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STAFF REPORT ON POST-INSTALLATION ENHANCED LEAK DETECTION (ELD) TESTING OF PHASE I ENHANCED VAPOR RECOVERY (EVR) EQUIPMENT

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Executive Summary.

State Water Resources Control Board (SWRCB) and California Air Resources Board (ARB) staff conducted an joint investigation to determine if properly installed Phase I Enhanced Vapor Recovery (EVR) equipment can currently pass the post-installation enhanced leak detection (ELD) test. This investigation resulted from concerns that underground storage tank (UST) installation contractors were observed torquing Phase I EVR equipment beyond the torque settings specified in the ARB's Executive Orders (E.O.s)[1]. At that time, the concern was whether the over-torquing was needed in order to pass the sensitive post-installation ELD test.

Subsequent to our initial investigation, the concerns were incorporated into Assembly Bill (AB) 2955 (McCarthy: Chapter 649, Statutes 2004). AB 2955 requires that the SWRCB and ARB, under the direction of the California Environmental Protection Agency, certify to the best of their knowledge, and within existing resources, that the equipment meets the ARB's EVR requirements, also meet the SWRCB's UST statutory requirements.

Based on the SWRCB and ARB joint investigation, we conclude that an UST facility, when installed according to manufacturer's specifications, will comply with ARB vapor recovery and SWRCB UST requirements.

Objective.

Observe construction and testing activities associated with installation of the Phase I EVR equipment and subsequent post-installation ELD testing. Determine whether conflicts existed such that Phase I EVR equipment could not satisfy both the SWRCB and ARB UST requirements.

Background on SWRCB and ARB Requirements.

Both the SWRCB and ARB have issued requirements that affect UST systems. The SWRCB UST Program's purpose is to protect human health, safety, and the environment from liquid or vapor releases of petroleum and other hazardous susbstances from UST systems. As of July 1, 2003, new UST systems must pass a very sensitive post-installation test, known as ELD, before being placed into service[2]. The ARB regulation of UST facilities focuses on the vapor recovery systems, which recover gasoline vapors generated during the transfer and storage of gasoline in UST systems. These regulations apply to new or modified vapor recovery systems. A Phase I system controls gasoline vapor during the transfer of gasoline from the cargo truck tank to the UST. Phase II systems control vapor during the transfer of gasoline from the UST to the vehicle and storage of gasoline. These E.O.s contain specific information about the type of equipment that must be installed, compliance testing requirements, and installation requirements, including torque settings for specific components.

The ARB certifies vapor recovery equipment by direct testing conducted by ARB staff. Test sites are set up near Sacramento by the equipment manufacturers. The products are tested and monitored in a semi-controlled environment at these sites. The SWRCB, with no budget or authority for a certification program, relies on a nationally-recognized and United States Environmental Protection

[1] The ARB's Phase I EVR E.O.s can be found on-line at: http://www.arb.ca.gov/vapor/eo-evrphaseI.htm.

[2] ELD or other approved test method must be performed on new UST systems intalled on or after July 1, 2003. [California Health and Safety Code, Chapter 6.7, §§ 25290.1(j) and 25290.2(i).]

Agency (US EPA)-sanctioned workgroup and independent third-party testing companies to evaluate leak detection test methods and UST equipment.

Overview of Post-Installation ELD Testing. Leak detection tests evaluated by third-parties must adhere to strict US EPA guidelines or equivalent protocols, which specify test procedures for various types of UST equipment and test methods. The Enhanced TracerTight®[3] test method has been evaluated several times by different third-party testing companies. Ken Wilcox Associates Inc., using the US EPA "Standard Test Method for Non-Volumetric Tank Testing," conducted the most recent evaluation. This evaluation determined that the Enhanced TracerTight® test method could effectively and accurately find a vapor and/or liquid release equivalent to a leak rate of 0.005 gallons per hour with a probability of detection (PD) of 97%, and a probability of false alarm (PFA) of 2.9%. This exceeds the current regulatory standard of 95% PD and no more than a 5% PFA.

