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# E-ssentials

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## Editorial

Dear Readers,

Welcome to the Summer 2011 issue of PetroChem E-ssentials, the quarterly e-newsletter of PetroChem Inspection Services, a subsidiary of TÜV SÜD America Inc.

These days, effective inspection and testing means applying new technologies in ways that increase the quality of the results while reducing testing time and minimizing disruption to normal operations. In our lead article, "Small Controlled Area Radiography (SCAR) and Computerized Radiography (CR) Provide Safer and More Productive RT Inspection," we discuss how the unique combination of SCAR and CR can help to better achieve those objectives.

Rope Access Technology is being increasingly used in inspection and testing services to access challenging locations. Our second article, "Rope Access Technology Provides Safe and Cost-Effective Evaluation," we provide a brief overview of the uses and benefits of this important alternative to traditional access methods, such as fixed scaffolding.

Ongoing training is essential for all active industry professionals. PetroChem has partnered with Lavender International, an internationally recognized training and consulting firm to the petrochemical industry, to conduct technical training here in the United States. In this issue of PetroChem Essentials, we interview Tim Armit, Advanced Projects Leader at Lavender, about that partnership and about future training offerings. We've also included a brief list of web-based resources for energy industry professionals. Collectively, these resources provide access to a wealth of technical papers and presentations, studies, and reports.

In this issue, you'll also find information on PetroChem's new Overview and Advanced Inspection Services product videos, brief clips providing an overview on some of the latest technologies available today at: [www.petrochemintl.com/videos](http://www.petrochemintl.com/videos). Additionally, find information about our Fall Open Houses near you – from Chicago to Pasadena – at <http://tuvamerica.com/PetroChemevents>. And PetroChem Inspection Services would like to invite you to join our new social media community. Come follow us on LinkedIn, Twitter, and YouTube for real-time content, videos, event information, and more. Join PetroChem's social media community and be entered in a raffle to win an iPod touch!

Finally, we'd like to get your comments on *PetroChem E-ssentials*. So we've created a brief online survey that will take just a few minutes of your time to complete. You can access the survey by clicking on the link in the article on page 6. Thanks in advance for your input!



Gerhard Abel

President, PetroChem Inspection Services

## Small Controlled Area Radiography (SCAR) and Computerized Radiography (CR) Provide Safer and More Productive RT Inspection

In today's demanding environment, effective approaches to inspection and testing must minimize operation downtime while also addressing environmental and personnel safety concerns. Fortunately, new testing technologies, including Small Controlled Area Radiography (SCAR) and Computerized Radiography (CR), can be used singularly or in combination to provide efficient and accurate inspections while ensuring greater operator safety and reduced downtime.

### SMALL CONTROLLED AREA RADIOGRAPHY (SCAR)



Figure 1: Sentinel's Model 989 SCAR exposure device applied to 6" pipe for uses in weld quality radiograph

SCAR technology uses the same basic principles of conventional radiographic inspection techniques. However, SCAR typically uses a relatively low curie radioactive source in combination with a specially-designed exposure device that includes an integrated collimator. This design means that source radiation travels an extremely short distance from its storage position to the exposure position, reducing the size of required restricted areas during testing, and allowing higher levels of productivity even during routine work periods.

SCAR exposure devices are available from multiple sources. One excellent device is Sentinel's Model 989, which is currently the smallest and lightest weight gamma exposure device available. The exposure device is constructed of a stainless steel tubular shell that contains tungsten shielding, and measures less than 8" long and 3.5" wide and weighs just 16 pounds (see Figure 1). The small size and reduced weight allow for maximum flexibility in difficult or hard-to-reach testing situations, such as those involving pipe racks, pipes mounted on columns, or tall structures.

In traditional gamma exposure devices, the radioactive isotope travels out of the device through a guide tube, meaning that it is momentarily unshielded before it reaches the controlled collimated position. With a SCAR exposure device, the isotope never physically exits the device, and travels only three inches from the shielded to the exposed position, eliminating the safety risk associated with an irretrievable source. Further, the Sentinel Model 989 uses Selenium 75, which outputs lower energy than other commonly used radioactive isotopes. Because the collimator is permanently fixed to the exposure device, overall radiation levels are reduced, making small restrictive boundaries possible.

For example, the restrictive barricade for a radiograph of a 6" weld conducted with a traditional exposure device and 4.7 curies of Iridium 192 would require a restrictive barrier of approximately 18' x 18'. Using the Model 989 SCAR exposure device with Selenium 75, the restrictive barrier would be reduced in size to 10' by 10' (see Figure 2).



Figure 2: 10' x 10' restricted area using a SCAR exposure device

The restrictive barrier can be even further reduced, to just 4' x 4', with the use of shielding material in conjunction with the SCAR exposure device (see Figure 3). Radiation attenuation material further reduces radiation levels, and allows for the smallest possible barricade sizes. In addition, attenuation material can be applied to gauges and sensors closest to the testing area to prevent false alarms or other emergencies. In our experience, the use of attenuation material can reduce radiation output by as much as 79%.



