

DETERMINATION OF AROCLORS AND RELATED PRODUCTS IN
MIXED LIQUOR SAMPLES FROM SEMI-CONTINUOUS
ACTIVATED SLUDGE UNITS BY ULTRAVIOLET ABSORPTION

SCOPE

This procedure is intended for the extraction and measurement of Aroclor 1242, Aroclor 1142 residue, Arobrochlor 1232, MCS 1016, MCS 1043, Aroclor 1221, 2,2'-dichlorodiphenylether and trichlorodiphenylether from activated sludge mixed liquor samples. The data are used to determine the rate of biodegradation of the above components in semi-continuous activated sludge (SCAS) units.

PRINCIPLE

The compound of interest is extracted into spectrograde hexane and the level present measured by ultraviolet absorption. The wavelength(s) of the absorption maxima and absorptivities in liters/g. cm. are as follows:

Aroclor 1242	245 nm.	37.0 ± 0.7 l/g cm
Aroclor 1142 Residue	248	40.2 ± 0.6
Arobrochlor 1232	248	59.8 ± 0.7
MCS-1016	245.5	36.1 ± 0.3
MCS-1043	244	48.9 ± 0.5
Aroclor 1221	245	66.4 ± 1.1
2,2'-Dichlorodiphenylether	273.5	8.50 ± 0.09
Trichlorodiphenylether	280 & 227.5	7.47 ± 0.07 & 63.1 ± 0.6

REAGENTS AND APPARATUS

1. Spectrograde hexane - Fisher Cat. No. H-334 or Mallinckrodt Cat. No. 5188.
2. Standard test materials -

Aroclor 1242	- Lot AK-255
Aroclor 1142 Residue	- OR-159809
Arobrochlor 1232	- OR-16882
MCS-1016	- OR-158591
MCS-1043	- OR-158591
Aroclor 1221	- Lot AK-2
2,2'-Dichlorodiphenylether	- OR-150661
Trichlorodiphenylether	- OR-174019
3. Undenatured absolute ethyl alcohol.
4. Cary Model 14 Recording Spectrophotometer with matched sets of 1.0, 2.0 and 5.0 cm. quartz cells, or equivalent.

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PROCEDURE

1. Extract the sample and a blank according to Analytical Chemistry Method No. 71-18 using spectrograde hexane concentrating the extracts to a final volume of 10 ml. as described.
2. Measure the absorption from 400 to 210 nm. of the concentrated blank and sample extracts from step 1 in suitable path length cells using spectrograde hexane as a reference.
3. Record the absorbance of the sample and blank at the maximum wavelength for the component of interest (listed in Principle section).

CALCULATIONS

$$\text{Milligrams of Component in SCAS unit} = \frac{(\text{Sample absorbance} - \text{blank absorbance})}{(\text{absorptivity})(\text{cell path, in cm.})} \times \frac{(0.01)(10^3)(1500)}{(\text{Sample volume, in ml.})}$$

$$\text{where absorptivity} = \frac{\text{absorbance}}{(\text{conc. in g/l})(\text{cell path, in cm.})}$$

Absorptivities for specific components are listed in Principle section.

RECOVERY DATA

Samples of activated sludge were spiked in duplicate at two levels with each component in undenatured absolute alcohol solution and analyzed by the above procedure.

Aroclor 1242	- 83.8 ± 1.3% recovered
Aroclor 1142 Residue	- 75.5 ± 2.4% recovered
Aroclor 1232	- 92.4 ± 1.7% recovered
MOS-1016	- 91.6 ± 1.2% recovered
MOS-1043	- 94.7 ± 1.0% recovered
Aroclor 1221	- 95.8 ± 1.4% recovered
2,2'-Dichlorodiphenylether	- 87.3 ± 4.2% recovered
Trichlorodiphenylether	- 95.1 ± 6.3% recovered

