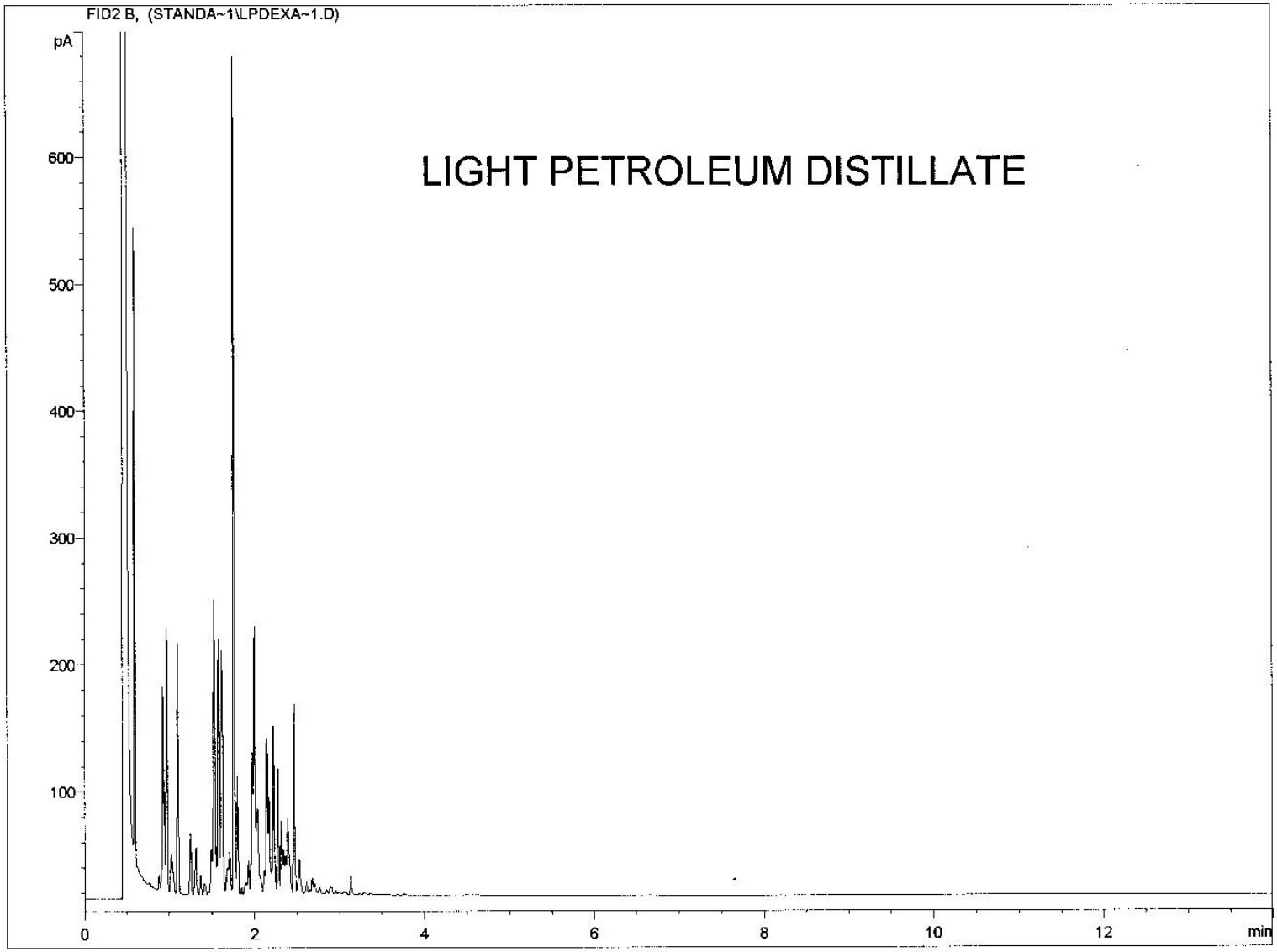


*** End of Report ***

Instrument 1 5/7/2004 1:59:26 PM skf

Examples:
Cigarette Lighter Fluid, Camping Fuel

