SOLAR POWER IS A BEAUTIFUL THING!!! (PHOTO FROM IESI PROJECT SITE)

Innovative Engineering Solutions, Inc.

December 2014 Newsletter

IN THIS ISSUE

IESI- Interesting News You Can Use!

Welcome to the Innovative Engineering Solutions, Inc. (IESI) newsletter. Our newsletters present interesting and relevant information for environmental and energy services customers and practitioners. In each newsletter, we provide at least one article related to renewable energy, site remediation and energy efficiency.

5 Renewable Energy (Solar) Facts

1. A 70-meter stretch of solar bike path was recently installed in the Netherlands and is the world's first (solar) road to convert sunlight into electricity!
2. The solar bike path is paved with modular, concrete-reinforced photovoltaic panels protected by tempered glass.
3. Average solar panels pump out about 200 watts, with a range from 175 - 315 watts/panel.
4. The most efficient solar panels have a rated 20% efficiency.
5. IESI has installed solar panels on buildings, trailers, open space, landfills and parking lots.

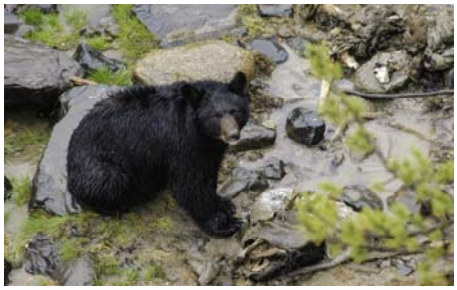
For more information contact Rich McCarthy, CEM RMcCarthy@IESIonline.com

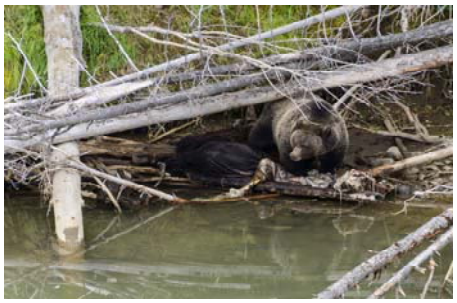
5 Site Remediation Tips

1. Chemical oxidation is a water based reaction. Chemical oxidants cannot oxidize NAPL.
2. The half-life of ozone in groundwater is around 15 minutes. Most in-situ ozone injections are essentially oxygen injection since the ozone breaks down so quickly.
3. For most petroleum product SVE applications, more hydrocarbons. are degraded than vented.
4. Biodegradation during SVE can be quantified by measurement of oxygen depletion or CO_2 production.
5. Fenton Reagent has an approximate life of 15-30 minutes. Stabilizers may be able to increase its half-life to hours.

For more information contact Sami Fam, Ph.D., P.E., LSP: Sami@IESIonline.com

In This Issue





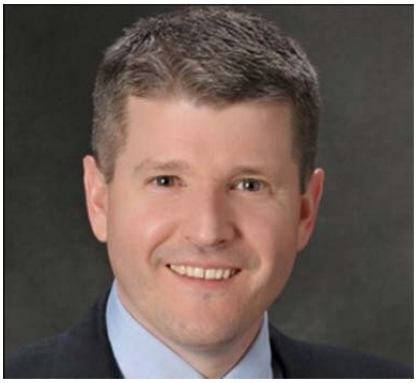
Top-Black Bear Feeding-Bottom- Grizzly Bear Feeding- Courtesy of Mike Gaudette;

Doug Lindsay Joins IESI!

Mr. Lindsay has more than 19 years of experience in environmental and hydrogeologic site investigations, environmental remediation and contaminated material management, transactional due diligence, and site closure activities under the Massachusetts Contingency Plan (MCP) and US EPA, Toxic Substances Control Act (TSCA), CERCLA and RCRA. Mr. Lindsay manages regulatory and transaction-driven subsurface soil and groundwater assessment and pre-characterization programs, soil and groundwater remediation design, construction, and implementation, vapor intrusion evaluations, building materials assessments, and risk-based closure strategies focused on solvent, petroleum, and metals contamination.

