

TBI-FORENSIC SERVICES DIVISION PERFORMANCE VERIFICATION FORM

Instrument/Method to Verify:

Agilent Cary 60 Ultraviolet Visible Spectrophotometer: "Dwight" Serial: MY22129220

Check the appropriate box: New Validation ☐ Modification ☐ Performance Check ☒

Laboratory: NCL ☐ KCL ☒ JCL ☐ Unit: Forensic Chemistry

Based on training and competency, the following analyst(s) are authorized by the Technical Leader to participate in this study:

Name Sharon A. Norman Title SA-FS II Initials SAN

Completed: Sharon A. Norman
Digitally signed by Sharon A. Norman
DN: cn=Sharon A. Norman, o, ou, email=sharon.norman@tn.gov, c=US
Date: 2022.06.10 09:31:05 -04'00'

Name _____ Title _____ Initials _____

Completed:

Name _____ Title _____ Initials _____

Completed:

Verification of final review:

Unit Supervisor: Michael D. Bleakley Michael D. Bleakley
2022.06.10 09:46:17 -04'00' Section Manager: Adam Gray Digitally signed by Adam Gray
Date: 2022.07.06 12:51:22 -04'00'

Unit Supervisor: Mollie J. Hood Digitally signed by Mollie J. Hood
Date: 2022.06.10 10:52:06 -04'00' Section Manager:

Unit Supervisor: Section Manager:

Regional Administrator: Kelvin Woodby Digitally signed by Kelvin Woodby
Date: 2022.06.10 11:05:28 -04'00'

Regional Administrator:

Regional Administrator:

Quality Assurance Manager: Chad D Johnson Digitally signed by Chad D Johnson
Date: 2022.07.06 10:31:36 -05'00'

By signing below, I have verified this study meets all requirements and I deem this procedure/instrument fit for the intended use:

Technical Leader: Brett Trotter Digitally signed by Brett Trotter
Date: 2022.06.30 07:45:35 -05'00'

All information must be submitted to the Quality Assurance Manager prior to the implementation of the procedure/instrument. If applicable, include training plan and competency testing schedule.

Dwight

Agilent Technologies

Cary 60

UV-Visible Spectrophotometer

Part No: G6860A

Serial No: MY22129220

Installation: 05/16/22

Cary WinUV Software (G6861-64001)

Cary Win UV upgrade software (G6861-64003)

Revision No: 5.1.3

TBI KNOXVILLE

FORENSIC CHEMISTRY

Tennessee Bureau of Investigation
Knoxville Crime Laboratory
Forensic Chemistry Unit
Instrument Performance Check

Instrument: Agilent Cary 60 Ultraviolet-Visible Spectrophotometer (Dwight)

Serial Number: MY22129220

Installation Date: 05/16/22

Summary and Conclusion

Agilent Technologies installed a new Cary 60 Ultraviolet-Visible spectrophotometer (UV-Vis) at the Knoxville Crime Laboratory, Forensic Chemistry Unit, on May 16, 2022. This instrument operates and functions the same as the current Agilent Cary 60 (Bane) in use at the Knoxville lab. This instrument utilizes Cary WinUV Upgrade Software, Revision Number 5.1.3.1042. The following includes performance check data and comparison data of standards run on both Dwight and Bane.

Solvents used for Performance Check

0.1N HCl – VWR/BDH lot # 20K0356037 (bottle C)

Sodium hydroxide (for saturated NaOH) – Fisher lot # 141711

Methanol – Fisher lot # 211779

Standards used for Performance Check

Testosterone – Sigma lot # 55K1785

Cocaine HCl – Sigma lot # 59H0640

Oxycodone – Sigma lot # 085K1833

Methamphetamine HCl – Sigma lot # 071K1580

Temazepam – Sigma lot # 56F0687

The instrument's performance was checked using the Validate application of the Cary 60 WinUV software during installation and then post-Performance Check. The software performed a Xenon Line Test, Photo Noise Test, and Baseline Flatness Test to ensure the instrument was operating within specifications. The standards listed above were run according to the Forensic Chemistry Standard Operating Procedure listed in Chapter 19. The data obtained from these standards was then compared to those run on the existing Cary 60 (Bane).

All tests performed in the Validation application passed, indicating that the instrument was operating within specifications. All standard spectra, obtained on Dwight, produced wavelength maxima comparable to those of Bane. Sample preparation, data interpretation, basic operations, and the basic theory of UV absorption are the same for both instruments. While the software is a different version, it is functionally the same. Therefore, training and competency testing are not necessary for current personnel.

CARY 60 UV-VIS SPECTROPHOTOMETER OPERATIONS

Initialization:

1. Ensure the power is on to all components.
2. Enter the Cary WinUV software via the computer desktop and select the **Scan** application.
3. To load the method, go to **File**, then **Open Method** and load the **drugs.MSW** method.
4. (A shortcut to this is to simply click on the **drugs.MSW** icon on the desktop if it has already been placed there). If a baseline hasn't been run for the day, a baseline window may appear when starting the application. Click **OK**.
5. Go to **File, Open Data...**, and under **Files of type:**, choose **Graph Template(*.GSW)**; choose the appropriate template for the instrument you are working on and click **OK**.

******These steps should load all of the necessary operating parameters for the instrument.

Sample Analysis:

1. Click the **Zero** button on the left side of the screen. A window will appear. Clear the sample compartment and click **OK**. This will zero the existing ordinate value.
2. Obtain a baseline by clicking the **Baseline** button on the left side of the screen. A window will appear. Be sure the sample compartment is clear and click **OK**. This is the equivalent of an "air blank" on the Agilent 8453 and will subtract the instrument's raw transmission data from the sample data. A printed baseline spectrum is not required, so click the **Remove Graph** icon on the toolbar to delete it. The spectrum remains in the instrument and the word "baseline" will appear in red in the upper left corner of the screen.
3. Samples may now be collected by following Chapter 19.0 in the Forensic Chemistry Standard Operating Procedure Manual.

Note: The application will automatically overlay spectra in a single graph window. However, you may obtain individual spectra by running one spectrum at a time, printing your data, and beginning again, OR by clicking on the **Add Graph** icon on the toolbar. This will add an empty graph window on top of the existing one.

Monthly Instrument Performance Testing:

1. Restart the Cary 60 by turning the instrument off and back on. The instrument calibrates automatically on start up.
2. Enter the Cary WinUV software and choose the **Validate** application.
3. Click the **Test...** button on the left of the screen.

4. Choose **Instrument Performance Tests** and observe that there are three tests. The **Xenon Line Test**, the **Photo Noise Test**, and the **Baseline Flatness Test**.
5. You will see also the tabs Wavelength Accuracy, Baseline, and Noise. Do not change any information under these tabs. These are the specifications by which the instrument was tested upon installation and are outlined on the Customer Test Certificate for the instrument.
6. Select **OK** to close the Instrument Performance Test window.
7. Click the **Start** button at the top of the screen. Be sure the sample compartment is clear and click **OK**. Check that the sample compartment lid is closed and click **OK** again. The software will automatically run all three tests.
8. When the tests are finished, go to **File** and **Print** the Validation Report.

Note: The holmium oxide test will not be performed monthly on this instrument. "The light flashes from the xenon lamp are very intense, so they can be passed through a beam splitter to give simultaneous reference beam correction without causing excess photometric noise. This means that the wavelength shift errors associated with traditional scanning methods are eliminated." - Cary 60 Software and Instrument Information

Additional Note: If the instrument fails to meet any of the performance check requirements, the instrument will be taken out of service and arrangements will be made for repair.

This is not meant to be all inclusive as there may be more than one way to accomplish the same task.

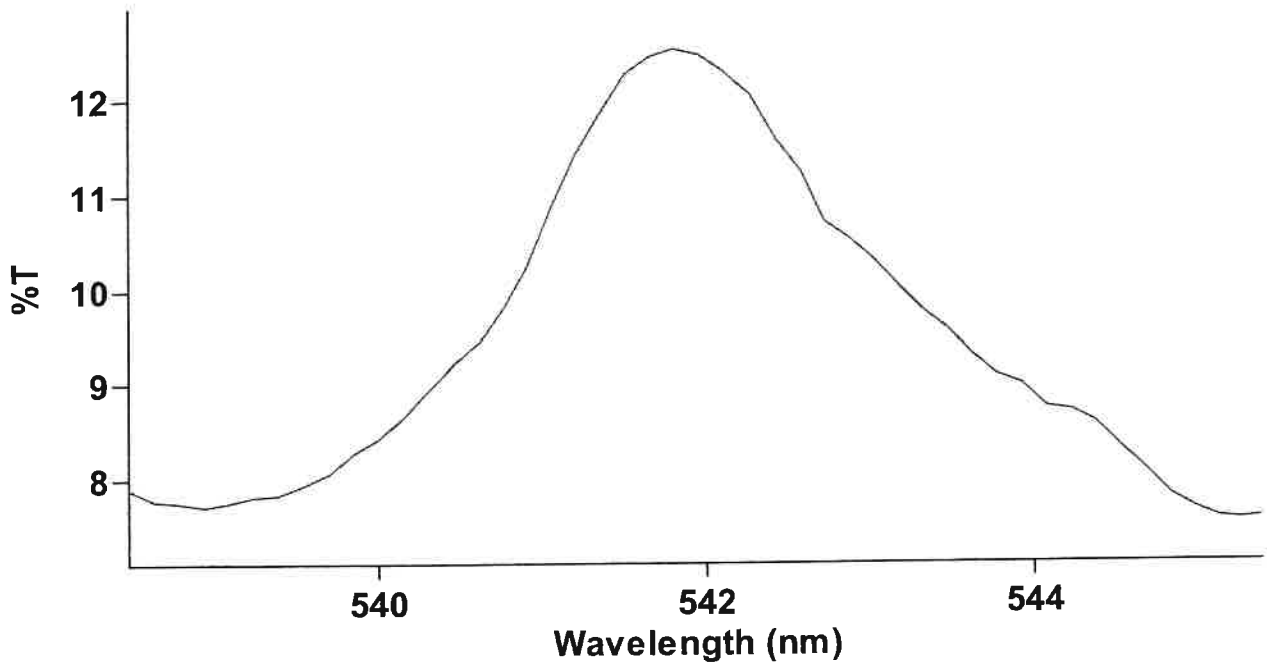
Cary Validation Report

Report time 5/16/2022 12:59:52 PM
Method:
Report C:\Users\Public\Documents\Agilent\Cary WinUV\5_16_2022 12:59:52 PM.RVO
Version 5.1.3.1042
Instrument Cary 60

Wavelength Accuracy Test Xenon Line Scan Test

5/16/2022 12:59:54 PM
Instrument Settings
Ave Time : 2.000 sec
UV/Vis Interval : 0.150 nm
Tolerance for 541.9 Line ± 0.50 nm