Data File C:\HPCHEM\1\DATA\STANDA~1\LPDEXA~1.D Sample Name: LPD example

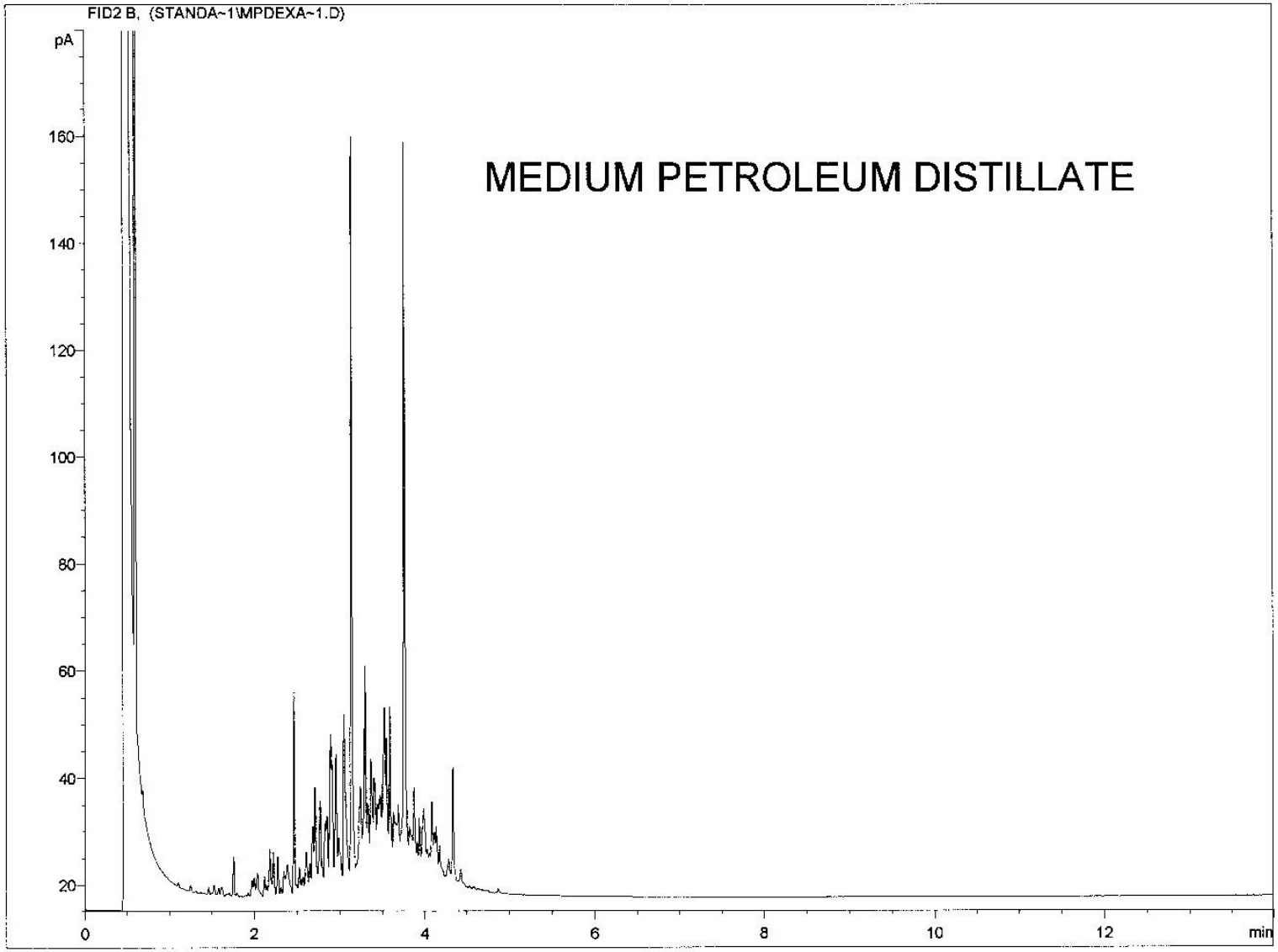


*** End of Report ***

Instrument 1 5/7/2004 2:02:00 PM skf

Examples:
Paint Thinner, Charcoal Starter, Mineral Spirits

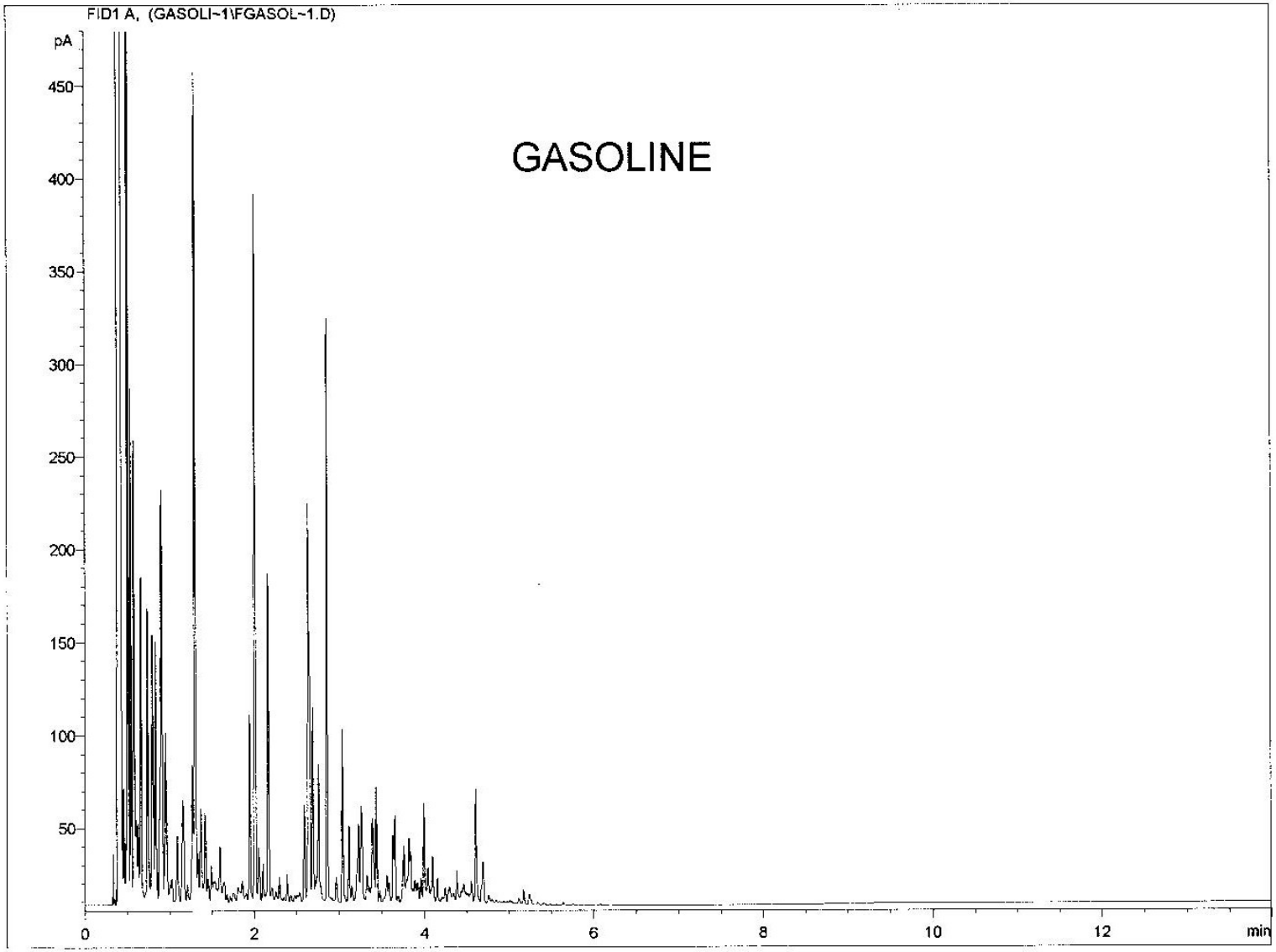
Data File C:\HPCHEM\1\DATA\STANDA~1\MPDEXA~1.D Sample Name: MPD example



