

Follow-up Report on Possible Contamination of the COS Grating Test Facility from Klinger Stages

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1. INTRODUCTION

NVR rinses were performed on the following surfaces: The nominal stainless steel witness plate used for vacuum testing, a portion the North wall of the chamber, the grating mounting plate, and the optical table surface. The results are shown in the attached ball reports, and indicate that the only substantial contamination was on the grating bezel mounting plate, and that appeared to be Nitrilite glove residue, probably transferred to the plate by touching it with a glove that had been moistened with IPA.

The tape pull test on the optics bench did not leave residue for those samples pulled up after three days, but those left in place for 18 days did leave residue, which suggests that the table was largely free of silicon contamination.

In order to mitigate any further contamination we took the following steps: We removed all klinger stages from the chamber and cleaned them as far as was practical without fully disassembling them using a variety of solvents (toluene, fluroclean, acetone and IPA), and then reinstalled them in the chamber. We then wrapped all motors in black kapton film, and vented the motors through xeolite pucks obtained for the FUSE projects (fig. 1). In addition to this encapsulation, we have also begun to reduce motor heating by limiting the time that the motors are energized as much as possible. We deenergize the motors after each movement and leave them off until they are needed again.

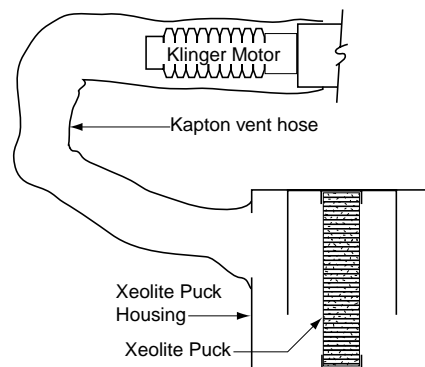


Figure 1. Venting for Klinger motors. Typically, several motors share a common puck housing.

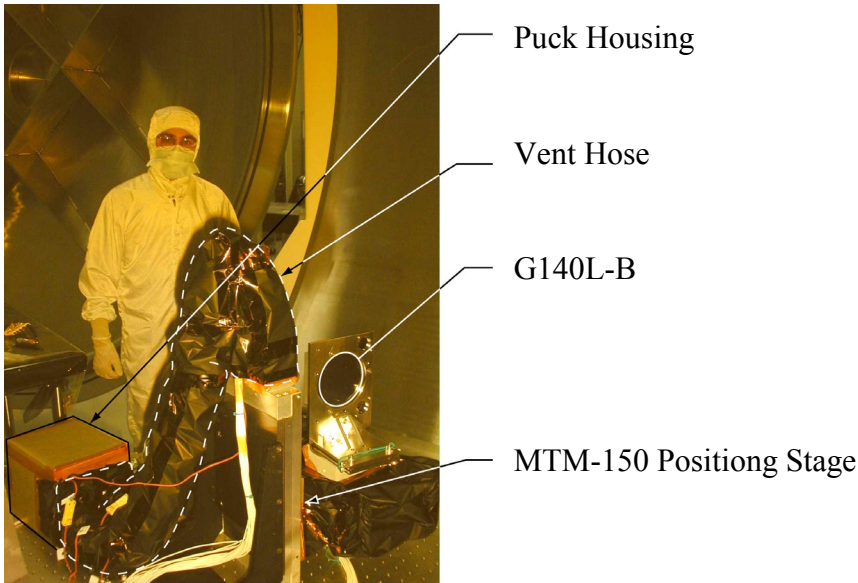


Figure 2. Grating mount showing four motors vented to common puck holder

Subsequent TQCM rates showed a substantial drop from 10-15Hz/hr to 4-6 Hz/hr. No significant change was observed in NVR plate rinses, but those were already at the detection limit.

Based on tape pull tests, NVR rinses, stability of optical witness samples, and initial low TQCM rates, I am convinced that there was no contamination from the Klingers which would have exceeded our contamination budget. With the additional encapsulation of the Klinger motors and our new motor operation methods, we have further improved on the cleanliness of the chamber.

2. NVR RESULTS

Attached are the results of NVR rinses performed by Ball Aerospace in support of our exploration of the potential contamination.