The Enhanced TracerTight® test method has been used to test UST systems and pipelines for more than 15 years. The Enhanced TracerTight® test method uses an inert proprietary chemical (known as a "tracer"), which is introduced into the UST system through a process known as inoculation. After the tracer is distributed throughout the system, air samples are collected from the UST secondary containment components and backfill. The samples are analyzed for the presence of the tracer using laboratory grade instrumentation. The presence of the tracer outside the UST system indicates a leak; conversely, the lack of tracer indicates a tight system.

Just prior to conducting a post-installation ELD test, testers commonly conduct a gross leak test using helium. This helium test confirms the tightness of the UST system before the tracer test so that any gross leaks can be found and repaired, preventing the surrounding backfill from becoming contaminated with tracer. After the helium "pre-test" is conducted, the ELD test procedure begins with a "Leak Simulation" process, which is used to determine the minimum time required to successfully conduct a valid ELD test for a particular UST facility's conditions. Leak Simulation is accomplished by introducing a tracer into the backfill and monitoring how quickly the tracer moves throughout the backfill. The rate of tracer movement is monitored using sampling probes installed in the backfill. The migration of the leak simulation tracer is measured until an acceptable concentration of tracer has migrated through the backfill, establishing the minimum time needed for migration and therefore for testing. Once this minimum test time is established, the UST system is inoculated with the tracer and the test begins. After the minimum time has elapsed, air samples are collected and analyzed for the presence of the tracer. An ELD test of a product-tight UST system is typically completed within 2 days. However, if tracer is detected, additional time must be devoted to finding the source of the leak and fixing the UST system. The length of time it takes to conduct an ELD test varies depends upon the number of leaks detected, and how long it takes to find and subsequently repair the leaking UST component(s). For post-installation ELD tests, the sample analysis is performed on-site (i.e., using a mobile laboratory) and the final summary report is provided to the client. Additional information on how the post-installation ELD testing is performed can be found in Appendix I[4].

[3] As of the date of this report, the Enhanced TracerTight® test is the only approved test method that meets the ELD requirement for post-installation testing.
[4] This information can also be obtained on-line at: www.tracerresearch.com/eld/index.htm.

ARB's Certification Process. Pursuant to Section 41954 of the California Health and Safety Code (CH & SC), the California Air Resources Board has adopted CP-201, Certification Procedures for Vapor Recovery Systems at Gasoline Dispensing Facilities[5]. CP-201 is applicable to vapor recovery systems installed at gasoline dispensing facilities for controlling gasoline vapors emitted during the fueling of storage tanks by cargo tanks (Phase I), the refueling of vehicle fuel tanks (Phase II), and storage of gasoline in the UST (Phase II).

Prior to system certification, applicants must obtain the approvals of the Department of Forestry and Fire Protection, Office of the State Fire Marshal; Department of Food and Agriculture, Division of Measurement Standards; and Department of Industrial Relations, Division of Occupational Safety and Health. The certification process is initiated by the applicant submitting a preliminary certification application. The application should include information such as a description of the vapor recovery system including plans and specifications, bench testing data, evidence of system compatibility, the operation and maintenance manual, and other specifics listed in CP-201, Certification Procedure for Vapor Recovery Systems at Gasoline Dispensing Facilities. The application also identifies where the system will undergo an operational test of at least 180 days. During this period, the system must meet applicable performance standards and specifications listed in CP-201. The performance standards and specifications are verified by conducting ARB Test Procedures specified in CP-201. Upon passing the 180-day operational test and meeting other requirements listed in CP-201, the applicant is issued an E.O. granting certification for the vapor recovery system. The E.O. lists performance standards and specifications, allowed components, the operation and maintenance manual, and testing intervals to follow for the certified system. The E.O.s have a term of 4 years and can be renewed.

Summary of Joint SWRCB and ARB Effort.

In early 2004, concerns surfaced that certain installation contractors apparently felt they needed to torque the Phase I EVR equipment beyond the torque settings established in the E.O.s in order to pass the post-installation ELD test. The SWRCB and ARB began to focus their efforts on resolving this concern by witnessing Phase I EVR equipment installation practices and subsquent post-installation ELD testing. In May 2004, the SWRCB and California ARB sent a joint letter to the four Phase I EVR manufacturers to request information on each company's position on the use of vacuum or pressure to inoculate the UST system (including Phase I EVR equipment) during the post-installation ELD testing. The letter and each company's response are included in Appendix II. Furthermore, to observe whether any conflicts existed between the two Boards' requirements that affect USTs, staff from both Boards witnessed the installation of Phase I EVR equipment according to the ARB's E.O.s (which incorporate specific torque settings), and the subsequent post-installation ELD testing.