Figure 3: 4' x 4' restricted area using a SCAR exposure device with additional shielding

It is important to note that SCAR exposure devices can present some limitations, depending on the testing application requirements. Specifically, the use of particular SCAR exposure device may be limited by the type of radioactive isotope it employs. For example, the Sentinel Model 989 can only use Selenium 75, which can test material up to a maximum thickness of just < 1.5".

### COMPUTERIZED RADIOGRAPHY

Computerized Radiography (CR) provides the most viable alternative to the traditional film medium that has long been the standard in industrial radiography. With CR, there is no need for the skill, time, and chemicals needed to process the film, and no concern for the proper disposal and

handling of processing chemicals. Moreover, the reoccurring cost of replenishing film and chemicals is effectively eliminated.

CR systems use phosphor storage plates (PSPs) as the medium to capture images and are scanned through a laser. The light that is released is harnessed and amplified by a Photomultiplier Tube (PMT) and converted into a digital image by a computer. The result is an image file that does not break down or degrade over time like stored film, and which can be archived indefinitely. Further, unlike the viewing and/or display of standard film images, which often require specialized equipment and skill, the image file can be emailed or presented to groups in electronic format and are easily viewed and interpreted through commonly available software.

### INCREASED PRODUCTIVITY AND SAFETY

The combination of SCAR and CR provides an important solution for a number of inspection and testing applications. SCAR vastly improves the safety and productivity of completing radiography in the field, by allowing other work to continue safely and normally during radiographic testing.

CR streamlines the end results in ways that are more advanced and in line with the contemporary technologies compared with conventional film.

The more time spent on tools means more work can be completed without stoppages or interruptions. The radiography crew can better plan possible exposures, and take radiation safety to a higher level. Smaller restricted area boundaries can be more closely monitored to keep unauthorized personnel away from the radiation hazard. And results can be delivered more quickly and efficiently than with conventional imaging techniques.

Just as digital cameras and memory cards have forever changed the potential of photography, the combination of SCAR and CR give industrial radiography the boost it needs to remain one of the most useful inspection tools. Using these two technologies together in concert with each other makes sense because they both make radiography safer and easier for the user and provide a multi-functional platform to meet needs. ■

## PetroChem Launches Advanced Services Product Video Series



PetroChem Inspection Services has released a new series of brief videos highlighting some of the company's Advanced Inspection capabilities. The videos feature Petrochem experts discussing a variety of specialized services and their benefits. The videos can be viewed at <http://www.petrochemintl.com/videos> or on PetroChem's new Youtube.com channel at <http://www.youtube.com/user/TUVPetroChem>.

The following is a list of current video topics available for viewing:

- PetroChem Company Overview
- Alternating Current Field Measurement (ACFM)

- Automated Ultrasonic Testing (AUT)
- Electromagnetic Acoustic Testing (EMAT)
- Guided Wave Ultrasonics
- Phased Array
- Rope Access
- Real Time Radiography (RTR)
- Tubular Inspection

Viewers can schedule a full demonstration by registering online at <http://www.petrochemintl.com/demos> or contacting Richard Cook at [richard\\_cook@petrochemintl.com](mailto:richard_cook@petrochemintl.com).

Additionally, in an effort to continue to keep customers current on technical topics, events, training, and more, PetroChem has

launched profile pages on social media websites. Find us on Twitter at <http://twitter.com/#!/TUVPetrolChem>, and on LinkedIn at <http://www.linkedin.com/company/tuv-america/petrochem-370144/product>.

**Join PetroChem's social media community, post comments, and be entered in a raffle to win an iPod touch! ■**



## Interview: Tim Armitt, Lavender International

The field of Non-Destructive Testing (NDT) is constantly changing to reflect the introduction of new technologies and to meet the demand of evermore challenging applications. Ongoing training is an important element in helping industry professionals remain current with emerging technologies, and to understand the appropriate uses and applications of individual testing techniques to address specific requirements.

PetroChem Inspection Services has partnered with Lavender International in the United Kingdom to bring quality NDT training programs to its customers in the United States. We spoke with Tim Armitt, Advanced Projects Director at Lavender, about his company's training partnership with PetroChem Inspection Services, and about the training that they provide.

**(PetroChem Essentials)** Tell us about Lavender International and your company's experience in NDT.

**(Tim Armitt)** Our roots in NDT go back to the early 1950s when Jack Lavender (the founder of our company) was working in the Sheffield Foundry industry with ultrasonic and radiographic inspection methods. In the 1970s Jack, his wife Joyce and son Dave saw an opportunity for independent training and examination services. From this small beginning evolved Lavender International, which today has 40 staff mainly operating from its Sheffield office in the United Kingdom, our initiative with PetroChem at Lavender International NDT USA in Houston, and our latest international branch in Perth, Australia.