Results of witness plate rinse performed before identification of the contamination.....	Pages 3-4
Rinses of Klinger motor covers	Pages 5-7
Rinses of chamber, optics bench and optics mounting GSE	Pages 8-12
Rinse of witness plate after contamination abatement finished	Pages 13-14



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ANALYSIS REPORT
M&P I.R. LAB

REPORTED BY: G K Moller
DATE: 5/23/00

SAMPLE DESCRIPTION: CASA 12"x12" NVR plate rinsed 4/21/00.

REQUESTER: Steve Osterman

PROGRAM: CASA



RESULTS:

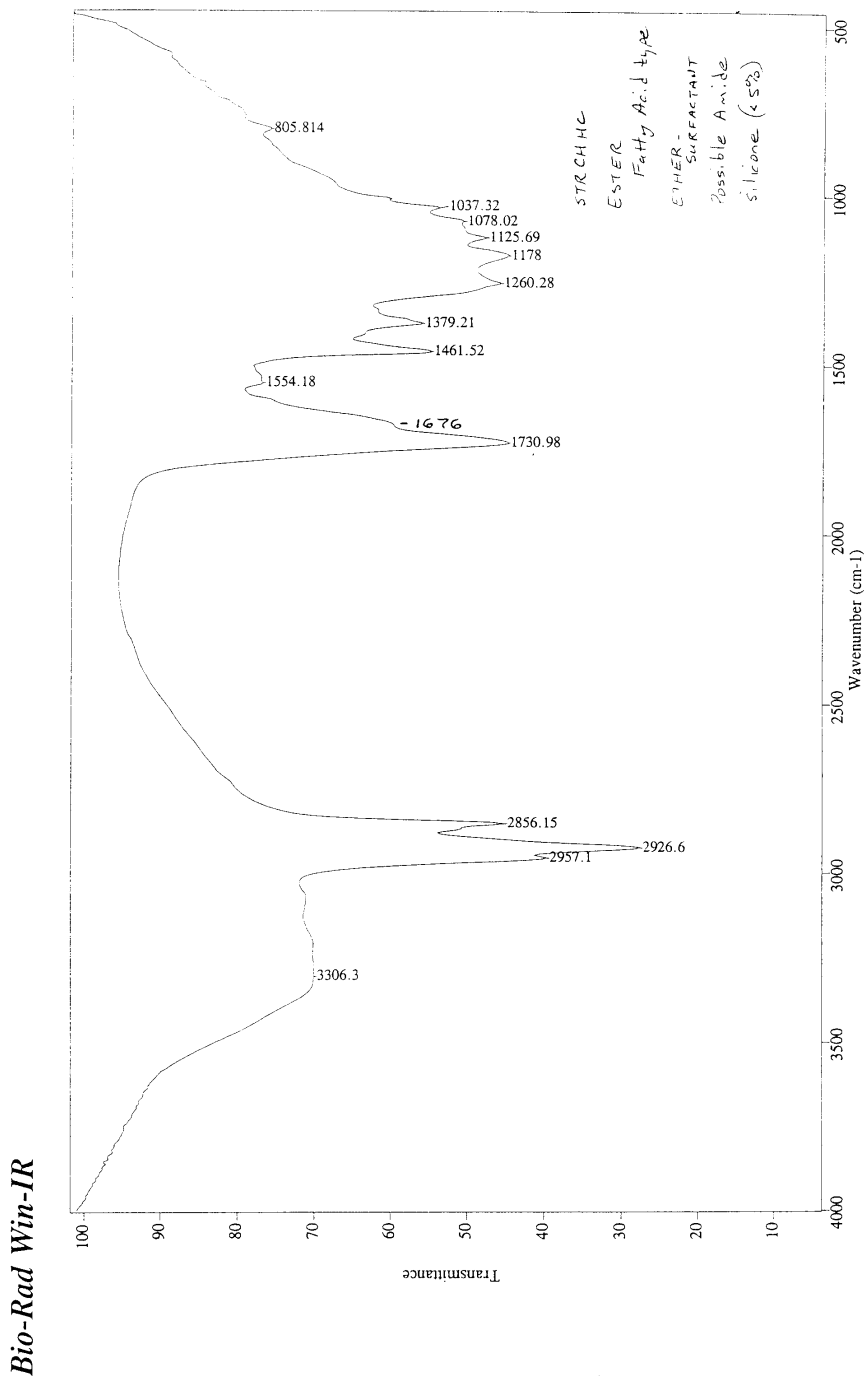
NVR = 0.04 mg/sq. ft. NVR # 00-272

IR # 00-0617 shows the major components of the residue to be: Straight chain hydrocarbons, Esters – fatty acid type, an ether – surfactant, possibly an amide, and a small amount (<5%) of silicone.