541.920 line found at 541.826 PASSED



Wavelength Accuracy Test Xenon Line Scan Test PASSED

Baseline Flatness Test

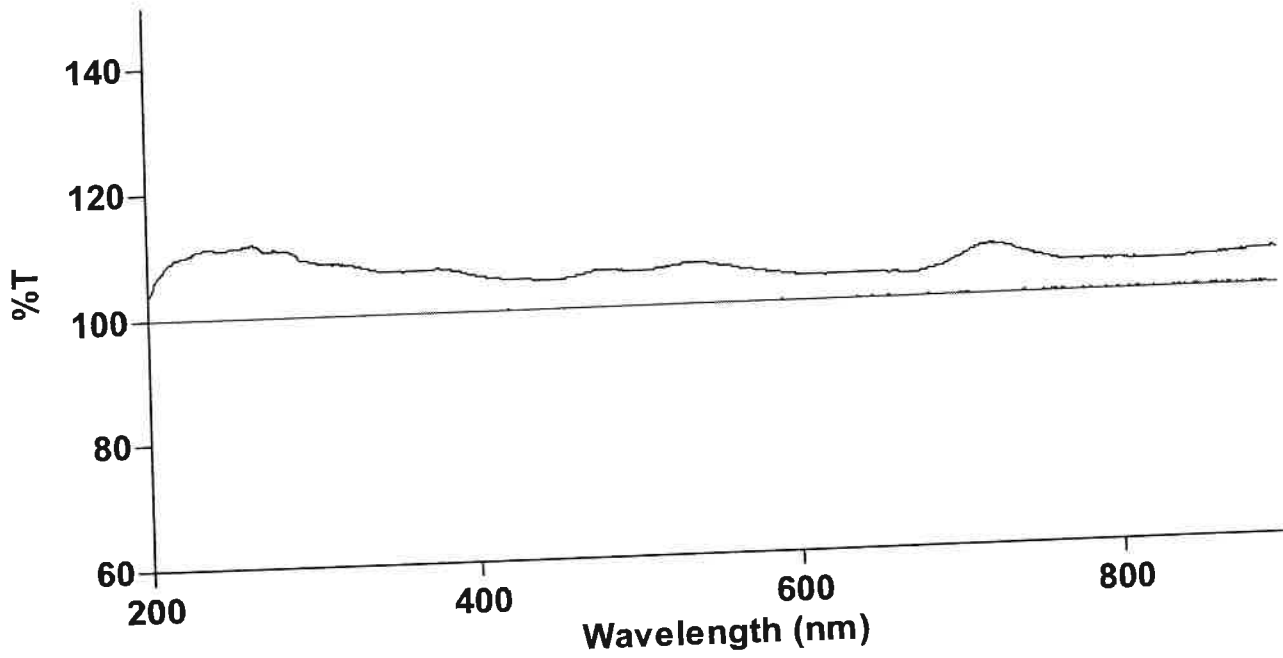
5/16/2022 1:01:36 PM
Instrument Settings
Ave Time : 0.100 sec
Interval : 1.00 nm
Scan range : 200.00 - 900.00 nm
Corrected Baseline 200.00 - 850.00 nm, Tolerance ± 0.0010 Abs

Corrected Baseline 200.00 - 850.00 nm, Abs from -0.0001 to 0.0002 PASSED

5/16/2022 1:07:23 PM

Baseline Correction in Abs

0.0002



Baseline Flatness Test PASSED

Photometric Noise Test

5/16/2022 1:05:21 PM

Instrument Settings

Ave Time :

1.000 sec

UV Wavelength :

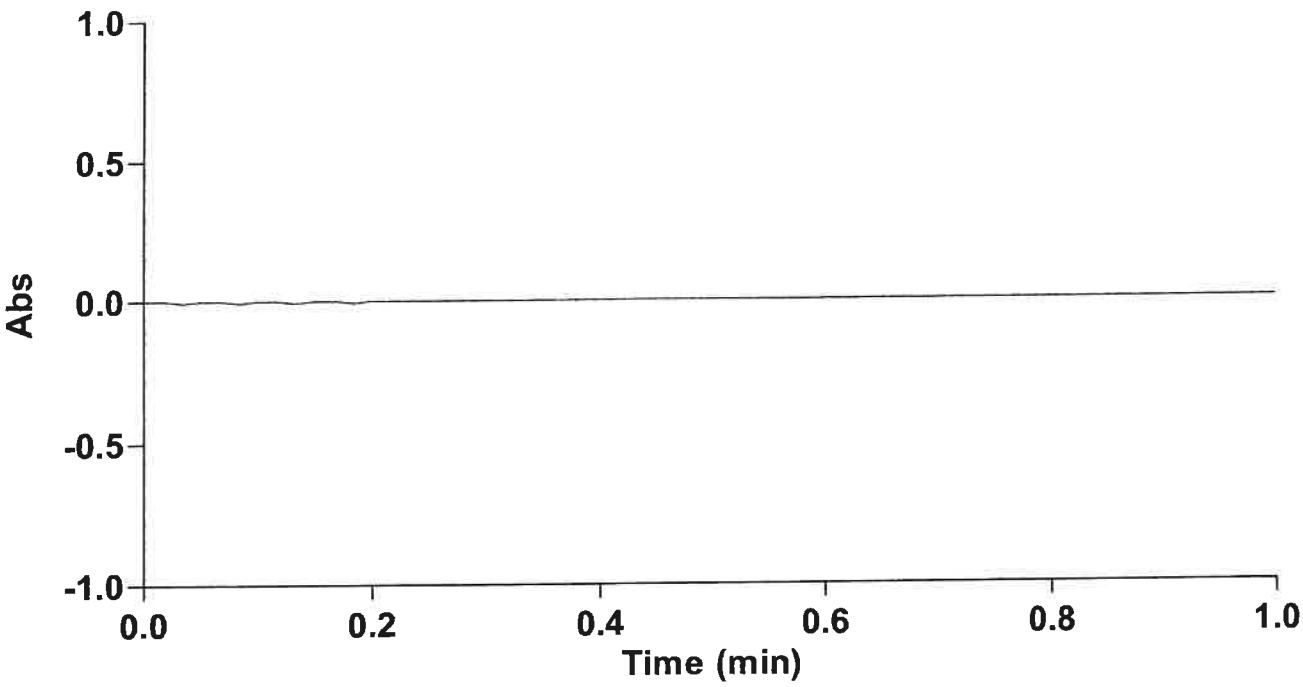
500.00 nm

0.0 Abs Test:

Mean = 0.000033 Abs

Tolerance

< 0.00010000



RMS noise reading 0.00002241 PASSED

Photometric Noise Test PASSED

Summary of Test Results

Wavelength Accuracy Test Xenon Line Scan Test	PASSED
Baseline Flatness Test	PASSED
Photometric Noise Test	PASSED

Operator Signature : _____ Date : _____

Supervisor Signature : _____ Date : _____



Cary Validation Report

Report time	6/2/2022 3:06:18 PM
Method:	
Report	C:\Users\Public\Documents\Agilent\Cary WinUV\Service\6_2_2022 3;06;18 PM.RVO
Version	5.1.3.1042
Instrument	Cary 60

Wavelength Accuracy Test Xenon Line Scan Test

6/2/2022 3:06:20 PM

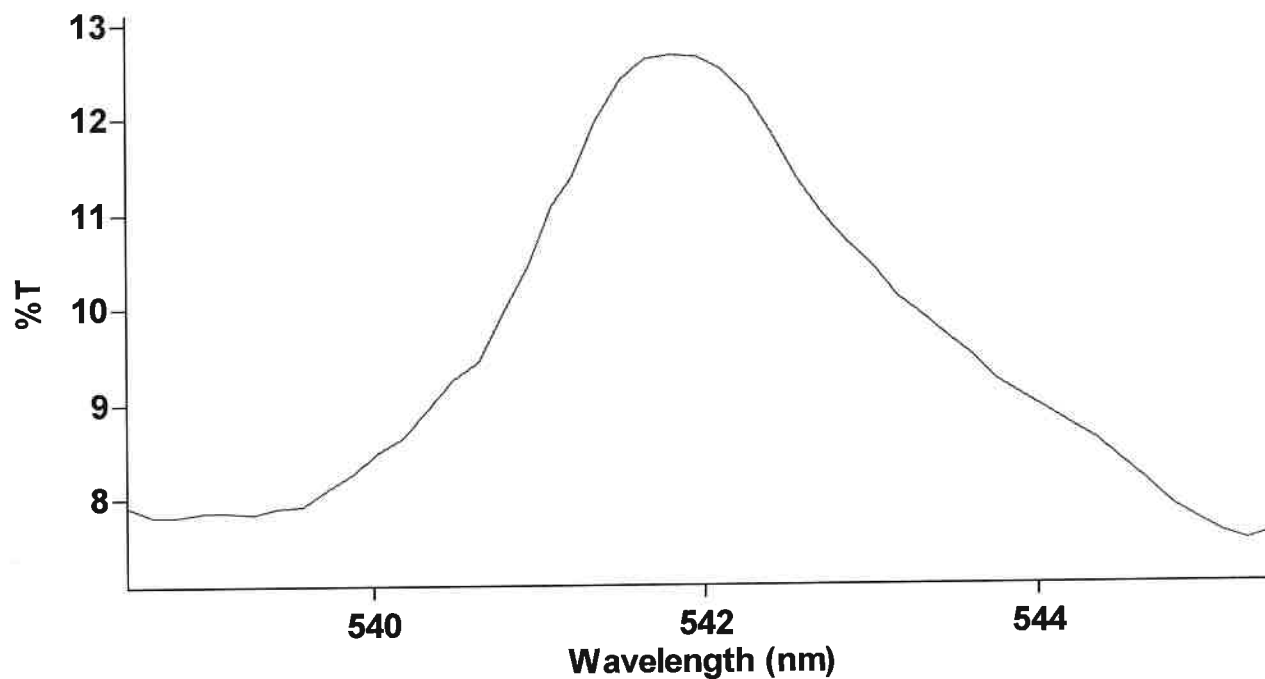
Instrument Settings

Ave Time :	2.000 sec
UV/Vis Interval :	0.150 nm
Tolerance for 541.9 Line	±0.50 nm

