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COMPARISON OF 7 OIL SAMPLES FROM WELL 34/10-2 AND 34/10-3

FILE 050 34/10-2 & 3
050 P5.18.30

STATOIL PRODUCTION LABORATORY

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Introduction.

Statoil Production Laboratory was asked by the reservoir engineers to make a comparison of the following oil samples:

Well	DST	Sample points
34/10-2	2	Bubble hose and separator
"	3A	Bubble hose
"	4	Bubble hose and separator
34/10-3	3	Bubble hose and separator

The purpose of the work was threefold:

1) Comparison of oil sampled at different locations (bubble hose and separator)

2) The separator was not cleaned between DST 3A and 4 in 34/10-2. The engineers wanted to know if traces of DST 3A oil were contaminating the DST 4 oil.

3) The most interesting question, however, was to see if oil produced in different DST's in 34/10-2 (α-structure) belongs to the same hydrocarbon system and compare them to a typical oil sample from the δ-structure (34/10-3).

Method:

The method is based on a whole oil gas chromatographic analysis, using a glass capillary coloumn.
Some of the components that could be identified very positively are matched in pairs with regards to simularity in boiling point and chemical structure. The ratios of the weight percents between matched molecules are plotted for a graphical comparison of different oil samples.

A similar method was first suggested by J.G. Erdman and D.A. Morris*.

Sampling.

Oil from three of the tests were sampled in two ways, one up-stream separator at "bubble hose", and the other at the separator. In both cases the pressure was bled off to atmosphere in an uncontrolled flash at the present field conditions.
One exception is 34/10-2, DST 4 separator sample that was flashed down from separator pressure to atmosphere at 15°C in a Ruska flash-separator, in our lab.

Results and discussion.

1) Sampling does not seem to influence the result when this technique for comparison is used (O follows ⊕ and Δ follows Δ within experimental errors in fig. 1).

2) It is not possible to see any difference (from fig. 1) between oil sampled up-stream or at the separator in DST 4, 34/10-2. A direct comparison between the chromatograms in the appendix does not reveal any difference either.

3) On the graphical plot three main patterns develops, suggesting a division into three groups:

Group I	34/10-2	DST 4
Group II	34/10-2	DST 2 and 34/10-2 DST 3A
Group III	34/10-3	DST 2

These three groups of hydrocarbons have probably had different

* (The American Association of Petroleum Geologists Bulletin, No. 11, 1974. Page 2326-2337).

geochemical histories. That is,the cumulative effect of temperature, pressure, water and solid contact, and possible biological degradation. It does not exclude that the oils might have originated from the same source rock.

A migration path or an open physical communication might exist between the oils found in 34/10-2 DST 2 and 3A.

