

# RESEARCH PROJECT

**Title:**

A survey of Australian petrol and diesel fuel

**Nature of problem this work is intended to address:**

Fire debris analysts must maintain a library of reference ignitable liquids for the purpose of comparison against casework samples. This library must be updated regularly to keep up with changes in liquid formulations and observe trends in liquid manufacture. Petrol and diesel fuel are no exception, and samples must be obtained regularly from retail outlets (mainly service stations) for this purpose. Over 90% of Australia's refined fuel is imported from overseas. Most of these products come from southeast Asian oil refineries located in Singapore, Japan, South Korea, Malaysia and China. These refineries obtain most of their crude oil from the Middle East. A small percentage of products are refined locally in one of Australia's four remaining oil refineries. The type of crude oil feedstock and the processes used at each specific refinery will influence the chemical composition of the end product. Moreover, state legislation requiring various fuel additives and limits on certain compound types can also change the composition of the liquid from location to location. For this reason, petrol and diesel samples may differ depending on where and when they are purchased.

Surveys of fuel products such as petrol are important as they are commonly encountered in forensic casework. The last comprehensive survey of Australian petrol was conducted almost twenty years ago, and surveys of petrol (gasoline) in other countries are limited to the USA and Canada. A more recent survey of Australian fuels would be beneficial to all practicing fire debris analysts.

**Outline of goals and objectives:**

- Obtain samples of petrol and diesel fuel, of different grades, from retail outlets across the country
- Analyse these samples to ascertain any significant differences in their chemical composition

**Special requirements:**

Knowledge and skills related to working in a chemistry laboratory are essential. Ability to travel or otherwise facilitate the collection of samples across a wide geographical area. Familiarity with analysis techniques, including gas chromatography-mass spectrometry, would be beneficial.

**GKA Investigations Group project supervisors:**

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