TECHNICAL NOTE

PROCESSING OF SL-4 ROLL 51, S190A UNFILTERED 2443 ORIGINAL

Prepared Under

Contract NAS 9-11500
Task Order HT-105

Prepared By

Harold E. Lockwood
Photoscientist

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PHOTOGRAPHIC TECHNOLOGY DIVISION
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS

PROCESSING OF SL-4 ROLL 51, S190A UNFILTERED 2443 ORIGINAL

This Report has been reviewed

and is approved.

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Photographic Technology Division

PROCESSING OF SL-4 ROLL 51, S190A UNFILTERED 2443 ORIGINAL

I. GENERAL:

The required yellow filter was not placed on the camera during the exposure of Skylab 4, S190A experiment, Roll 51. Roll 51 was film type 2443, Kodak Color Infrared Film, which results in an overexposed, predominantly magenta image when the yellow filter is omitted.

Radiometric or photometric data from Roll 51 was severely degraded because blue light, normally filtered out, contaminated all layers of the imagery.

PTD was instructed to process Roll 51 so that the results would appear near normal. Those results and the testing preliminary to processing the original are summarized here.

II. PRE-PROCESS TESTING:

Prior to processing Roll 51 extensive sensitometric and aircraft simulation tests were conducted to determine the character of the image degradation due to yellow filter omission. A speed loss was required for each layer varying from the largest loss required in the infrared sensitive layer (about 2 stops), to about 1 stop in the green sensitive layer and less than 1 stop in the red sensitive layer.

Eastman Kodak was directed to recommend a modified process for the Versamat 1811 EA-5 reversal chemical process which would correct the sensitometric results to near normal even though radiometric results cannot be corrected due to subject reflectance unknowns.

This process was termed cosmetically correct in project discussions.

Prior to receiving Kodak's recommendations, PTD conducted a test series as documented in Appendix A.

These tests resulted in an infrared layer loss of 1.3 stops, a red sensitive layer loss of 0.67 stops and green sensitive layer loss of 0.67 stops. The operating parameters included the addition of Anti-Fog #6 to the First Developer, Neutralizer, and Prehardener, lowering of color developer pH to 11.10 and an increase in machine speed to 10 feet per minute. These results demonstrated the difficulties in selectively changing effective speed of the three layers of 2443 and provided an insight into some possible methods for achieving some changes.

Eastman Kodak's recommendations, based on experience at their research facility were:

- Change color developer pH to 11.0 from 11.60
- Add MX-870 neutralizer to EA-5 neutralizer in a 1:1 ratio
- Add Anti-Fog #6 to the EA-5 neutralizer in 50 milligrams per liter increments to reduce cyan dye layer (infrared sensitive) speed as necessary.

III. ORIGINAL PROCESSING:

The original roll of 2443, Roll 51, was processed by PTD in a Versamat 1811 with EA-5 chemistry modified as follows:

- A color developer pH of 11.05
- MX-870 neutralizer added to EA-5 neutralizer in a 1:1 ratio
- The first developer temperature was lowered 10°F. to 100°F.

The certification sensitometric curve for Roll 51 is attached for reference as Figure 1.

IV. CONCLUSIONS:

The process produced results which satisfied the cosmetically correct specification.

A review of the Roll 51 imagery demonstrated that densities were close to those predicted and on the straight line portion of the characteristic curve.

Color balance was acceptable showing a noticeable color change only in water which appeared magenta rather than blue.

The sensitometric speed relationships were acceptable with the infrared sensitive layer being about one-half stop fast and the visual speed about one-half stop fast.

DATE 5/30/74 CONTROL # Imod /0mm TASK Certification PREPARED BY Roll 51

FILM 2443 EMULSION # 116-3 MFG EK EXPIRATION DATE

EXPOSURE DATA		PROCESSING DATA		DENSITOMETRY	
SENSITOMETER	I-B	PROCESSOR	Versamat 1811 #3	INSTRUMENT	MacBeth
ILLUMINANT	2850 °K	CHEMISTRY	EA-5 mod.	TYPE	TD504
TIME	1/50 SEC.	SPEED	TANKS 7 FPM	APERTURE SIZE	3 MM
FILTER	5500°K	TEMP °F	100 TIME	FILTER	Visual

SPEED ( ) D-MAX GAMMA BASE + FOG

CHEMICAL ANALYSIS

SP GR

pH

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TRP

KB_r

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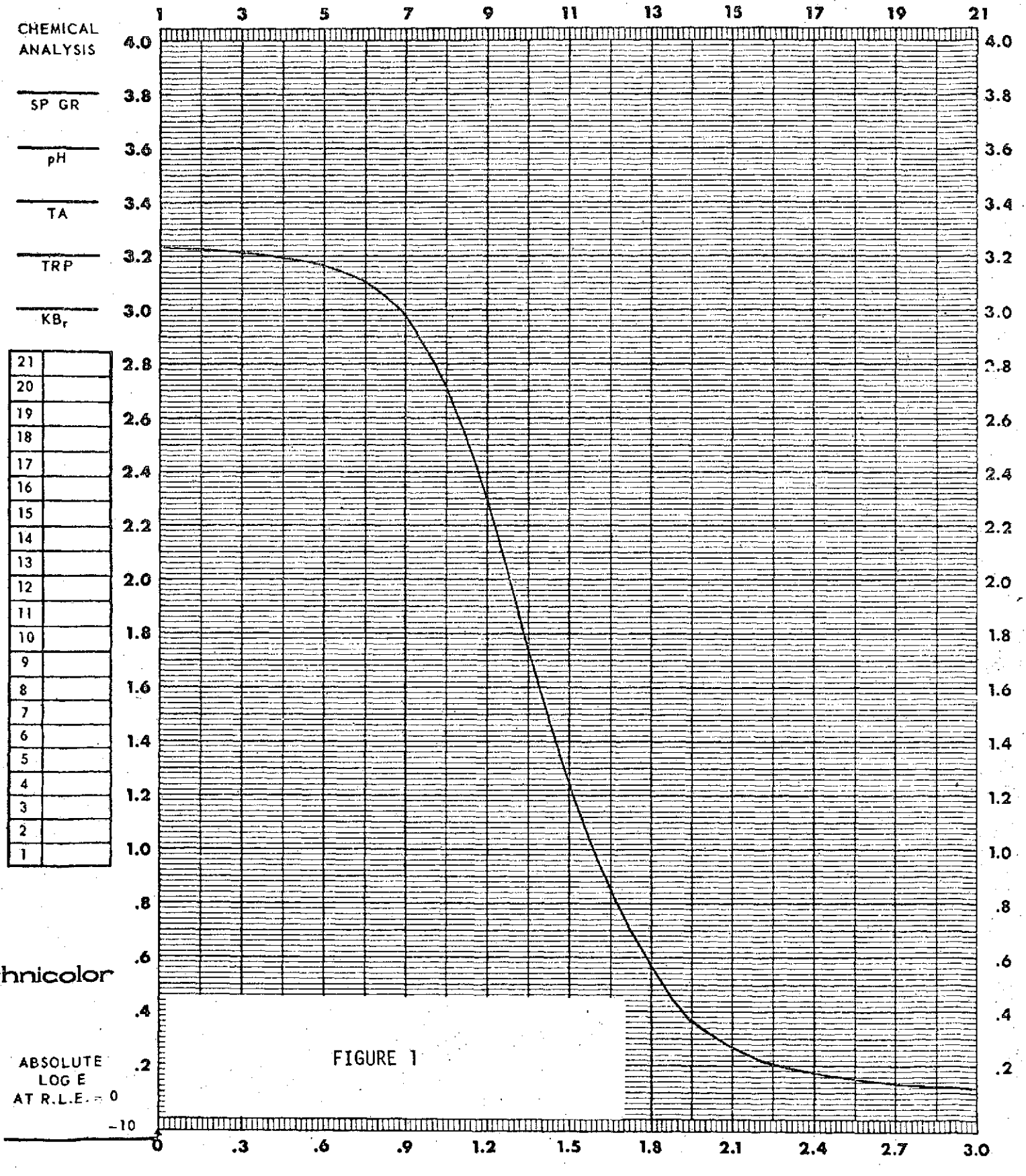

Technicolor

ABSOLUTE LOG E AT R.L.E. = 0

-10

FIGURE 1

DATE 5/30/74 CONTROL # Imod 70mm TASK Certification PREPARED BY Roll 51

FILM 2443 EMULSION # 116-3 MFG EK EXPIRATION DATE

EXPOSURE DATA	PROCESSING DATA	DENSITOMETRY
SENSITOMETER I-B	PROCESSOR Versamat 1811 #3	INSTRUMENT MacBeth
ILLUMINANT 2850 °K	CHEMISTRY EA-5 mod	TYPE TD504
TIME 1/50 SEC.	SPEED TANKS 7 FPM	APERTURE SIZE 3 MM
FILTER 5500°K	TEMP °F 100 TIME	FILTER Status A

SPEED ( ) D-MAX GAMMA BASE + FOG

CHEMICAL ANALYSIS

SP GR

pH

TA

TRP

KB_r

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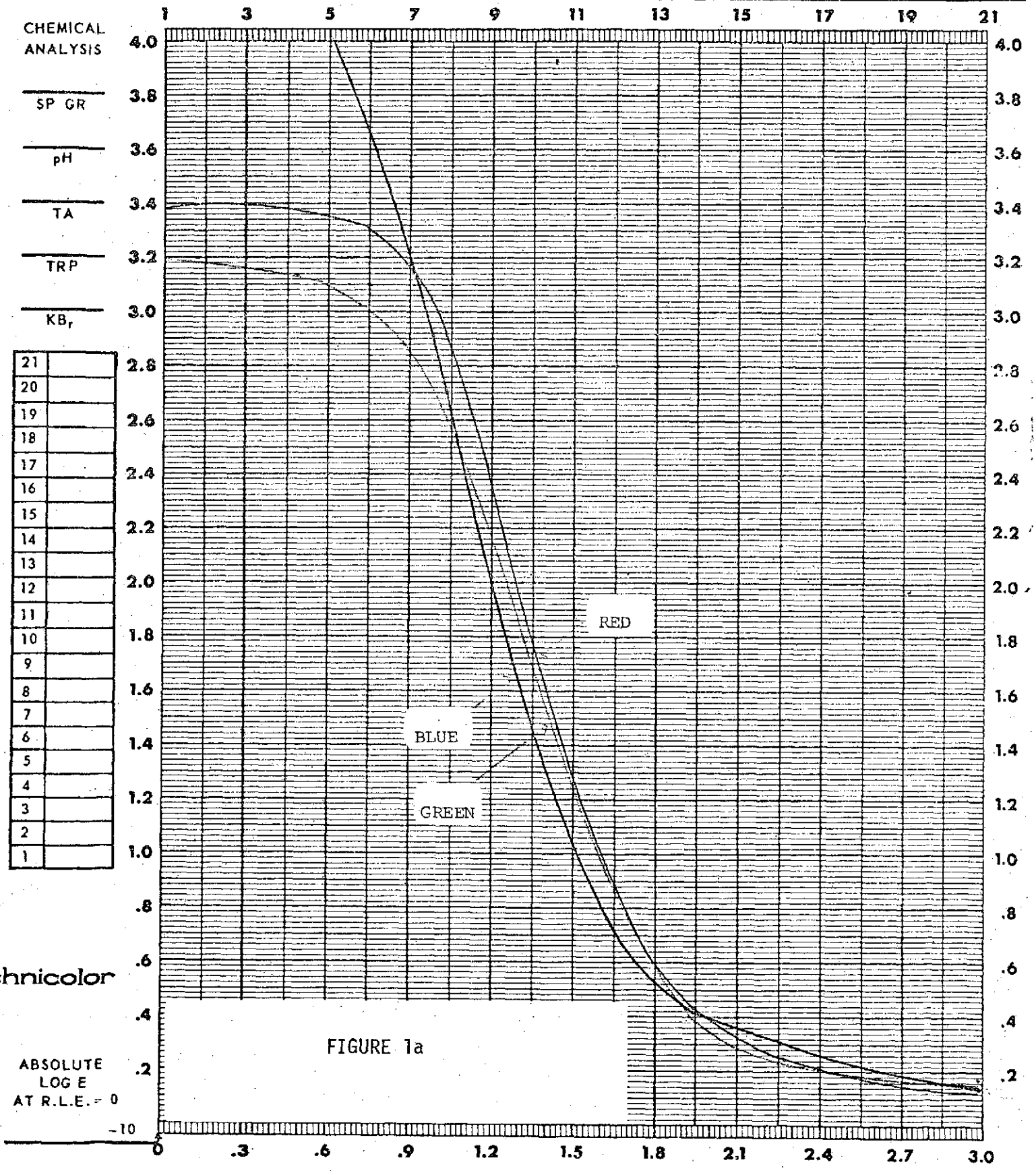

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FIGURE 1a

ABSOLUTE LOG E AT R.L.E. = 0

-10

APPENDIX A

PTD TESTS ON TYPE 2443 FILM

EXPOSED WITHOUT A WRATTEN 12 FILTER

Technicolor

INTEROFFICE CORRESPONDENCE

TO Harold Lockwood **DATE** June 10, 1974

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FROM Lincoln Perry

SUBJECT Process Modification Tests for Unfiltered 2443 Film

Attached is a summary of process modification tests performed by Chuck Klein, on May 18 and 20, 1974.

These tests, while not producing the desired final result, provided valuable information of the effect of chemical and mechanical variations on 2443 film. The knowledge gained was put to good use when the flight film was processed.

Lincoln Perry

Lincoln Perry, Supervisor
Chemical Mix and Process Control

LP/rc

TESTS ON TYPE 2443 FILM
EXPOSED WITHOUT A WRATTEN 12 FILTER

I. PURPOSE:

To produce a modified EA-5 process that would yield an apparently normal sensitometric step tablet, even though the film had been exposed without a Wratten 12 filter.

II. APPARATUS:

A. Kodak 1811 Color Processor with EA-5 Color Chemistry
B. Mead/Data Densitometer System
C. Kodak I-B Sensitometer

III. MATERIALS:

A. Film type 2443-116-3, normally exposed (1/50, 5500°K, Wratten 12 filter)
B. Film Type 2443-116-3, exposed (1/50, 5500°K filter only)
C. Kodak Anti-Fog Agent #6
D. 18 Normal Sulphuric Acid (18N-H_2SO_4)

IV. TEST PROCEDURES:

The first two tests involved the processing of two sensitometric strips exposed (1) normally, and (2) with 5500°K filtration only. These strips were processed to standard sensitometric control (110°F. first developer, 7 fpm) for that film type. The resultant plots of these strips graphically depicted how far the unfiltered layers would have to be shifted to match the standard control for 2443-116-3 with Wratten 12 filtration. At a density of 1.40, the RED layer required a speed loss of 0.54; the GREEN layer required a speed loss of 0.21; and the BLUE layer required a speed loss of 0.35 log exposure increments.

A third processing test was run to determine the effect of shorter processing time on the desired curve shape. The processor speed was increased from 7 to 10 feet per minute. The overall reduction in process time produced some desirable affects, however, the test yielded an undesirable toe shape to the D-log E curve. It was then decided that chemical additions could be used to selectively retard development in the individual layers without the undesirable affects.

Therefore, for Tests 4 and 5, two additions of Anti-Fog Agent #6 were made to the Prehardener. The sensitometric results showed a shifting of all the layers closer to the desired speed and density. Unfortunately, an undesirable "bump" was produced in the toe of the BLUE layer.

Tests 6 and 7 were pursued to correct the condition of the BLUE layer. By adding sulfuric acid to the color developer, the pH was lowered from 11.65 (normal) to 11.10. The resultant plots of these tests showed a great improvement in the toe shape of the BLUE layer; the remaining layers were virtually unaffected in any area that could be significant. In addition, these tests produced a one-third of a stop gain in speed.

In an attempt to further decrease the speed of all of the layers, an eighth test was conducted. By the addition of Anti-Fog Agent #6 to the Neutralizer, a speed decrease was evident in the GREEN and BLUE layers, and the BLUE layer toe shape was also improved slightly. In any of the measurable portions of the D-log E curve, there was very little affect on the RED layer.

Test 9 was an attempt to directly retard development in the first developer. The addition of Anti-Fog Agent #6 yielded favorable results in that the speed of the RED and GREEN layers decreased

significantly, with only a slight decrease in the BLUE layer. Unfortunately, the toe shape of the BLUE layer was not significantly improved.

