Guidelines for Writing Industrial Style Lab Reports

Overview:

Industrial laboratory reports are written from a different perspective and with a completely different purpose than a typical academic formal laboratory report. A typical academic report is written so that the instructor can gauge the level of a student's understanding of the material, and to simulate the style of a peer-reviewed scientific journal where new scientific findings are shared with the greater scientific community. Industrial reports are written instead from the perspective of creating an easy to read document conveying results for management and customers primarily, and containing supporting material and the documentation requirements to comply with quality assurance needs after results.

The following is an example of the format for an industrial laboratory report. The exact specifics will vary based on the individual company, but the overall concepts behind the organization will remain the same.

- ✓ **Title**: Use a specific, professional title indicating both the specific analyte and the method/instrumentation by which it was measured. Indicate also any control numbers for the sample here in the title.

  Example:

  Semiautomated pH Titration to Determine Soda Ash Carbonate: Bicarbonate Mass Ratio "Clarion Soda Ash Sample #1"

- ✓ **Results**: Immediately give the relevant results of the analysis in a highly concise form. Include the mean value from the analysis, the precision (as determined as +/- one standard deviation (s.d.)), the accuracy of the instrumentation (as determined from a propagation of uncertainty treatment), and the expected accuracy range (as determined by the 95% confidence interval (CI)). These values should be identified as to how they were calculated. If the information is complicated, or contains a large number (more than 3) of different samples, construct a clear table of this data instead or using paragraph format.

  Example:

  Six replicates determined the dissolved lead concentration to be 2.37 ± 0.03 ppb (± 1 s.d.). The error level of the instrumentation and glassware results in a minimum uncertainty of ± 0.07 ppb lead, and the expected range of data as determined by the 95% C.I. is 2.34 – 2.40 ppb lead.

- ✓ **Procedure**: Only reference the procedure, do not list the steps here. As this procedure will specify both instrumentation and lab ware tolerances, you do not need to give examples of calculations used to determine error. Cite and deviations from the established procedure in concise terms and give the reason for the change.

  Examples:

  EPA method 234.2 (revision 1.4.2) was used unmodified.

Method 1 of Analytical Chemistry 353 Laboratory Manual, issued 2005, pages 35-39, was used with the following modifications: Computer controlled Mark 500 pH interfaces were utilized instead of the Zahner 1.4 pH meters due to malfunction of the Zahner units.

- ✓ **Supporting Material**: Include in this section any graphs or transient data items that need to be calculated in the procedure, such as: Extinction coefficients, calibration curves, internal standard response levels, standardized titrant concentrations, etc…

- ✓ **Quality Assurance Information**: Include here information from the method that allows you to track the results of a series of measurements. Identify the specific instrumentation used and any specific calibrated glassware. Give the values of any data that tracks the functionality of the instruments or lab ware used.

  Example:

  Calibrated Buret "KW1" was used, along with Zahner pH meter serial number 1331-ZH-1. Buffers (pH 4.01 and 9.48) were used to calibrate the pH meter with a resulting slope of 57 mV.

- ✓ **Signature Lines**: Include three signature lines (four if for a customer and not an internal analysis) in the following order:

_____	_____
Analyst	Date
_____	_____
Supervisor	Date
_____	_____
Quality Assurance	Date
_____	_____
(Customer Approval)	Date

Layout:

Industry lab reports will need to follow a specific layout, with the exact specifics changing based on the preference of the company. To simulate this practice, industrial lab write-ups for this class will be required to follow guidelines that include formatting.

Overall Instructions:

- Do *not* list the headings: Title, Results, Procedure or Signature Lines.
- *Do* list the headings: Supporting material and Quality Assurance Information.
- Only use typed information; do not write anything in by hand.

***Page one**: Title and Results*

- Title is centered, horizontally and vertically.
- Make the title descriptive, including the analyte and the instrumental technique used in the analysis.
- On the following line indicate the samples analyzed by ID tag.
- Results are listed at the bottom of the page and column (full width) justified.