*** End of Report ***

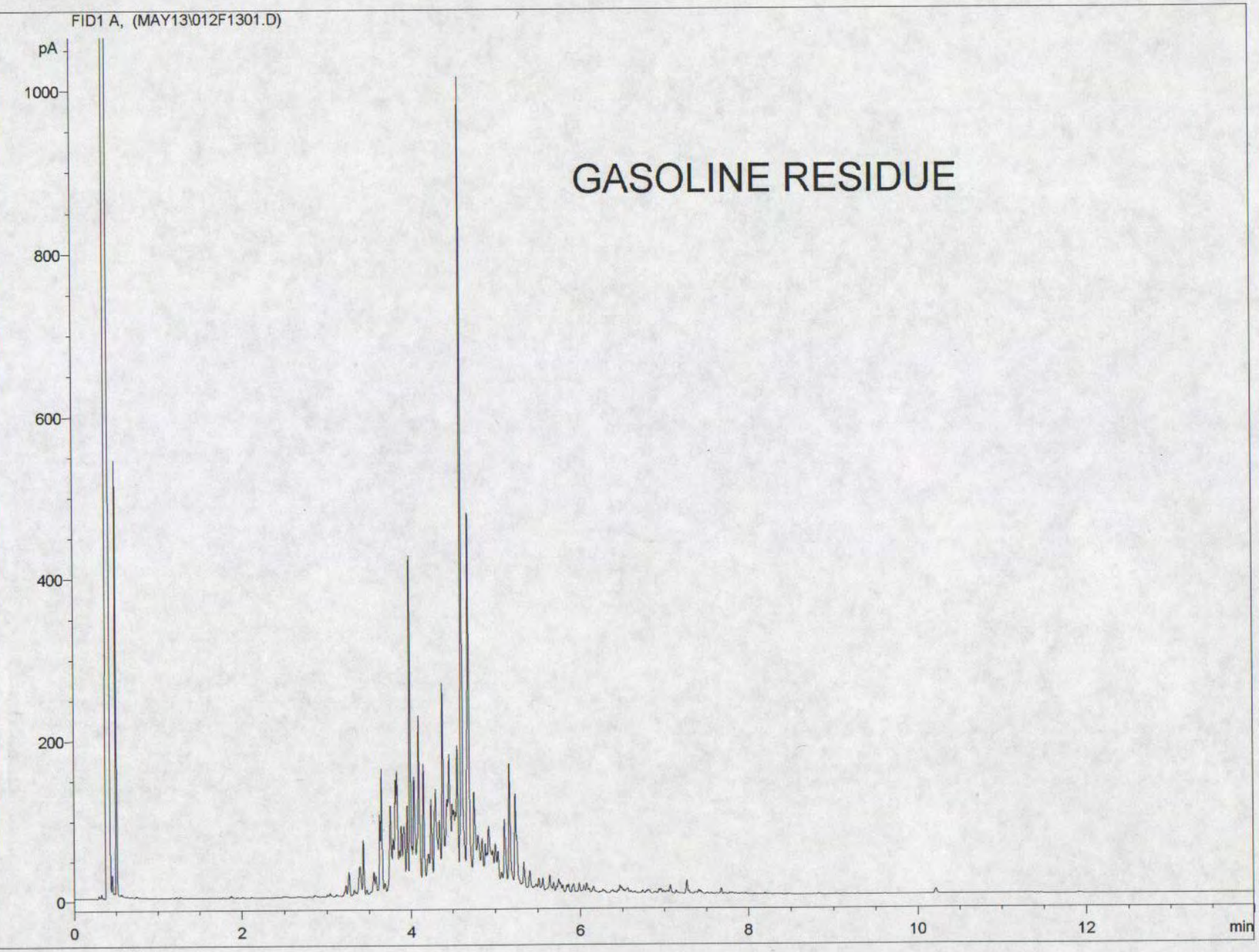
Instrument 1 5/7/2004 2:03:00 PM skf

Data File C:\HPCHEM\1\DATA\GASOLI~1\FGASOL~1.D Sample Name: gasoline std



*** End of Report ***

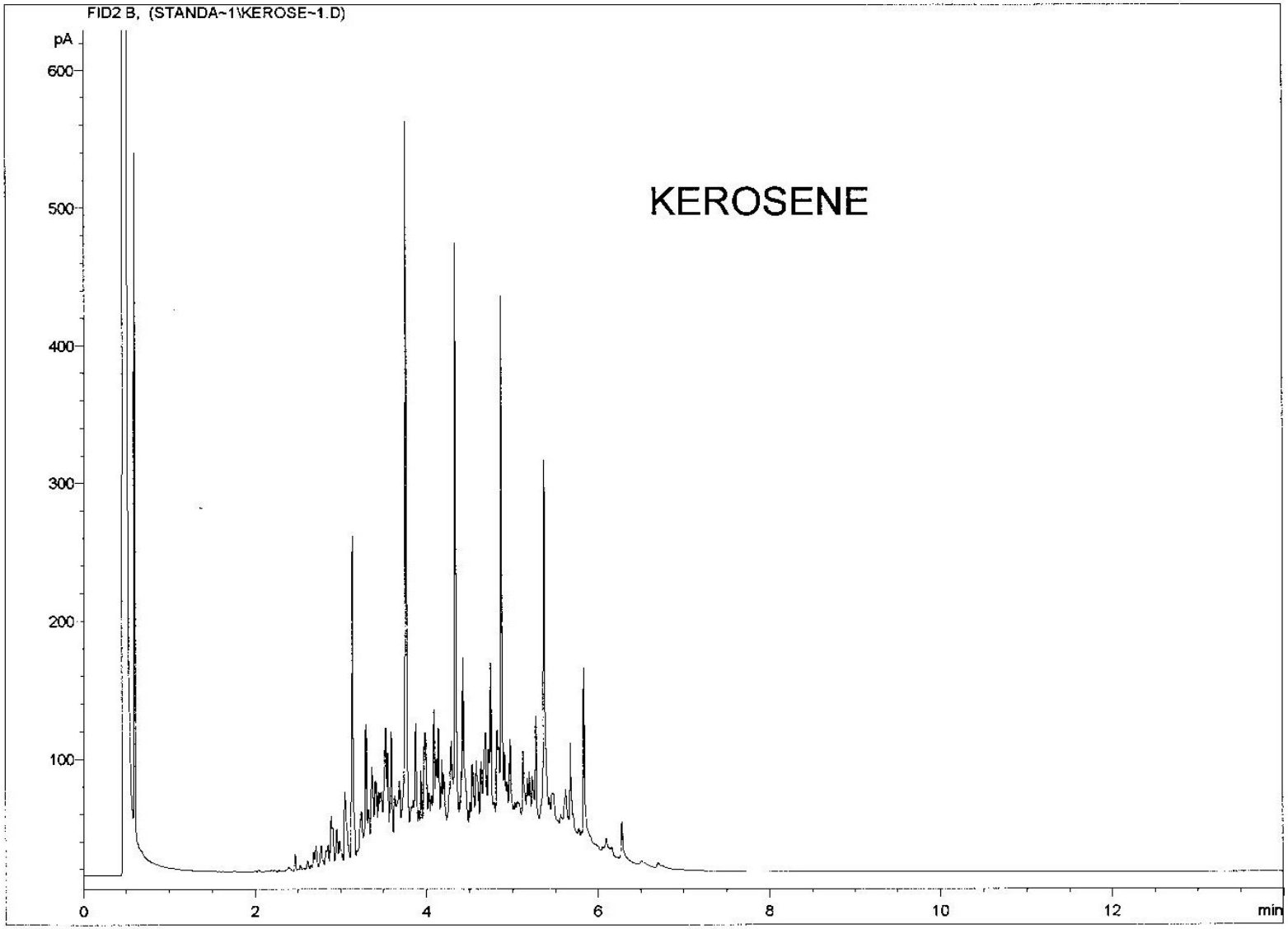
Instrument 1 5/7/2004 1:54:40 PM skf



*** End of Report ***

Examples: Kerosene, Charcoal Starter

Data File C:\HPCHEM\1\DATA\STANDA~1\KEROSE~1.D Sample Name: kerosene std

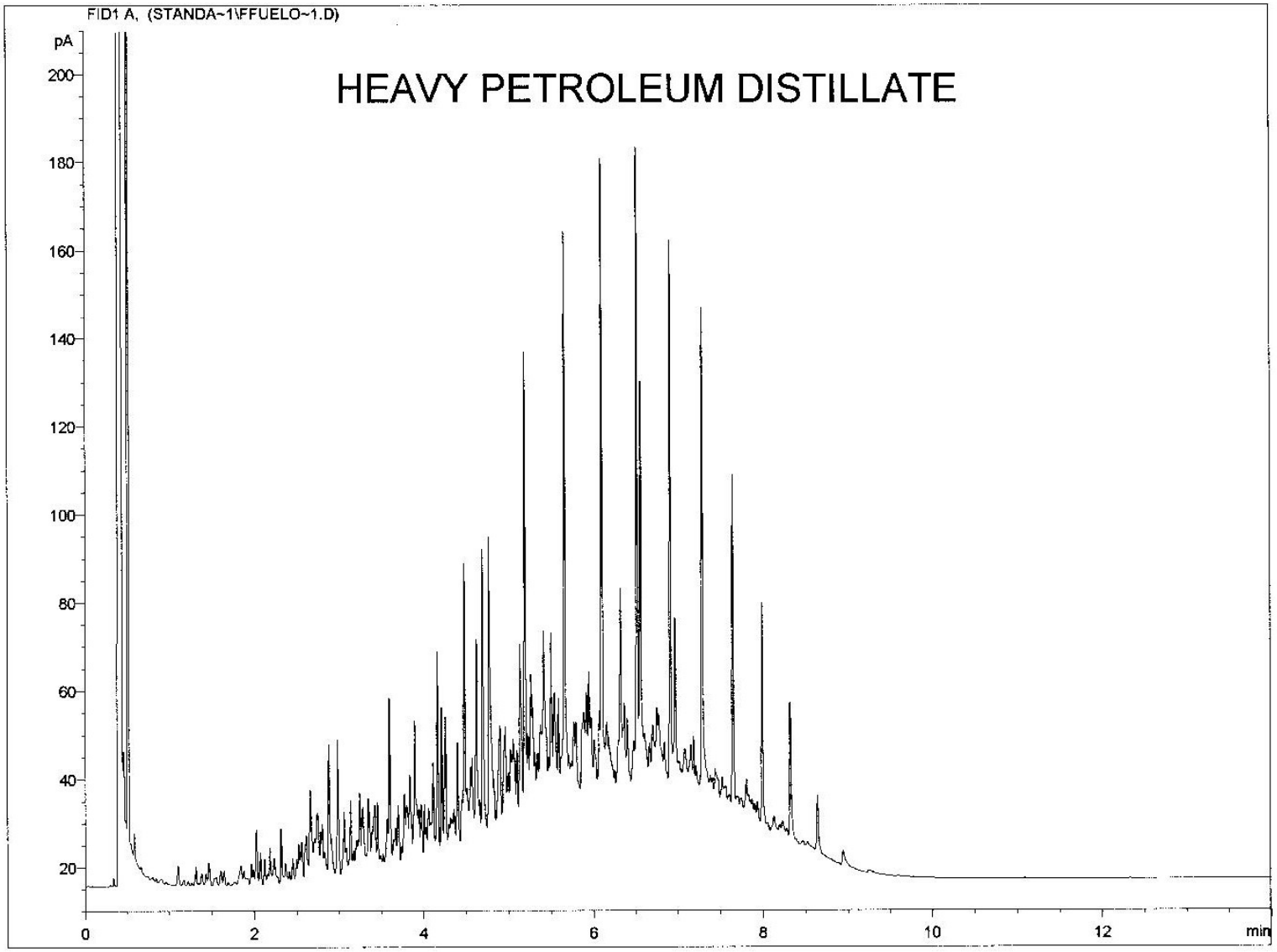


*** End of Report ***

Instrument 1 5/7/2004 2:03:51 PM skf

Examples: Fuel Oil #2, Diesel Fuel

Data File C:\HPCHEM\1\DATA\STANDA~1\FFUELO~1.D Sample Name: Fuel Oil example



*** End of Report ***

Instrument 1 5/7/2004 2:05:59 PM skf