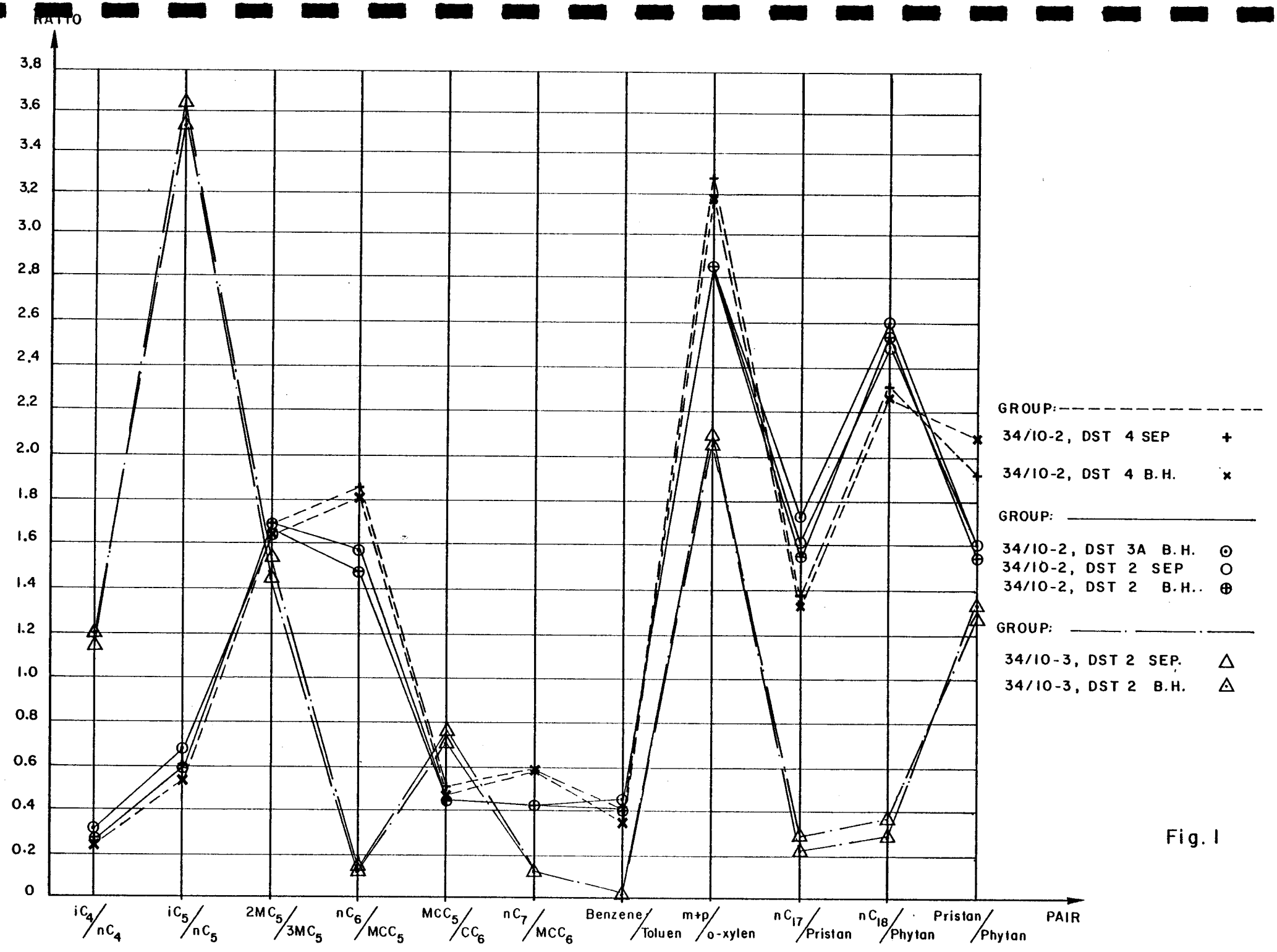
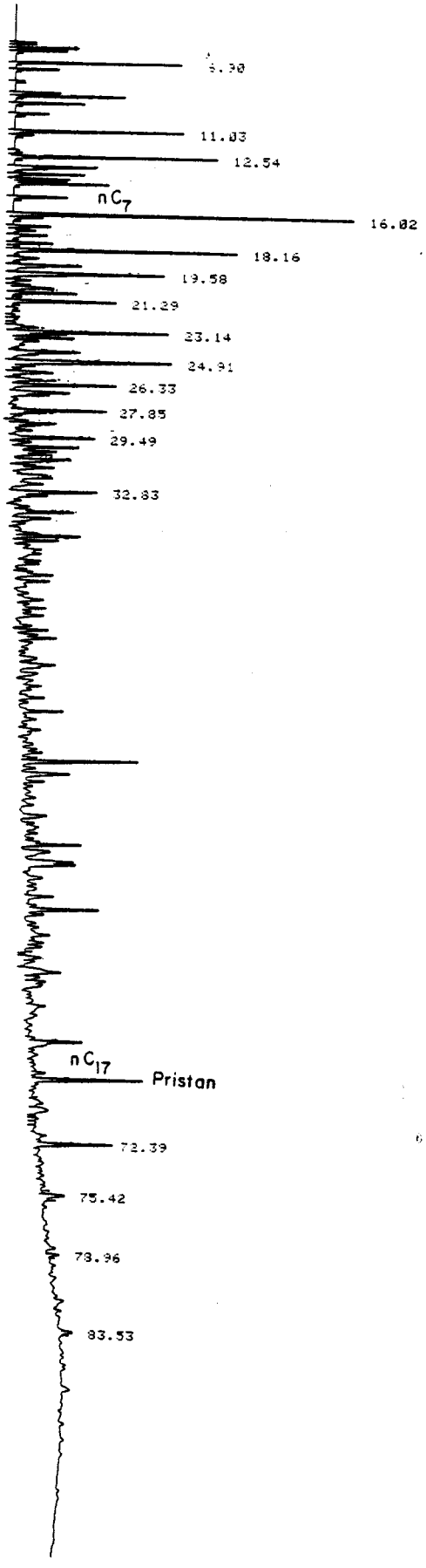