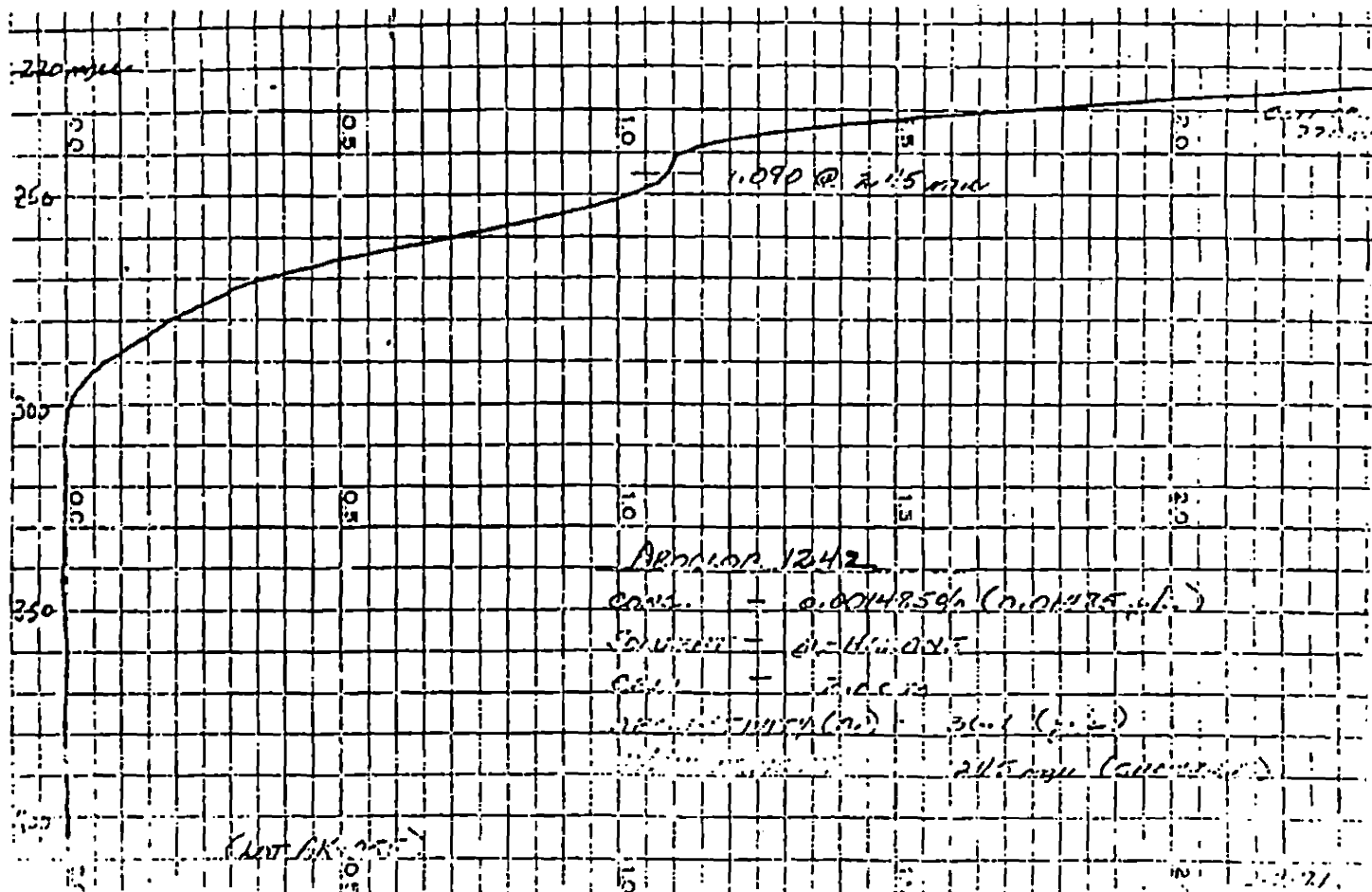
The levels selected were on either side of the level found in the SCAS units.