At this stage in testing, the processor was covered to retard oxidation and possible contamination and left at room temperature for a 48-hour period. A test was then conducted to determine the extent of oxidation of the Anti-Fog Agent and the effect on 2443 without the Wratten 12 filter.

Two final tests were made after the addition of Anti-Fog Agent #6 to the first developer. Results of the tests and the cumulative results of the entire series are listed in the following section.

IV. TEST RESULTS:

Cumulative results of the aforementioned tests netted the following results:

Layers	Speed Decrease	Comments
Red	1 1/3 stops	1/2 stop short of desired
Green	2/3 stop	.01 log E over desired
Blue	2/3 stop	1/3 stop short of desired

Sensitometric curves, numbered to correspond with test numbers, are attached for your reference.

DATE 5-18-74 CONTROL # ① TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA	PROCESSING DATA	DENSITOMETRY
SENSITOMETER IB	PROCESSOR 1211 #3	INSTRUMENT MacBeth / SPEED ( )
ILLUMINANT 2850 °K	CHEMISTRY EA 5	TYPE TD504 / D-MAX
TIME 1/50 SEC.	SPEED ___ FEET 7 PER	APERTURE SIZE 3 MM / GAMMA
FILTER 5500 + Wr 12	TEMP °F 110 TIME ___	FILTER Visual / BASE + FOG

CHEMICAL ANALYSIS

SP GR

pH

TA

TRP

KBr

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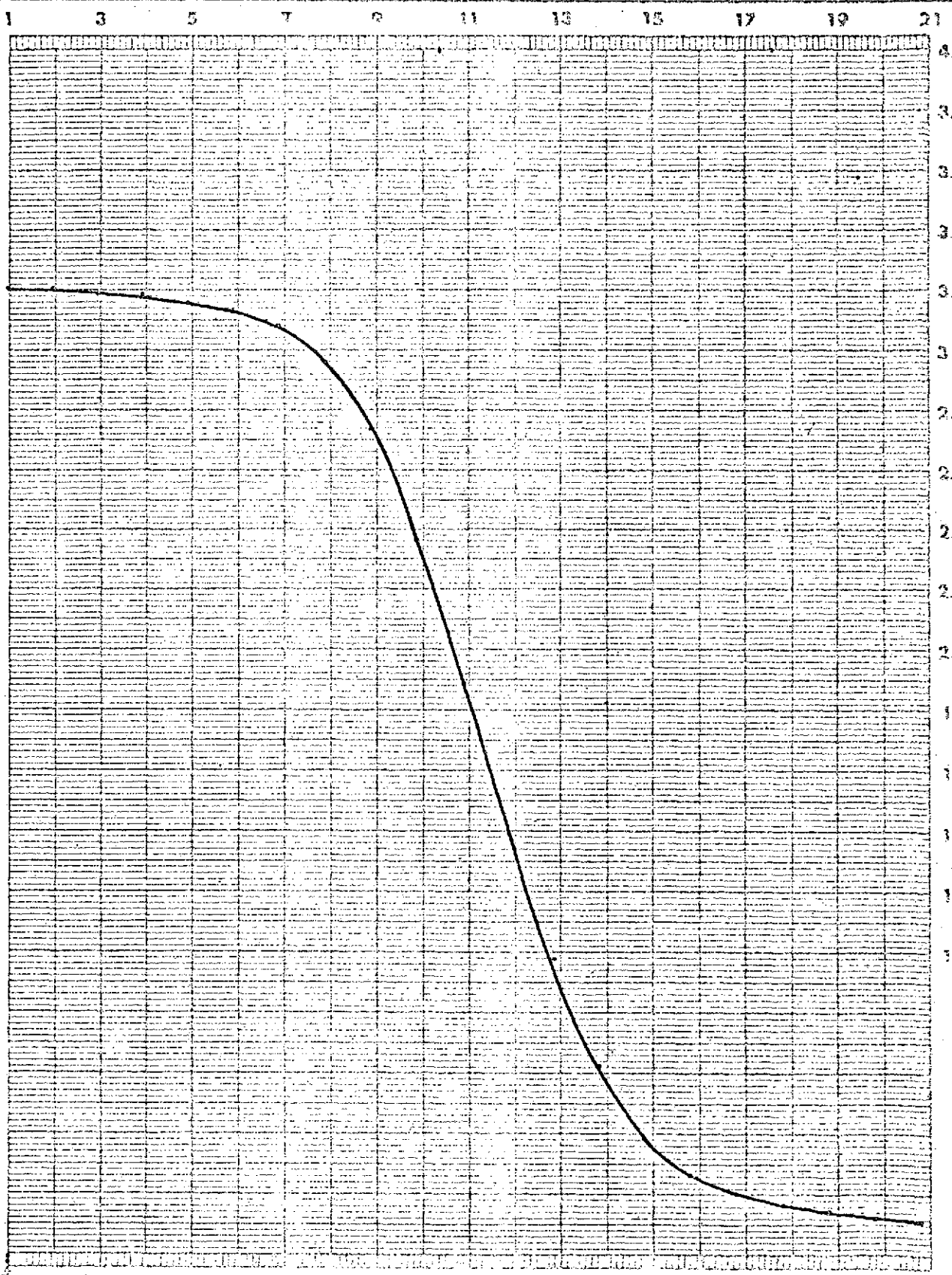

Technicolor

ABSOLUTE LOG E AT R.L.E. = 0

-10

DATE 5-18-74 CONTROL # 1 TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA	PROCESSING DATA	DENSITOMETRY
SENSITOMETER 1B	PROCESSOR 1811 #3	INSTRUMENT MacBeth / SPEED ( )
ILLUMINANT 2850 °K	CHEMISTRY EA 5	TYPE TD504 / D-MAX
TIME 1/50 SEC.	SPEED ____ TANKS 7 FPM	APERTURE SIZE 3 MM / GAMMA
FILTER 5500 wr 12	TEMP °F 110 TIME ____	FILTER STATUS A / BASE + FOG

CHEMICAL ANALYSIS

SP GR

pH

TA

TRF

KBr

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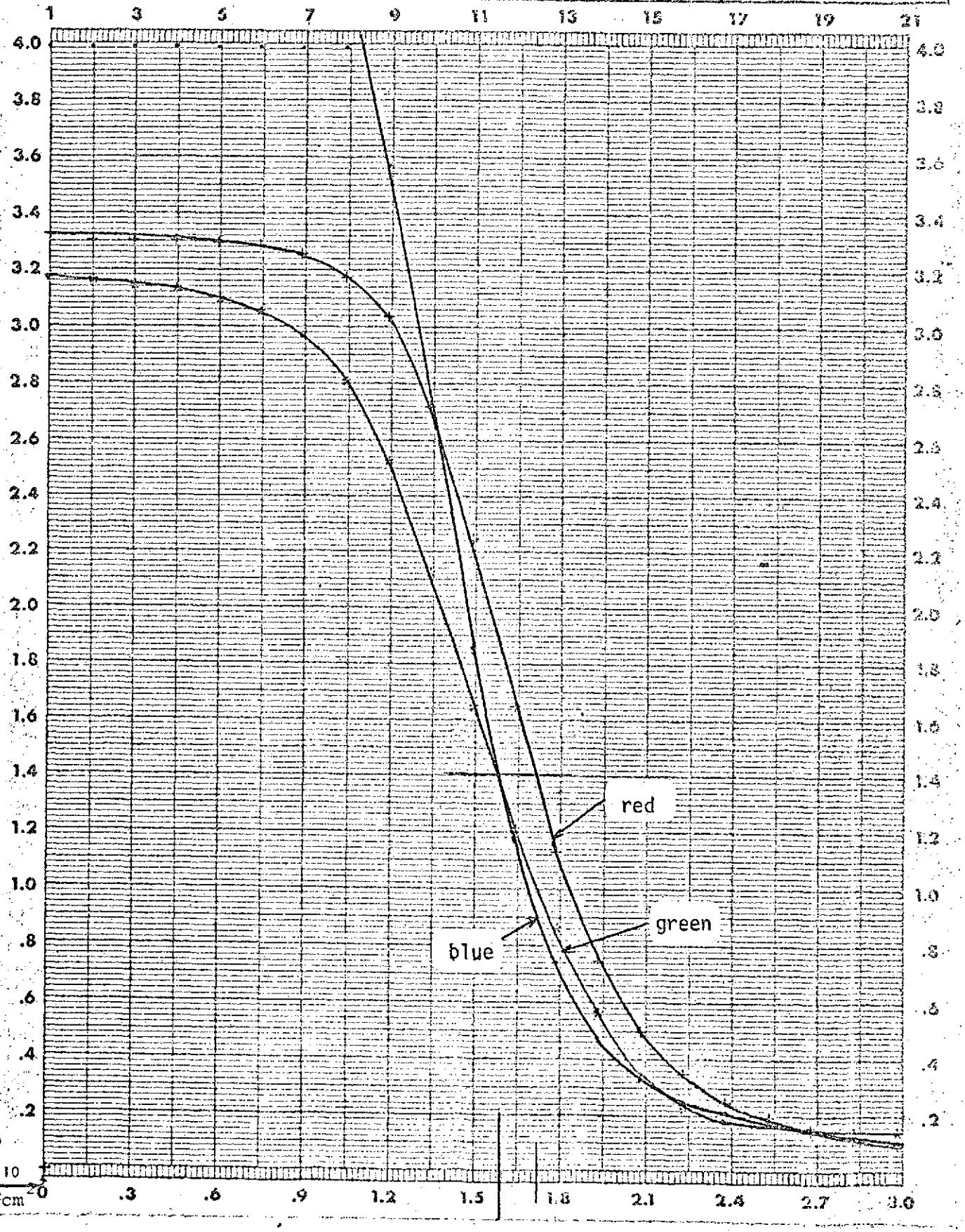

Technicolor

+R +G +B

ABSOLUTE LOG E AT R.L.E. = 0

-10

mcs ergs/cm^2 0

DATE 5-18-70 CONTROL # (2) TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA	PROCESSING DATA	DENSITOMETRY
SENSITOMETER I-B	PROCESSOR 1811 #3	INSTRUMENT MacBeth / SPEED ( )
ILLUMINANT 2850 °K	CHEMISTRY EA-5	TYPE TD504 / D-MAX
TIME 1/50 SEC.	SPEED ____ TANKS 7 PPM	APERTURE SIZE 3 MM / GAMMA
FILTER 5500	TEMP °F 110 TIME ____	FILTER VISUAL / BASE + FOG

CHEMICAL ANALYSIS

SP. GR

pH

TA

TRP

KB_r

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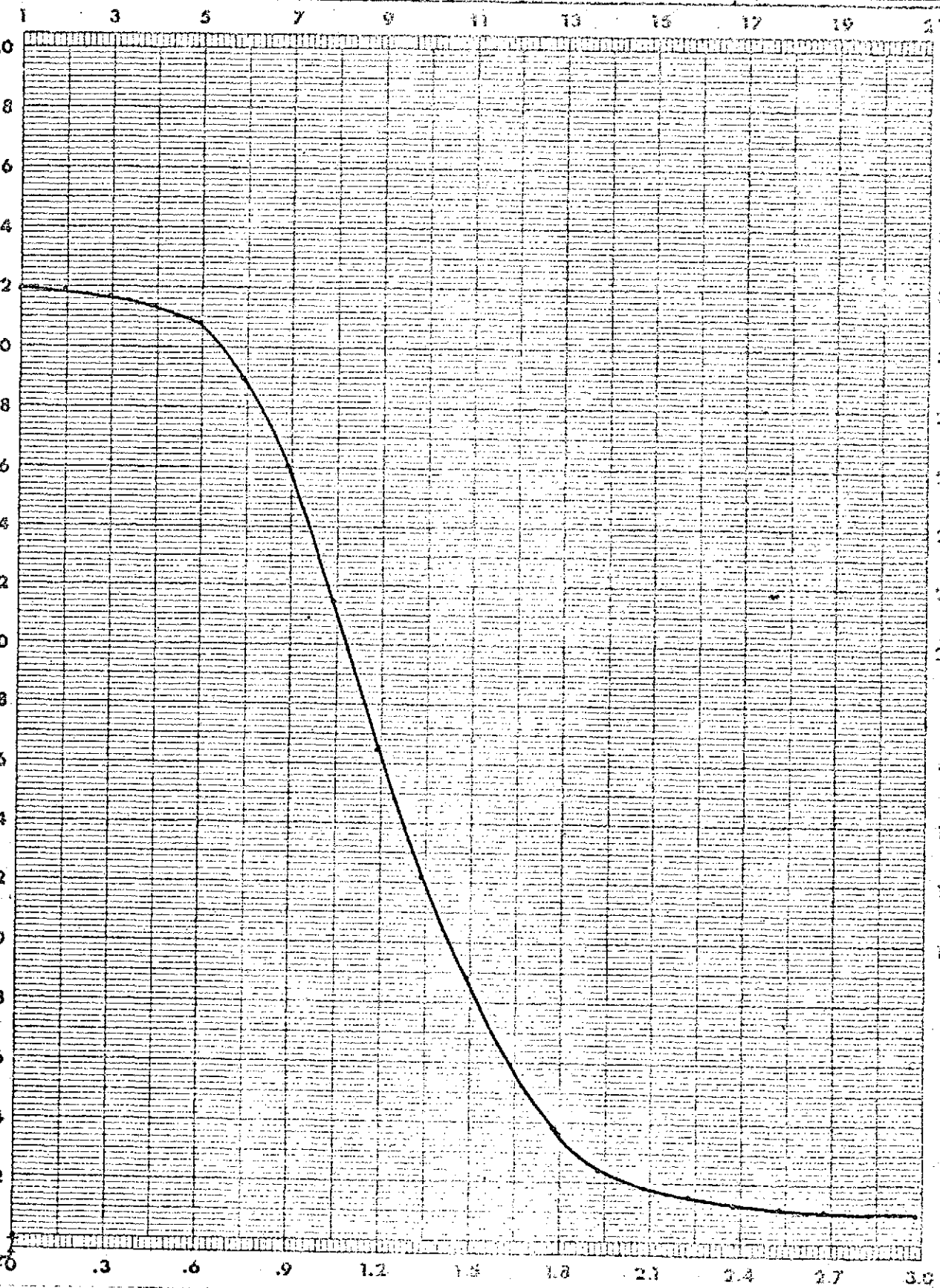

Technicolor

ABSOLUTE LOG E AT R.L.E. = 0

-10 -20

MCS ergs/cm²

DATE 5-18-74 CONTROL # (2) TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA	PROCESSING DATA	DENSITOMETRY
SENSITOMETER EG TB	PROCESSOR 1811 #3	INSTRUMENT MacBeth / SPEED ( )
ILLUMINANT 2850 °K	CHEMISTRY CA-5	TYPE TD504 / D-MAX
TIME 1/50 SEC.	SPEED . TANKS 7 FPM	APERTURE SIZE 3 MM / GAMMA
FILTER 5500	TEMP °F 110 TIME	FILTER STATUS A / BASE + FOG