541.920 line found at 541.876 PASSED

SAW





Wavelength Accuracy Test Xenon Line Scan Test PASSED

SAN

Photometric Noise Test

6/2/2022 3:07:59 PM

Instrument Settings

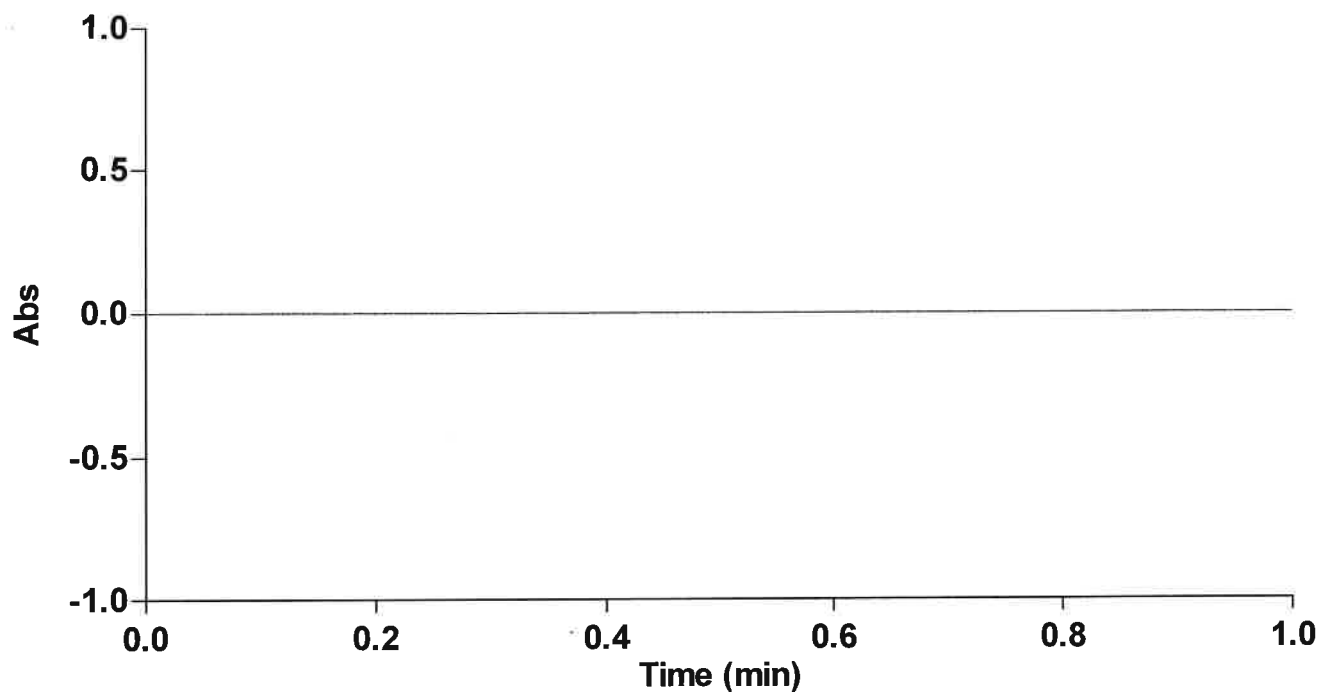
Ave Time : 1.000 sec

UV Wavelength : 500.00 nm

0.0 Abs Test: Mean = 0.000013 Abs

Tolerance < 0.00010000





RMS noise reading 0.00002208 PASSED *SAW*

Photometric Noise Test PASSED *SAW*

Baseline Flatness Test

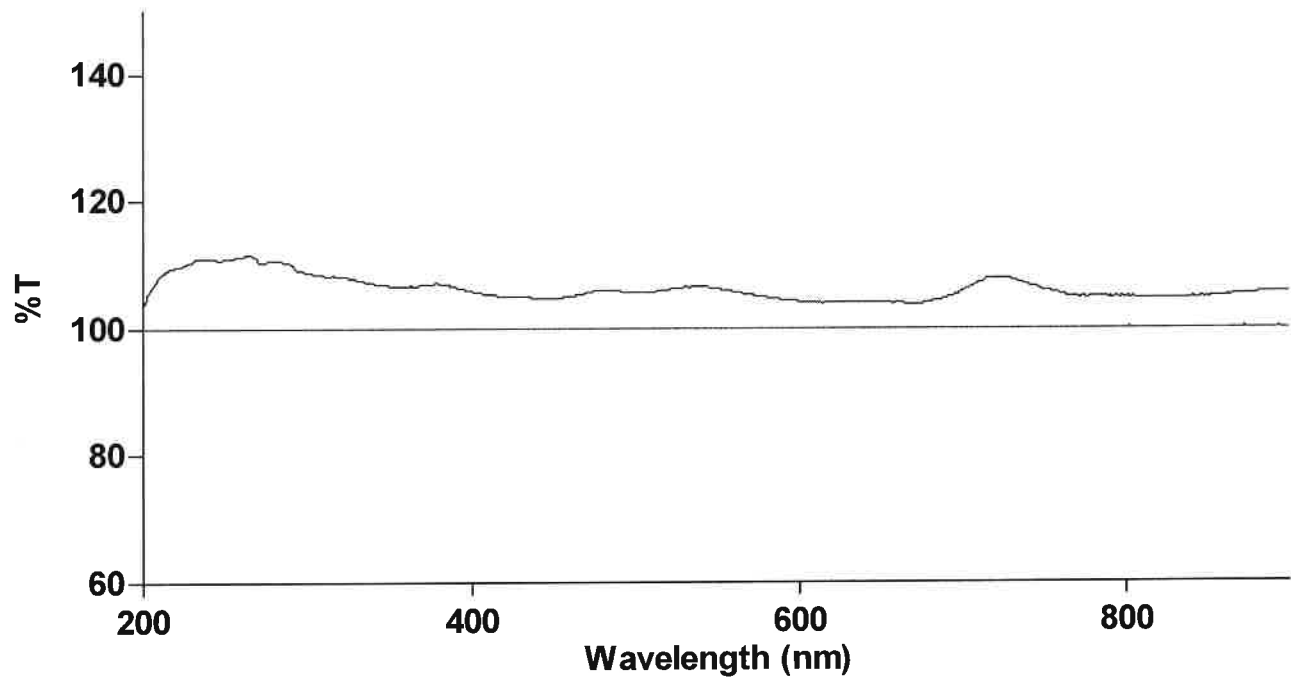
6/2/2022 3:09:07 PM
Instrument Settings

Ave Time :	0.100 sec
Interval :	1.00 nm
Scan range :	200.00 - 900.00 nm
Corrected Baseline	200.00 - 850.00 nm, Tolerance ± 0.0010 Abs

Corrected Baseline	200.00 - 850.00 nm, Abs from -0.0001 to 0.0002 PASSED
Baseline Correction in Abs	0.0002

SAW





Baseline Flatness Test PASSED SAN

Summary of Test Results

Wavelength Accuracy Test Xenon Line Scan Test
Photometric Noise Test
Baseline Flatness Test

