

# Form 40 (version 3)ucpr 35.1 essays examples

[Business](#), [Company](#)



## **AFFIDAVIT OF [NAME] [DATE]**

[on separate page]

I [#say on oath #affirm]:

I am currently employed as an Environmental Forensic Scientist with the New South Wales Government. I have held this position since 2002.

I obtained a Bachelor of Science (Forensic Science) degree from the University of Western Sydney in 2001.

I have read, understand and will abide by the Expert Witness Code of Conduct.

I was requested by [requester] to determine the composition of the material present in the environment, the source of this material and the level of environmental harm associated with this material.

### **Sample submission**

On the 9th of May 2014, Company A and B submitted a total of 2 samples to the laboratory (Table 1). A copy of the chain of custody for these samples is attached in Appendix 1.

I conducted a visual observation of the samples, the result of which are indicated in Table 1.

### **The samples were stored at 4 degrees Celsius, as per the laboratory standard operating procedures.**

The samples collected for analysis were preserved and analyzed immediately to ensure that biological, chemical and physical changes between the time of collection and analysis is minimized to avoid bias in results.

## **Sample analysis**

I analysed samples from Company A and B, Creek 1 and 2, and a control group by High Performance Liquid Chromatography with UV-Vis detection (HPLC-UV). HPLC-UV is a technique that separates a sample into its individual components and allows the chemical composition of a sample to be determined. I used this technique to determine the presence of vegetable oil, white flake, powder and other organic and inorganic compounds in samples labeled as Creek 1, Creek 2, Company A Black Lid, Company B Yellow Lid, and IPA (i. e. a blank sample or control) respectively. I also used this technique to compare the organic and inorganic compounds present in samples Creek 1, Creek 2, Company A Black Lid, Company B Yellow Lid and IPA and to determine the amount of organic compounds present within the material.

I analysed samples Creek 1, Creek 2, Company A Black Lid, Company A Red Lid, Company B Yellow Lid, and QC (polystyrene) by Fourier Transform Infrared (FTIR). FTIR is a technique that involves the use of a spectrometer to collect spectral data of absorption or emission of a material. I used FTIR to characterize the amount of absorbed or transmitted light of the samples Creek 1, Creek 2, Company A Black Lid, Company A Red Lid, Company B Yellow Lid and QC at different wavelengths so as to determine the functional groups that is present or absent in the material suspected as vegetable oil, white flake and powder.

I analysed samples Company B, Company B inorganic, Creek 1 inorganic, Creek 1 organic, Creek 2 inorganic, Creek 2 organic and Quality Control by Atomic Absorption Spectroscopy (AAS). AAS is a technique used to measure

the concentration of elements present in the sample. I used AAS to determine the copper (Cu) and Zinc (Zn) concentration levels present within Company B, Company B inorganic, Creek 1 inorganic, Creek 1 organic, Creek 2 inorganic, Creek 2 organic and Quality Control.

## **Assumptions**

I made the following assumptions when interpreting the data from the chemical analyses:

- The submitted samples were collected using correct sampling procedures and protocols.
- The submitted samples have the same chemical composition as the material present in the environment.
- The submitted samples were collected within two days (48 hours) of the material being placed in the environment following the standard protocol for collection, management and storage of samples.
- The analysis of submitted samples may provide information on the chemical properties of the substance to include possible chemical structures and concentrations of chemicals present in Creeks 1 and 2 and Company A and B in relation to potential risks that is involved but the analysis does not provide any information on the safety of the chemicals.

## **Data interpretation**

The results of the analysis for the presence of organic and inorganic compounds in samples samples Creek 1, Creek 2, Company A Black Lid, Company A Red Lid, Company B Yellow Lid, and QC by FTIR indicate that polystyrene is present in samples Company A Black Lid and Creek 1. The

results of the analysis by FTIR reveals that samples Company B Yellow Lid and Creek 2 have the same chemical characteristic.

Figure 2 shows a comparison of the absorbance peaks (1451. 74/cm and 747. 91/cm) of QC, Company A Black Lid (1452. 9/cm and 756. 78/cm) and Creek 1(1452. 03/cm and 748. 31/cm). All three samples share the same chemical characteristic when analysed by FTIR. The differences in observed values can be attributed to the error margin of the method used for the analysis. I am therefore of the opinion that the polystyrene composition in samples Company A Black Lid, Creek 1 and QC is the same.