CHEMICAL ANALYSIS

SP GR

pH

TA

TRP

KBr

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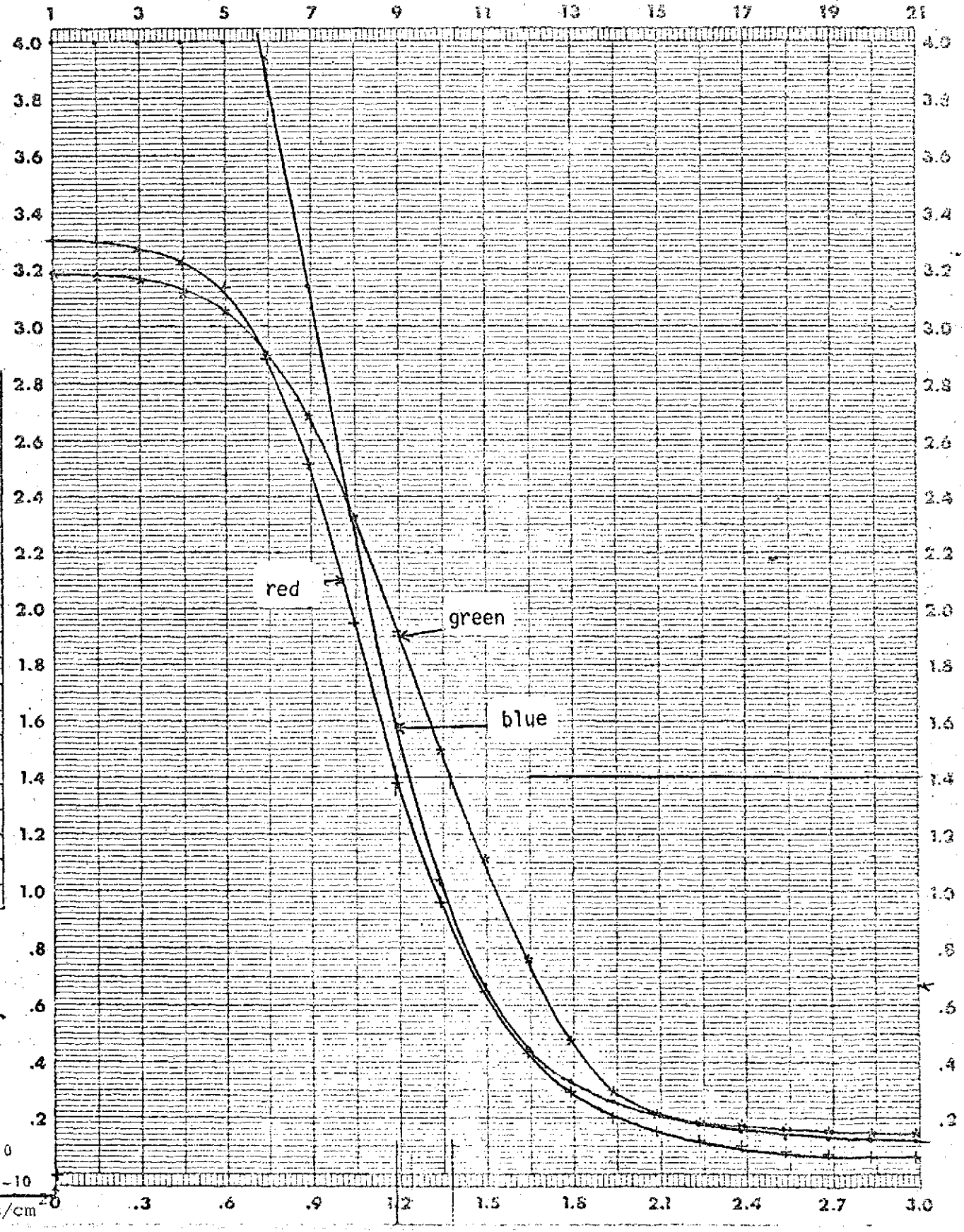

Technicolor

+R +G +B

ABSOLUTE LOG E AT R.L.E. = 0

-10

mcs ergs/cm²

(3)

DATE 5-18-73 CONTROL # _____ TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA	PROCESSING DATA	DENSITOMETRY
SENSITOMETER I-B	PROCESSOR 1811 #3	INSTRUMENT MacBeth
ILLUMINANT 2850 °K	CHEMISTRY EA-5	TYPE TD 504
TIME 1/50 SEC.	SPEED _____ TANKS 10 FPM	APERTURE SIZE 3 MM
FILTER 5500	TEMP °F 110 TIME _____	FILTER VISUAL

SPEED ( ) _____
D-MAX _____
GAMMA _____
BASE + FOG _____

CHEMICAL ANALYSIS

SP. GR _____

pH _____

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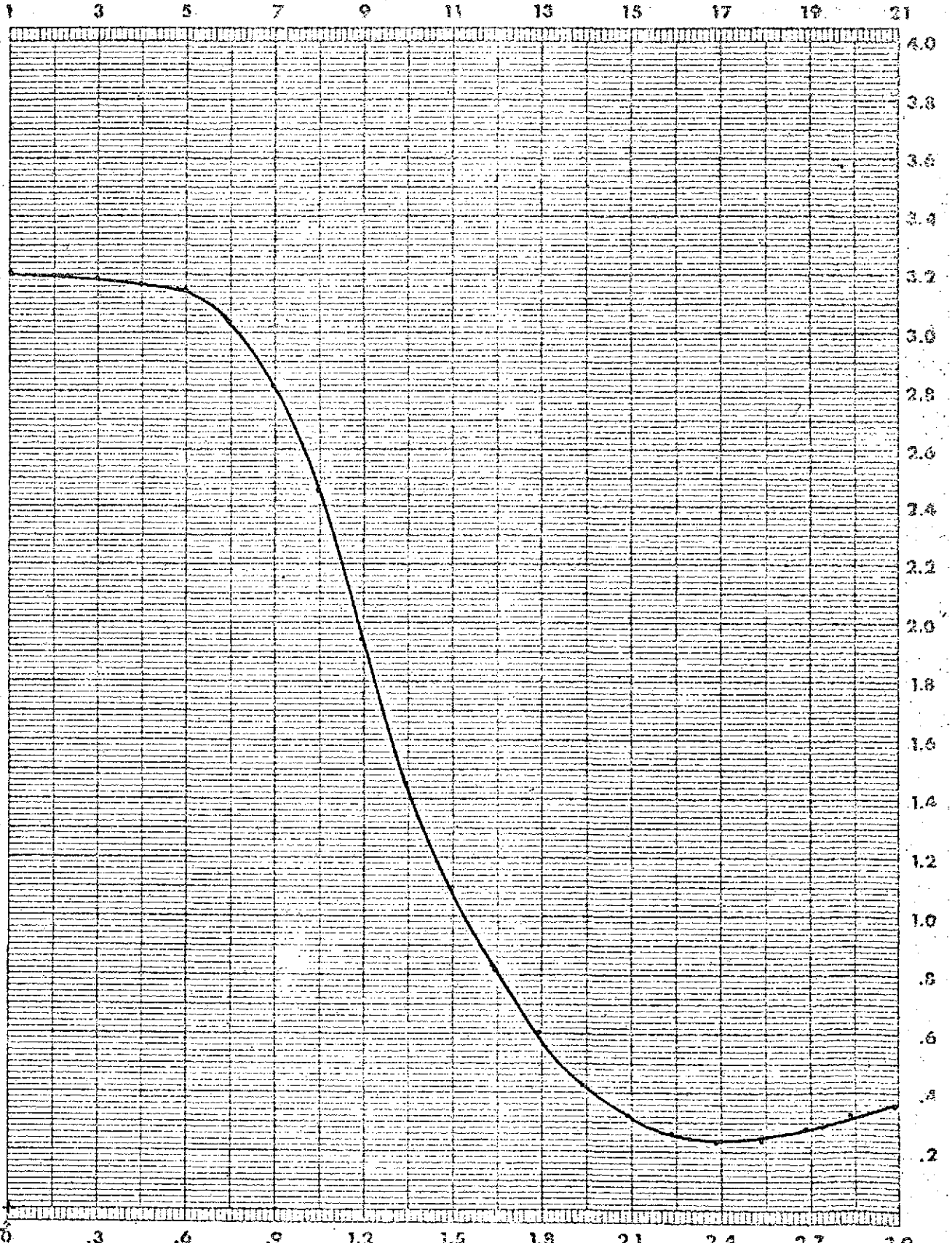

Technicolor

ABSOLUTE LOG E AT R.L.E. = 0

-10^{-20} mcs ergs/cm

DATE 5-18-74 CONTROL # (3) TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA	PROCESSING DATA	DENSITOMETRY
SENSITOMETER EB	PROCESSOR 1811 #3	INSTRUMENT Macbeth
ILLUMINANT 2850 °K	CHEMISTRY EA 5	TYPE TD504
TIME 1/60 SEC.	SPEED ____ TANKS 10 FPM	APERTURE SIZE 3 MM
FILTER 5500	TEMP °F 110 TIME ____	FILTER STATUS A
		SPEED ( ) ____
		D-MAX ____
		GAMMA ____
		BASE + FOG ____

CHEMICAL ANALYSIS

SP. GR

pH

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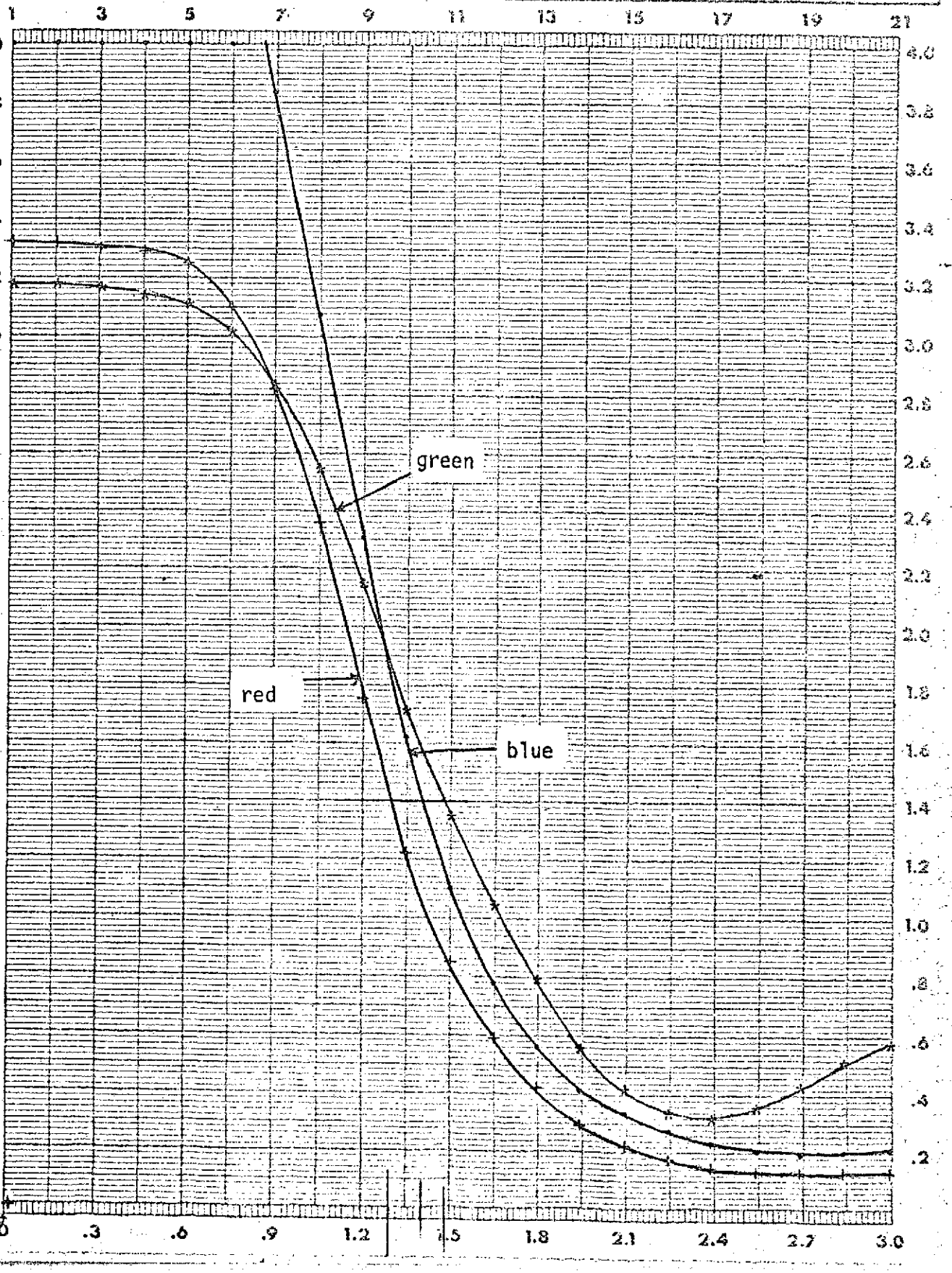

Technicolor

+R *G •B

ABSOLUTE LOG E AT R.L.E. = 0

10^{-10} mcs ergs/cm

(4)

DATE 5-18-74 CONTROL # _____ TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA	PROCESSING DATA	DENSITOMETRY
SENSITOMETER I-B	PROCESSOR 1811	INSTRUMENT MacBeth
ILLUMINANT 2850 °K	CHEMISTRY EA-5	TYPE TD504
TIME 1/50 SEC.	SPEED _____ TANKS 7 RPM	APERTURE SIZE 3 MM
FILTER 5500	TEMP °F 110 TIME _____	FILTER VISUAL
		SPEED ( ) _____
		D-MAX _____
		GAMMA _____
		BASE + FOG _____

CHEMICAL ANALYSIS

SP GR

pH

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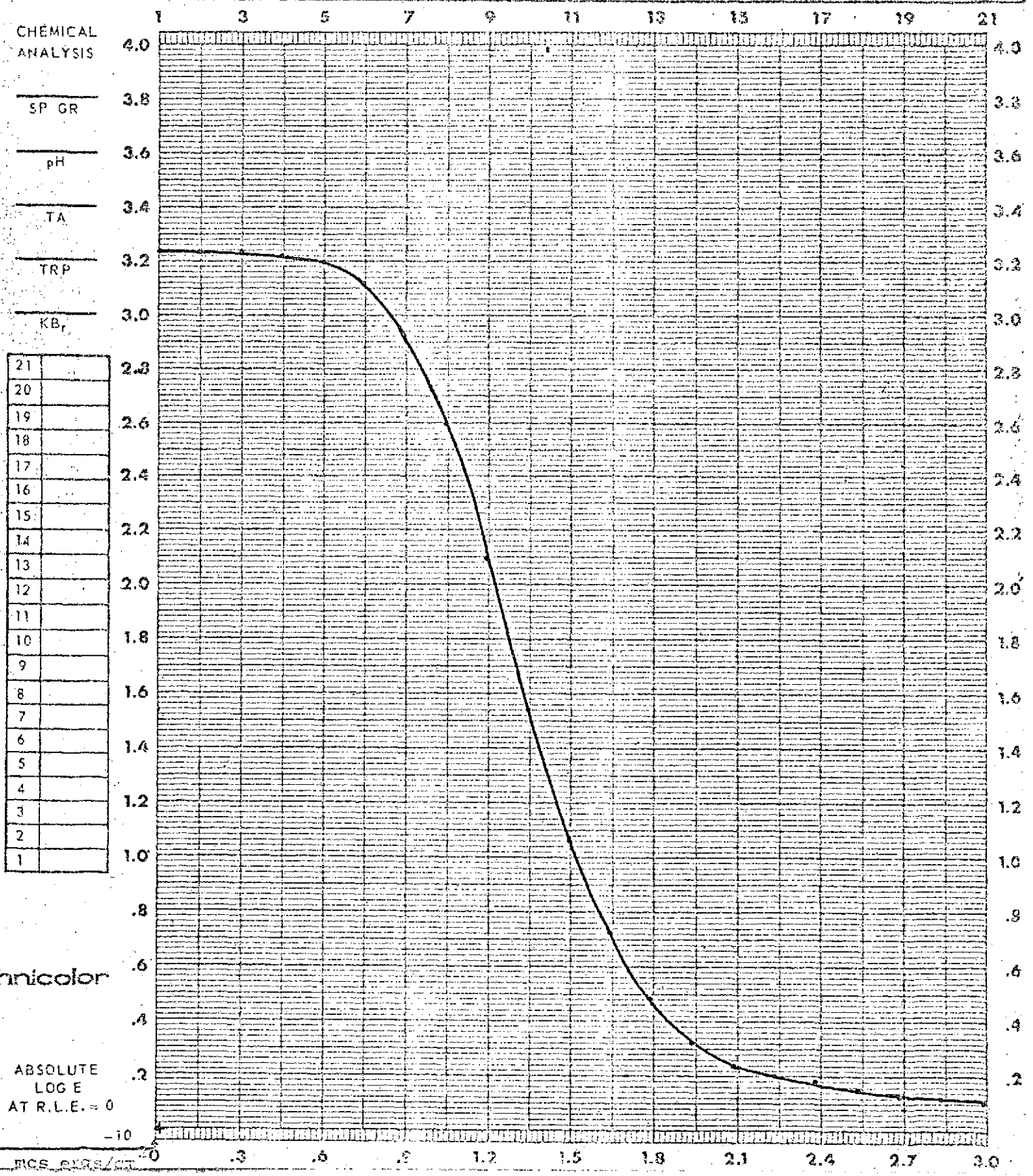
TRP

