Acton • Mickelson • Environmental, Inc.

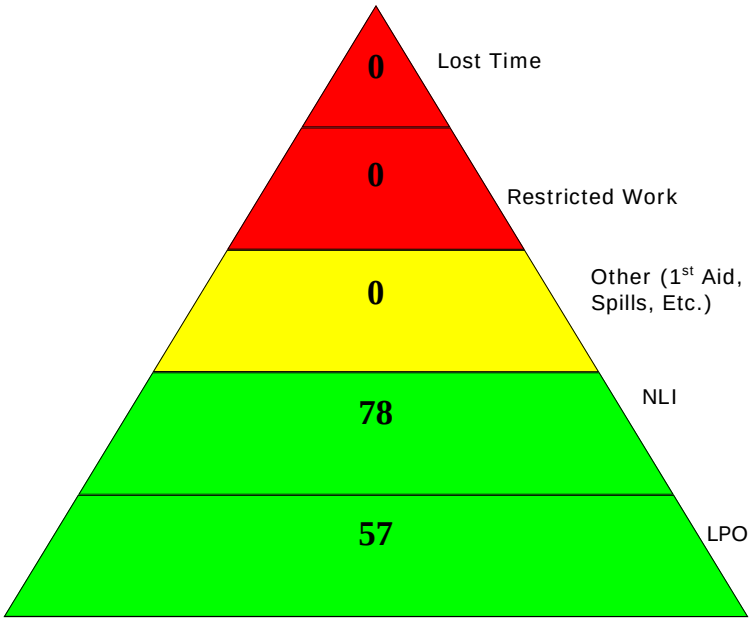
September 2006 Newsletter

From the President

In May of this year we defined our vision of Environmental Logistics. The completion of the AME-LPIS is a significant achievement toward our ultimate goal of real time access to the data we and our clients require to manage risks. Thank you to everyone who worked on creating this tool.

Safety Matters

2006 YTD (through August)
AME Total ExxonMobil Hours Worked YTD (2006): 10,871



August Health & Safety Summary

By Michael Redfern: We had another productive month of field work in August, yet another month in which we can proudly say, "No One Got Hurt." In 377 hours of field work for ExxonMobil, including 10 subcontractor hours, we produced 13 Near-Loss Incident (NLI) reports and 6 Loss Prevention Observation (LPO) reports. This resulted in a ratio of one LPO report for every 63 field hours worked. Keep up the good work and thank you all for the sustained effort in driving the LPS program. It truly reflects the established commitment of AME personnel to health and safety at all levels in our company.

Near Loss Incident

By Michael Redfern: There was a recent near loss incident where an employee was driving on the freeway and had to swerve to miss a cone that was in the middle of the lane. This should be a reminder to everyone that hazards not only exist at job sites, but also on the way to and from the job sites. Please continue to be alert and cautious on the roadways.

Trends Analysis July and August

Production of Near Loss Incident Reports and Loss Prevention Observations is as follows:

Month	NLI's Produced*	LPO's Produced*	Field Hours Worked*	Field Hours per LPO*
July	14	13	502	38.6
August	13	6	377	62.8

*Major Projects plus Retail combined

The following table presents the distribution of root causes identified in LPOs.

LPO Root Causes Identified	July	August
1. Lack of Skill or Knowledge	1	1
2. Takes More Time or Effort	9	4
3. Short-cutting tolerated	0	0
4. Procedure Not Followed/No Incident	3	3
5. Lack of or Inadequate Procedure	4	2
6. Inadequate Communication	0	0
7. Inadequate Tools/Equipment	1	0
8. External Factors	0	0

The following table presents the root cause distribution for NLIs.

NLI Root Causes Identified	July	August
1. Lack of Skill or Knowledge	0	2
2. Takes More Time or Effort	7	6
3. Short-cutting tolerated	0	0
4. Procedure Not Followed/No Incident	1	1
5. Lack of or Inadequate Procedure	7	1
6. Inadequate Communication	1	0
7. Inadequate Tools/Equipment	2	2
8. External Factors	0	0

As can be seen for July and August these root cause distributions are similar, and they are similar to the distributions for the first two quarters of 2006, with higher numbers in the personal factors group (1-4) and lower numbers in the job factors group (5-7). We continue to see no root cause 3 incidents or root cause 6 incidents.