Mr. Lindsay develops business opportunities and provides technical advice and regulatory compliance strategies for commercial real estate developers, attorneys, financial institutions, municipalities, and civil engineers. In his previous positions, Mr. Lindsay has served as a Certified Project Manager and Senior Geologist and is a LSP for the Commonwealth of Massachusetts and a licensed professional geologist for the State of New Hampshire.

Say welcome to Doug at:
DLindsay@IESIonline.com



5 Health Tips

Below are 5 super foods for healthy eating. How is this related to energy and environment? Good question. When you feel better, you make better decisions.

- Blueberries;
- Black beans;
- Kale;
- Salmon;
- Dark Chocolate!

5 Energy Efficiency Tips

1. Replace magnetic ballast with electronic ballast;
2. Replace T-12 lights with T-8.
3. When a motor is larger than the breakpoint horsepower send it for repair. When a motor is smaller than the breakpoint horsepower replace it with an energy efficient motor.
4. Specify energy efficient motors when you request a quotation from a vendor. Only 10-15% of motors are energy efficient.
5. Drive sensibly, excessive speeding and braking wastes energy!

For more information contact Rich McCarthy, CEM RMcCarthy@IESIonline.com

IESI Starts Another Solar Project!

IESI is currently constructing a solar energy generation facility in Southwick, Massachusetts. The project includes the installation of a ~4,900 kilowatt (kW) direct current (DC)/~3,400 kW alternating current (AC) solar energy generation facility consisting of approximately 16,416 photovoltaic (PV) modules, 2 inverters, and 2 transformers. The solar energy will be converted to electricity onsite before input into the electrical grid. PV modules will be ground-mounted in rows, two modules in portrait orientation. Each row of PV modules will be mounted on steel posts that are either set in concrete-filled post holes in the ground, driven piles, or in surface mounted concrete ballast blocks. The panels will be tilted 25 degrees and the front end of the southerly facing rows of PV modules will be three feet off the ground surface. Each row will be separated by approximately 15 feet to eliminate shading of one row upon next. The project is expected to be completed with just a few months!!

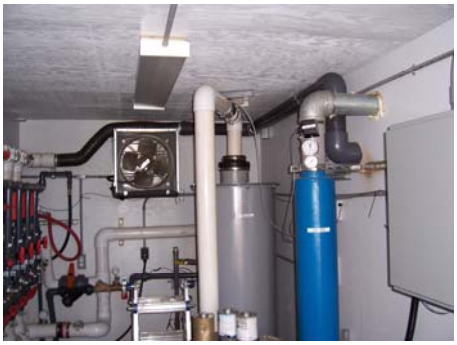
Above is a construction process photo of IESI's latest 4.9 MW project in Southwick, MA.

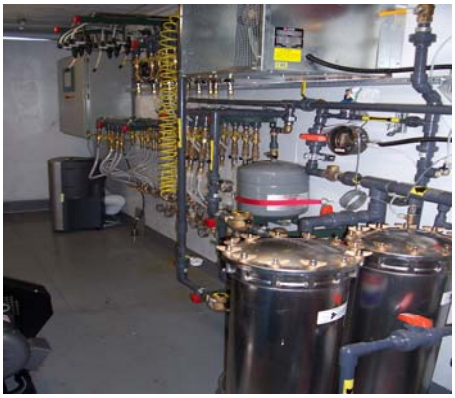
SVE- Not As Simple As You Think!