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NEV 029681

6/71 - O. Hicks, V. Saeger, E. S. Tucker



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Wavenumber

2200

2500

3000

3500

4000

Wavelength

0.0

0.5

1.0

1.5

2.0

WST @ 21/EAR

Beam

APOLAR 12.52 (APOLAR 12.21 + VI (5.06 mm))

COND. - 0.001485 cm (0.01485 mm)

SOLVENT - m-CLXDC

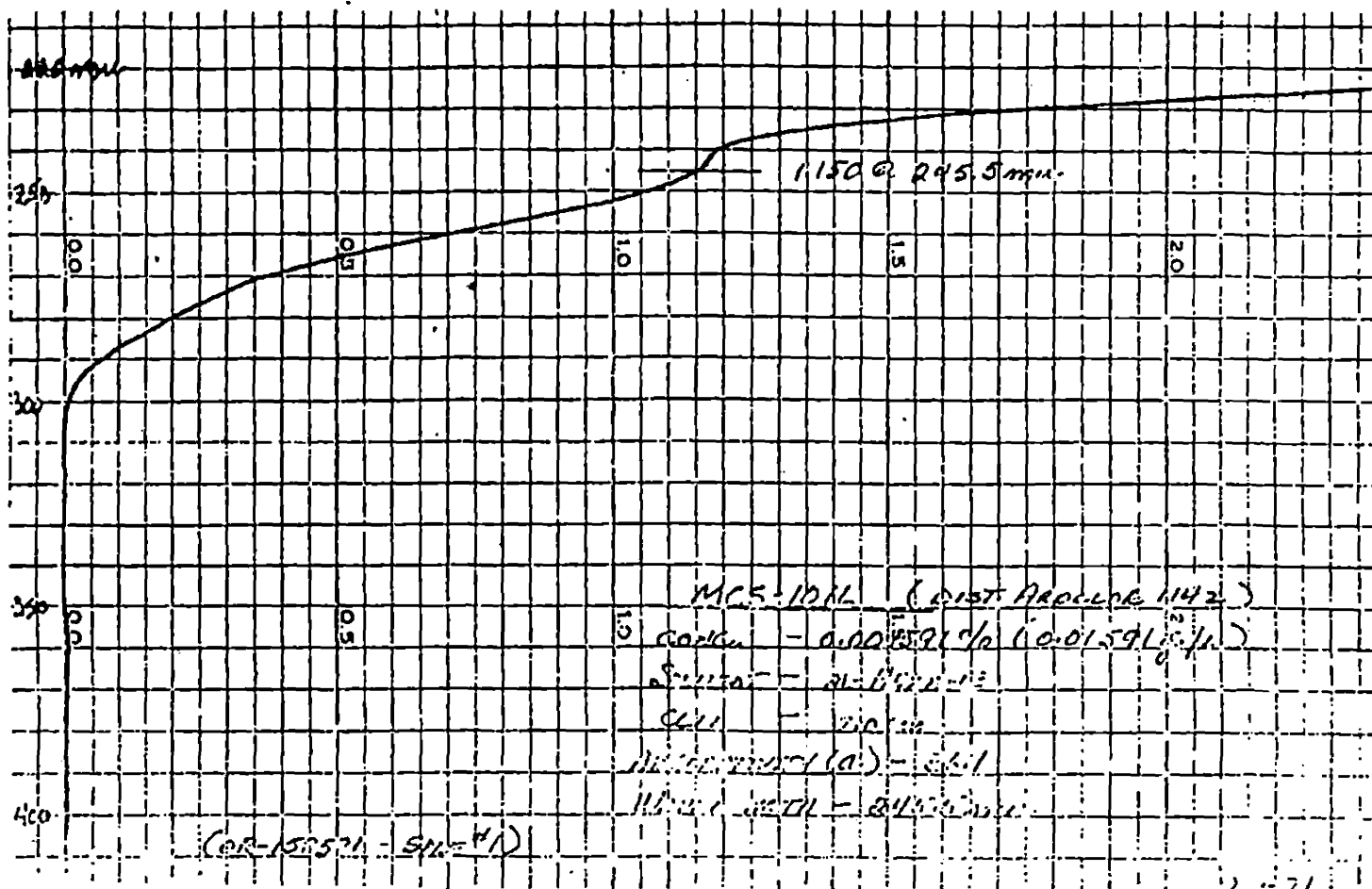
CELL - 7.0 mm

ABSORPTIVITY (C) = 57.07 (1/l.)

