Loss Detection Protocol for Equipment Integrity Tests on Underground Petroleum Storage Systems

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Introduction

The Loss Detection Protocol for Equipment Integrity Tests on Underground Petroleum Storage Systems (EIT Protocol) relates to equipment integrity tests (EITs) which are undertaken to determine whether an underground petroleum storage system (UPSS) or a component of a storage system is not providing full and continuous containment. This includes whether petroleum is leaking out of the UPSS or water is entering the UPSS. While no EIT is capable of proving categorically that a UPSS is not leaking, an aim of this protocol is to ensure that the person commissioning the test is notified of the smallest leak/gain that the method can detect (at the required accuracy). The smaller the leak that an EIT can detect, the sooner actions are able to be taken to stop the leak. This will result in less impact on the environment and potentially lower clean up expenses.

This EIT Protocol must be complied with for all equipment integrity tests conducted on UPSS in Tasmania and is relevant to people who are commissioning EITs (including UPSS Infrastructure Owners) and EIT providers.

This protocol details requirements in relation to the evaluation/certification of EIT methods, how an EIT must be carried out and how EIT results must be reported. This protocol has been issued by the Director EPA under regulation 52 of the *Environmental Management and Pollution Control (Underground Petroleum Storage Systems) Regulations 2020 (*UPSS Regulations).

Application

The UPSS Regulations require an EIT to be undertaken (and passed) prior to a new or replaced storage system, or a repaired tank or piping, being used for the first time. EITs are also commonly undertaken:

- where loss monitoring (eg SIRA) indicates that the UPSS may not be providing full and continuous containment (ie fuel may be leaking out of the UPSS or water may be entering the UPSS); and/or
- to determine the source of fuel when fuel is detected in the environment (eg in groundwater).

Use of this protocol will be taken into consideration in assessing compliance with regulation 7(1) of the UPSS Regulations, which states: *A person must not falsely represent a service offered by the person to be an equipment integrity test.*

Purpose

The purpose of this protocol is to ensure that EITs are undertaken and reported in a standardised manner so that results of the test can be relied upon, and the results are easily interpreted by the person commissioning the test. In particular, the EIT protocol ensures that method specific PASS/FAIL criteria are adhered to.

Definition

An equipment integrity test is defined in regulation 3 of the *Environmental Management and Pollution Control (Underground Petroleum Storage Systems) Regulations 2020* (UPSS Regulations) as:

equipment integrity test, in relation to a storage system, or a component of a storage system, means a test –

(a) to determine whether the storage system or component is providing full and continuous containment; and

(b) that is –

(i) capable, at a minimum, of detecting a leak occurring at a rate of 0.38 litres per hour with at least a 95% probability of detection and a 5% or less probability of false detection; and

(ii) capable of detecting a leak, described in subparagraph (i), from any part of the storage system that routinely contains petroleum; and

(iii) evaluated and certified, by an independent third party using loss detection protocols, as meeting the performance standards specified in subparagraphs (i) and (ii) ; and

(c) carried out in accordance with –

(i) AS 4897; and

(ii) the manner of testing certified by the independent third party under paragraph (b)(iii) ; and

(iii) loss detection protocols; and

(d) reported on in accordance with loss detection protocols;

Note: 0.38 L/hour is not an acceptable leak rate, rather, it represents the minimum sensitivity of an EIT allowed by EPA Tasmania.

In this context, any leak detected at a rate greater than or equal to the EIT's leak detection limit must be reported as a FAIL. Examples are provided below:

Example 1: if an EIT has a 0.1 L/hour leak detection limit (well below the required 0.38 L/hour), then any result greater than or equal to 0.1 L/hour must be reported as a FAIL. Any leak detected less than 0.1 L/hour will be reported as a PASS.

Example 2: if an EIT has a 0.38 L/hour leak detection limit, then any result greater than or equal to 0.38 L/hour must be reported as a FAIL. Any leak detected less than 0.38 L/hour will be reported as a PASS.

In the examples above, the EIT with a leak detection rate of 0.1 litres per hour (with at least a 95% probability of detection and a 5% or less probability of false detection), will be able to detect smaller leaks with the same level of confidence when compared with EITs adopting the minimum standard (0.38 L/hour). The more sensitive (i.e. 0.1 L/hour) EIT will therefore detect leaks earlier resulting in less loss of fuel, less impact to the environment and potentially less cost associated with contaminated land management.

Requirements

AS4897 states that: The EIT shall be a nationally approved and certified method of EIT that meets, as a minimum, the requirements and certification standards of the USEPA.

The National Work Group on Leak Detection Evaluations (NWGLDE) has been set up by the US Federal Government and State Governments to provide a web site which contains details of leak detection equipment for storage tanks, and associated piping, which have undergone third-party evaluations that have been found by the Work Group to meet the evaluation/certification requirements of the USEPA.

Independent third-party evaluation and certification

EITs must be third-party approved and must appear on the list maintained by the National Work Group on Leak Detection Evaluations (NWGLDE) which is posted on their website at www.nwglde.org. No other third-party evaluation or certification is acceptable unless approved in writing by the Director.

Loss Detection Protocols

The approved loss detection protocols are those testing protocols listed on the NWGLDE website (NWGLDE Acceptable Protocols http://www.nwglde.org/protocols.html). No other loss detection protocols may be used unless approved in writing by the Director.

Note:
Some EITs have specific limiting factors, including ullage ranges that must be present when the tank is tested and groundwater depth must be known. The person commissioning the EIT should ensure that the method selected is suitable for their purpose.

Carrying out an EIT

EITs must be carried out in accordance with the test's third-party evaluation and certification on the NWGLDE website. If required by the manufacturer, the technician performing the test must hold a current manufacturer's certification of training to perform the testing.

Reporting

The EIT report which is provided to the client must contain as a minimum:

- The test date;
- Location details including the address and a plan of tank and line layouts;
- Tank and line details – tank name, fuel type etc;
- Information which identifies the test method (e.g. name of the EIT method as listed on the NWGLDE web site);
- Factors referred to in the NWGLDE listing which have been adhered to, and the field measurement of these factors, to show that the EIT method was conducted in accordance with the third-party certification. For example, the NWGLDE listing may state that the ullage range must be between 5,000L and 10,000L and when tested the tank ullage was 7,500L. Other factors may include: depth to groundwater, duration of test, tank capacity, waiting time, test period, test pressure, temperature, groundwater level, equipment calibration date etc. If a factor is unknown (e.g. tank backfill - which cannot be clay) then this must be stated;
- Calculated leak rate for each line/tank in L/hour, where this is or can be calculated;
- Leak detection limit – this is the minimum leak rate (in L/hour) where a tank/line will be declared as having passed or failed the test, where this is or can be calculated. The leak detection limit must reflect the leak threshold stated on the NWGLDE listing;
- Whether the tank/line has passed or failed the test. A FAIL result must be given if the test results show that that the infrastructure cannot be declared as tight;
- Details of the person performing the test, including their company details and where relevant their EIT related certification number and certification expiration date; and
- Declaration from the person performing the test that the EIT was undertaken in accordance with third-party certification as listed on NWGLDE.

Further information

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