Vapor extraction systems are so simple to install that many users overlook the theory behind the technology and, therefore may not install an effective or efficient remedy. Many systems are designed based upon achieving a specified vacuum zone of influence across the area to be remediated. There is often a huge difference between the zone of vacuum influence and the zone of remediation- which is the zone of the site that receives adequate air flow to achieve site remediation goals. Designers of vapor extraction systems should know how to select appropriate subsurface airflow rates and be aware of the effects of soil parameters such as moisture permeability. At low permeability sites, there is high resistance to air flow and as such, significant vacuum can be observed at distal locations, but this may not be a good thing. At distal locations in a low permeability site, there is generally low air flow and in order to volatilize VOCs in a reasonable time frame, minimum air flow velocities must be achieved.
Conversely at high permeability sites, where there is minimal resistance to air flow, you may see minimal vacuum influence. The correct design approach is based upon pore volume exchange and comparing air velocities at the most distal locations to minimal air velocities that are required to volatilize the compound of interest in a reasonable time frame.

For more information, please read the full article in "Critical State of the Art Review of Vapor Extraction," Proc. Purdue Ind. Waste Conf.50:137, 1995. or contact Sami Fam: Sami@IESIonline.com

IESI has designed and constructed dozens of Remediation system trailers across the US





Above are photos of the interior of Remediation system trailers.

Air Source Heat Pumps

Air source heat pumps (ASHPs) use a refrigeration cycle to draw heat from the outside in winter to heat a building, and pull heat from the inside to cool it in summer. ASHPs use an above-ground fan and heat exchanger assembly similar to the evaporator on a traditional whole house air conditioner. As such, the ASHP uses a refrigerant system involving a compressor and a condenser to absorb heat at one place and release it at another. They can be used as a space heater or cooler, and are sometimes called "reverse-cycle air conditioners".

Before the advent of variable speed compressor technology, air source heat pumps were only suitable in mild climates because heating performance fell off rapidly at temperatures below 40°F. However, now, the most efficient ASHP models only begin to lose significant heating efficiency at 5°F, a change which has made them more practical in most of the United States.

When properly installed, an ASHP can deliver one and a half to three times more heat energy to a space than the electrical energy it consumes (Source: U.S. Department of Energy). As a result, these systems can provide heat for cold climate shoulder seasons (fall and spring) at a higher efficiency and lower cost than electric resistance heating, oil, or propane heating systems and in some cases, for a lower cost than gas heating as well. In the northeast and upper Midwest, one will need a backup heat source when temperatures are below 30°F, typically mid-December through mid-February.

Many utilities offer ASHP rebates on both electrically heated and non-electrically heated buildings.

About IESI

Innovative Engineering Solutions, Inc., is a leading provider of environmental consulting services for the remediation of contaminated properties - including chemical facilities and manufactured gas plants.

IESI provides the consistent, high quality, responsive, and low-cost environmental services associated with smaller firms, but with the depth and expertise of larger traditional environmental consulting firms.

IESI offers a wide variety of remediation services to its clients, which can generally be grouped into four categories: Bioremediation, Hydrocarbon Cleanup, Regulatory Compliance, and Manufactured Gas Plant Cleanup. Please explore the rest of this site or contact one of our principals for further information. The combination of our technical, design, laboratory, and most importantly practical common sense and experience, makes us the best remediation firm in the United States

IESI Energy Services provide customers with comprehensive solutions to energy efficiency and renewable energy concerns. Our competencies include the expertise required to develop, engineer, design, permit, procure, build, project manage and commission energy efficiency projects from the audit stage through project completion. Our projects take advantage of all available utility incentives. Our sustainable technology team provides an integrated sustainable design process, working with all stakeholders, to deliver successful renewable and sustainable energy projects including solar, biogas, geothermal, biomass and landfill-gas-to-energy technologies. Through June 2014, IESI has constructed over 30 MW of solar projects and has an additional 15 MW under contract. In 2013, IESI installed approximately 6% of all solar panels in Massachusetts. We work with our customers in taking a creative financing approach to projects and can incorporate leasing, debt financing, asset-based lending and power purchase agreements as well as other financing methods into projects.

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Photo of a solar powered remediation trailer for 1,4 dioxane.

For More Information:

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