WAVELENGTH = 2.15 mm

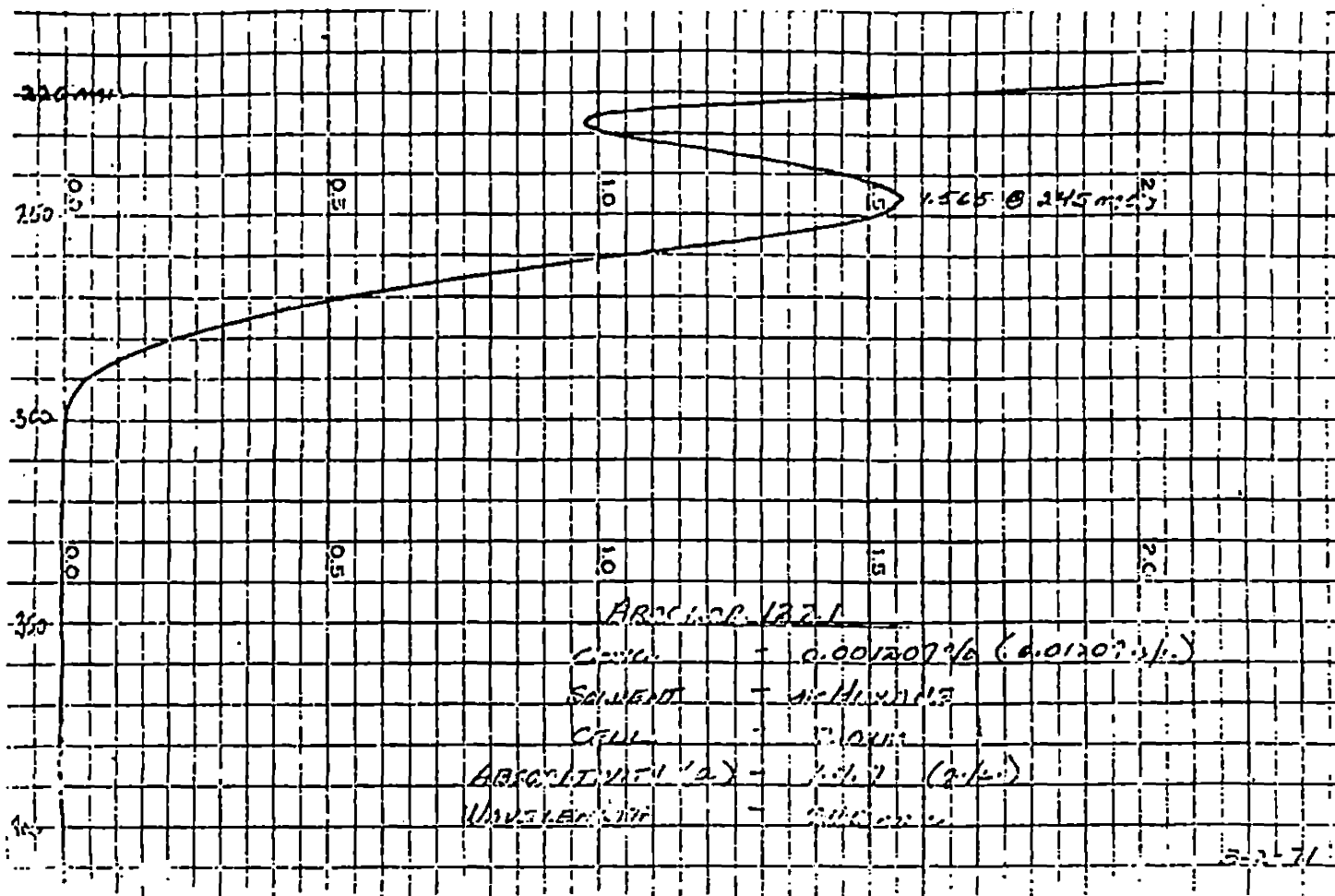