LPIS Program Implementation Update

The data base is being populated with historical data in advance of initiating company wide use of the tool. The benefits of the new system include increased ease of use of the written LPS tools (JSA, LPO, LI/NLI reports), accuracy and data security, and greatly increased efficiency with real-time communication of LPS reports to the network and thus to supervisors and project managers.

Ice Age Alert (Montana Sampling)

By John Mattey: The next ground water sampling event in Montana is scheduled for early November. Snow on the ground will more than likely be encountered and with wind chill the ambient air temperatures could drop to below zero. The forecast this Friday evening at Bozeman is snow flurries. Among other things, the sampling crew should be concerned with vehicle safety (chains, antifreeze, windshield ice scrapers, driving on ice and snow, etc.), wearing the right clothing, and even walking on slippery surfaces. Because of vapors, it probably isn't good to keep the vehicle engine and heater running (for a quick warm up) if you are ground water sampling. Thawing out may be limited to the Terminal Office. If the van goes up the leeward side makes a good work station. Anything liquid, samples, decon water or drinking water may freeze solid overnight. Also, because of the latitude, the hours of actual daylight will be short so a good battery operated lantern may be useful.

Benicia Refinery

By Will Speth: Beginning the first week of October several members of AME will be at the Benicia Valero Refinery to implement the *Enhanced Bioremediation Work Plan* prepared by URS Corporation. In general, the scope of work is to air-knife 28 boring locations followed by direct-push drilling to a predetermined depth, injection of an oxygen releasing compound (ORC®) slurry, and the backfilling of each boring with neat cement grout.

Prior to drilling, each boring location will be air/water-knife cleared to a depth of eight feet below ground surface. The use of an air/water knife has quickly become the drilling industries safest way to remove soil to clear a bore location prior to advancement of drill rod or augers. After each bore locations is cleared the requisite depth a direct push drill rig is brought in to advance the drill rods into the saturated zone. Direct push or commonly referred to as a 'Geoprobe" use hydraulic and roto-percussion forces to advance the tool string, sampler, or probe to depth. After reaching the saturated zone a progressive cavity pump is attached to the hollow drill rods and a water/ORC slurry is injected under pressure into the target zone(s). With most petroleum hydrocarbon plume attenuations the limiting factor is the lack of oxygen for the microbes. In general, going from an anaerobic to an aerobic condition speeds up the decomposition or bioremediation of the petroleum hydrocarbon plume mass.

Working at the refinery has several challenges. These include the process of getting badged to enter the refinery itself, the refinery strict pre-drilling/drilling protocols, and the daily work permitting.

This will be the third and proposed final phase of "bioaugmentation" work at the Valero refinery. Previous events were conducted in late 2003 and the beginning of 2006.

Differentiating Anthropogenic and Natural Hydrocarbon Releases

Natural hydrocarbon releases at the surface are widespread occurrences in many areas. These releases can be in the form of vapors as natural gas or as liquids in the form of petroleum. Today, these formerly remote natural seeps are now within or near developed areas. As a result, confusion often exists in distinguishing natural seeps and recent anthropogenic hydrocarbon due to similarities in fluid type and composition. This paper documents case studies that applied different approaches to distinguish natural releases from man-made releases.

The first case study involved gas emanating from along a stream. The gas formed observable bubbles in the stream. A natural gas pipeline and production wells are located in the vicinity of the observed gas release and concern existed that these features may have been potentially leaking. Results of analyses indicated the gas emanating along the surface was derived from coal seams located beneath the area and was not derived from the production facilities.

The second case study involved petroleum seeps occurring a quarter mile reach of a major river. At this site, observable product sheens, ranging from 4 to 10 inches in diameter, continuously developed at the surface of the river. Historically, oil production occurred on the banks of the river, and the former overflow pits were considered to be the source of the product. Characterization efforts detected product in the subsurface but did not delineate a source of the sheens. Subsequent to the characterization effort, volume calculations were performed based on physical measurements of the product volume required to produce the size of the sheens in the river. These volume calculations indicated that the production pits were an unlikely source of the petroleum since the volume of product emanating in the river exceeded any reasonable released volumes derived from the historic production activity.