KB_r



DATE 5-18-74 CONTROL # 4 TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA	PROCESSING DATA	DENSITOMETRY
SENSITOMETER A-B	PROCESSOR 1811	INSTRUMENT MacBeth
ILLUMINANT 2850 °K	CHEMISTRY EA 5	TYPE TD50f
TIME 1/50 SEC.	SPEED _____ TANKS 7 FPM	APERTURE SIZE 3 MM
FILTER 5500	TEMP °F 110 TIME _____	FILTER STATUS A
		SPEED ( ) _____
		D-MAX _____
		GAMMA _____
		BASE FOG _____

CHEMICAL ANALYSIS

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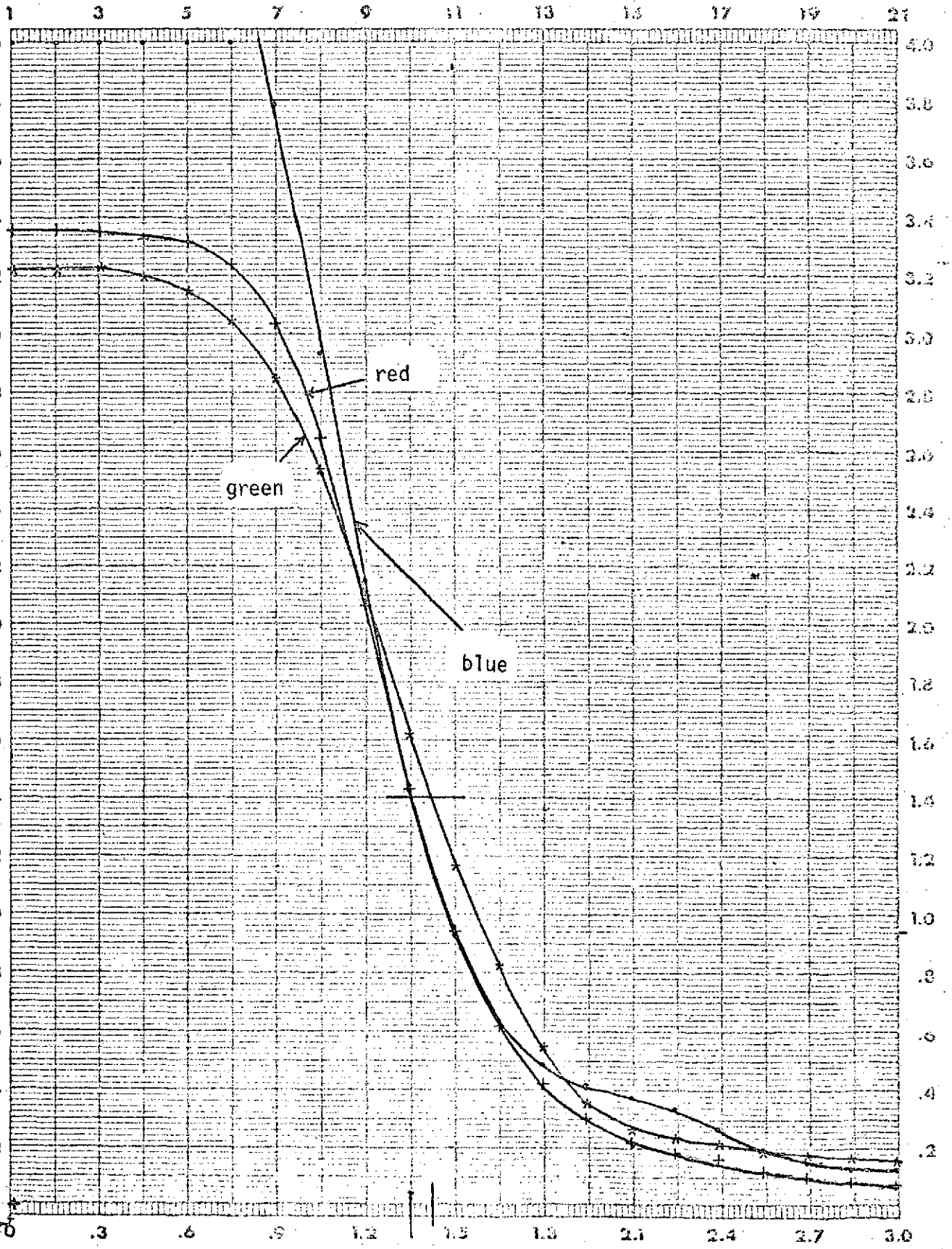

Technicolor

+R *G •B

ABSOLUTE LOG E AT R.L.E. = 0

-10

mcs ergs/cm²

(5)

DATE 5-18-74 CONTROL # _____ TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA	PROCESSING DATA	DENSITOMETRY
SENSITOMETER I-B	PROCESSOR 1811	INSTRUMENT MacBeth
ILLUMINANT 2850 °K	CHEMISTRY E-5	TYPE TD504
TIME 1/50 SEC.	SPEED _____ TANKS 7 FPM	APERTURE SIZE 3 MM
FILTER 5500	TEMP °F 110 TIME _____	FILTER VISUAL
		SPEED ( ) _____
		D-MAX _____
		GAMMA _____
		BASE + FOG _____

CHEMICAL ANALYSIS

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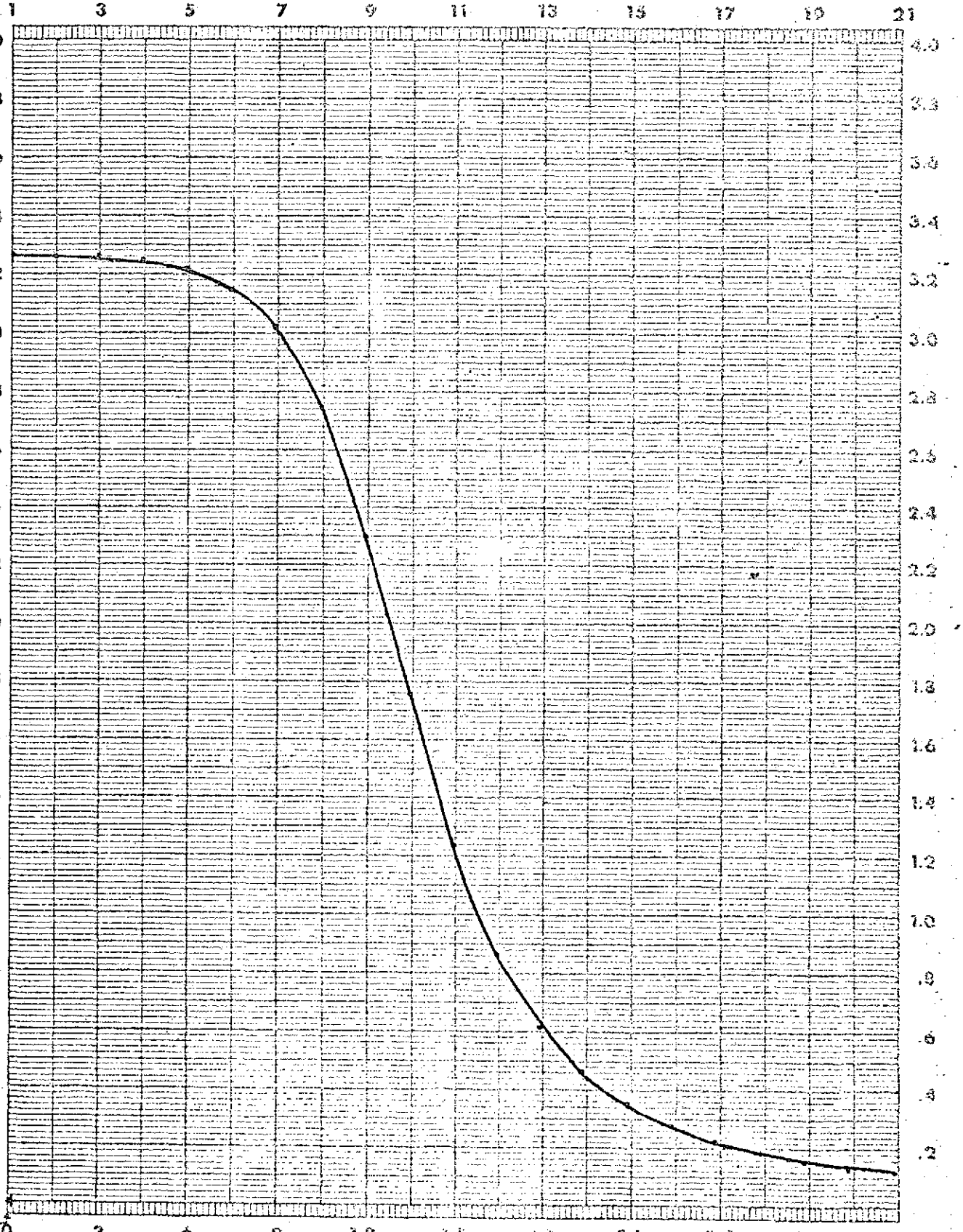

Technicolor

ABSOLUTE LOG E AT R.L.E. = 0

-10

mcs ergs/cm²

DATE 5-18-74 CONTROL # (5) TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA	PROCESSING DATA	DENSITOMETRY
SENSITOMETER I-B	PROCESSOR 1811	INSTRUMENT Mac Beth
ILLUMINANT 2850 °K	CHEMISTRY EA-5	TYPE TD 504
TIME 1/50 SEC.	SPEED _____ TANKS 7 FPM	APERTURE SIZE 3 MM
FILTER 5500	TEMP °F 110 TIME _____	FILTER STATUS A
		SPEED ( ) _____
		D-MAX _____
		GAMMA _____
		BASE + FOG _____

CHEMICAL ANALYSIS

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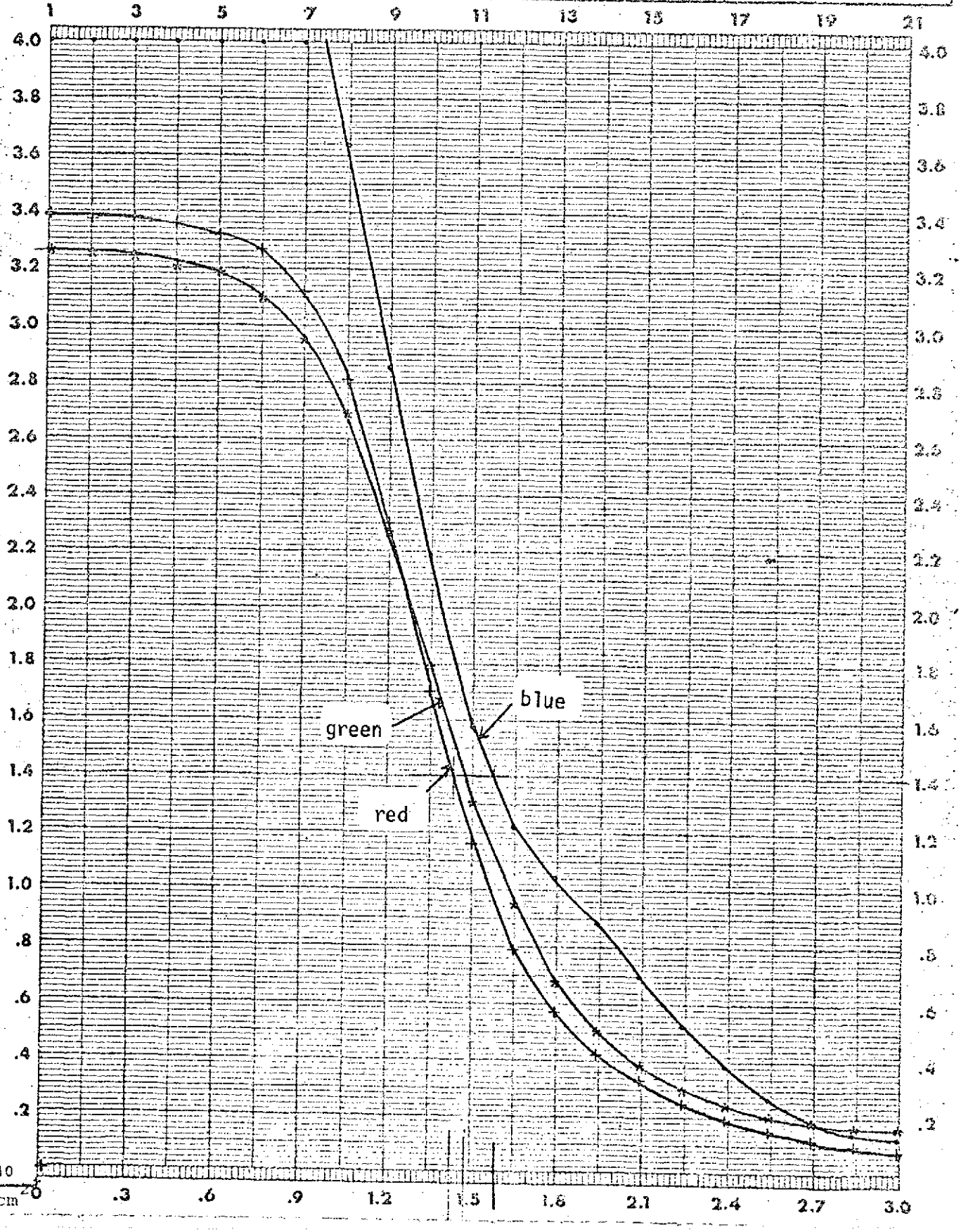

Technicolor

+R *G •B

ABSOLUTE LOG E AT R.L.E. = 0

-10

mcs ergs/cm²

(6)

DATE 5-18-72 CONTROL # _____ TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA	PROCESSING DATA	DENSITOMETRY
SENSITOMETER I-B	PROCESSOR 1811	INSTRUMENT MacBeth
ILLUMINANT 2850 °K	CHEMISTRY EA-5	TYPE TD504
TIME 1/50 SEC.	SPEED _____ TANKS 7 FPM	APERTURE SIZE 3 MM
FILTER 5500	TEMP °F 110 TIME _____	FILTER VISUAL

SPEED ( ) _____
D-MAX _____
GAMMA _____
BASE + FOG _____

CHEMICAL ANALYSIS

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TRP _____

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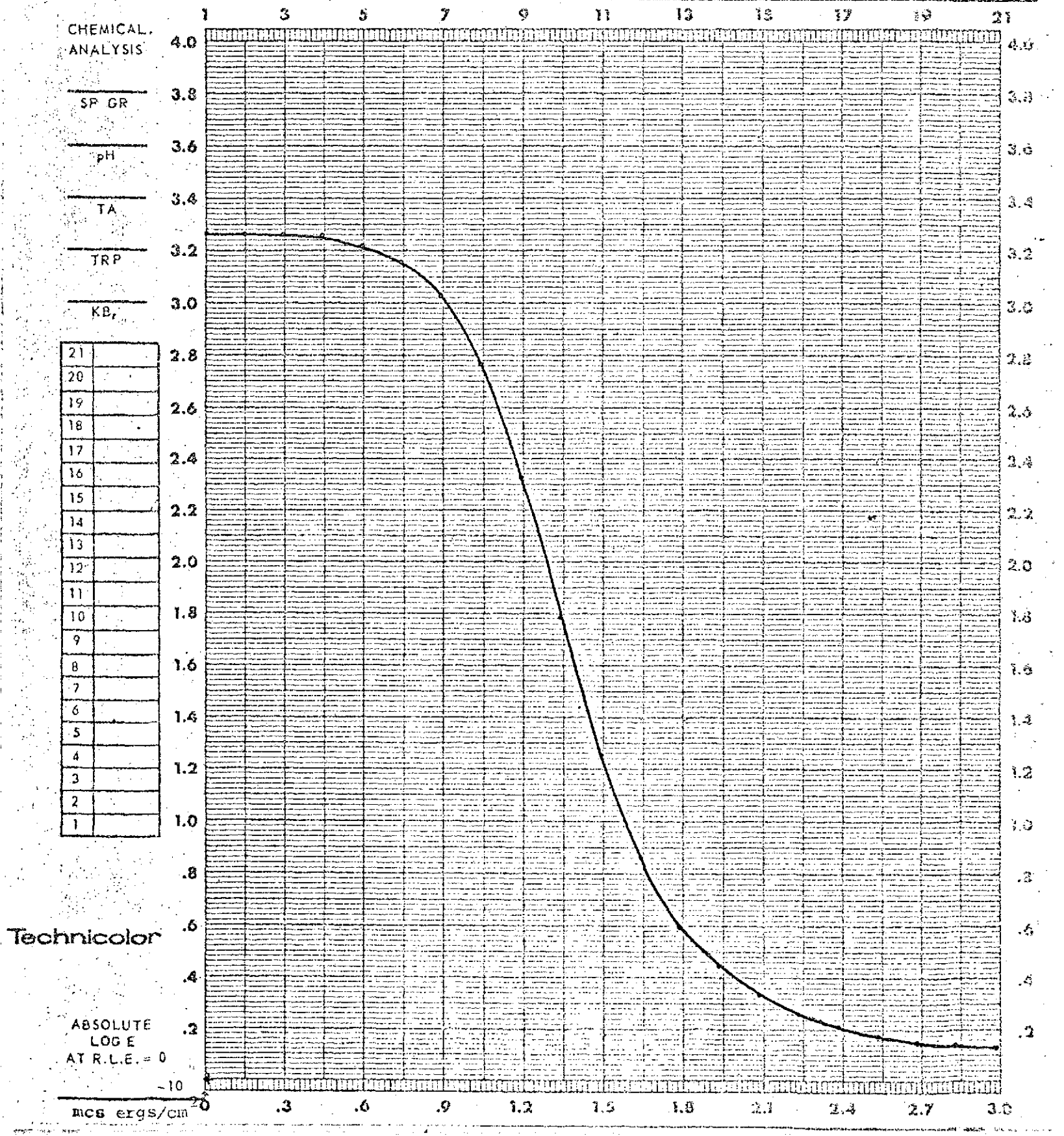