PASSED
PASSED
PASSED

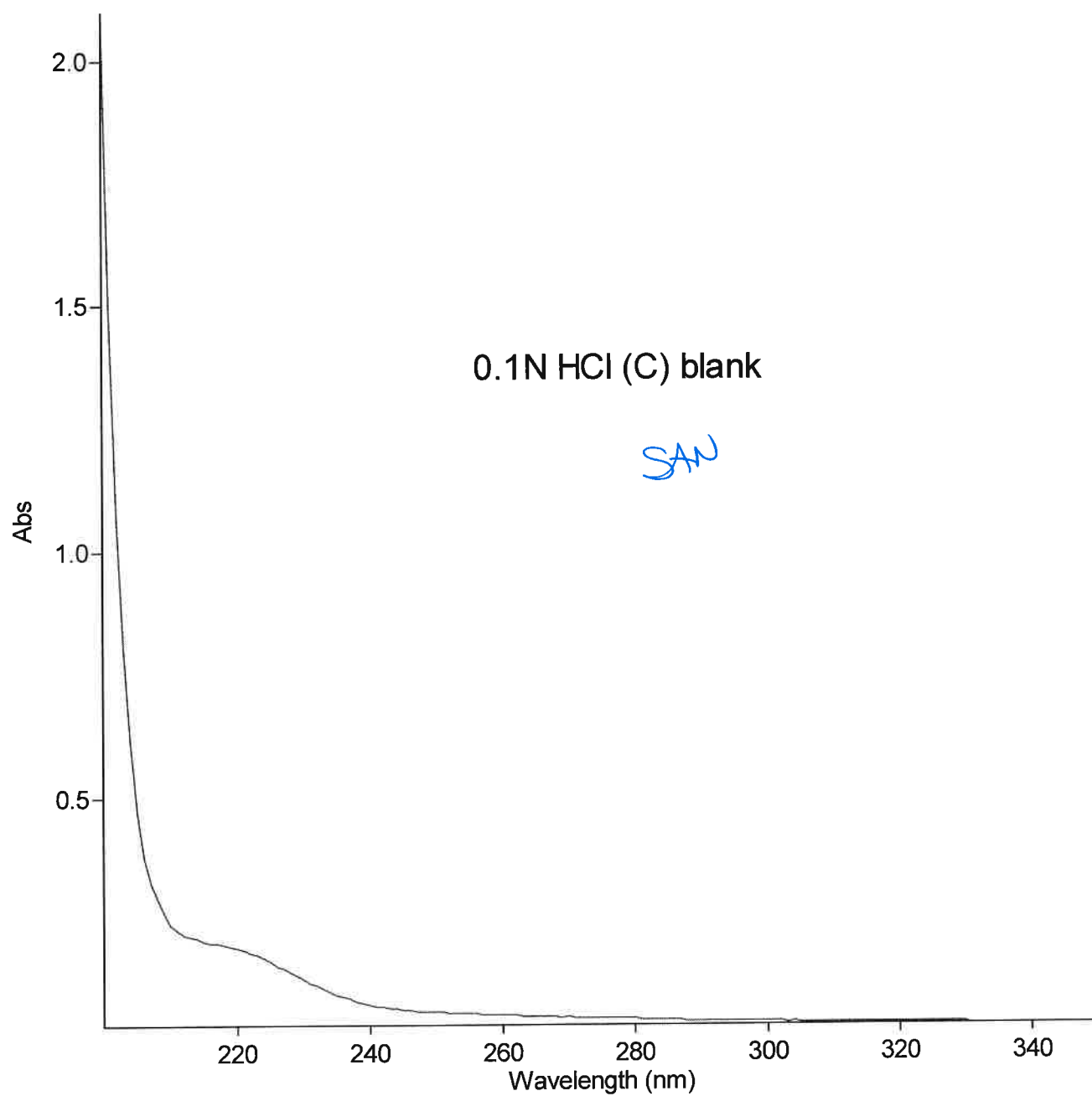
Operator Signature : SAN

Date : 06-02-22

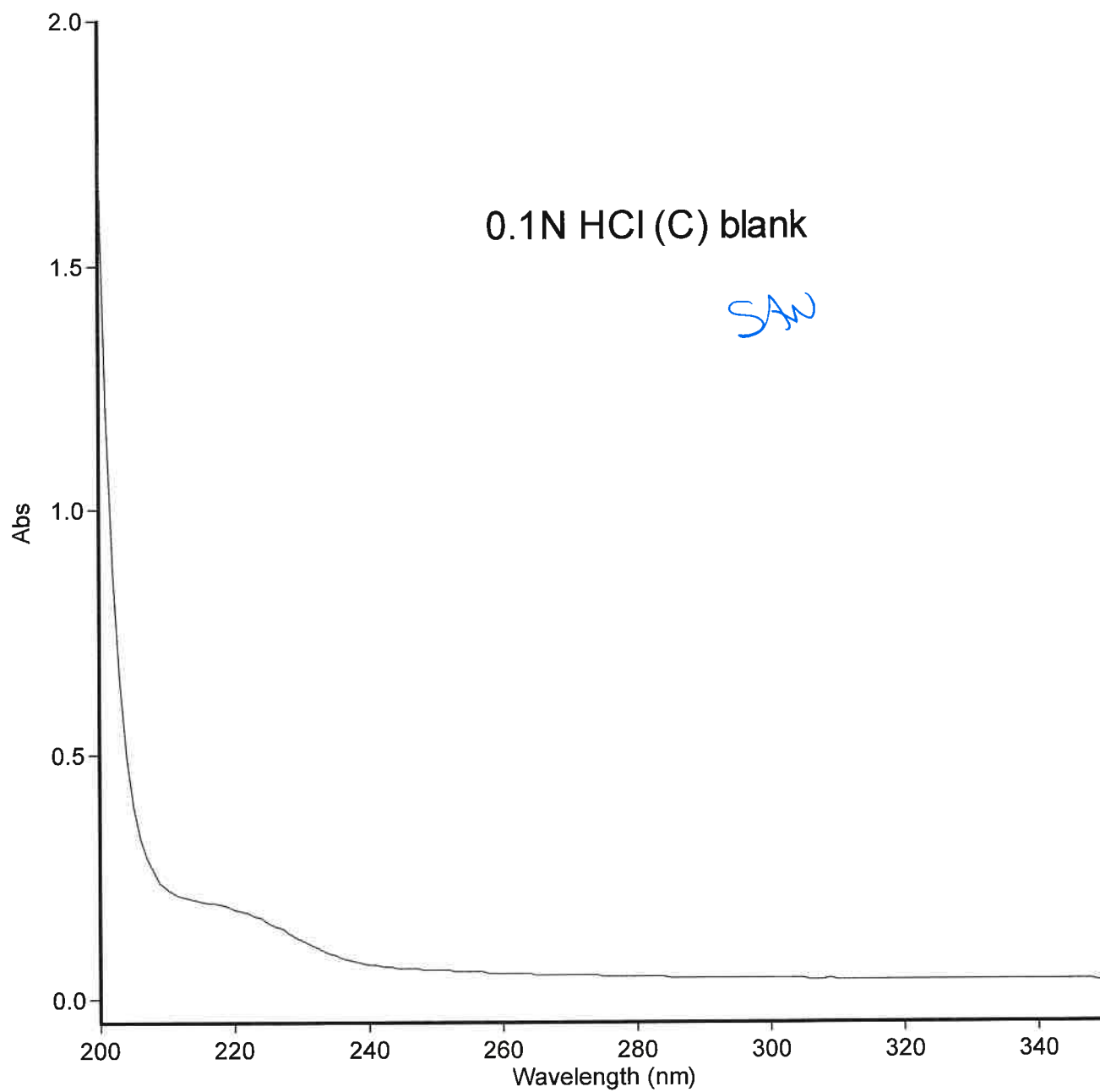
Supervisor Signature : _____

