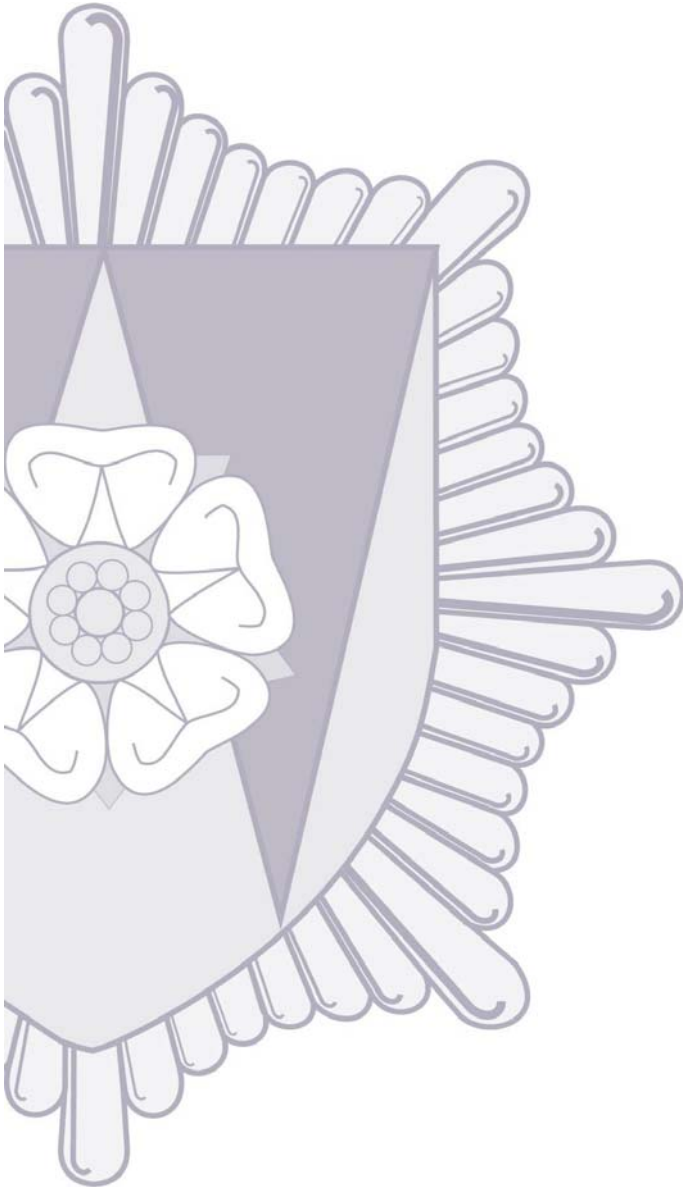


West Yorkshire Fire & Rescue Service

Fire Safety - Information Note FS-INF005

Petrol Filling Stations - Soil Gas Surveys



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PREVENTING PROTECTING RESPONDING

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1 Introduction:

1.1 Soil gas surveys at licensed petrol filling stations may only be carried out after consultation with the local Petroleum Inspector. Consultation will normally take the form of submitting a risk assessment and safety method statement for the work to be undertaken.

2 Safety Precautions:

2.1 All geophysical and geotechnical site works must be undertaken with due regard to safety precautions in respect of moving vehicles, pedestrian safety, etc. Appropriate use should be made of road cones, barriers and warning signs so as to ensure a safe system of work for both survey staff and the public.

2.2 The presence of hazardous areas, as defined in section 3 of the Blue Guide ⁽¹⁾ for the petrol filling station forecourt area must be taken into full account.

2.3 Where geophysical/geotechnical electrical equipment and instrumentation is of a non-certified type, the total closure of the filling station forecourt may be required for the duration of the survey. Road tanker fuel deliveries shall, where possible, be postponed for the duration of the survey, where this is not possible, site investigative works must be suspended during road tanker deliveries.

2.4 If total forecourt closure is not deemed necessary, the following procedures must be undertaken:-

- wherever possible all non-certified electrical equipment and compressors etc shall be located outside the hazardous areas. See paragraph 6.3.
- if, however, non-certified electrical equipment and compressors etc are required to be used within a hazard zone to complete essential survey works, all fuel dispensing pumps within a 4m radius of operation will be temporarily closed down. Temporary barriers and signs must be used to cordon off the zoned hazardous area.

2.5 Contractors are expected to use safe working practices when carrying out soil gas surveys at petrol filling stations. Guidance regarding model work procedures and safety method statements etc can be found in the IP 'Code of Practice for Contractors Working on Petrol Filling Stations'².