Technicolor

ABSOLUTE LOG E AT R.L.E. = 0

-10

mcs ergs/cm²

DATE 5-18-74 CONTROL # (6) TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA		PROCESSING DATA		DENSITOMETRY	
SENSITOMETER	I-B	PROCESSOR	1811	INSTRUMENT	MacBeth
ILLUMINANT	2850 °K	CHEMISTRY	EA-5	TYPE	TD504
TIME	1/50 SEC.	SPEED	TANKS 7 FPM	APERTURE SIZE	3 MM
FILTER	5500	TEMP °F	110 TIME	FILTER	STATUS A
				SPEED ( )	
				D-MAX	
				GAMMA	
				BASE + FOG	

CHEMICAL ANALYSIS

SP. GR

pH

TA

TRP

KB_r

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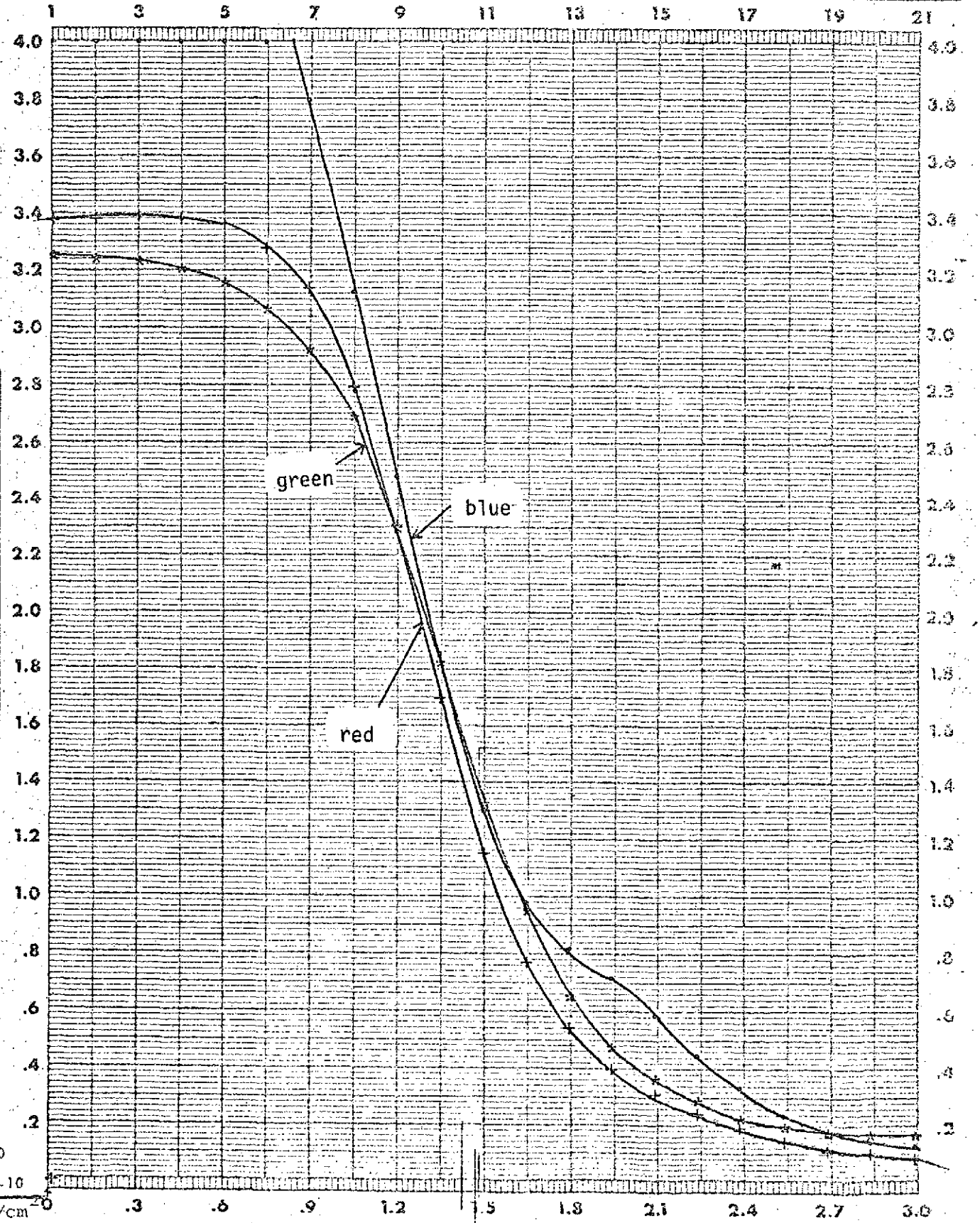

Technicolor

+R *G •B

ABSOLUTE LOG E AT R.L.E. = 0

-10 -0

mcs ergs/cm²

DATE 5-18-74 CONTROL # _____ TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA	PROCESSING DATA	DENSITOMETRY
SENSITOMETER I-B	PROCESSOR 1811	INSTRUMENT MacBeth
ILLUMINANT 2850 °K	CHEMISTRY EA-5	TYPE TD504
TIME 1/50 SEC.	SPEED _____ TANKS 7 FPM	APERTURE SIZE 3 MM
FILTER 5500	TEMP °F 110 TIME _____	FILTER VISUAL

SPEED ( ) _____
D-MAX _____
GAMMA _____
BASE + FOG _____

CHEMICAL ANALYSIS

SP GR _____

pH _____

TA _____

TRP _____

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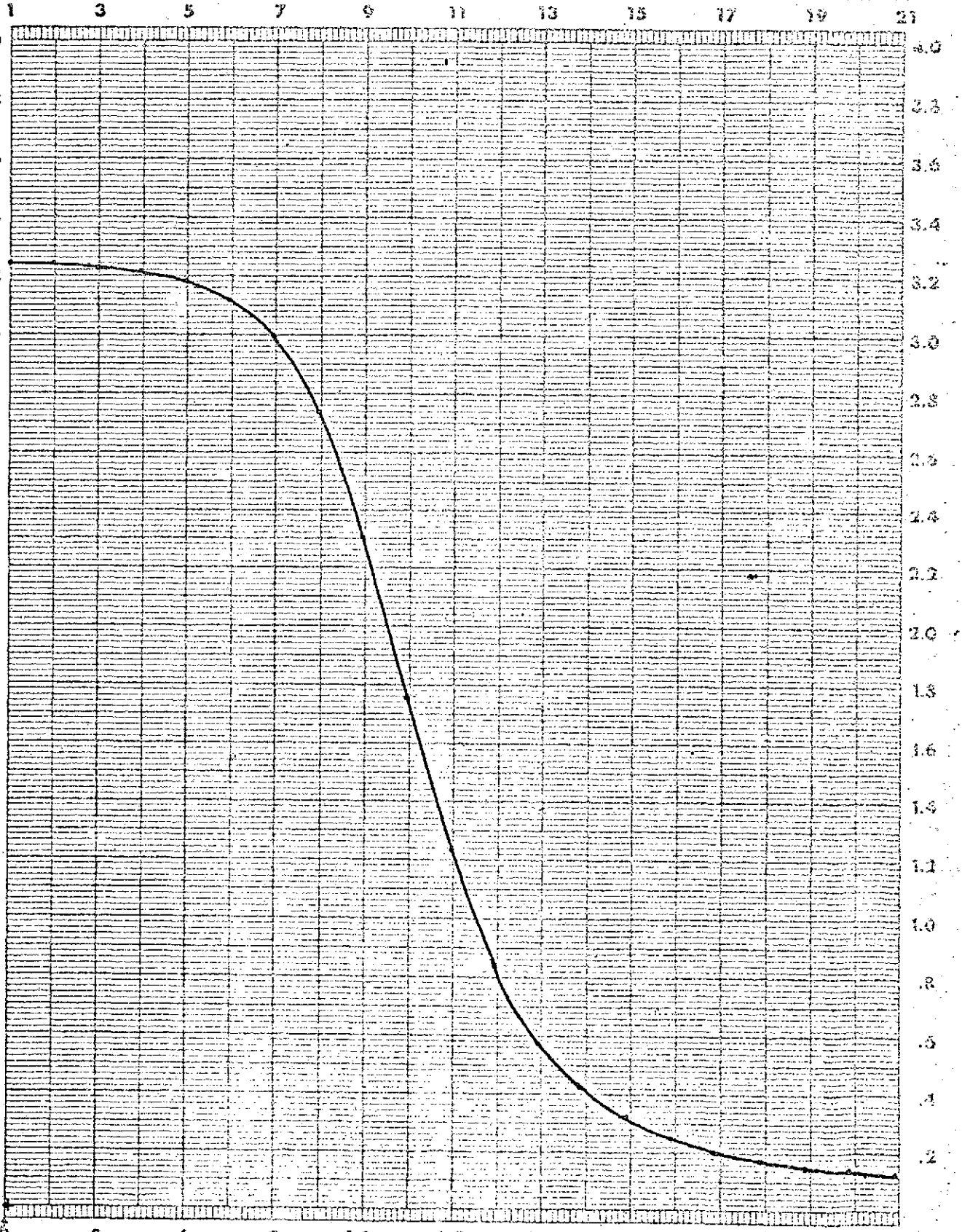

Technicolor

ABSOLUTE LOG E AT R.L.E. = 0

-10 -20

mcs ergs/cm²

DATE 5-18-74 CONTROL # (7) TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA		PROCESSING DATA		DENSITOMETRY	
SENSITOMETER	I-B	PROCESSOR	1811	INSTRUMENT	MacBeth
ILLUMINANT	2850 °K	CHEMISTRY	EA-5	TYPE	TD504
TIME	1/50 SEC.	SPEED	TANKS 7 FPM	APERTURE SIZE	3 MM
FILTER	5500	TEMP °F 110	TIME	FILTER	STATUS A
				SPEED	
				D-MAX	
				GAMMA	
				BASE + FOG	

CHEMICAL ANALYSIS

SP GR

pH

TA

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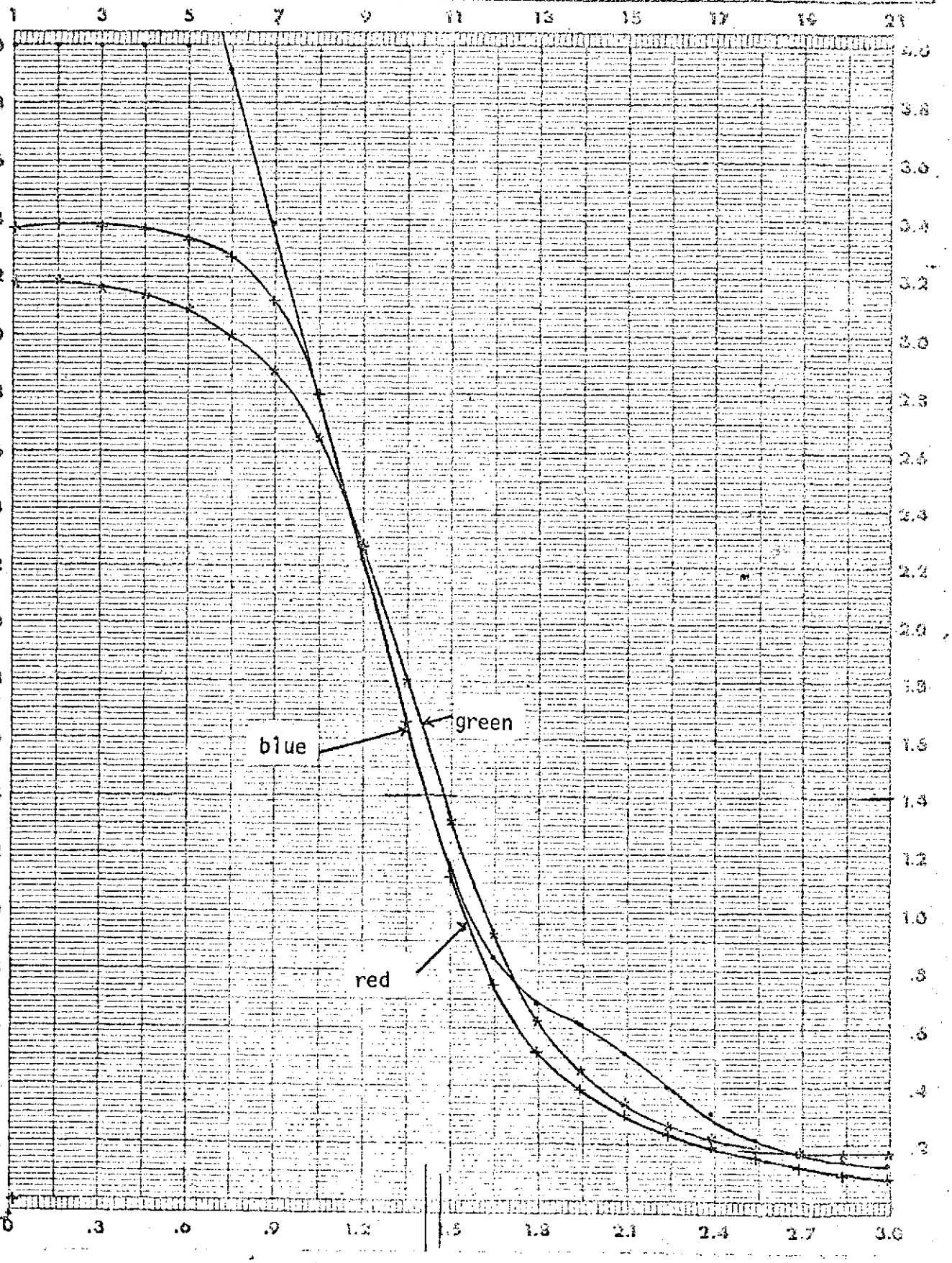

Technicolor

+R *G •B

ABSOLUTE LOG E AT R.L.E. = 0

-10

mcs ergs/cm^2

(8)

DATE 5-18-74 CONTROL # _____ TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA		PROCESSING DATA		DENSITOMETRY	
SENSITOMETER	E-B	PROCESSOR	1811	INSTRUMENT	MacBeth
ILLUMINANT	2850 °K	CHEMISTRY	EA-5	TYPE	TD504
TIME	1/50 SEC.	SPEED	TANKS 7 FPM	APERTURE SIZE	3 MM
FILTER	5500	TEMP °F 110	TIME	FILTER	VISUAL