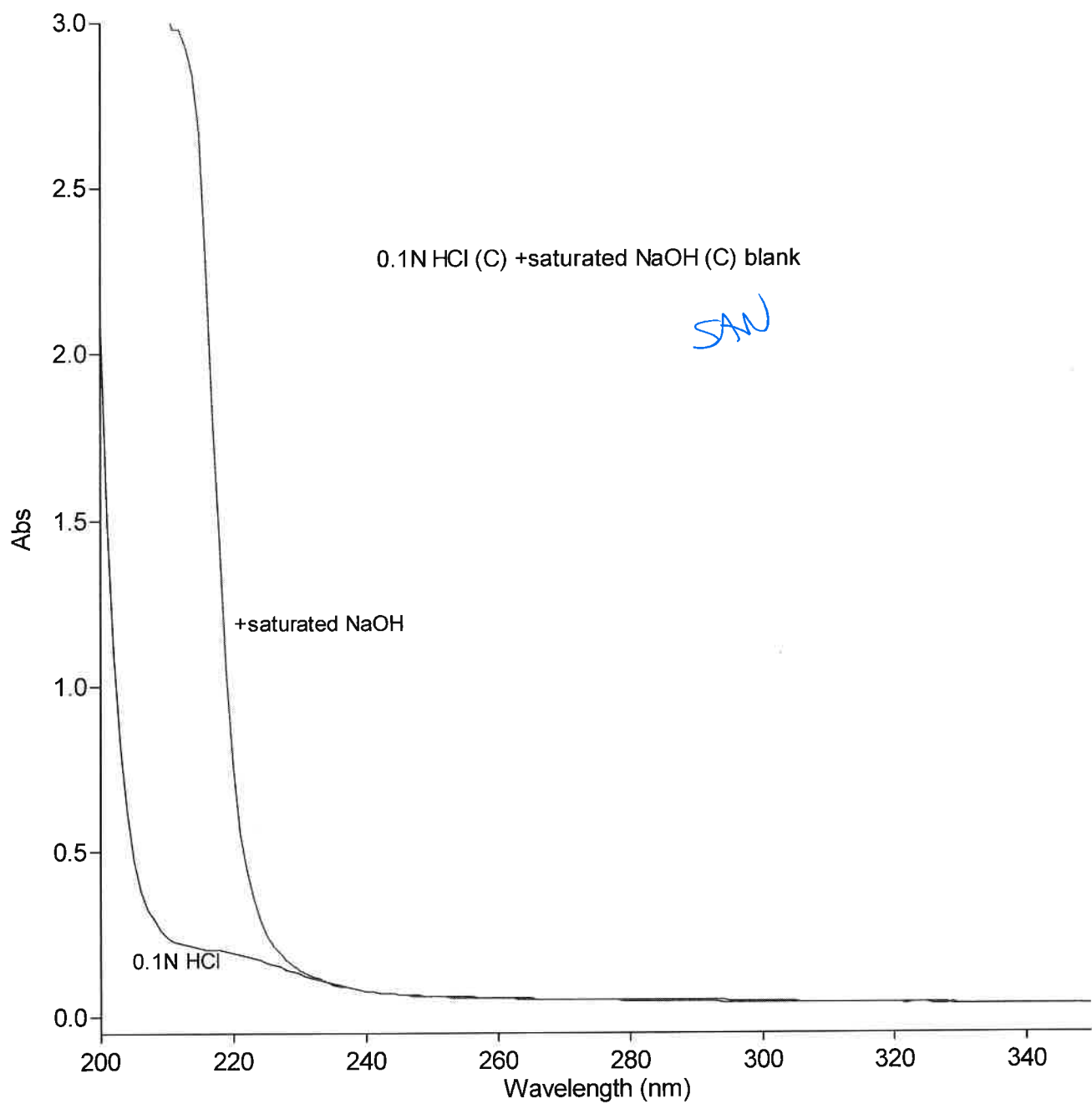
Date : _____



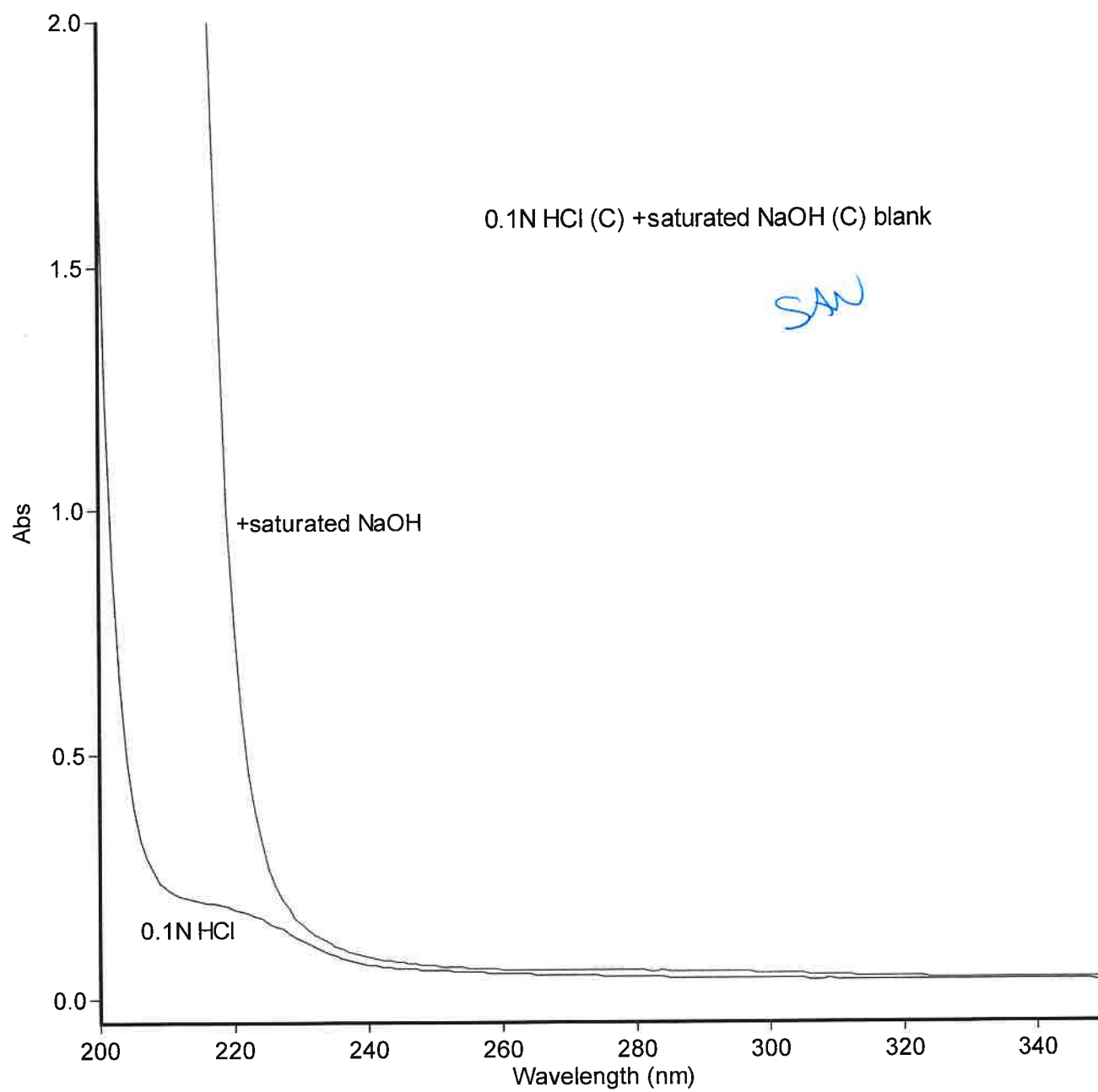


Bane

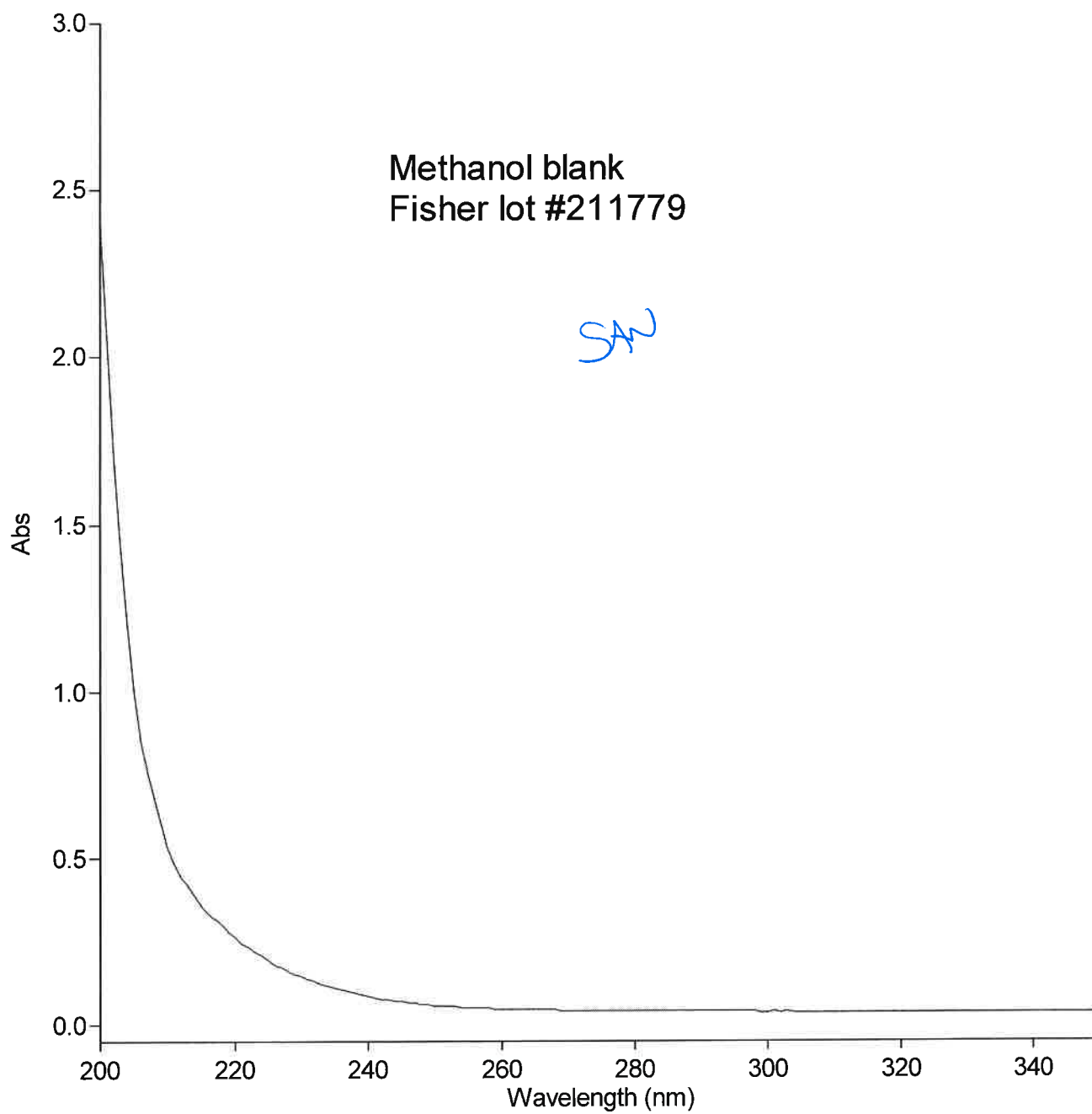