K-9 IGNITABLE LIQUIDS*

PRODUCT	BRAND	TYPE	CLASS #
DIESEL	ANY	HPD	5
TURPENTINE	KLEAN, PARKS	MISC	0
ULTRA PURE LAMP OIL	LAMPLIGHTER FARMS	NORPAR	0.3
TRANSMISSION FLUID	CHEVRON ATF	MISC	0
PAINT REMOVER	PARKS	MISC	0.4, 0.1
KEROSENE	ANY	KEROSENE	4
GASOLINE FRESH, 50% EVAPORATED, 75% EVAPORATED	ANY	GASOLINE	2
CHARCOAL LIGHTER	HEB, ROYAL OAK	ISOPAR	0.2
PAINT THINNER (100% mineral spirits)	KLEAN, PARKS	MPD	3
COLEMAN FUEL	COLEMAN	LPD	1
ACETONE	KLEAN, PARKS	OXY. SOLV.	0.1
LACQUER THINNER	PARKS	MISC	0.4, 0.1

* ASTM E1387-95 TABLE 1

Recently it became possible to establish chain of custody for court purposes by issuing an affidavit stating such. This can obviate the necessity of the analyzing chemist to appear and testify at trial.

CHAIN OF CUSTODY AFFIDAVIT

BEFORE ME, the undersigned authority, personally appeared
_____, who being by me duly sworn, stated as follows:
My name is _____. I am of sound mind, over the age of 18 years, capable of making this affidavit, and personally acquainted with the facts stated in this affidavit.
My address is 7915 Cameron Road, Austin, TX 78754.
On *appropriate date*, I was employed by the Texas Department of Insurance.
On that date, I came into possession of the physical evidence described as follows:

Description of evidence containers

I received the physical evidence from *submitting agency, tracking code, date*
This physical evidence was in a container described and marked as follows:

Description of evidence

I transferred the physical evidence to the evidence vault on *appropriate date*, by hand in person.
During the time that the physical evidence was in my custody, I did not make any changes or alterations to the condition of the physical evidence except for those resulting from field or laboratory testing procedures, and the physical evidence or a representative sample of the physical evidence was transferred in essentially the same condition as received.

_____

Affiant

SWORN TO AND SUBSCRIBED before me on the ____ day of _____, 2009.

_____

Notary Public, State of Texas

QUESTIONS??

Thank you!