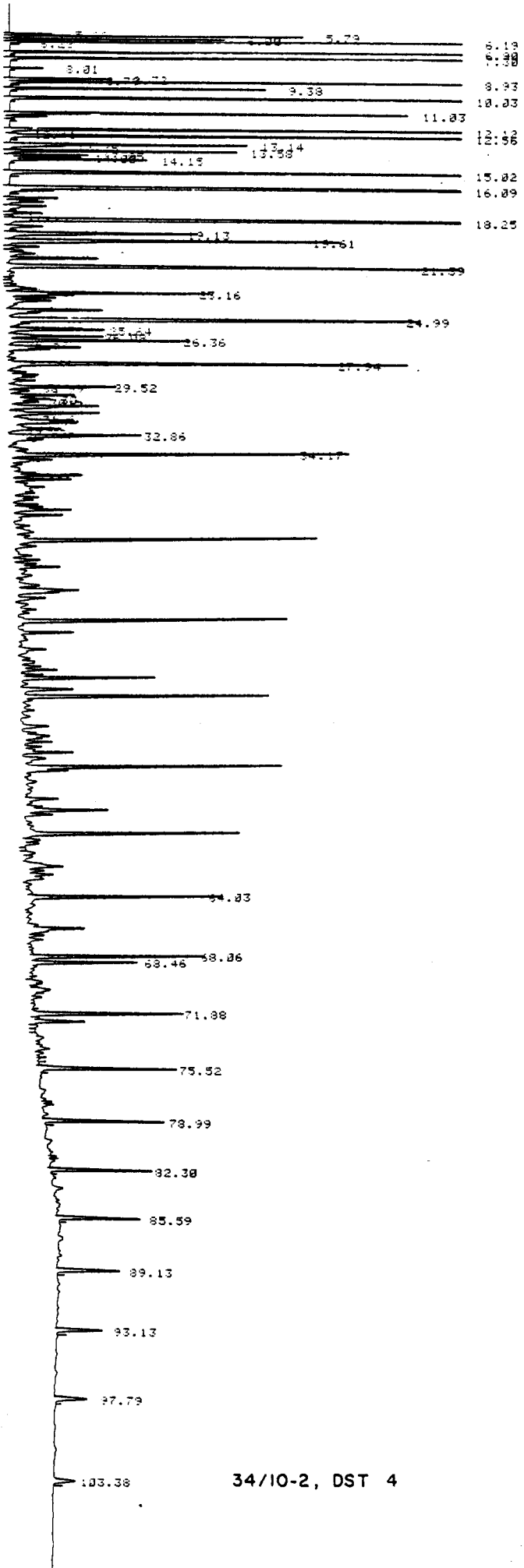