If you have any questions about this information, please call me: 303-939-4529.



Gary Moller



View Mode: Overlay

4/26/00 1:46 PM Res=8cm-1

File # 1 : 00-0617

Number of Scans: 256

Comment: 31076 CASA 12"X12" PLATE 0.04 MG/FT² 4/21/00 DPRR M# T15

002442



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ANALYSIS REPORT
M&P I.R. LAB

REPORTED BY: G K Moller
DATE: June 9, 2000

SAMPLE DESCRIPTION: CASA. Two surface contamination samples for identification:

1. URM 100 exterior surface.
2. MTM 150 interior surface

REQUESTER: Steve Osterman

PROGRAM: CU CASA



RESULTS:

1. URM 100 exterior surface. IR shows the major components of the surface contamination to be: Straight chain hydrocarbons (oil), Esters – fatty acid types and possibly aromatic types, silicone and an amide.
2. MTM 150 interior surface. IR shows the major components of the surface contamination to be: Straight chain hydrocarbons, and esters – fatty acid type and a small amount of aromatic type.

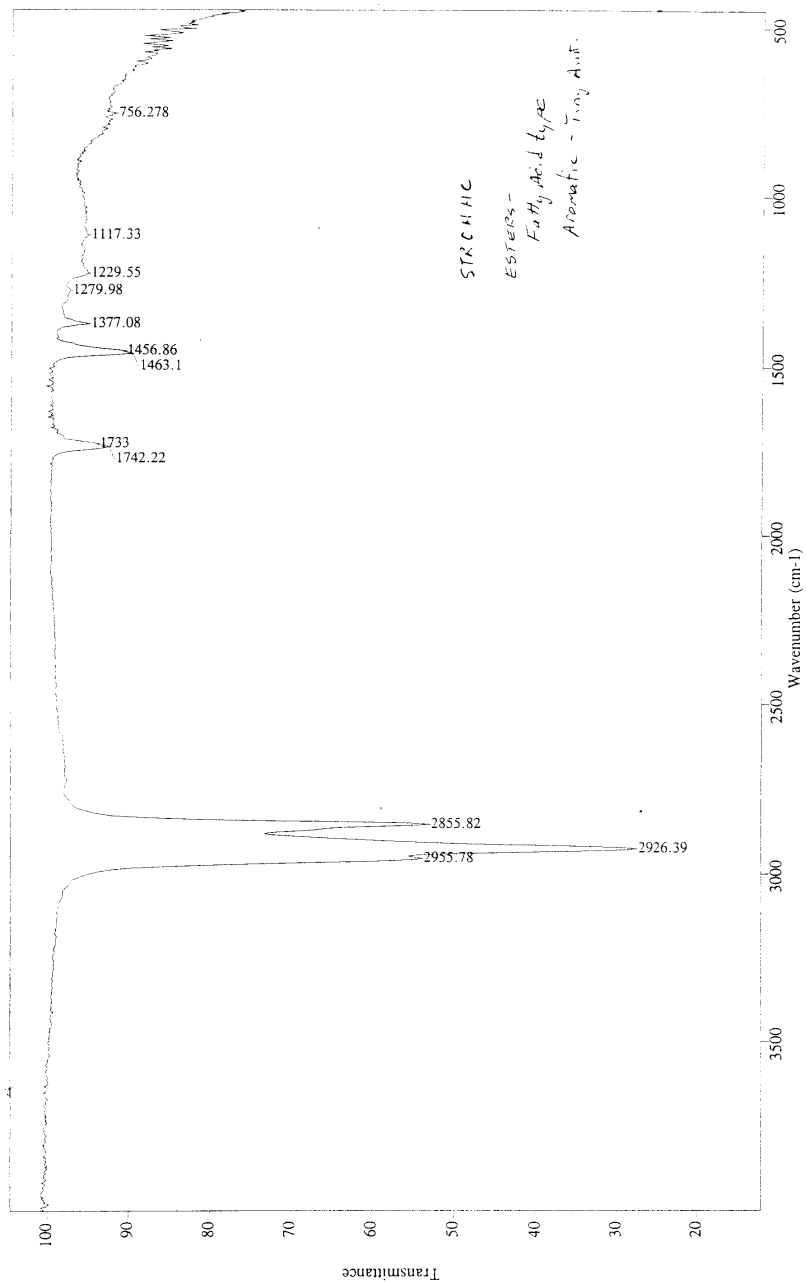
These samples were collected by rinsing the surfaces with a small amount of distilled Prelete, and collecting and evaporating the rinse solution on a first surface mirror at room temperature. The samples were not weighed.