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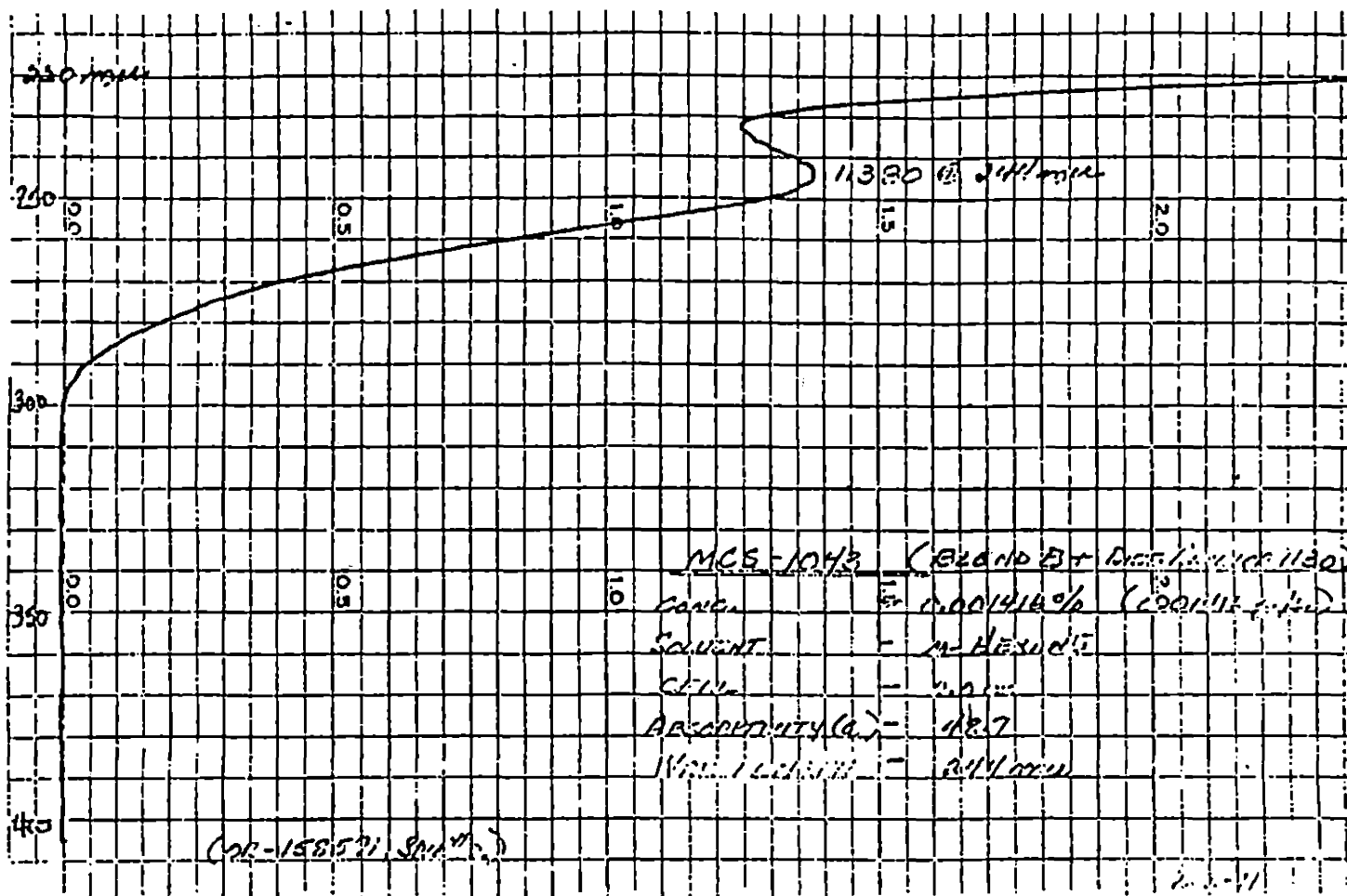


