New Folder Name LNT1 Cold Trap Contamination and Calibrated Leak

LIGO-T950130-00-D

Chicago Bridge & Iron

Technical Services Company

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December 19, 1995

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RE: LNT1 cold trap contamination and calibrated leak recalibration
LIGO Beam Tube Module
Caltech
CBI Project # 930212

Attached is the FTIR analysis of the Iso propyl alcohol wash of the LNT1 cold trap. The analysis indicates a contamination of the control sample of 1.6 mg/100 ml of alcohol. The trap wash sample has 3.3 mg/100 ml of contamination. The contamination is stated as being "hydrocarbon oil and other non identified components."

We have also verbally received the results of the recalibration of the two hydrogen calibrated leaks. Their results are as follows:

Valve No.	**purchased leak rate**	**current leak rate**
V26	2.15×10^{-7} atm cc/s	$\approx 1.2 \times 10^{-7}$ atm cc/s - unstable
V27	6.5×10^{-6} atm cc/s	5.0×10^{-6} atm cc/s

VTI would not recertify the small leak without rebuilding because of the instability. They believe that the capillary is partially plugged. I also expressed my surprise that the large leak was as far from the original leak rate as it is. VTI stated that each measurement is guaranteed to within ±15%. They then said they had 30 % for the two measurements (15% for each) and the leak was within tolerance. We discussed the causes of the plugging and VTI felt it had nothing to do with the bake out but was most likely from a particle forced into the capillary during a pressure spike in the system.

I questioned VTI about my concerns for the next set of purchased leaks for the pump port hardware and was there a better type of leak which was not as prone to plugging . He said that the capillary was the best form of calibrated leak for most gasses in these leak rate sizes (helium has glass permeation leaks). He also said that reducing the pressure on the cylinder and using a larger capillary provides less chance of plugging than higher pressure cylinders with smaller capillary tubes. This does however reduce the life of the leak. He suggested that we specify our concern for plugging when we spec out the calibrated leaks.

I have reviewed the last time that V27 was used (3/8/95) in RGA files 030814.asc and 0314a.asc and the ratio between the leak rates is approximately 30 which is the same as the ratio of the

initially calibrated values of the leaks. The plugging must, therefore, have been after the post bakeout outgassing measurements.

Regards,

Warren A. Carpenter
Senior Engineer

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ANALYSIS REPORT FOR:

CBI TECH. SERVICES CO.
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Plainfield, IL 60544

Attn: Warren Carpenter

PURCHASE ORDER NO. 5-1116-03

DATE 11/22/95

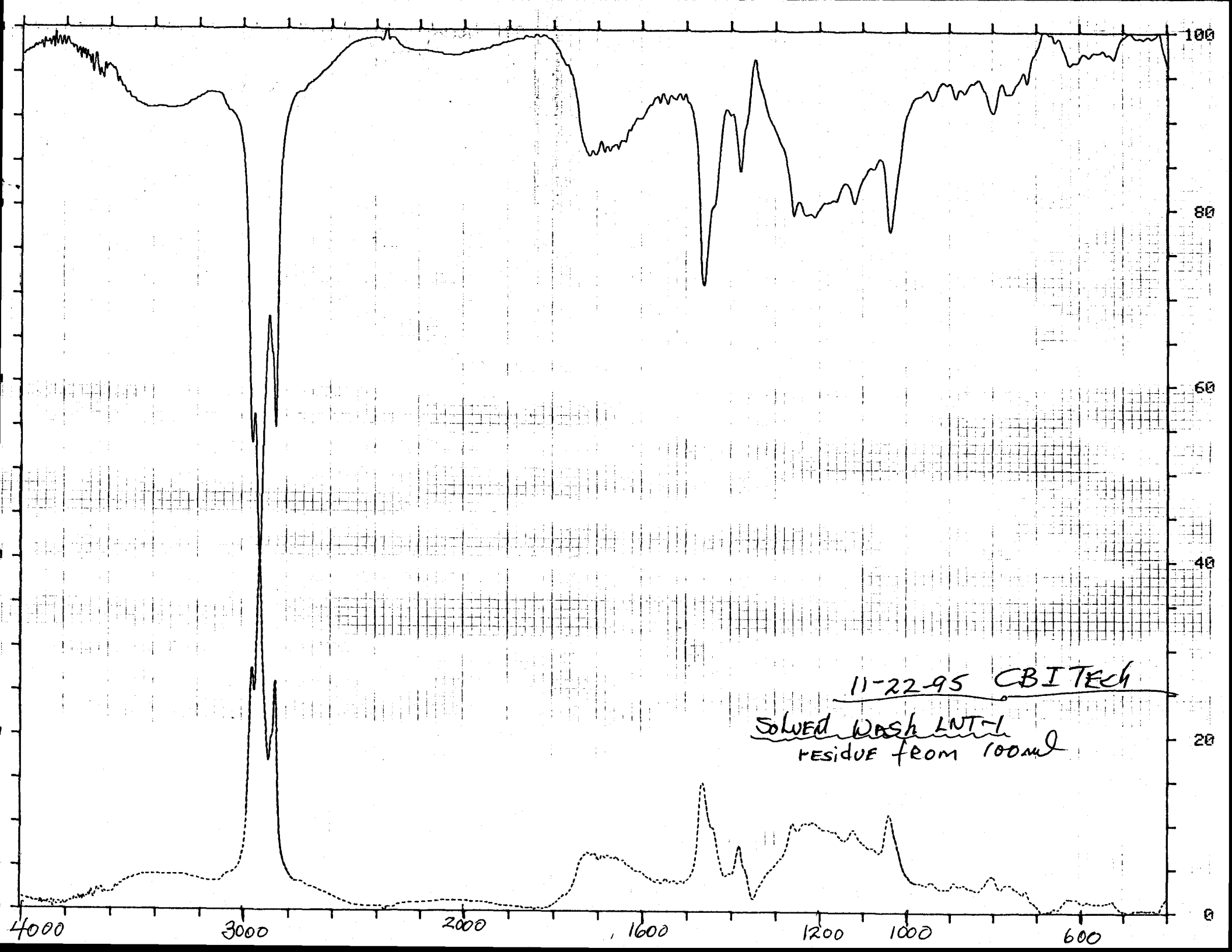
REPORT OF MATERIALS ANALYSIS: Analysis of two samples of 2-propanol used as a wash solvent.
Samples: Control and LNT-1 Wash