If you have any questions about this information, please call me.



Gary Moller
303-939-4529

BATC



File # 1 : 00-0882

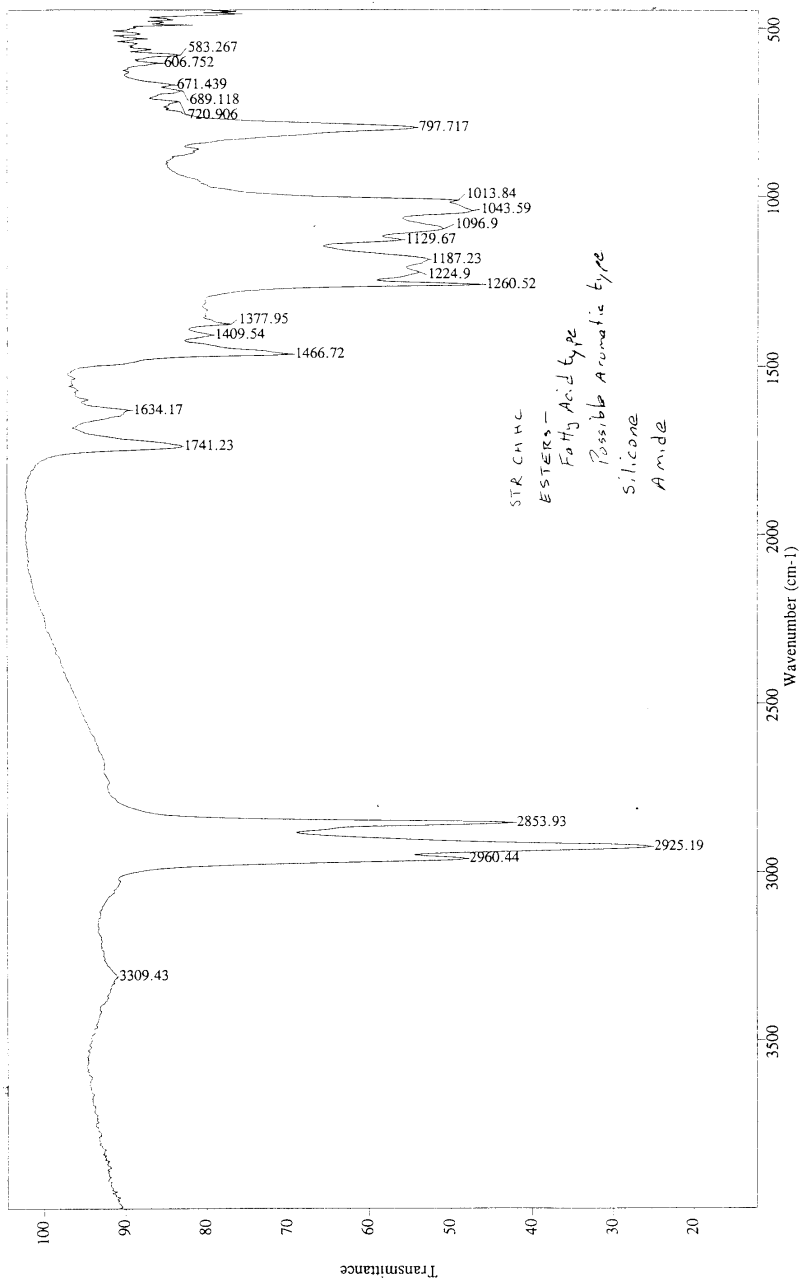
Number of Scans: 256

Comment: 31076 CASA MTM 150 Interior surface contamination, DPRR 6/8/00, m# 15

View Mode: Overlay

6/8/00 2:54 PM Res=4cm-1

BATC



File # 1 : 00-0881

Number of Scans: 256

Comment: 31076 CASA URM 100 surface contamination, DPRR 6/8/00, m# FS

View Mode: Overlay

6/8/00 2:47 PM Res=4cm-1

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ANALYSIS REPORT
M&P I.R. LAB

REPORTED BY: G K Moller
DATE: 6/19/00

SAMPLE DESCRIPTION: CASA, Four surface samples: 1. S.S. witness plate # "X", 1 sq. ft. DPRR.
2. Vacuum chamber wall north side port, 90 sq. in. DPRR. 3. S.S. optical plate, ~22 sq. in. DPRR.
3. Optical table in chamber by stage, DPRR 2 areas 6"x6" each.