CHEMICAL ANALYSIS

SP GR

pH

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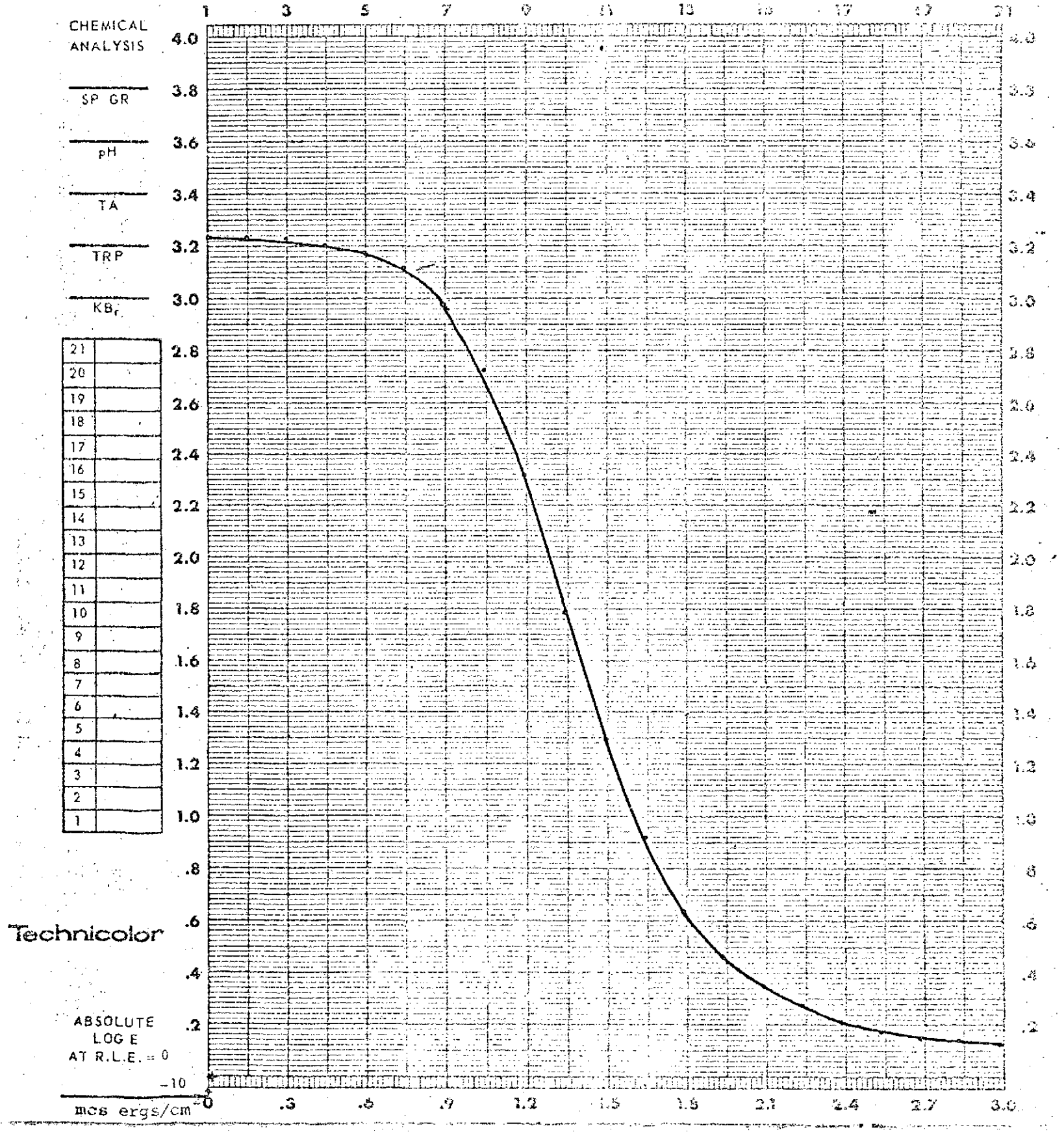

Technicolor

ABSOLUTE LOG E AT R.L.E. = 0

-10

mcs ergs/cm²

DATE 5-18-74 CONTROL # (8) TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA		PROCESSING DATA		DENSITOMETRY	
SENSITOMETER	I-B	PROCESSOR	1811	INSTRUMENT	MacBeth
ILLUMINANT	2850 °K	CHEMISTRY	EA-5	TYPE	TD504
TIME	1/50 SEC.	SPEED	TANKS 7 FPM	APERTURE SIZE	3 MM
FILTER	5500	TEMP °F 110	TIME	FILTER	STATUS A
				SPEED ( )	
				D-MAX	
				GAMMA	
				BASE + FOG	

CHEMICAL ANALYSIS

SP GR

pH

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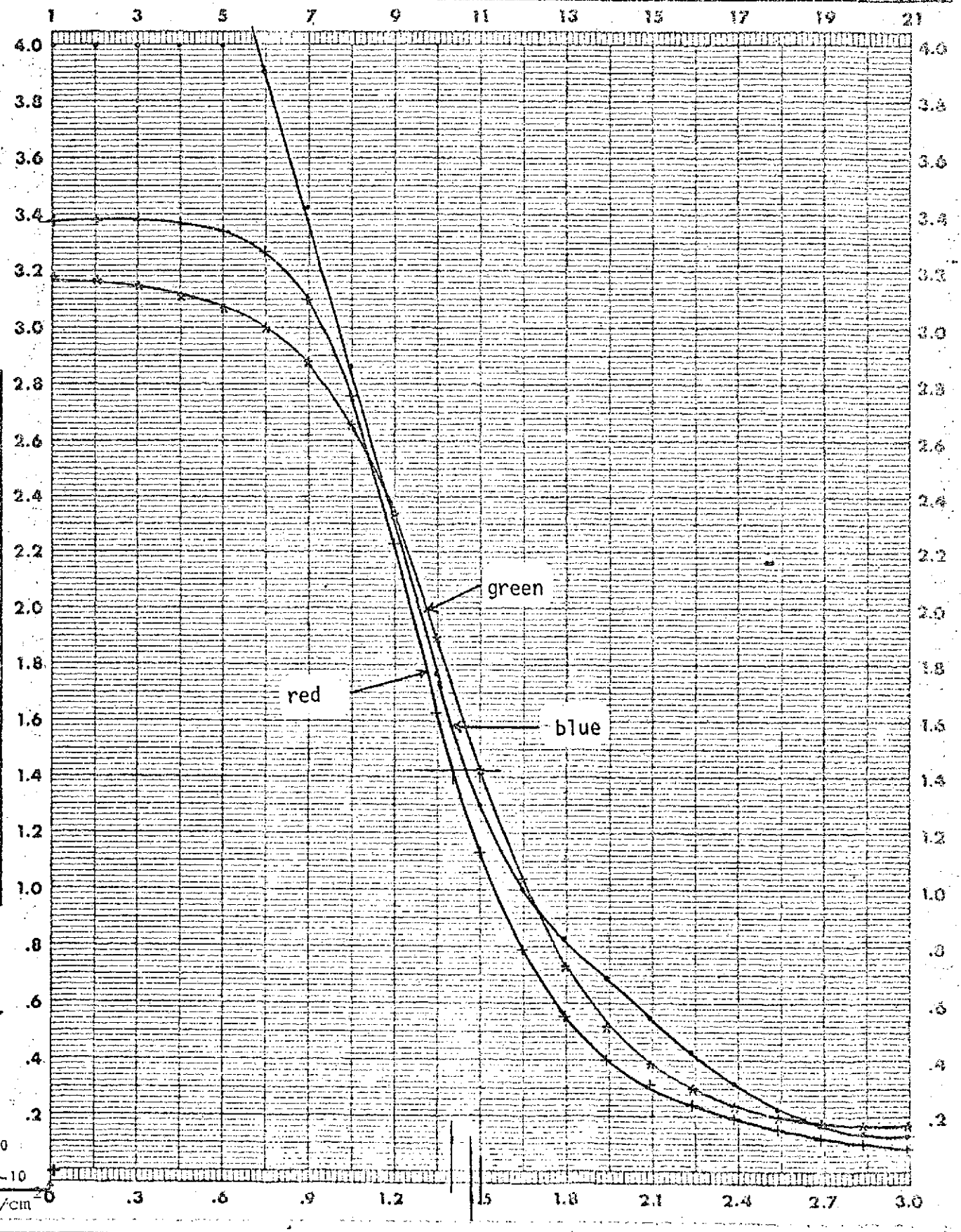

Technicolor

+R *G •B

ABSOLUTE LOG E AT R.L.E. = 0

-10

mcs ergs/cm^2 0

DATE 5-18-74 CONTROL # (1) TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA		PROCESSING DATA		DENSITOMETRY	
SENSITOMETER	I-B	PROCESSOR	181	INSTRUMENT	MacBeth
ILLUMINANT	2850 °K	CHEMISTRY	EA-5	TYPE	TD504
TIME	1/50 sec.	SPEED	TANKS 7 RPM	APERTURE SIZE	3 MM
FILTER	5500	TEMP °F 110	TIME	FILTER	VISUAL

SPEED _____ D-MAX _____ GAMMA _____ BASE + FOG _____

CHEMICAL ANALYSIS

SP GR _____

pH _____

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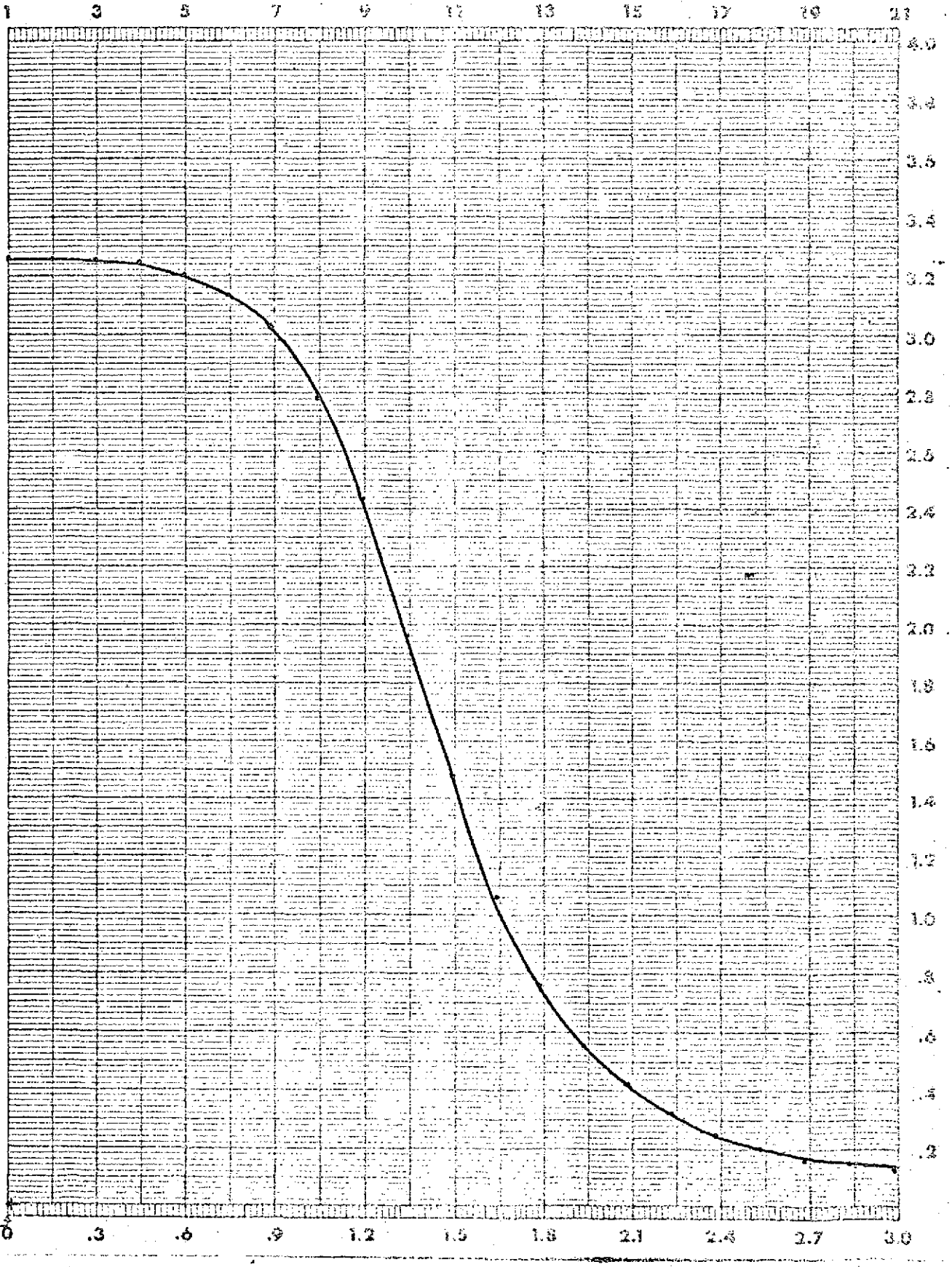

Technicolor

ABSOLUTE LOG E AT R.L.E. = 0

-10

mcs ergs/cm²

DATE 5-18-74 CONTROL # (9) TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA	PROCESSING DATA	DENSITOMETRY
SENSITOMETER I-B	PROCESSOR 1811	INSTRUMENT MacBeth
ILLUMINANT 2850 °K	CHEMISTRY EA-5	TYPE TD504
TIME 1/50 sec.	SPEED ____ TANKS 7 FPM	APERTURE SIZE 3 mm
FILTER 5500	TEMP °F 110 TIME ____	FILTER STATUS A

SPEED ( ) _____
D-MAX _____
GAMMA _____
BASE + FOG _____

CHEMICAL ANALYSIS

SP GR

pH

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TRP

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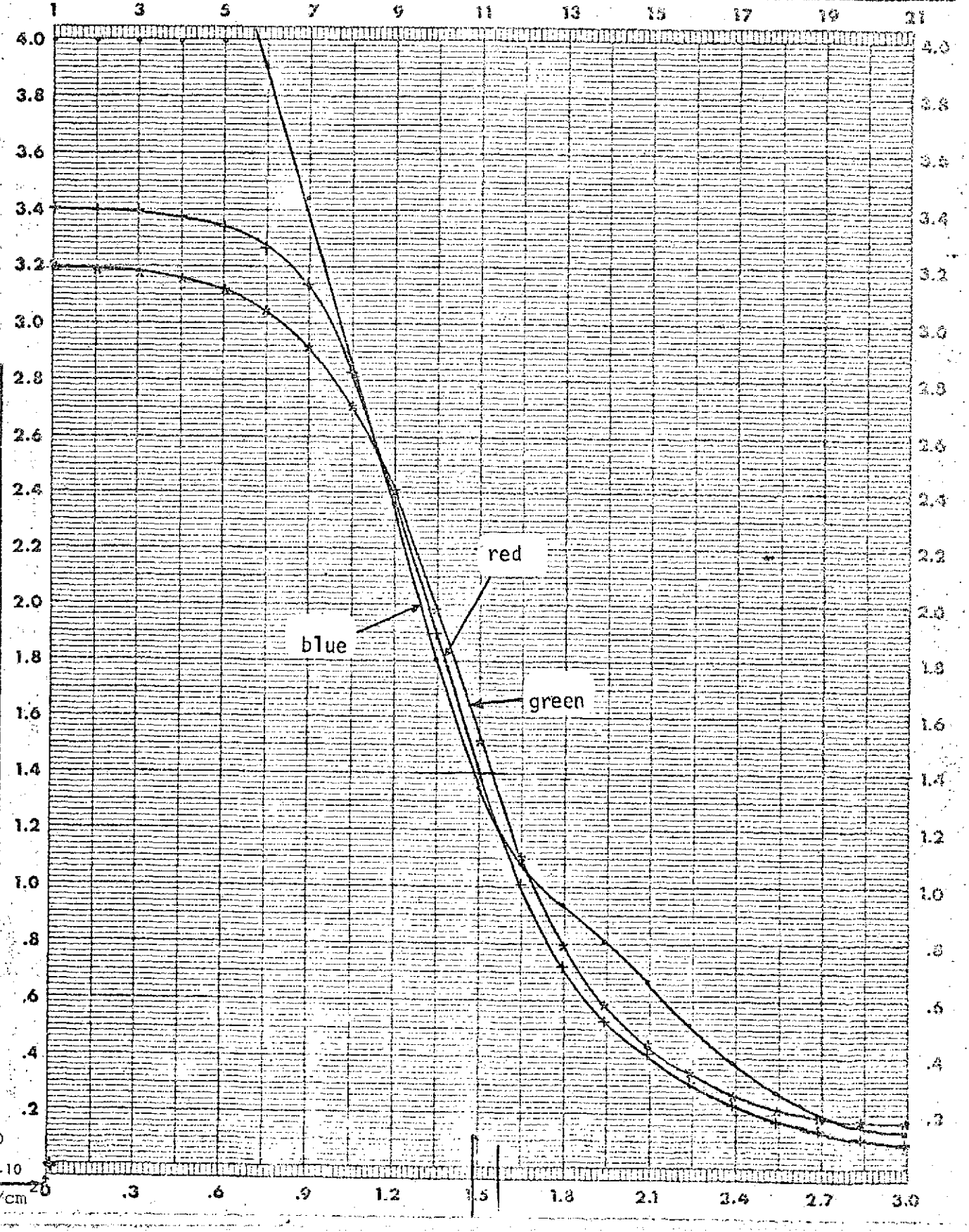