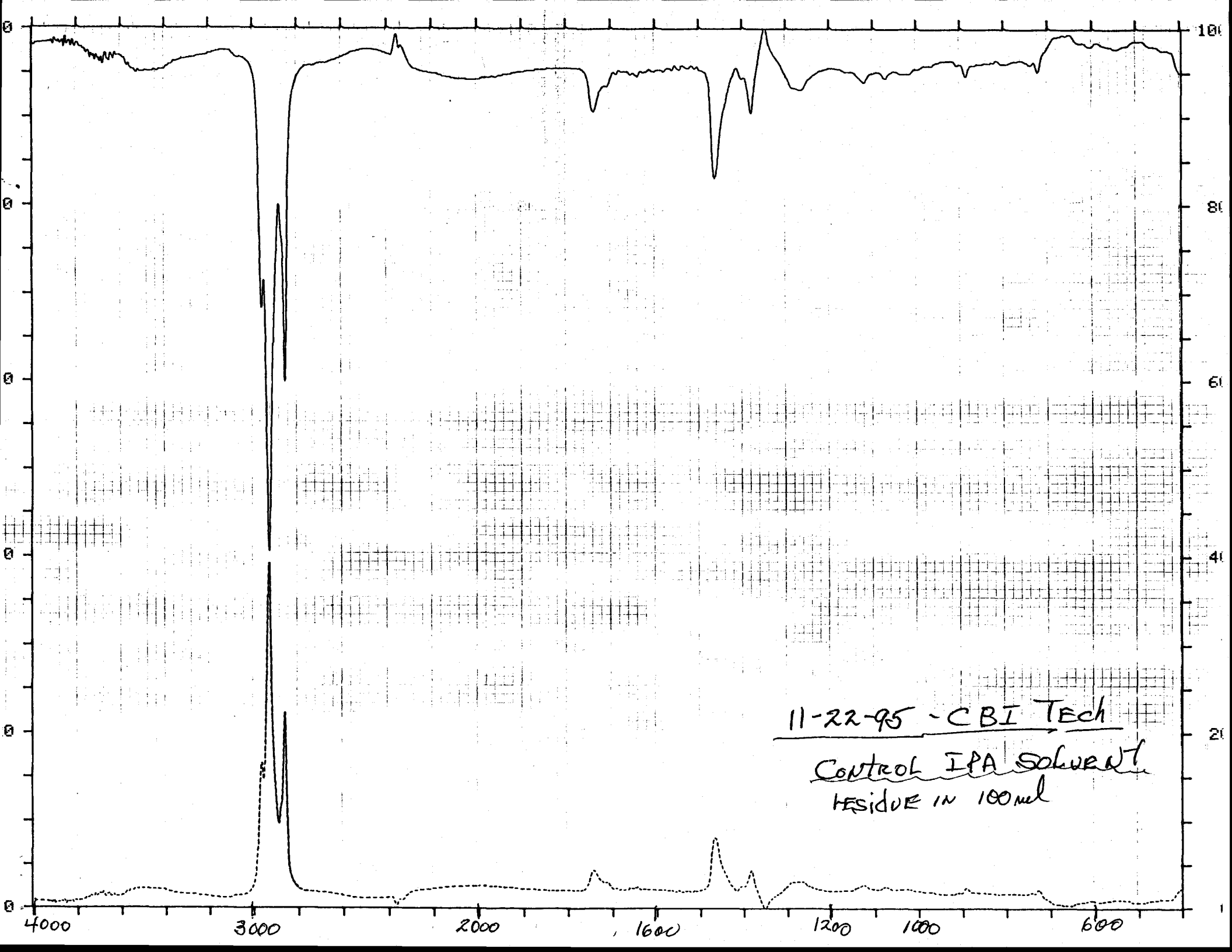
METHODS: For both the control propanol solvent and the contaminanted wash sample (LNT-1), 100 ml samples of each solvent was evaporated in an oven at 95 C. The non volatile materials left drying were analyzed by FTIR spectral analysis on a KBr window for identification and comparison. The ordinate expansion factor)abex) is the same for both spectra. Copies of the FTIR spectra are enclosed.

RESULTS:

Control sample- The non-volatile residue from 100 ml of this solution was 1.6mg/100 ml and was found to be predominantly a hydrocarbon oil.

Sample Wash LNT-1 - The non volatile residue from 100 ml of this solution was 3.3 mg/ 100ml.
The residue was a yellow-brown color and is composed of approximately equal amounts of hydrocarbon oil and other unidentified component(s).


100
80
60
40
20
0
4000
3000
2000
1600
1200
1000
600
11-22-95 CBI TECH
SOLVED WASH LNT-1
RESIDUE FROM 100ml


11-22-95 - CBI TECH
CONTROL IPA SOLVENT
RESIDUE IN 100ml
4000
3000
2000
1600
1200
1000
600