Figure 3 shows a comparison of the absorbance peaks of Company B Yellow Lid (3277. 73/cm, 2928. 47/cm, 2161. 68/cm, 1635. 12/cm, 1338. 98/cm, 1148. 07/cm, 1076. 1/cm, 926. 98/cm, 859. 33/cm and 762. 85/cm) and Creek 2 (3287. 02/cm, 2928. 2/cm, 2165. 38/cm, 1635. 15/cm, 1337. 05/cm, 1149. 21/cm, 1076. 74/cm, 926. 73/cm, 859. 91/cm and 760. 49/cm). I am therefore of the opinion that the chemical profile of the powder in samples Company B Yellow Lid and Creek 2 is the same. The discrepancies in the values of both samples is due to the error margin of the method used for the analysis.

I need to clarify that other potential sources containing the same polystyrene content as samples Company A Black Lid and Creek 1 will show the same profile as is demonstrated in Figure 2 for samples Company A Black Lid and Creek 1 when analysed for the presence of polystyrene by the same FTIR method. Other potential sources containing the same powder material found in Company B Yellow Lid and Creek 2 using the same method of analysis will reveal the same chemical profile as demonstrated in Figure 3 for samples

Company B Yellow Lid and Creek 2.

Results of the analysis for the presence of copper and zinc concentration in samples Company B, Company B inorganic, Creek 1 inorganic, Creek 1 organic, Creek 2 inorganic, Creek 2 organic and Quality Control by AAS indicate that zinc concentrations of samples Company B and Company B inorganic Creek 1 inorganic, Creek 1 organic is higher than that of Quality Control. Samples Company B, Company B inorganic and Creek 2 inorganic show a higher copper concentration than that of Quality Control.

Figure 4 shows a comparison of the amount of copper and zinc concentrations of samples Company B (5.17 mg Cu/L and 6.06 mg Zn/L), Company B inorganic (5.11 mg Cu/L and 6.03 mg Zn/L), Creek 1 inorganic (5.02 mg Cu/L and 6.12 mg Zn/L), Creek 1 organic (2.04 mg Cu/L and 6.08 mg Zn/L), Creek 2 inorganic (5.18 mg Cu/L and 4.46 mg Zn/L), Creek 2 organic (1.97 Cu mg/L and 4.49 mg Zn/L) and Quality Control (5.03 mg Cu/L and 5.95 mg Zn/L). I am therefore in the opinion that the zinc and copper concentrations in the in the surface (i. e. samples Creek 1 inorganic) region of the creek corresponds to the concentration of Company B inorganic. Any deviations in the result may be attributed to a marginal error in the analysis.

I need to clarify that other potential sources containing the same zinc and copper content as samples Company B inorganic and Creek 1 inorganic will show the same expected result as is demonstrated in Figure 4 for samples Company B inorganic and Creek 1 inorganic when analysed for the presence of zinc and by the same AAS method given the same amount of copper and zinc discharge at a particular period. Other potential sources containing the

same material found in Company B inorganic and Creek 1 inorganic using the same method of analysis will reveal the same chemical profile as demonstrated in Figure 4 for samples Company B inorganic and Creek 1 inorganic.

## **Conclusions**

Based on the FTIR results obtained for samples Creek 1, Creek 2, Company A Black Lid, Company A Red Lid, Company B Yellow Lid, and QC, I am of the opinion that Company A is the primary cause of flake deposition in Creek 1 while Company B is the primary cause of powder deposition in Creek 2.

Based on the AAS results for the copper and zinc concentration obtained for samples Company B, Company B inorganic, Creek 1 inorganic, Creek 1 organic, Creek 2 inorganic, Creek 2 organic and Quality Control, I am of the opinion that Company B is the main source of Powder deposition for Creek 1 as shown in the concentration values of both metals found in the surface level of Creek 1.

Note: The deponent and witness must sign each page of the affidavit. See UCPR 35. 7B.

APPENDIX