

Tuesday, March 18, 2008

Black Lab Pub, Churchill Room • 4100 Montrose Blvd.

Social 5:30 p.m., Dinner 6:30 p.m.

Cost: \$25 Preregistered members; \$30 non-members & walk-ups

The HGS prefers that you make your reservations on-line through the HGS website at www.hgs.org. If you have no Internet access, you can e-mail reservations@hgs.org, or call the office at 713-463-9476 (include your name, e-mail address, meeting you are attending, phone number and membership ID#).

HGS Environmental & Engineering Dinner Meeting

by Alan McArthur
ALMAC Environmental
Services

HGS Environmental & Engineering Dinner Meeting

Naturally-Occurring Radioactive Materials (NORM) in the Oil and Gas Industry

The co-production of naturally-occurring radioactive materials (NORM) as scale and sludge associated with oil and gas extraction has led to the introduction and development of NORM regulations. At this time, NORM is regulated on a state by state basis in the US with thirteen states having implemented NORM regulations. On the federal level, American National Standards Institute (ANSI) has introduced a standard for the management of NORM for use in those states that have no regulations. The main hazard from NORM is the inhalation and or ingestion of NORM dust and or aerosols. In oil production, the principle radioisotopes found in the NORM are radium 226 and radium 228. The long half-life of radium 226, 1,620 years, and its decay to radon 222, lead and polonium 210 means that once formed, NORM remains a potential health hazard for many thousands of years.

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engineer before returning to Scotland and completing an MBA at the Scottish Business School in Glasgow Scotland. Between 1980 and 1989, he founded two NORM licensed companies in the United Kingdom. Subsequently, he worked for ICI Synetix in Houston and later was Vice President Senior Consultant with CEI, Inc. Since 1999, Mr. McArthur has been the owner and President of ALMAC Environmental Services located in Friendswood, Texas. ALMAC provides clients in energy, environmental services, and oil and gas industries with professional services related to NORM.

Radon 222 in natural gas production has recently been found at levels of concentration many times that associated with oil production. The gas NORM radioisotopes of concern are the daughter radioisotopes of radon 222, lead, bismuth and polonium 210 that form a self-concentrating film on the inside of pipelines, processing plants, and on pipeline inspection and cleaning pigs. Polonium 210 was used in lethal concentrations to kill the Russian dissident Alexander Litvinenko in London, England in November 2006.

Awareness of the potential presence and dangers related to NORM in oil and gas production requires that an assessment be included in Phase I and Phase II investigations and reports. The presentation will show photographs of NORM related to oil and gas production and provide regulatory and technical information. ■

Biographical Sketch



ALAN MCARTHUR P.Eng., received a BS degree in electrical power and high voltage engineering with honors from Strathclyde University in Glasgow Scotland. He worked in Canada as a professional