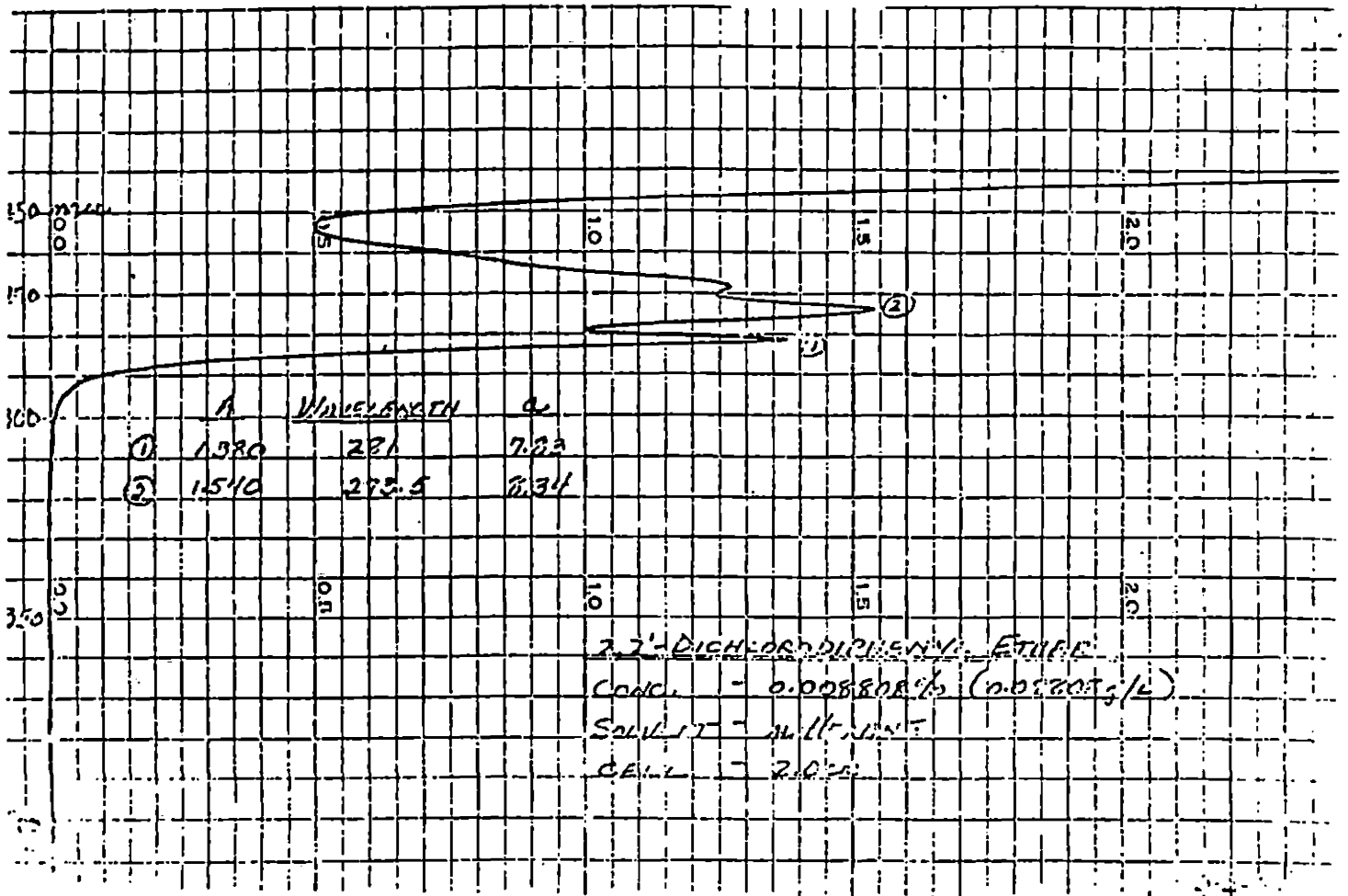
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