Technicolor

+R *G •B

ABSOLUTE LOG E AT R.L.E. = 0

−10

mcs ergs/cm²

(10)

DATE 5-18-74 CONTROL # _____ TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA		PROCESSING DATA		DENSITOMETRY	
SENSITOMETER	I-B	PROCESSOR	1811	INSTRUMENT	MacBeth
ILLUMINANT	2850 °K	CHEMISTRY	EA-5	TYPE	TD504
TIME	1/50 SEC.	SPEED	TANKS 7 FPM	APERTURE SIZE	3 MM
FILTER	5500+W12	TEMP °F	110 TIME	FILTER	VISUAL
				SPEED ( )	
				D-MAX	
				GAMMA	
				BASE + FOG	

CHEMICAL ANALYSIS

SP GR

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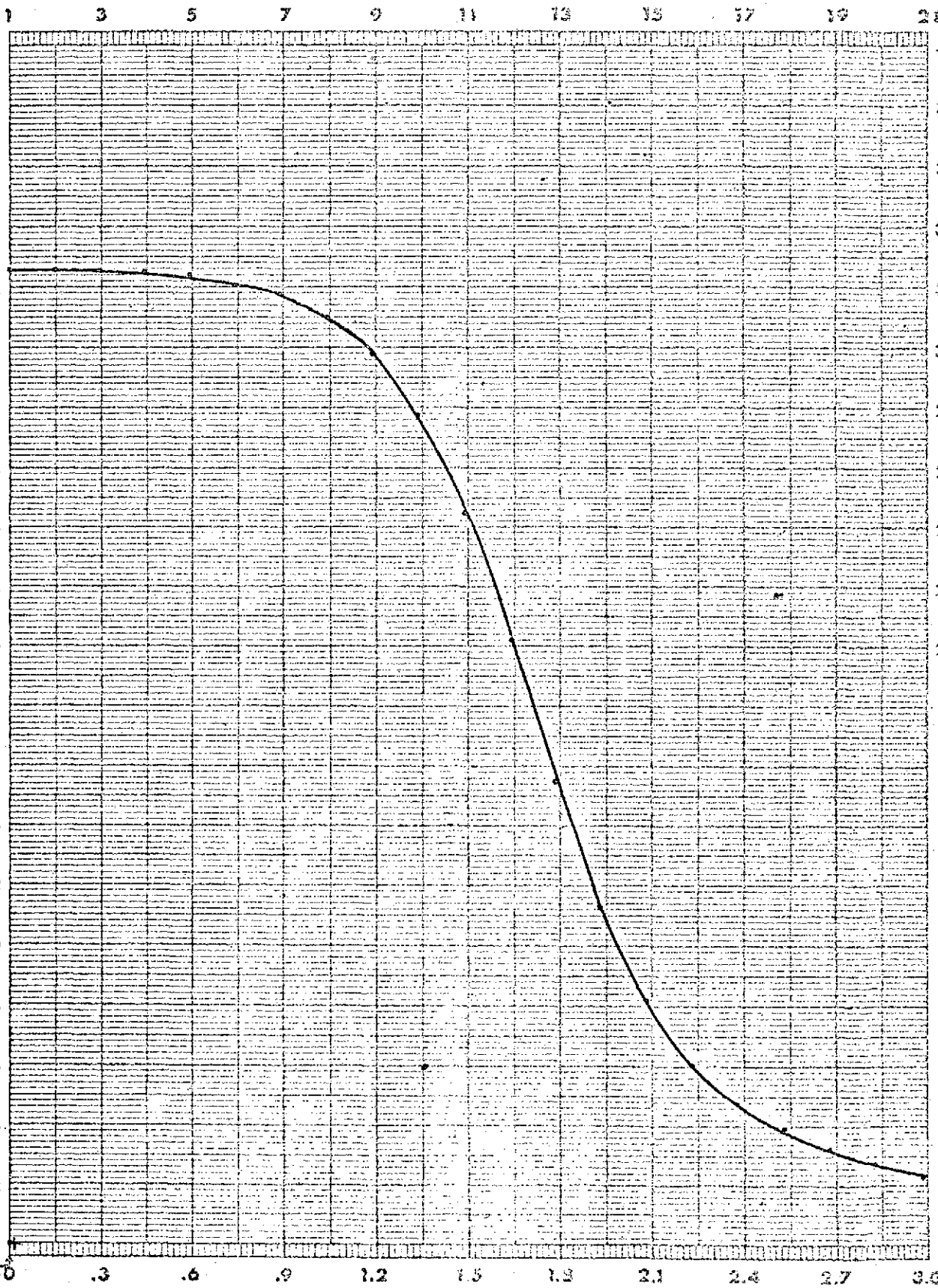

Technicolor

ABSOLUTE LOG E AT R.L.E. = 0

-10

ergs/cm²

DATE 5-18-74 CONTROL # (10) TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA	PROCESSING DATA	DENSITOMETRY
SENSITOMETER I-B	PROCESSOR 1811	INSTRUMENT MacBeth
ILLUMINANT 2850 °K	CHEMISTRY EA-5	TYPE TD504
TIME 1/50 SEC.	SPEED _____ TANKS 7 FPM	APERTURE SIZE 3 MM
FILTER 5500+W12	TEMP °F 110 TIME _____	FILTER STATUS A

SPEED ( ) _____
D-MAX _____
GAMMA _____
BASE + FOG _____

CHEMICAL ANALYSIS

SP GR _____

pH _____

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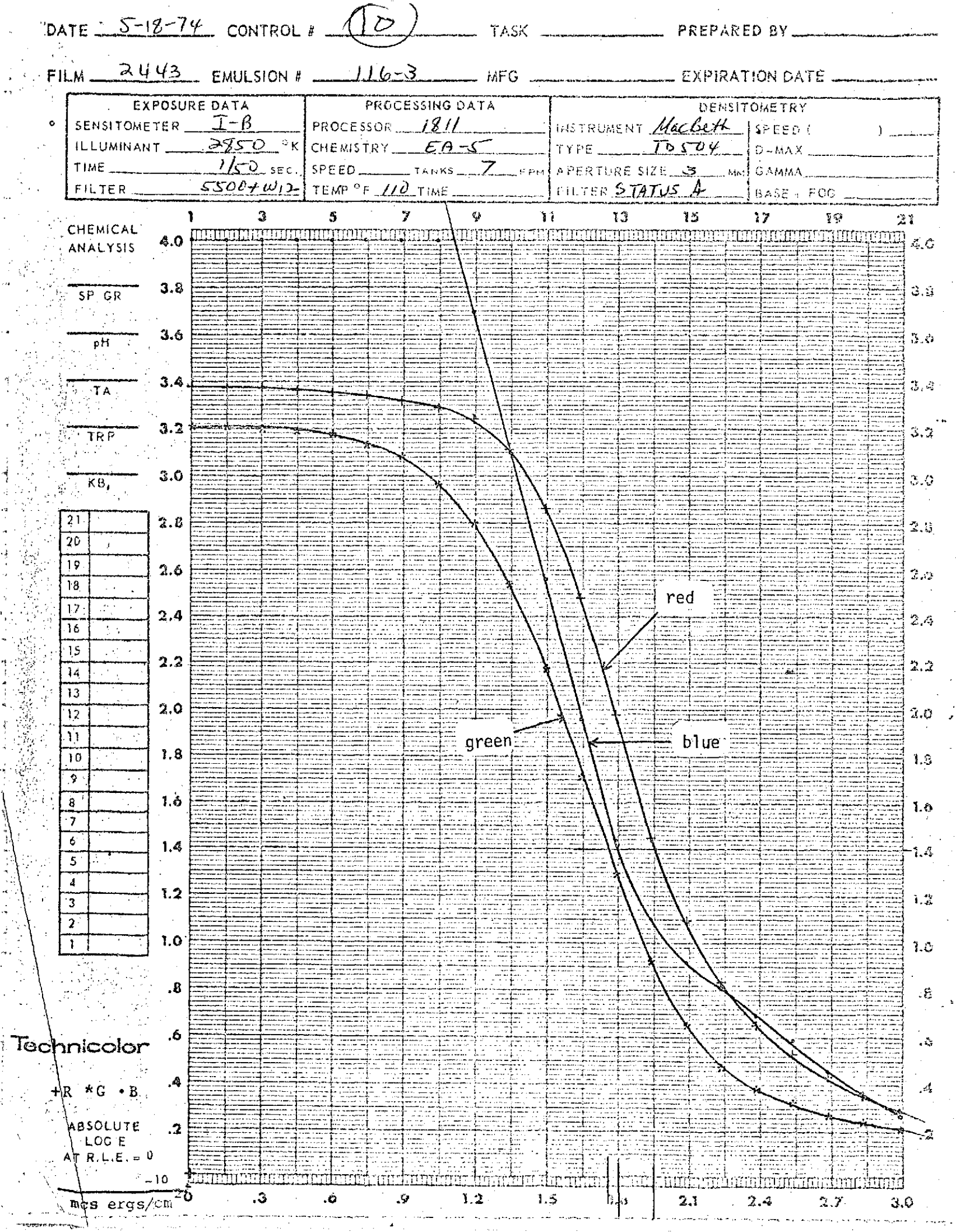

Technicolor

+R *G •B

ABSOLUTE LOG E AT R.L.E. = 0

-10

mcs ergs/cm²

DATE 5-20-74 CONTROL # (11) TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA		PROCESSING DATA		DENSITOMETRY	
SENSITOMETER	I-B	PROCESSOR	1811	INSTRUMENT	MacBeth
ILLUMINANT	2850 °K	CHEMISTRY	EA-5	TYPE	TD504
TIME	1/50 SEC.	SPEED	TANKS 7 FPM	APERTURE SIZE	3 MM
FILTER	5500	TEMP °F 110	TIME	FILTER	STATUS A
				SPEED ( )	
				D-MAX	
				GAMMA	
				BASE + FOG	

CHEMICAL ANALYSIS

SP GR

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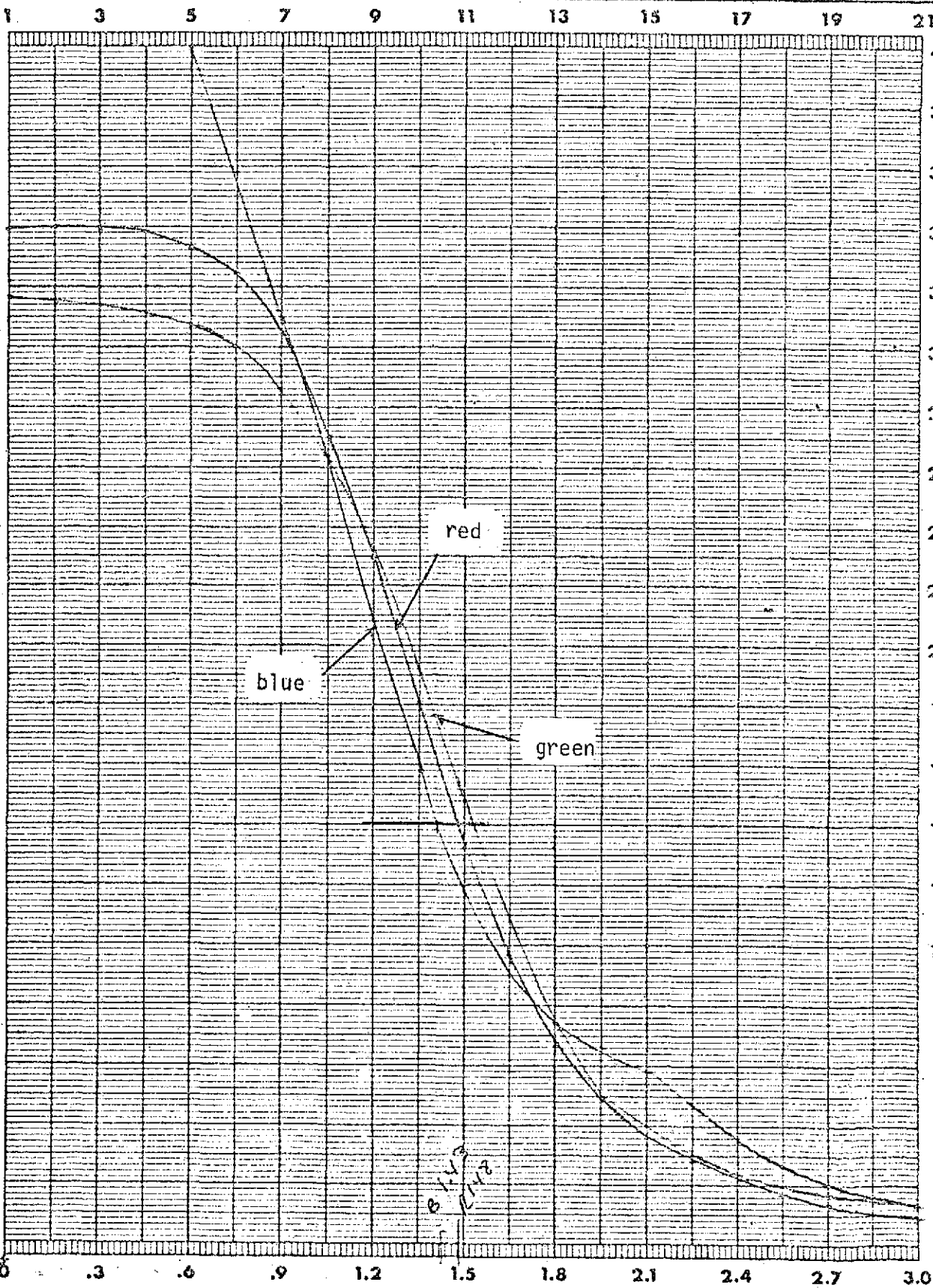

Technicolor

ABSOLUTE LOG E AT R.L.E. = 0

-10

DATE 5-20-74 CONTROL # (12) TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

4

EXPOSURE DATA		PROCESSING DATA		SENSITOMETRY	
SENSITOMETER	I-B	PROCESSOR	1811	INSTRUMENT	MacBeth
ILLUMINANT	2850 °K	CHEMISTRY	EA-5	TYPE	TD504
TIME	1/50 SEC.	SPEED	TRIALS 7 RPM	APERTURE SIZE	3
FILTER	5500	TEMP °F	110 TIME	FILTER	VISUAL

