Our Ref: MPW/45463R

Mr.Tony Tough
Contracts Manager
VertaseFLI Limited
Number 1
Middle Bridge Business Park
Bristol Road
Portishead
BS20 6PN

By Email Only

Subsight Surveys Ltd
Subsight House
2 Cross Lane
Braunston
Daventry
Northants
NN11 7HH

Tel: 01788 891721
Fax: 01788 891621
Email: mail@subsight.co.uk
Web: www.subsight.co.uk

23rd January 2012

Dear Tony,

Heyford Park, Camp Road, Upper Heyford, Bicester
Electronic Location of Underground Fuel Pipeline

Further to our two recent site visits please find below our summary report.

Scope of Survey

The objective of our survey was to electronically locate and mark on site the route of the redundant fuel pipelines using coloured spray marker paint and marker flags, to compliment the tracing work of others, it should be noted Subsight were not tasked with location and mapping of the complete fuel pipeline network.

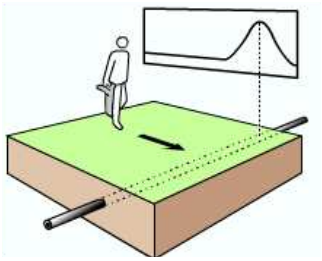
Outline Method Statement

Equipment
All electronic service location was carried out using electro-magnetic theory instruments as manufactured by Radiodetection of Bristol.

We currently use the RD8000 locator, which is a more sophisticated version of the more common Cat & Genny.

General Principles

A brief summary of the methodologies utilised for the location of underground surveys is detailed below:-



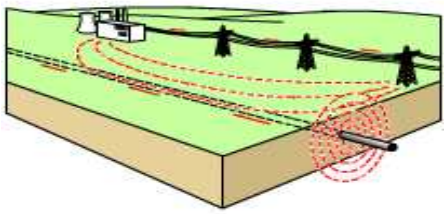
Electromagnetic pipe detection is a common and widely used method of detecting underground services.

This electromagnetic method requires a signal to be either **passive** (power or radio signal) **direct connection** (access to the service required) or **indirectly induced** across the service by a transmitter.

The signal is then detected with a hand held receiver.

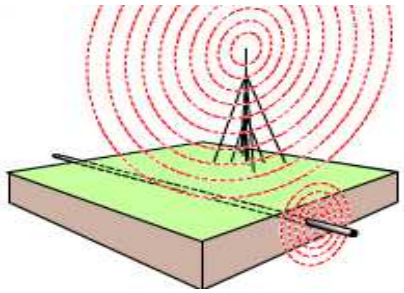
The transmission of this signal requires a conductive element, therefore the service must be metallic.

Passive Signals are naturally present in many conductors and buried metal utilities. There are two types of passive signal.

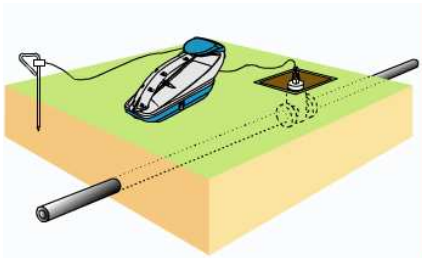


Power

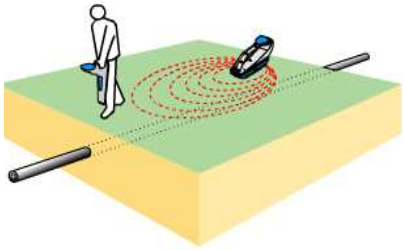
Current carrying power cables radiate a signal at 50/60 KHz. However the earth is also full of power system return currents, which tend to flow along other metal pipes and cable sheaths as they offer a lower resistance path.



Radio
Long wave radio transmissions penetrate the ground and flow as radio frequency currents along buried pipes and cables, whether they are electrically live or dead.

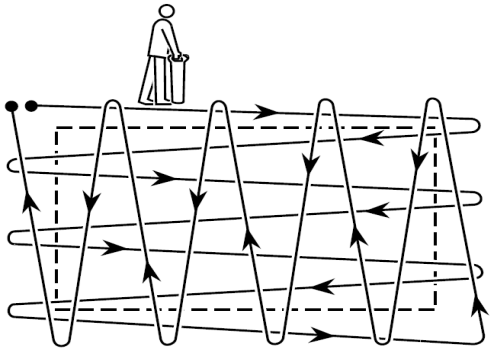


Direct Connection
Electrical connection leads are plugged into the transmitter and are attached directly to the line.
The circuit is completed by connection to a ground stake.
This method ensures a clear signal on an individual line.

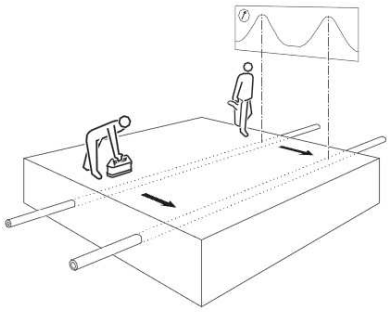


Induction
By placing the transmitter on the ground in the area to be located a signal will be induced on to any line(s) below or close to the transmitter.

Grid Sweep
When all known services are located within an area, carry out a grid sweep on passive modes and then in parallel with the transmitter on induction mode.



Passive Sweep



Induction Sweep

Initial Site Visit – Tuesday 29th November 2011

Our original remit was to locate a particular problem section of fuel pipeline not locatable using a basic CAT & Genny locating instrument, available to the Vertase FLI field engineer/contractor on site.

If time permitted we were to spend the rest of the day locating and marking further sections of pipeline.

Using a combination of the locating principles, as detailed above and with reference to the site "fuel pipeline record drawing" provided, good quality trace signals were obtainable on the fuel pipelines enabling lengthy sections of the pipeline to be located within our day.

The subsequent remediation works required the fuel pipeline to be exposed; the feedback from the field engineer is that our locating of the pipework had proven accurate.

Revisit to Site – Wednesday 21st December 2011

Following our successful first visit we were requested to return in an attempt to locate further sections of pipeline not locatable using a basic CAT & Genny locating instruments available to the Vertase FLI field engineer/contractor on site. These investigations centred around pipework shown on a drawing produced in 1971.

Whilst we were successful in locating certain sections of this additional pipework, other lengths shown on the 1971 drawing could not be traced. In some cases we were unable to locate the Fuel Dispensing Point and were therefore unable to apply an induced current with the signal generator. Other areas were beneath concrete hardstanding or buildings and structures which we understand were developed at a later date suggesting that the pipeline(s) in these areas may have been decommissioned and removed prior to development works.

In a final attempt to identify the 'missing' fuel pipelines plotted on the 1971 record drawing we increased our search areas up to 20 metres away from the declared pipe routes to try and locate the pipelines in the very general areas that it was shown on the records, but this still proved unsuccessful / inclusive.

Revisit to Site – Wednesday 18th January 2012

Following our previous two visits we were requested to return in an attempt to locate further sections of pipeline not locatable using a basic CAT & Genny locating instruments available to the Vertase FLI field engineer/contractor on site. These investigations centred around pipework shown on a drawing produced in 1971, all as instructed on site by Mike Parry.

Summary

We have no evidence to prove that the fuel pipelines not located were either incorrectly drawn, never installed or have at some stage been removed, we believe we have used all available locating techniques, the best locating instrument currently available on the market and our most experienced of Utility Surveyors in an attempt to verify the pipeline routes.

This report to be read in conjunction with Vertase FLI report.

Yours sincerely
Subsight Surveys Limited

Martin Weaver
Managing Director