Phase I EVR System Field Observations. Currently there are four Phase I EVR systems certified by the ARB, each with an E.O. specifying manufacturer's installation and maintenance guidelines: OPW, CNI, Phil-Tite, and EBW. Below is a summary of staffs' observation of installation of Phase I EVR equipment and subsequent post-installation ELD testing. More detailed information on our joint findings based upon field observations of the proper installation of the three Phase I EVR systems and subsequent post-installation ELD tests can be found in Appendix III. For reference, between October 2003 and November 2004, approximately 380 UST facilities passed the post-installation ELD test.

[5] ARB Certification Procedures for Vapor Recovery Systems at Gasoline Dispensing Facilities can be found on-line at: http://www.arb.ca.gov/testmeth/vol2/new2004vol2.htm.

OPW. Phase I EVR equipment was installed in new UST systems at a facility in Willows, California during the summer of 2004 by Ed Staub & Sons. Mr. Kevin Tokunaga of the Glenn County Air Pollution Control District (APCD), observed the proper installation of the OPW Phase I EVR system to the appropriate torque settings on June 30, 2004. Mr. Tokunaga initialed the OPW installation checklist verifying that the components were installed correctly. The contractor that built the system, Ed Staub & Sons, was present at the facility and made the minor fix, which consisted of tightening the automatic tank gauge riser on the 91 Premium tank to the torque specified in ARB E.O. VR-102-D. The range specified in the E.O. is 125-250 foot-pounds, and as noted on the OPW checklist that Mr. Tokunaga initialed, the torque of this component was tightened to 200 foot-pounds. None of the EVR Phase I components were torqued beyond the specifications established in the OPW E.O.. On July 1-2, 2004, Mr. Michael Sahlin, of the SWRCB, along with Mr. Tokunaga and Mr. Rick Steward of the Glenn County APCD witnessed the UST systems pass the final ELD test.

CNI. Phase I EVR equipment was installed in new UST systems at a facility in Fair Oaks, California in Summer 2004 by Fillner Construction Inc. On August 16-17, 2004, Mr. Michael Sahlin, of the SWRCB, and Ms. Terrel Ferreira, of the ARB, witnessed the proper installation of the CNI Phase I EVR system at a facility located in Fair Oaks. The CNI components were installed to the appropriate torque settings and subsequently successfully completed the post-installation ELD test with minimal repairs to the systems. None of the fixes required removing and/or re-torquing of the Phase I EVR system components.

Phil-Tite. Phase I EVR equipment was installed in the new UST systems at a facility in Wilton, California in Summer 2004 by Town & Country Construction. Since August 2004, the ARB and SWRCB worked together with Town & Country Construction to verify the installation and subsequent passage of the post-installation ELD test at a UST facility in Wilton. On August 5, 2004, ARB staff witnessed the correct installation and torque of the Phil-Tite Phase I EVR components at the Wilton site. Then the SWRCB and ARB staff jointly monitored this UST facility until a final ELD test was performed on October 29-30, 2004. During the post-installation ELD testing, the testers encountered difficulty pulling the nylon sampling tubing through the horizontal sampling probes (HSPs). This difficulty was resolved by feeding electricians tape through the conduit. At several additional UST facilities with Phil-Tite Phase I EVR equipment installed, SWRCB staff witnessed the correct torque settings and subsequent successful completion of the post-installation ELD tests.

EBW. At this time, the EBW Phase I EVR system cannot be installed on a new UST system because fill sumps and lids compatible with this system are not yet available.

Conclusion.

SWRCB and ARB staff conclude that OPW, CNI, and Phil-Tite Phase I EVR systems for USTs, when installed in accordance with the requirements of the E.O.s, will comply with SWRCB UST requirements. The results of the Boards' joint efforts demonstrate that it is not necessary to over-tighten Phase I EVR components in order to pass the post-installation ELD test.