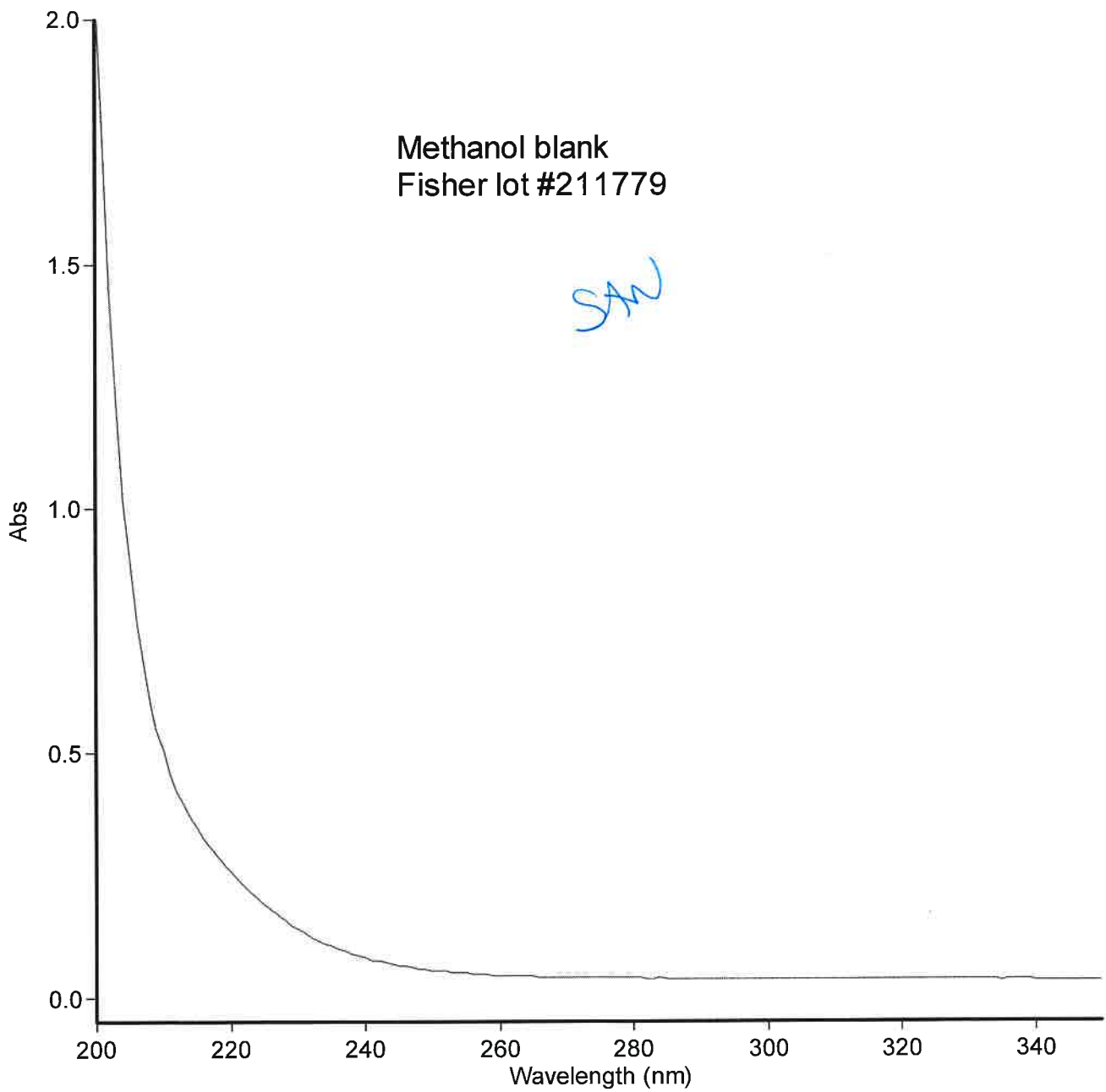
Bane

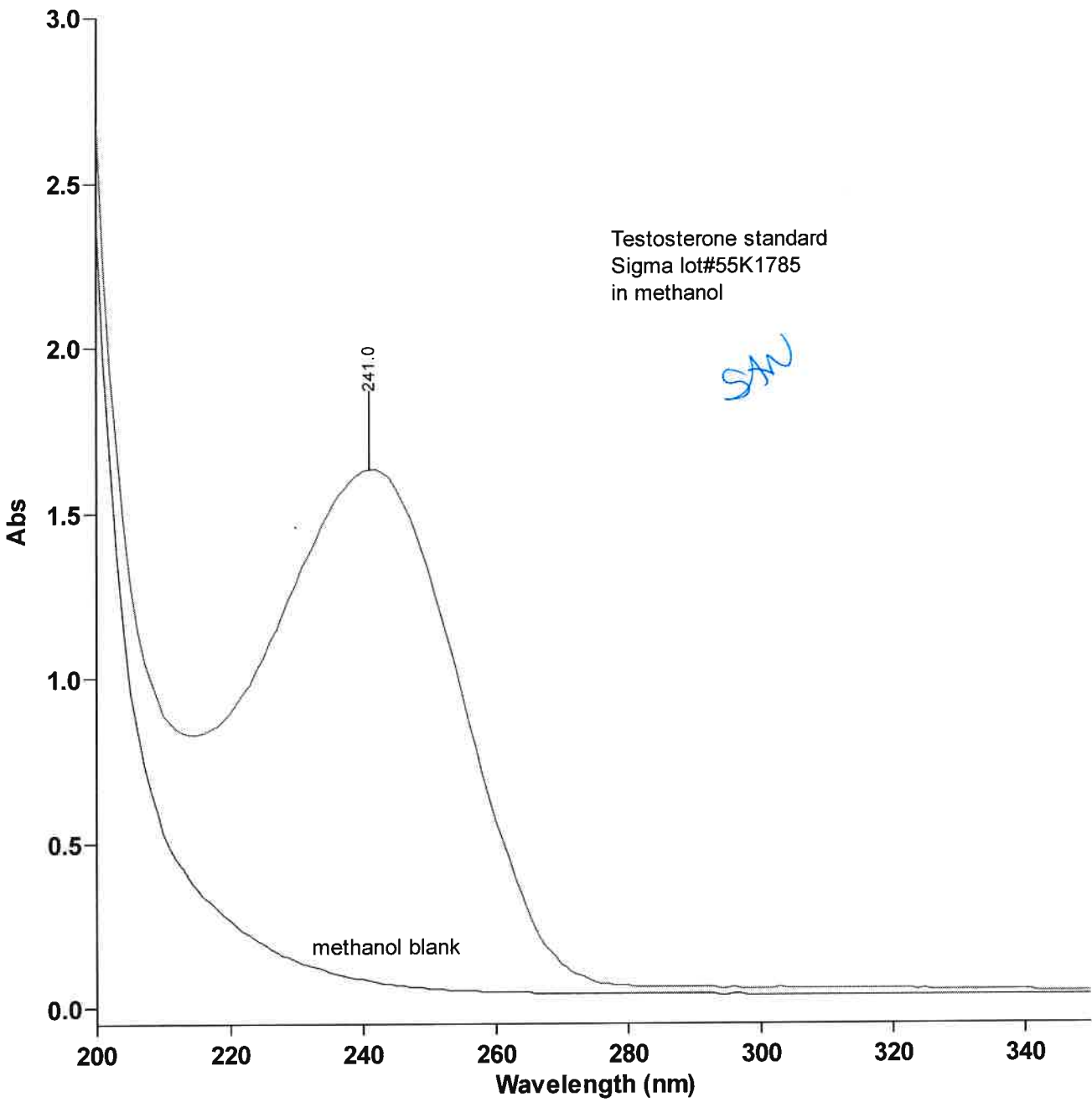


5/18/2022 1:04:05 PM
Dwight

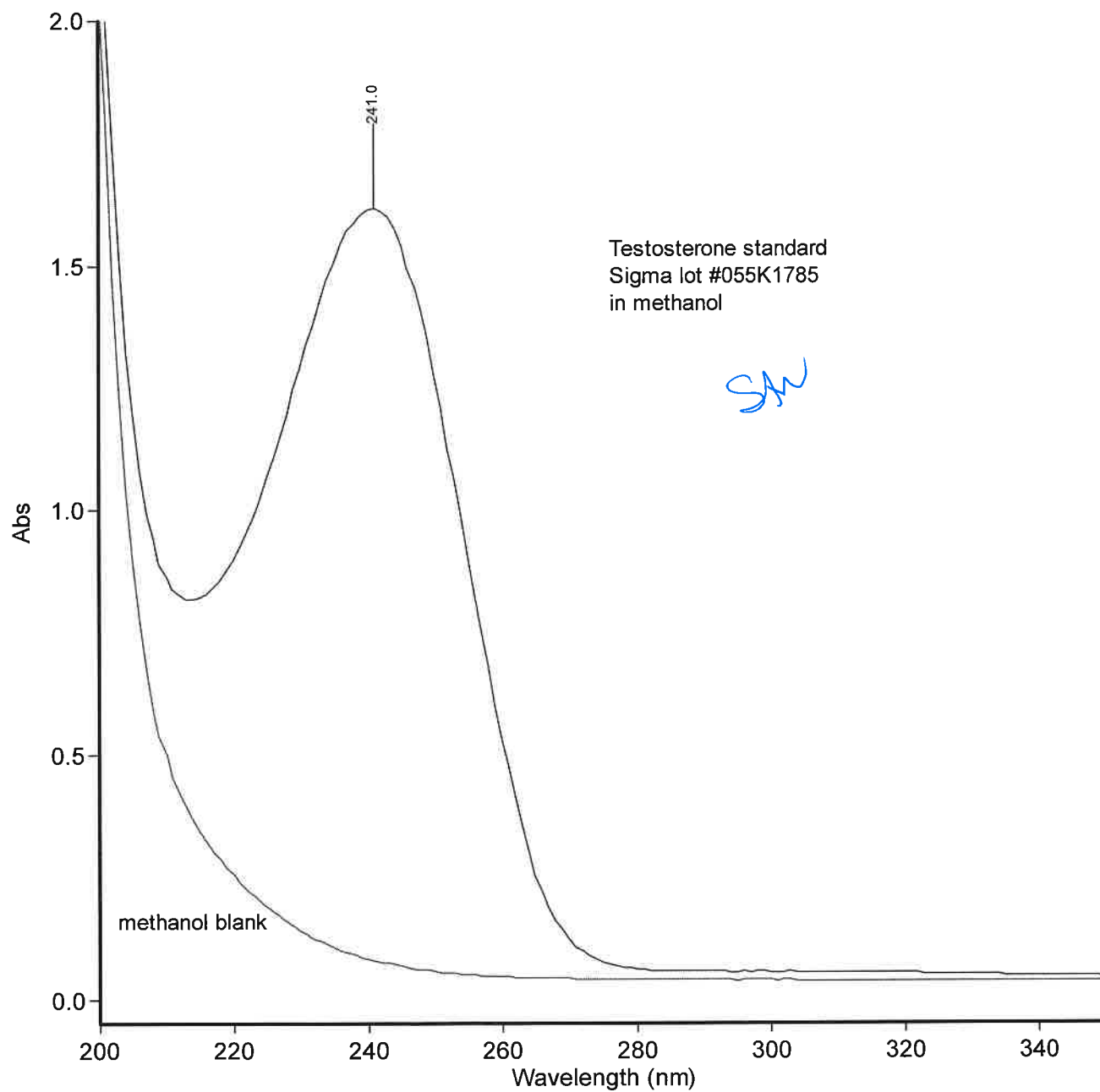


Bane