REQUESTER: Steve Osterman

PROGRAM: CU CASA



RESULTS:

Sample	NVR mg/sq. ft.	NVR # 00-	IR # 00-	IR of residue: Major Components
S.S. Witness plate	0.06	443	0913	Str ch hc*, Esters – fatty acid and aromatic types, Surfactant – similar to Alconox.
Chamber wall N. port	0.10	445	0915M	Polyester – similar to material extracted from TX 609 tissue.
S.S. optical plate	1.37	444	0914	Similar to residue obtained by rinsing Nitrilite gloves with IPA.
Optical table	0.10	446	0916	Str ch hc, Esters – aromatic and fatty acid types, probably a surfactant – similar to Alconox

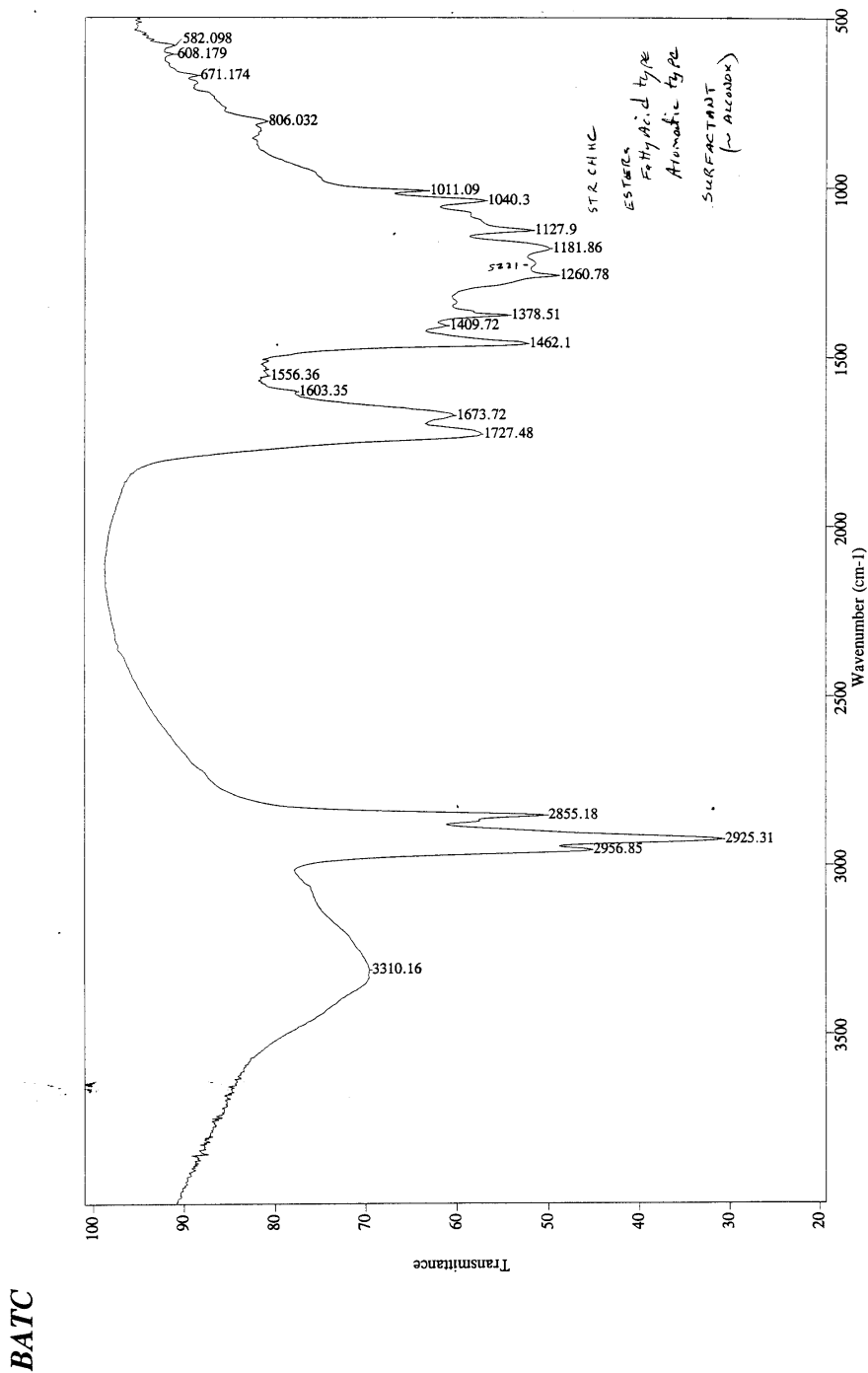
*Str ch hc = Straight chain hydrocarbons