***Page two**: Procedure and Supporting Material*

- Figures should be in the same page layout (portrait) as the rest of the document and imbedded in the page.
- Be sure to include all of the information normally associated with a figure, such as:
  - Figure # and a descriptive title
  - Labeled axis, including the units
  - Use a line only if it is a true linear fit, do not connect the dots arbitrarily
  - Include the equation of the line with full uncertainty values

***Last page(s):** Quality Assurance information and Signature Lines*

- Besides what is asked for in the method in terms of Quality Assurance, give the dates of calibration for any glassware and equipment you used.
- This will be cut and paste after the first lab for everything except the electronic scales.
- Also indicate who calibrated the item(s) and identify the tools by their identification number.
- Signature lines should be placed at the bottom of whatever page they fall on.

A Sample Lab Report Follows on the Next Pages

Dichromate Analysis by Fluorescence Emission Spectroscopy
Samples: Peirce Science Building Water Tap, 3rd floor. Lot 1,
Sample CMD1, CMD 2, CMD3

Analysis found detectable levels of dichromate for all three samples. Mean concentrations were found to be 2.4, 2.8, and 2.5 ppb for CMD1, CMD2, and CMD3 respectively. Measurement precision was found to be the same in each case, ± 0.3 ppm. From instrumentation and glassware used, the maximum level of precision was determined to be ± 0.02 ppb. At the 95% confidence level, the range of data expected was 2.1-2.7 ppb, 2.5-3.1 ppb, and 2.1-2.9 ppb for samples CMD1, CMD2, and CMD3 respectively.

The procedure listed within the laboratory manual, "Chemistry 388, Analytical Chemistry II, Instrumental Analysis", V1.s.06 was followed with the following exceptions:

- The sample volume was reduced from 10.00 mL to 2.00 mL in order to make 3 determinations with the sample on hand
- Absorbance was measured directly by setting the spectrometer to ABSORBANCE mode instead of the stated procedure of measuring in TRANSMITTANCE mode and converting numerically