Introduction

Natural hydrocarbon sources

Natural seeps occur when crude oil or natural gas derived from subsurface geologic strata intersects the surface. Probably the most notable natural hydrocarbon seep is the California tar pits, which trapped over 1,000 different species over 10,000 of years. In North America, hydrocarbon seeps were utilized for centuries by numerous Indian tribes prior to the Europeans. In recent times, seeps have been recognized by geologists for decades as indicating the existence of potentially economic reserves of petroleum. Natural seeps have been classified into two general groups, macroseeps and microseeps (Schumacker, 2000). Macroseepage refers to visible natural releases of hydrocarbon liquids and gases. Typically, these occur at the surface along stratigraphic

contacts or fractures. Microseepage refers to elevated concentrations of volatile or semi-volatile hydrocarbons or hydrocarbon-induced changes in sediments or soils. Our focus in this paper is primarily on delineation of macroseeps.

Natural seeps release vast amounts of hydrocarbons to the surface environment. Typically, the seeps are released at a sufficiently low rate that the surrounding ecosystem is capable of adapting to the organic influx and in some cases may even thrive in their presence. For example, it has been estimated that natural seepage of crude oil to the marine environment off of North America exceeds 47 million gallons annually and over 180 million gallons globally (NOIA, 2006). Hence, the occurrence of natural seeps is widespread and typically corresponds, as would be expected, in areas of active hydrocarbon exploration and development.

Since most natural seeps were not mapped prior to the introduction of exploration and development, differentiating natural seeps from man-made contamination can be difficult. In particular, comprehensive characterization is often required to delineate releases from oil pits, pipelines, and/or leaking wells from natural seeps since both can occur in the same general area. More specifically, since both forms of releases can be of similar form and composition it various analyses may be needed to clearly delineate the source of the hydrocarbons entering the environment.

Potential factors that may differentiate natural seeps from anthropogenic releases are outlined below.

- Composition
- Distribution
- Location of potential man-made sources
- Geology
- Rate of release
- Volume of release
- Historical information

Considerable effort may be needed in characterization to define these factors. As such, it is important to evaluate the site and all existing data prior to initializing a characterization program. In particular, a focused characterization program could reduce the level of effort required to identify the source.

Case Studies

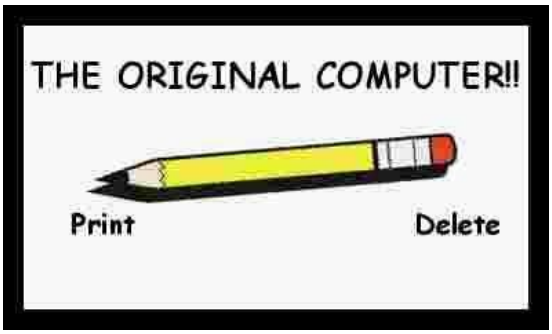
Two case studies are documented to illustrate approaches on determining the source of a hydrocarbon seep at the surface. The first case study involves delineating the source of hydrocarbon vapors in the vicinity of an active pipeline and in a former natural gas well field. The second case study describes an area of oil seeps in a former oil production field.

Case Study 1

The study area occurs along a river in the Gulf Coast region of the southern United States. The first environmental investigations were initiated in 1991 when the first documented reports of oil seeps in the river were submitted to the state regulatory agency. Subsequent field investigations over the next 13 years involved soil excavations, soil borings, a Geoprobe investigation, monitoring well installation, a Laser-Induced Fluorescence Rapid Optical Screening Testing (LIF-ROST) investigation, as well as numerous soil, groundwater, and NAPL analyses. The results of these investigations were not conclusive. The current investigation involved a review of the site history and data, a field site visit, and laboratory experiments.

The site is located within an active oil production field. In particular, the field was initially developed in the mid-1930s. As was common practice during this time, oil pits were used to store overflow crude during production operations and storage tanks were located within the oil field. In addition, a production well located on the edge of the river blew out in the late 1950's; this well was subsequently abandoned in the early 1970's. Currently, most of the production wells in the vicinity of the oil seeps have been abandoned. According to a resident in the area, oil has been seeping into the river since as early as the 1950.

Humor



Memory was something you lost with age
An application was for employment
A program was a TV show
A cursor used profanity

A keyboard was a piano
A web was a spider's home
A virus was the flu
A CD was a bank account

A hard drive was a long trip on the road
A mouse pad was where a mouse lived