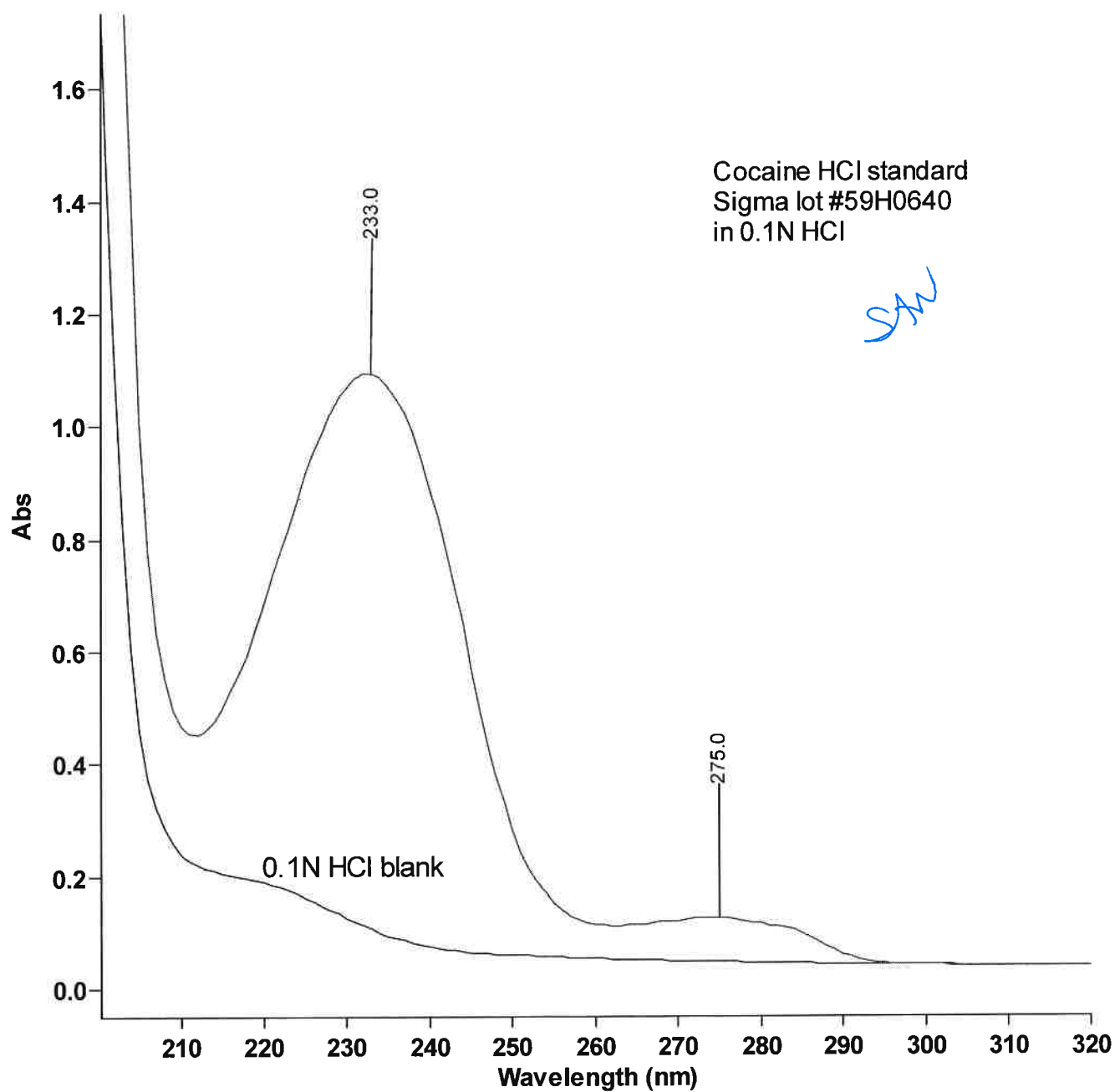




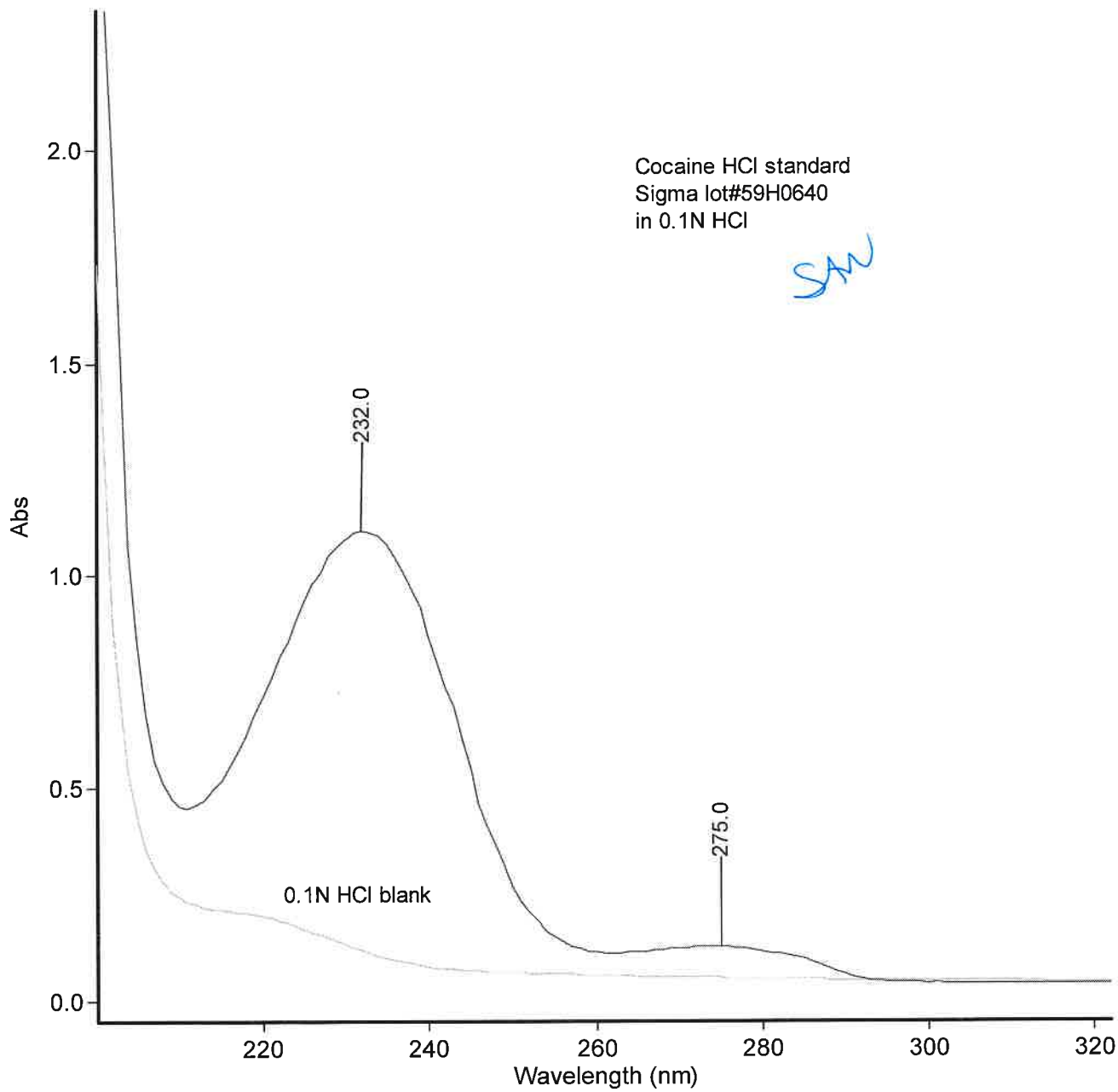
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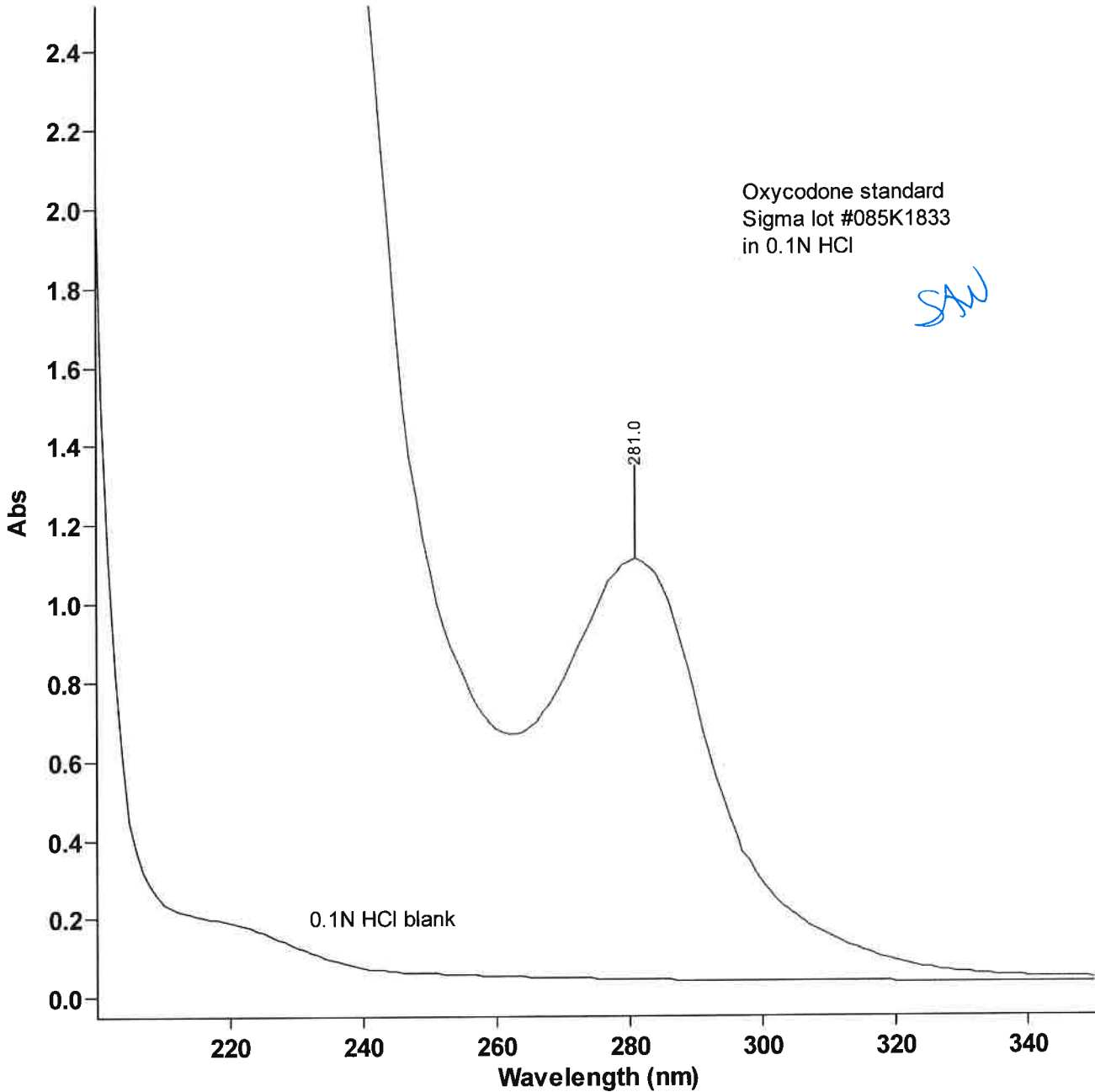