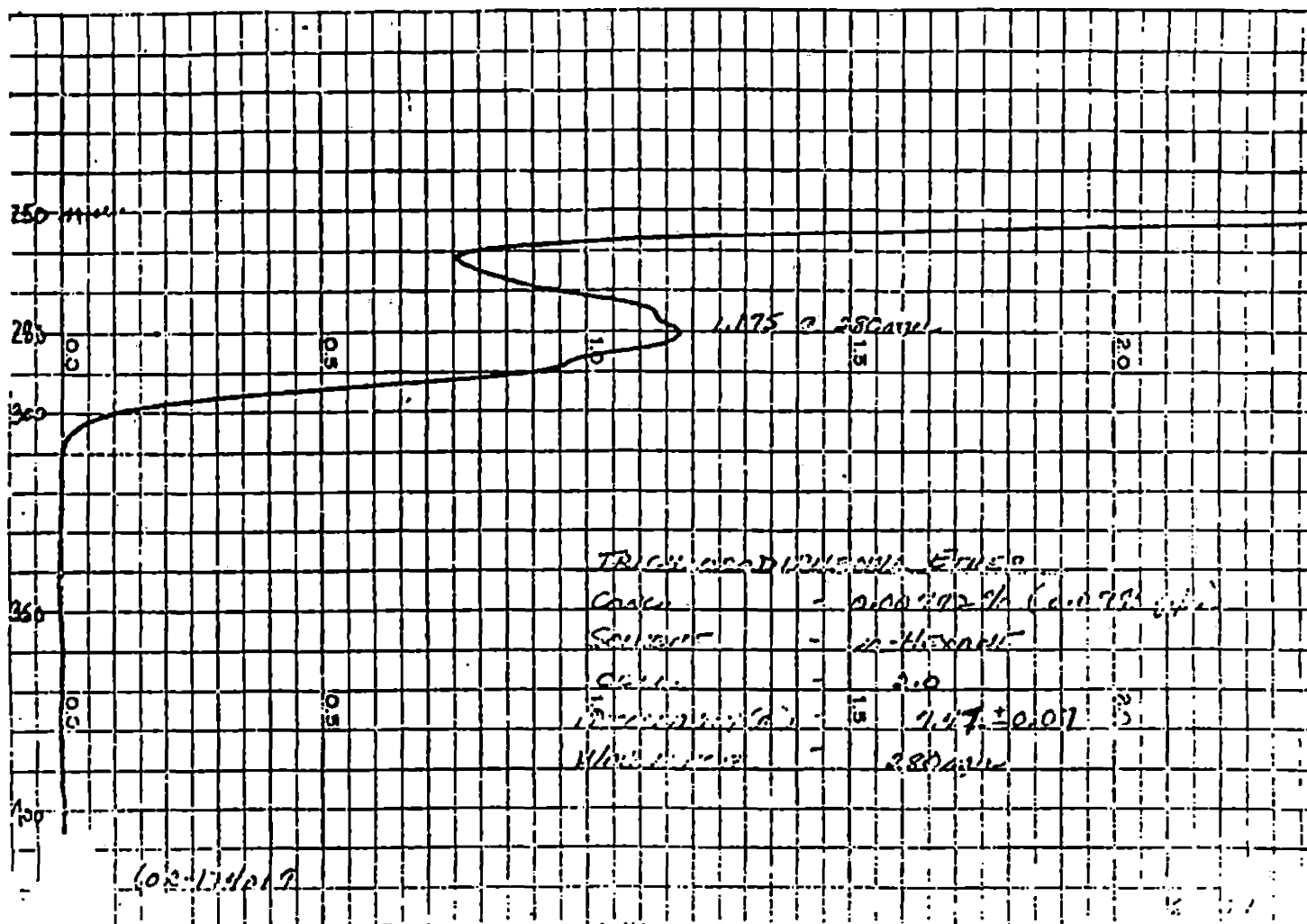
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