*DPRR = Distilled Prelete Rinse Residue. Actually a mixture of ~10% IPA in distilled Prelete.

If you have any questions about this information, please call me.

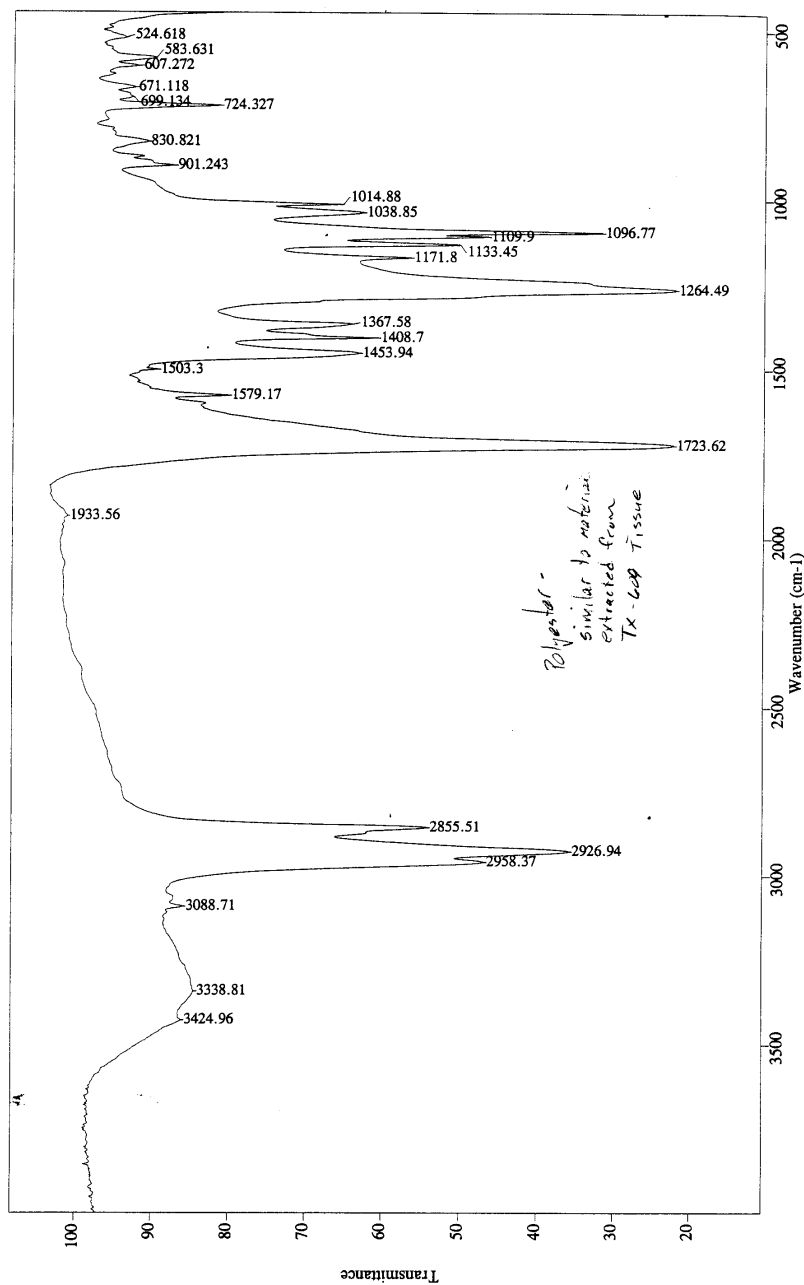


Gary Moller
303-939-4529



View Mode: Overlay
 6/19/00 9:14 AM Res=4cm-1
 File # 1 : 00-0913
 Number of Scans: 512
 Comment: 31076 CASA Witness plate "X", DPRR 6/13/00, 0.06 mg/sqft, m# 135