5/18/2022 2:01:20 PM
Dwight

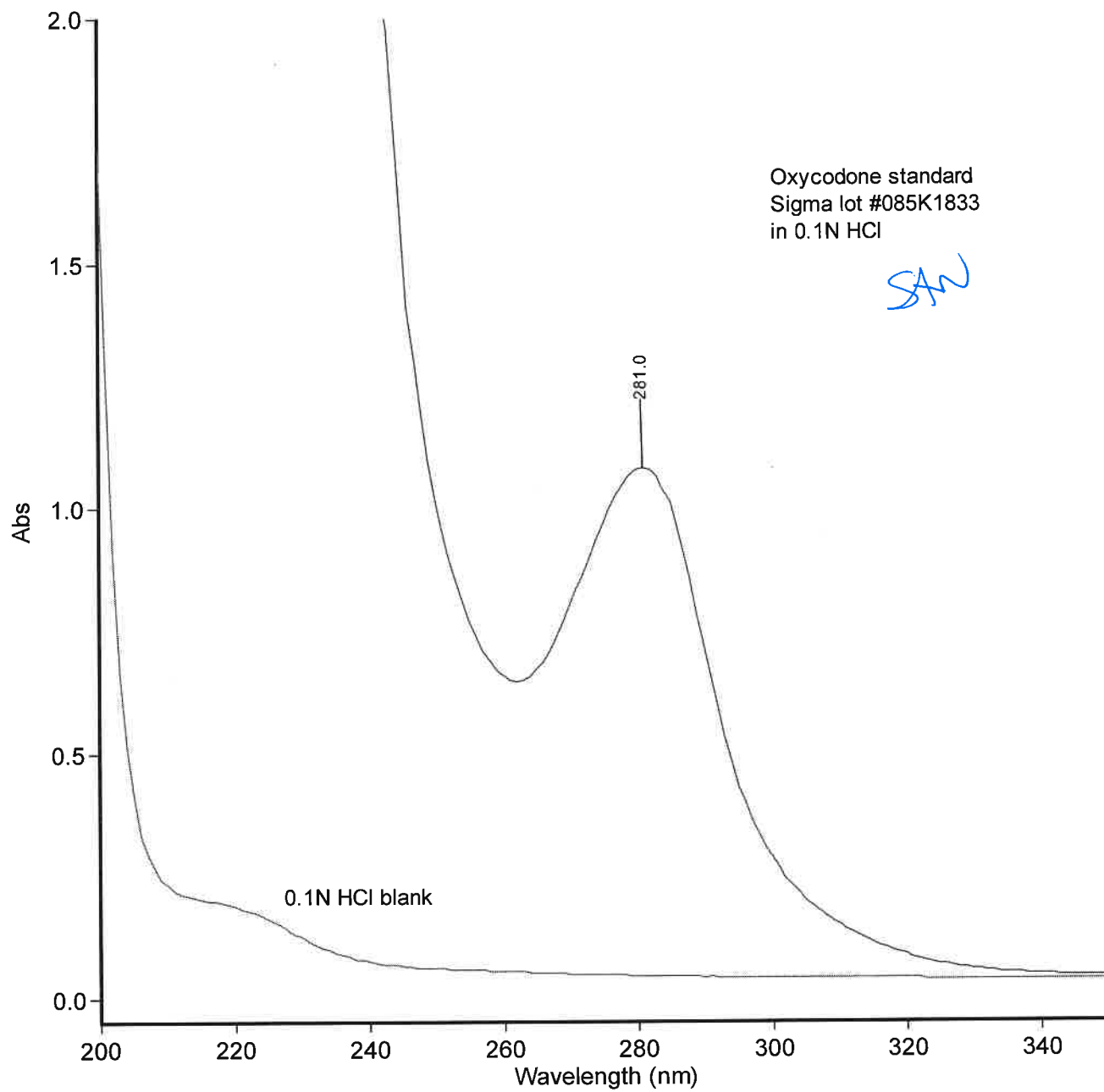


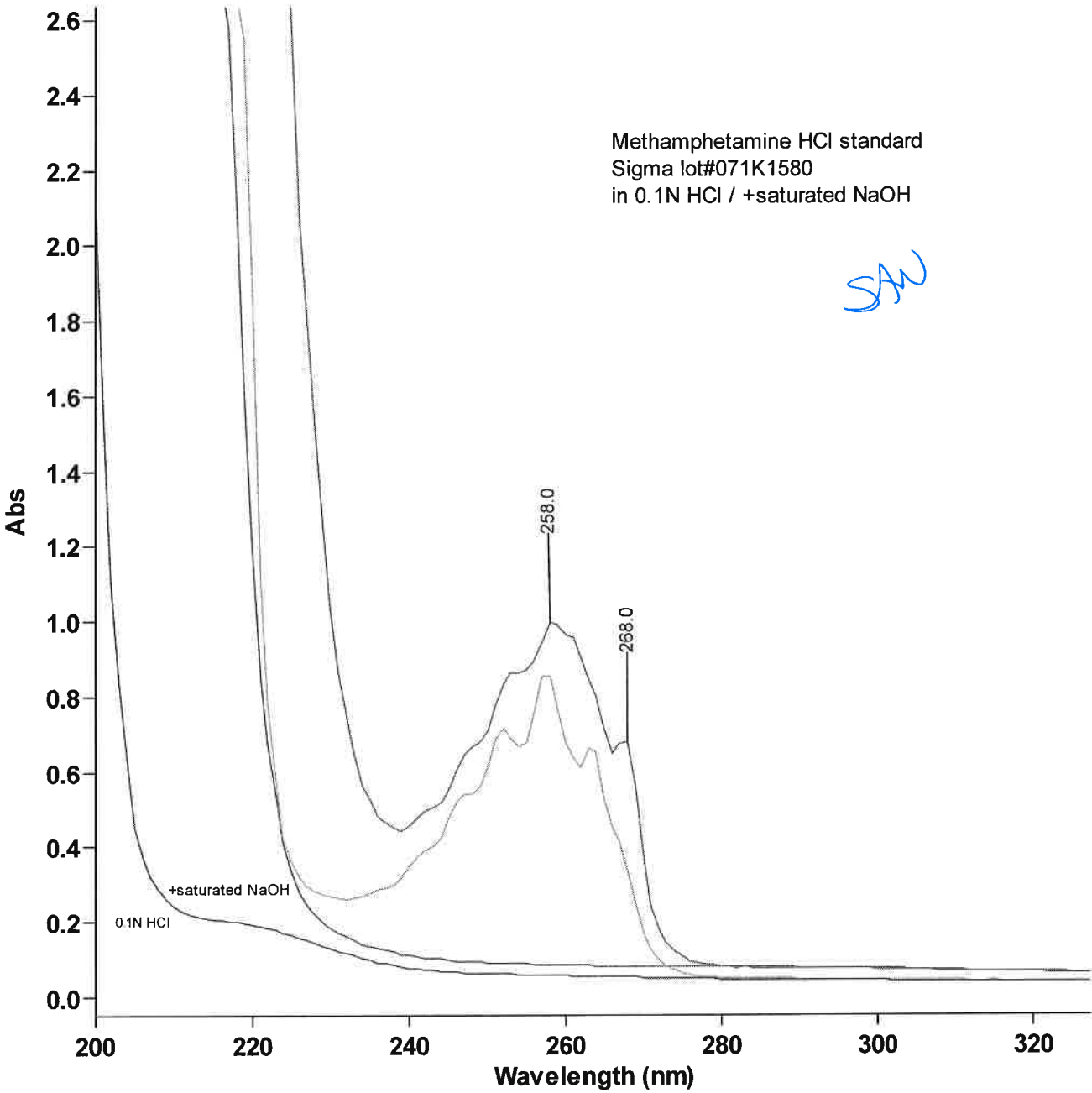
Bane



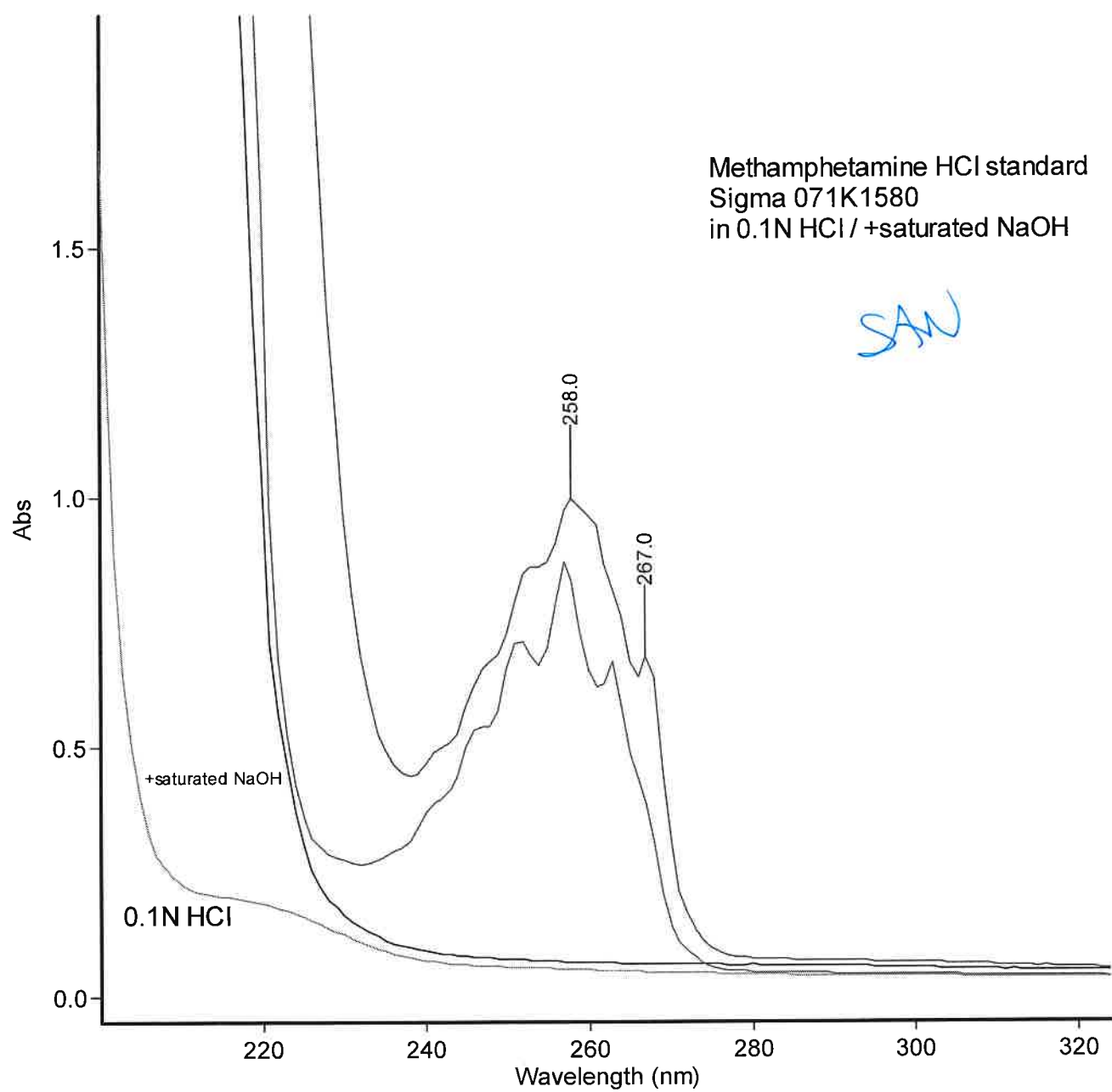


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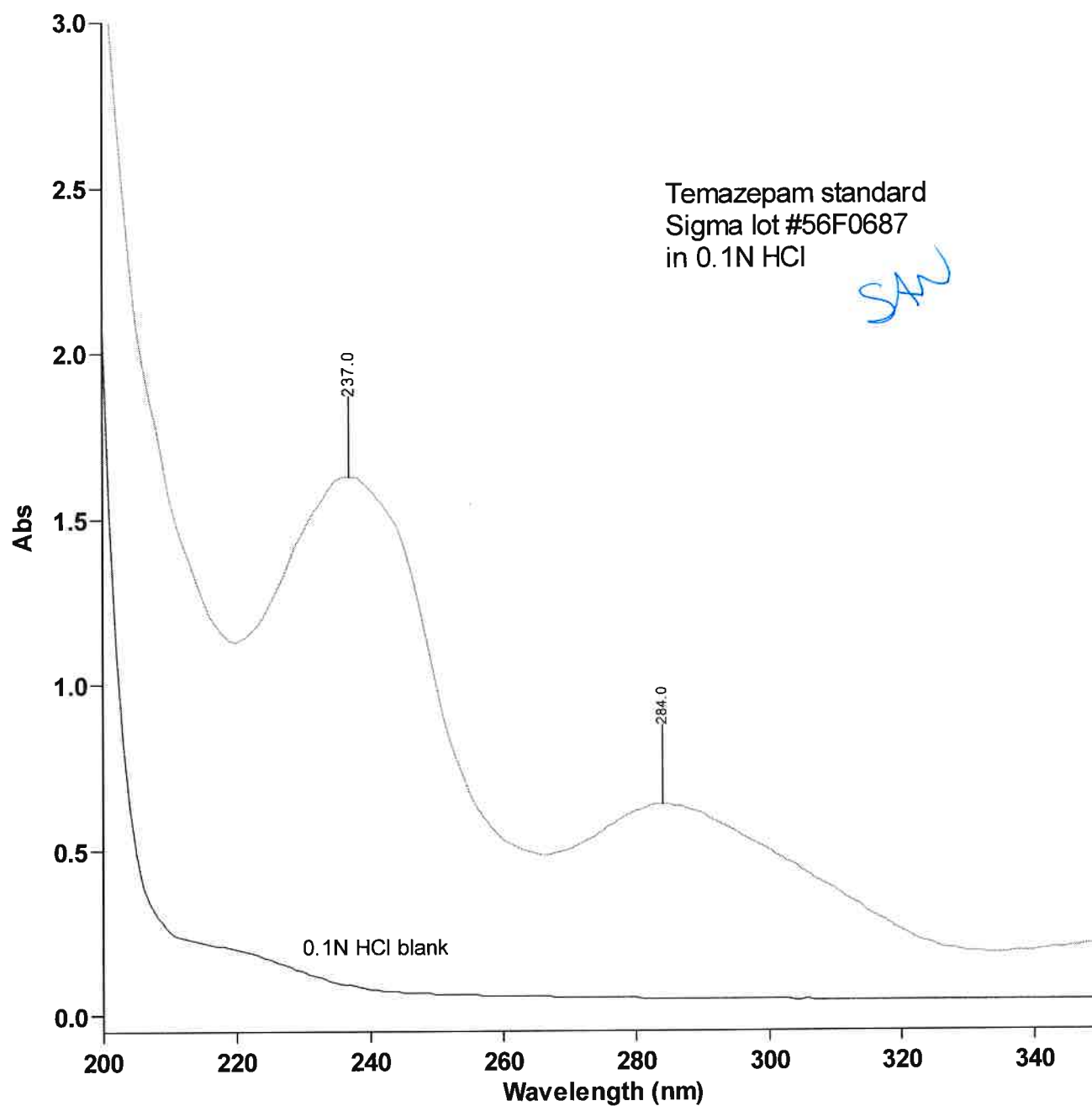




Bane



5/18/2022 3:06:49 PM
Dwight



Bane