CHEMICAL ANALYSIS

SP GR

pH

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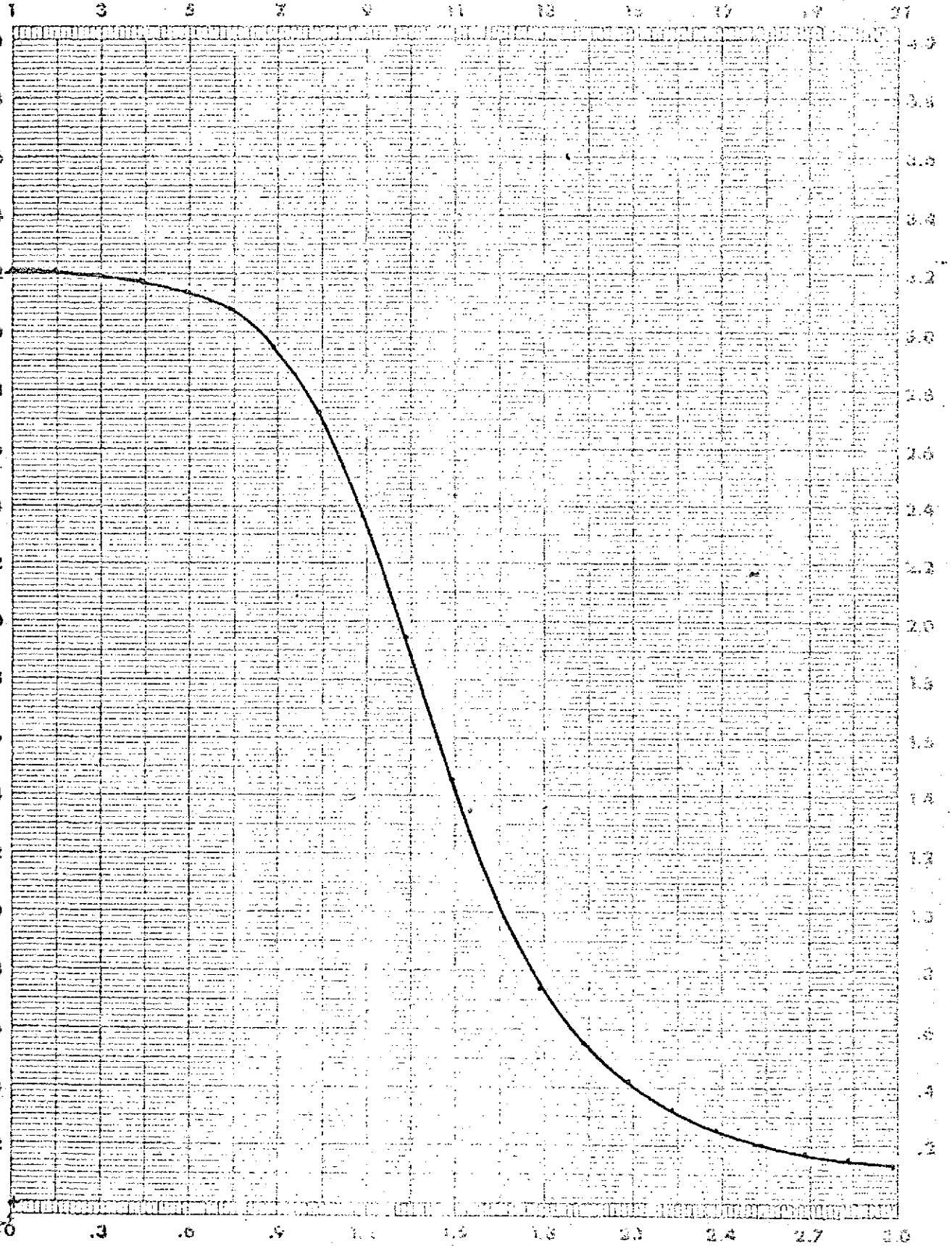

Technicolor

ABSOLUTE LOG E AT R.L.E. = 0

-10

mcs ergs/cm²

DATE 5-20-74 CONTROL # (12) TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA	PROCESSING DATA	DENSITOMETRY
SENSITOMETER I-B	PROCESSOR 1811	INSTRUMENT MacBeth
ILLUMINANT 2850 °K	CHEMISTRY EA-5	TYPE TD504
TIME 1/50 SEC.	SPEED _____ TANK 7	APERTURE SIZE 3
FILTER 5500	TEMP °F 110 TIME _____	FILTER STATUS A

CHEMICAL ANALYSIS

SP GR _____

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TRP _____

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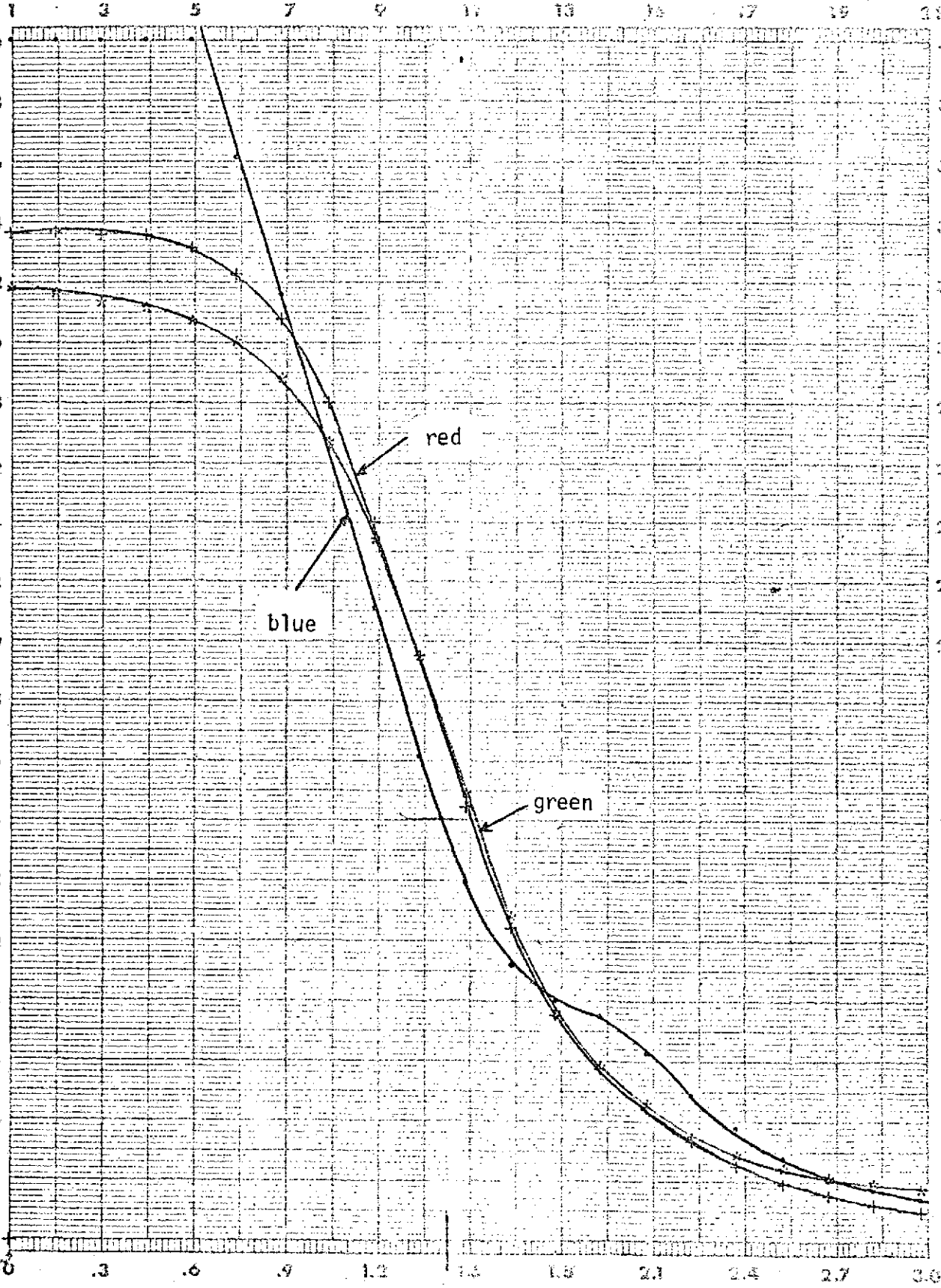

Technicolor

+R *G •B

ABSOLUTE LOG E AT R.L.E. = 0

-10

mcs ergs/cm

DATE 5-20-74 CONTROL # (13) TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA		PROCESSING DATA		DENSITOMETRY	
SENSITOMETER	I-B	PROCESSOR	1811	INSTRUMENT	MacBeth
ILLUMINANT	2850 °K	CHEMISTRY	EA-5	TYPE	TD504
TIME	1/50 SEC.	SPEED	TANKS 7 FPM	APERTURE SIZE	5 MM
FILTER	5500	TEMP °F 110	TIME	FILTER	VISUAL
				SPEED ( )	
				D-MAX	
				GAMMA	
				BASE + FOG	

CHEMICAL ANALYSIS

SP GR

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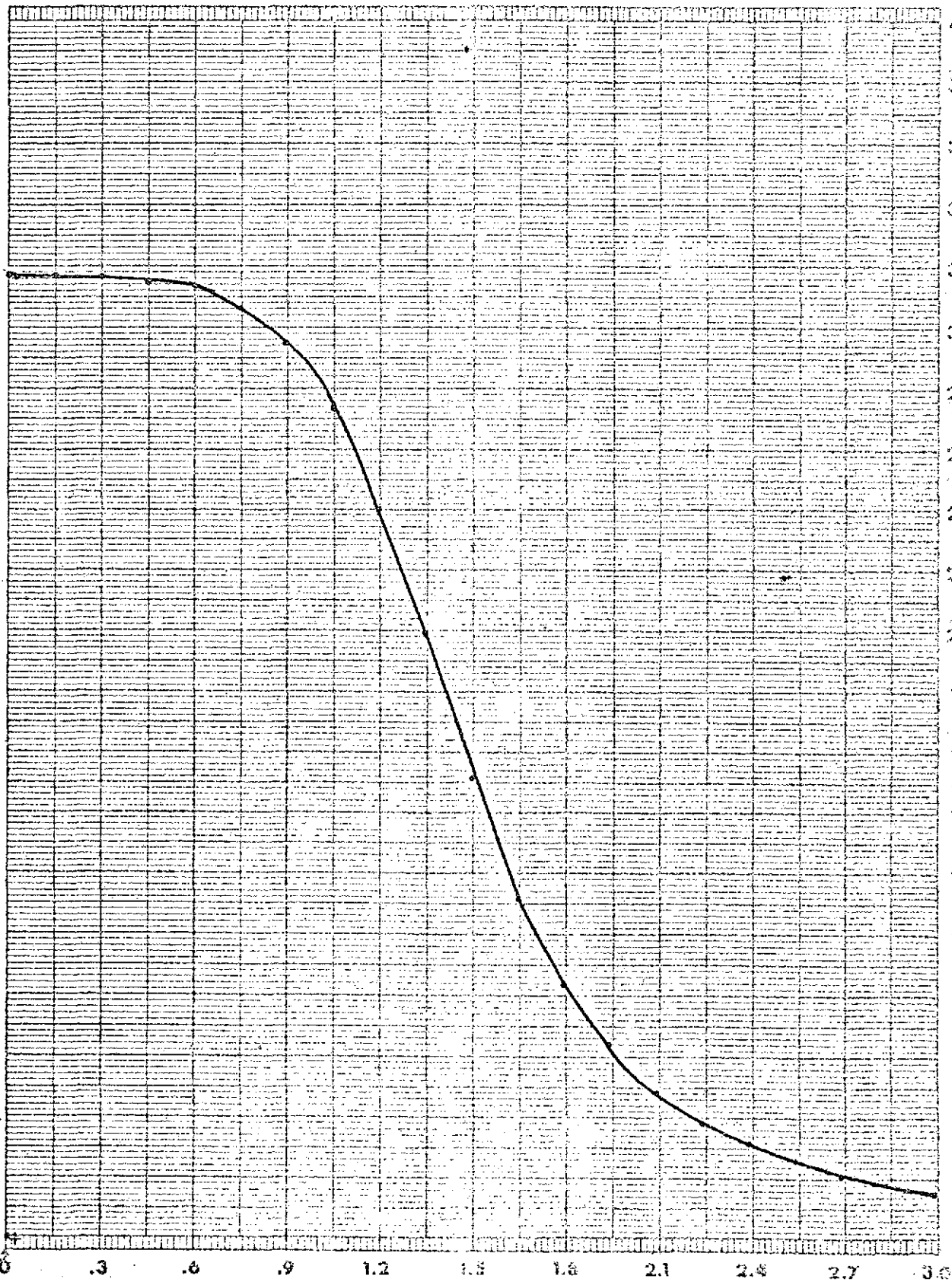

Technicolor

ABSOLUTE LOG E AT R.L.E. = 0

-10 -0

mcs ergs/cm²

DATE 5-20-74 CONTROL # (13) TASK _____ PREPARED BY _____

FILM 2443 EMULSION # 116-3 MFG _____ EXPIRATION DATE _____

EXPOSURE DATA		PROCESSING DATA		DENSITOMETRY	
SENSITOMETER	I-B	PROCESSOR	1811	INSTRUMENT	MacBeth
ILLUMINANT	2850 °K	CHEMISTRY	EA5	TYPE	TD504
TIME	1/50 SEC.	SPEED	TANKS 7 TPM	APERTURE SIZE	3 MM
FILTER	5600	TEMP °F 110	TIME	FILTER	STATUS A
				SPEED	
				D-MAX	
				GAMMA	
				BASE + FOG	

CHEMICAL ANALYSIS

SP GR

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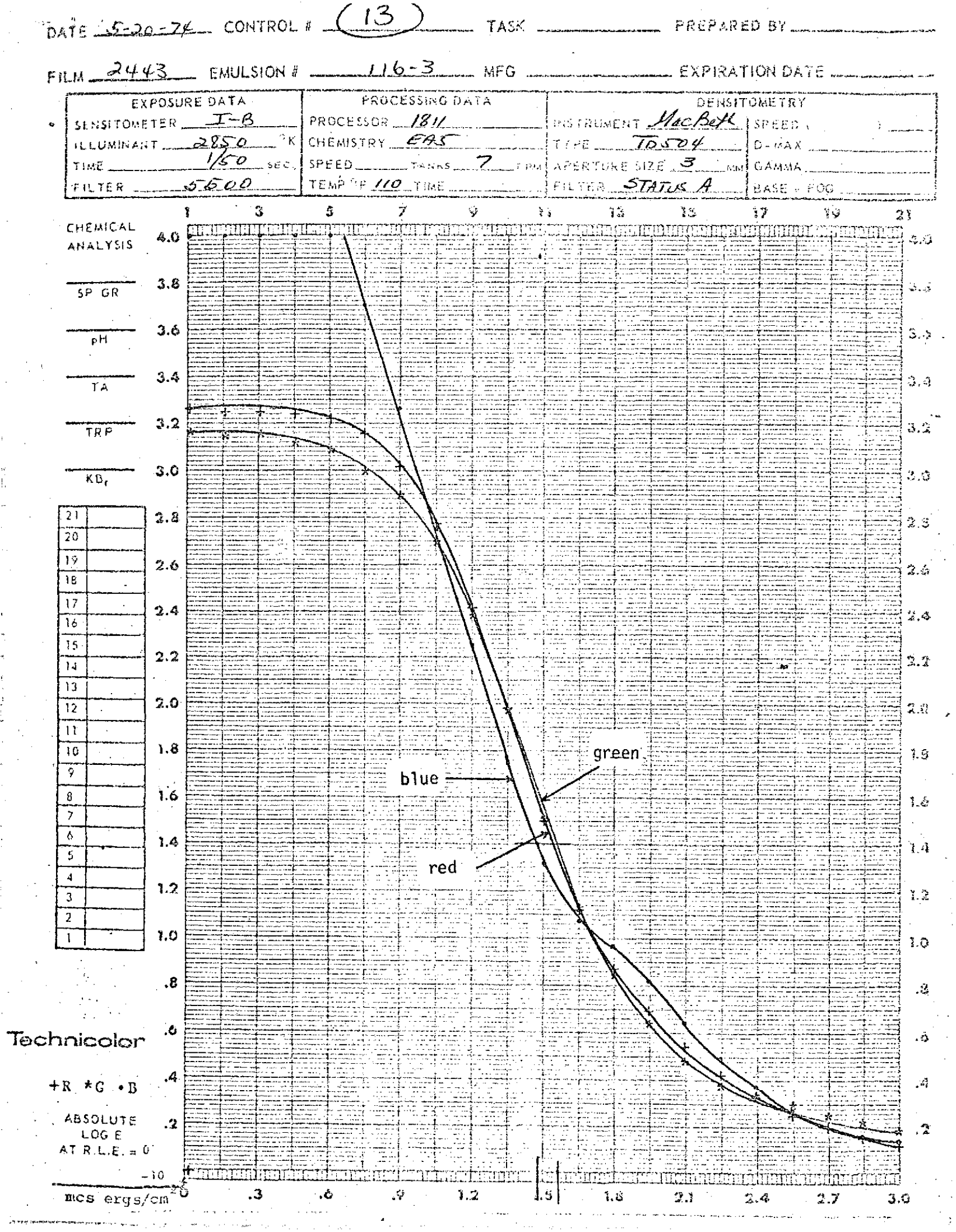

Technicolor

+R *G •B

ABSOLUTE LOG E AT R.L.E. = 0

-10

mcs ergs/cm^2