BATC



View Mode: Overlay

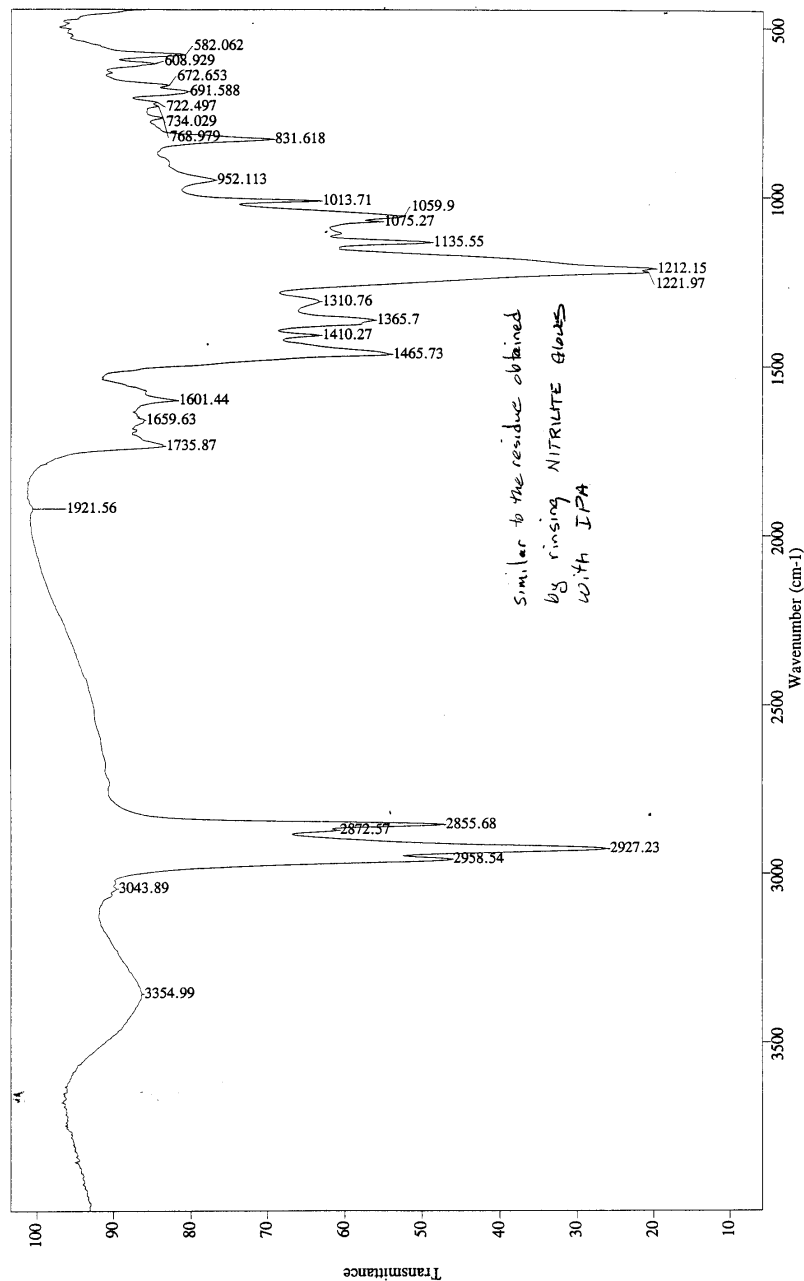
6/19/00 9:35 AM Res=4cm-1

File # 1 : 00-0915M

Number of Scans: 512

Comment: 31076 CASA Chamber north wall, 90 sqin DPRR 6/13/00, 0.10 mg/sqft, m# A14