RATIO
3.8
3.6
3.4
3.2
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
iC4/nC4
iC5/nC5
2MC5/3MC5
nC6/MCC5
MCC5/CC6
nC7/MCC6
Benzene/Toluen
m+p/o-xylen
nC17/Pristan
nC18/Phytan
Pristan/Phytan
PAIR
GROUP:
34/10-2, DST 4 SEP +
34/10-2, DST 4 B.H. ×
GROUP:
34/10-2, DST 3A B.H. ⊙
34/10-2, DST 2 SEP ○
34/10-2, DST 2 B.H.. ⊕
GROUP:
34/10-3, DST 2 SEP. △
34/10-3, DST 2 B.H. △

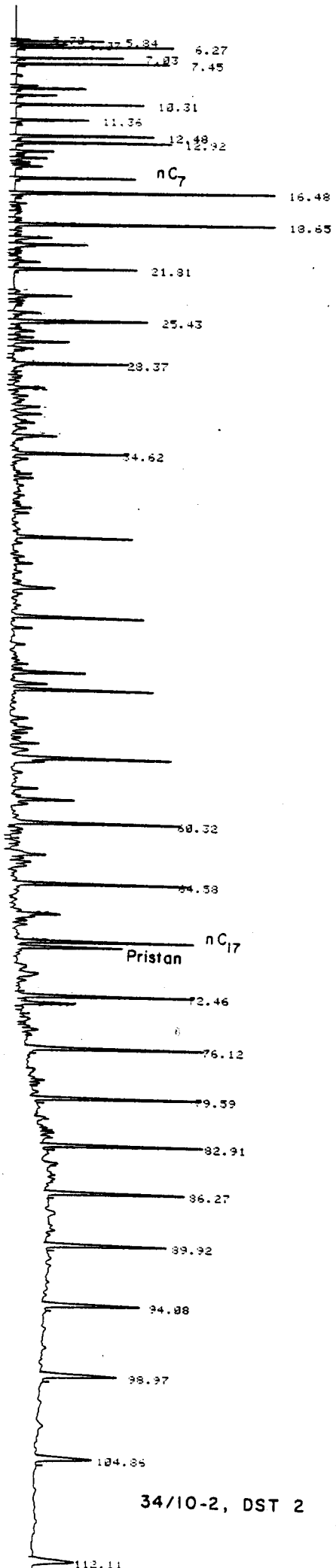
Fig. 1



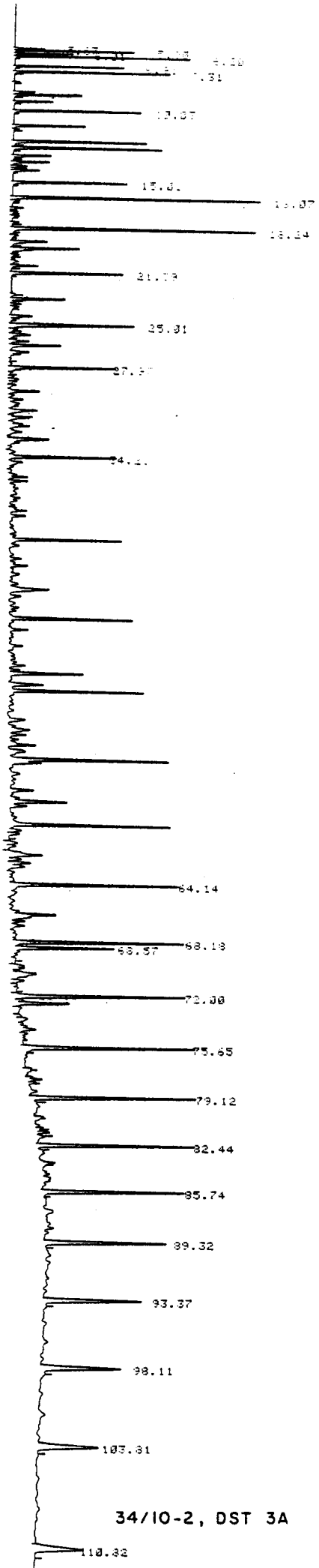
34/10-3, DST 2



34/10-2, DST 4



34/10-2, DST 2



34/10-2, DST 3A