Supporting Material

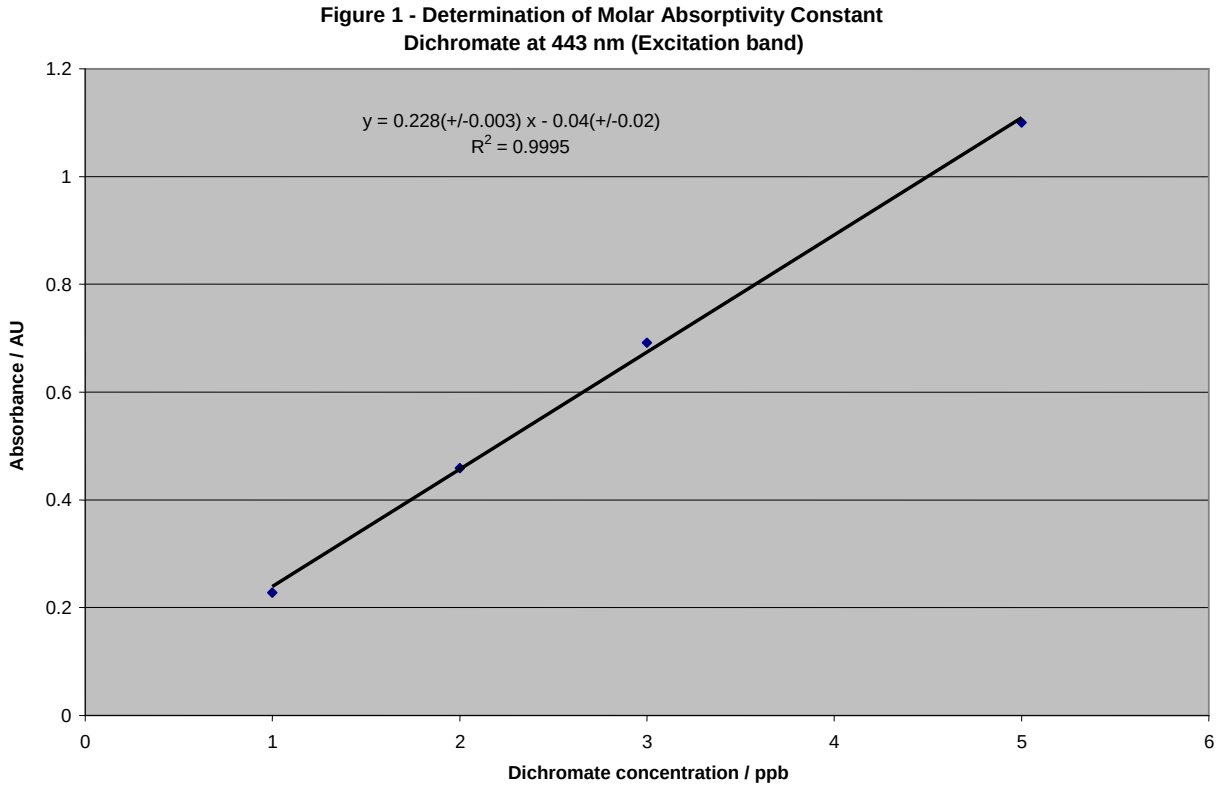


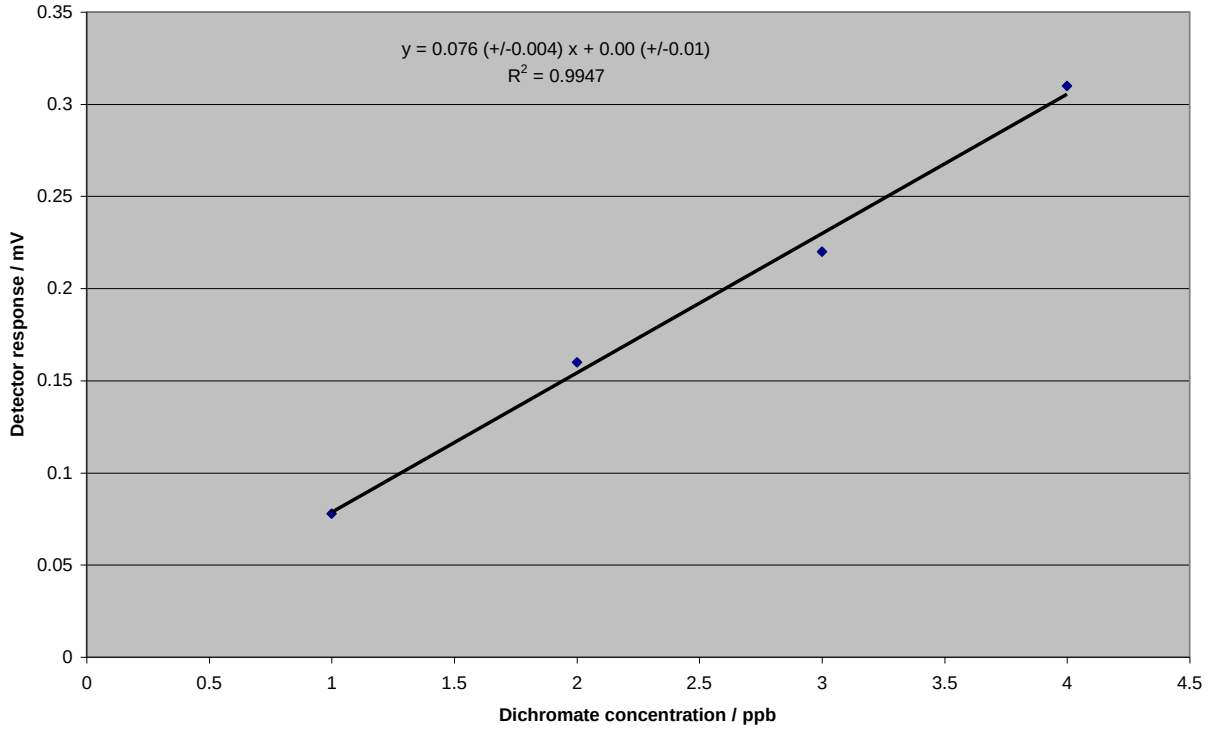
Table 1 - Calculations involving emission intensity

Sample	Emission (mV)	Calculated Conc (mM)
CMD1	122	2.250715
CMD2	125	2.30606
CMD3	134	2.472097
Formula	Calc. Conc = emission*2/25.41	

Quality Assurance Information

Blank absorbance measurements were found to be 0.000 ± 0.002 AU before and after sample measurement. Emission blank measurements were found to be 0.000 ± 0.001 mV before and after sample measurement.

Figure 2 - Emission Calibration Curve



_____ _____

Analyst Date

_____ _____

Supervisor Date

_____ _____

Quality Assurance Date

_____ _____

Customer Approval Date