

ENVS4450 Coursework - Monitoring

In 1948 a smog killed 20 people and sickened 7,000 people in Donora, Pennsylvania. Compared to the London smog of 1952 (12,000 deaths) the event was rather minor, however it has been attributed to laying the foundations for the clean air act of 1955.

Part A – Historical Setting

1. Describe the event referred to as the 'Donora Smog' of October 1948.
2. What information is available with regard to the industrial processes and emissions which occurred in Donora during the period 1920 – 1960.
3. What were the measured levels of air pollutants at the time of the disaster?
4. Describe the methods used in the determination of air pollutants in Donora at the time of the incident.
5. What are the important lessons from the Donora Smog episode; give your answer from the perspective of environmental pollution monitoring.

Part B – Monitoring

6. What is the present use of the original site of the Donora Zinc works? What contaminants would you expect to find at the site 50 years after the event and following significant changes in land use and possible clean up at the location? Note: If the site has been repurposed it may be impossible to conduct a sampling survey.

7. Explain how environmental archives of pollution are used to reconstruct past pollution history; answer in terms of how specific pollutant levels are determined and how archives are given a chronology.

8. If the industrial activities occurring during the smog event utilized smoke stacks would you expect to find the maximum contamination at the site or further away? Explain how you could estimate the location of the maximum contamination based on an atmospheric dispersion model.

9. Locate the most likely archive site (a lake) available in the vicinity of the former site of the Donora Zinc works. Suggest how publically available photographic records could be used to determine if this archive was actively recording a record during the 1930's-1940's.

10. What type of sampling and subsequent analysis would be needed at this site in order to establish a record of metal pollution for the surrounding area? Include in your answer a description of specific equipment required, number of samples required and specific analysis involved in such a study.

BONUS: It has been shown via autopsy that fluorine levels in victims of the smog disaster were at 'lethal levels' (20 times normal). Explain how you would test for fluorine in environmental samples (air, water, sediments).