3 Visual Survey:

3.1 Before carrying out any survey works involving the examination of access chambers all chambers shall be investigated for the presence of hazardous fumes etc, utilising gas-monitoring equipment. All opened chambers shall be clearly cordoned off with barriers and appropriate warning signs to ensure public safety.

4 Services Location Survey:

4.1 No line tracing transmitter signal connections should be made on suction pipes, fuel delivery pipes, fuel dispensing points or any pipes associated with the fuel storage/delivery system, located in sub-surface chambers. (Such connections would be limited to vent pipes or offset fills located in open areas only).

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5 Services Tracing:

5.1 All underground pipelines shall be detected using remote transducer equipment and the positions of the pipework run clearly and indelibly marked on the ground.

6 Gas Track/Vapour Survey:

General requirements

6.1 Unless all underground pipework runs are determined and identified no drilling work shall be carried out. No holes should be drilled where there is any doubt about the exact location of underground services. Drilling through any hard standing materials (concrete/asphalt) into the under slab fill material and foundation materials shall be limited generally to a depth of approximately 600mm to allow a *hydrocarbon trace gas analyser* assessment of soil vapours.

6.2 A detailed drill hole depth schedule should be prepared prior to drilling site works to ensure that no over depth drilling occurs in the region of storage tanks.

6.3 Holes should be drilled using an air-powered drill any corresponding compressor being located at a suitable position at the perimeter of the filling station site, a maximum distance from any hazardous area.

6.4 All proposed drill hole locations should be based on a thorough assessment of all information concerning sub-surface pipe and tank locations.

6.5 Water quenching shall be used during drilling to ensure spark free operation.

Pipework area drilling

6.6 Holes should not be drilled within one metre of a pipe/cable location.

7 Tank Storage Area Drilling:

Shallow bore drilling

7.1 Any holes drilled across the top of underground storage tanks should be limited in depth to a value of 200mm less the depth to the tank invert measured in the access chamber.

Deep bore drilling

7.2 This involves a cable percussion-drilling rig to drill a limited number of boreholes to a depth of 6-8 metres to allow soil samples to be collected for laboratory analysis.

7.3 All proposed borehole locations should be based on a thorough assessment of all information concerning the location of pipes/cables and underground tanks.

7.4 All borehole drilling works shall be adequately located by *ground probing radar* survey or other means that clearly show the profile of the underground tank.

7.5 If it is not possible to accurately determine the position of the tank by the survey method a theoretical boundary for the vessel can be calculated where the diameter and volume are known.

7.6 Although the diameter can be accurately measured by using a dipstick or similar object, caution must be exercised where the volume is concerned.

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NOTE: Working capacities on some older tanks may be anecdotal and could be considerably less than the total capacity.

7.7 If the actual capacity is known, it must be assumed to be a working capacity and a margin of safety of at least 10% should be added for the purpose of the calculations.

7.8 The following calculation for a right circular cylindrical tank will ensure that the theoretical boundary encompasses the full extent of the tank regardless of the tank orientation or the fill point position; i.e. centre or end fill.

Using the transposed formula

$$\text{LENGTH} \\ (\text{m}) = \frac{V}{\pi r^2}$$

a 4,546 litre ($V = 4.546\text{m}^3$) 1.5 m diameter tank (radius $r = 0.75\text{m}$) would have a theoretical boundary radius (measured from the fill point) of

$$\frac{4.546}{3.14 \times (0.75)^2} \cong 2.6\text{m} \text{ (i.e. approximately 2.6 metres).}$$

7.9 No geotechnical boreholes may be drilled within a 2m distance of the theoretical radial boundary of an underground storage tank.

8 References:

¹*Guidance for the Design, Construction, Modification & Maintenance of Petrol Filling Stations. Jointly published by the APEA and the IP (ISBN 0 85293 217 0). Available from the Energy Institute, 61 New Cavendish Street, London, W1M 8AR. ☎ 020 7467 7100. 📠 020 7255 1472.*

Detailed guidance on the procedures for carrying out soil gas surveys and adopting safe working practices at licensed petroleum sites can be obtained from the under mentioned publications by the Institute of Petroleum. Available from the Energy Institute, 61 New Cavendish Street, London, W1M 8AR. ☎ 020 7467 7100. 📠 020 7255 1472.

- ²*Code of Practice for Contractors Working on Petrol Filling Stations. ISBN 0 85293 1948.*
- *Code of Practice for the Investigation and Mitigation of Possible Petroleum Based Land Contamination" ISBN 0 85293 124 7.*