BATC



File # 1 : 00-0914

Number of Scans: 512

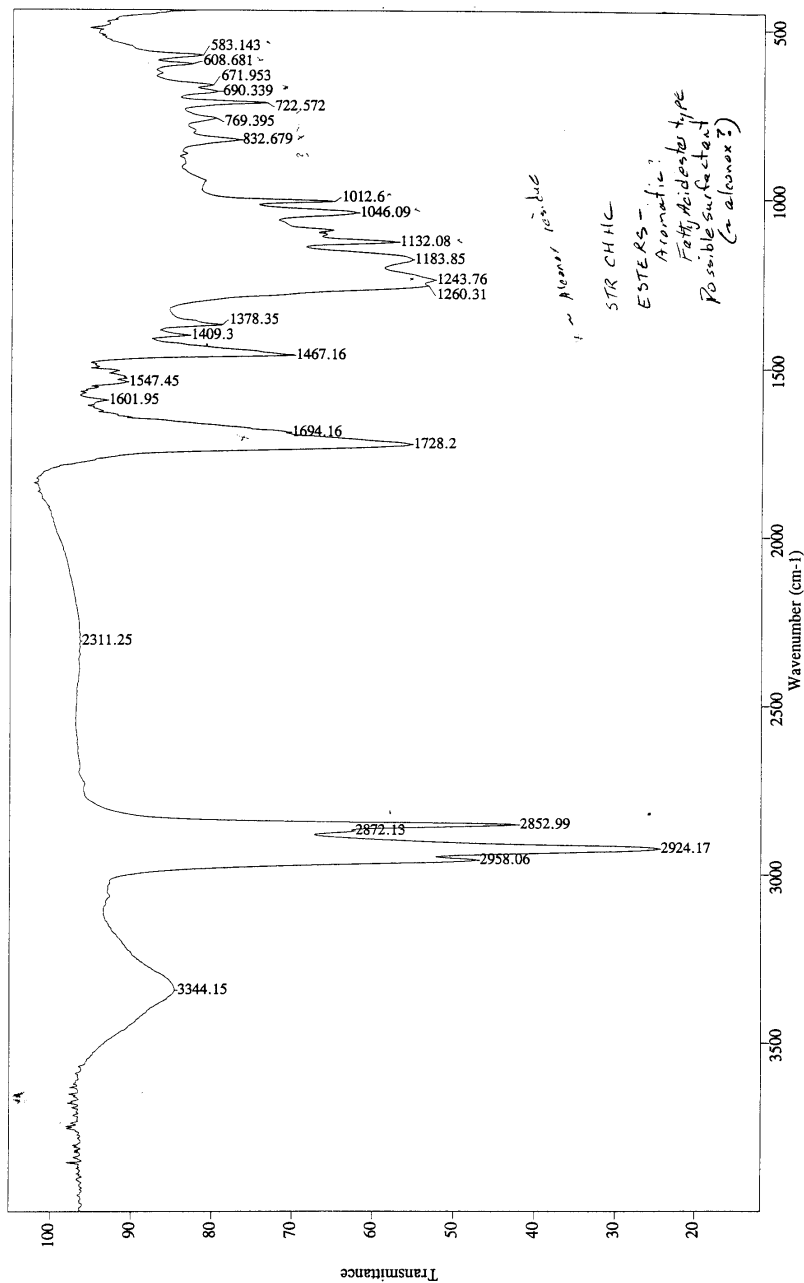
Comment: 31076 CASA SS Optical Plate, DPRR 22 sqin, 6/13/00, 1.37 mg/sqft, mh# 14

View Mode: Overlay

6/19/00 9:27 AM Res=4cm-1

467

BATC



File # 1 : 00-0916

Number of Scans: 512

Comment: 31076 CASA Optical table 72 sqin DPRR, 0.10 mg/sqft, m # T29

View Mode: Overlay

6/19/00 9:45 AM Res=4cm-1



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ANALYSIS REPORT
M&P I.R. LAB

REPORTED BY: G K Moller
DATE: 9/29/00

SAMPLE DESCRIPTION: CASA NVR plate, 12" x 12", DPRR 9/27/00

REQUESTED BY: Steve Osterman

PROGRAM: CU CASA



RESULTS:

A Distilled Prelete rinse of a CASA NVR plate, 12" x 12", on September 27, 2000 gave the following residue results:

0.05 mg/sq.ft.

IR spectrum # 00-1354 indicated the following components in the residue:

- Straight chain hydrocarbons
- Esters
 - Fatty acid type
 - Aromatic type
- Possible surfactant
- Possible amide
- Silicone

If you have any questions about this information, please call me.

Thanks,



Gary Moller
303-939-4529