**(PCE)** What was the impetus behind Lavender's decision to enter the training business?

**(Armitt)** During the 1960s, Jack Lavender's research in the ultrasonic and radiographic inspection mainly of castings led to a national and international demand for a better understanding of NDT in general. Jack and Dave developed these innovative training courses which have evolved over time to those that are now being used.

**(PCE)** How did Lavender become involved with PetroChem Inspection services?

**(Armitt)** For some years, Lavender International

has conducted advanced Ultrasonic Testing (UT) training courses hosted by Mechanical Integrity Inc. When PetroChem Inspection Services acquired Mechanical Integrity in 2010, we were keen not only to continue a similar arrangement but also to promote additional quality training courses.

Our course calendar continues to grow, and now includes courses covering methods of manual UT, Time of Flight Diffraction (ToFD), phased array, TomoView software, and data analysis including detection, characterization and sizing. We're also looking at future training courses covering magnetic particle testing and Alternating Current Field Measurement (ACFM).

NDT training provides an operator with the basic understanding not only of the method but also the advantages and limitations of what each type of NDT test can achieve.

**(PCE)** What has been the response to the Lavender/PetroChem NDT training programs that have been offered here so far?

**(Armitt)** We have been encouraged in that all of the courses that we have offered have been fully subscribed. Student feedback from the courses has also been very encouraging, with many attendees expressing an interest in longer courses that would provide participants with the opportunity to practice newly developed skills.

**(PCE)** What has surprised you the most about the training programs that you've conducted in the U.S.?

**(Armitt)** A number of factors continue to surprise me, including the generally poor standard of training that students have experienced in the NDT courses they've attended prior to their participation in a Lavender training class.

**(PCE)** In your experience, what are the biggest misconceptions and/or misunderstandings that industry professionals have about NDT?

**(Armitt)** In my opinion, there is widespread

### UPCOMING TRAINING SCHEDULE

Sept 28-Oct 7	Lavender TOFD
Oct 12-23	Lavender Phased Array
Nov 28-Dec 9	Lavender Phased Array
Dec 12-21	Lavender TOFD

Additional information about the PetroChem 2011 training program is available at <http://lavender-ndt.co.uk/usa/usa.html>.

misunderstanding both in the U.S. and internationally about certification programs in general, and about the actual responsibilities of the company level 3 or the company-responsible person. We believe that every company employing an NDT tester should manage this through a written procedure that is integrated with the company's quality system.

**(PCE)** Why is NDT training so important?

**(Armitt)** NDT training provides an operator with the basic understanding not only of the method but also the advantages and limitations of what each type of NDT test can achieve. However, we believe that the quality of the training is also highly important, and that all NDT trainers should be audited to minimum requirements, such as those of the British Institute of NDT. This program sets minimum requirements for the experience and ability of the trainer, the required equipment for each testing method, the number of appropriate samples, and other factors.

**(PCE)** What are the future plans for Lavender/PetroChem training?

**(Armitt)** We've seen interest in ACFM training, along with crack-sizing courses and magnetic particle testing. We're in the process of devising a revised schedule of training courses with PetroChem Inspection Services that would include these additional options.

**(PCE)** Are there any new NDT courses being planned?

**(Armitt)** We're constantly reviewing new initiatives for future training courses. Here in the United Kingdom, we have already invested in computed RT equipment, and expect to be able to present ACFM training programs in the near future. There are other training initiatives in the planning stages, and information about them will soon be available.

## Rope Access Technology Provides Safe and Cost-Effective Evaluation

In many inspection and testing situations, accessing equipment located at extreme heights is a challenging proposition. Temporary scaffolding has been the standard approach for accessing such locations, but fixed scaffolding is expensive and time-consuming to install, and often doesn't provide the flexibility necessary to ensure uncompromised access and worker safety.

Rope access technology involves the application of specialized techniques to safely place workers in hard-to-reach job locations. Technicians use ropes and descend, ascend, and traverse open spaces to access equipment. As such, rope access technology represents a proactive approach to hazard identification and risk management, producing a safe and compliant system for work at any height. Rope access has an exemplary safety record as a result of comprehensive guidelines for technique, training, and supervision. The Society of Professional Rope Access Technicians (SPRAT) guidelines are the recognized industry standards. As such, rope access is a legitimate access alternative in many inspection and testing scenarios.

### TYPICAL ROPE ACCESS APPLICATIONS

Rope access technology is currently used for a wide range of inspection tasks involving hard-to-reach locations. Almost all nondestructive inspection and testing services can be conducted using rope access technology, including real-time radiography, Time of Flight Diffraction (ToFD), Manual Ultrasonic Shear Wave (UTSW), Alternating Current Field Measurement (ACFM) and other methods.



Figure 1: Imager real-time radiography (RTR)



Figure 2: Manual Ultrasonic Shear Wave (UTSW) testing

In addition to inspection and testing services, rope access technology can be an asset in conducting routine maintenance and repair in challenging locations, such as boiler cleaning and deslagging, applying protective coatings to vertical surfaces, and removing and/or repairing insulation.



Figure 3: Insulation removal and repair

### BENEFITS OF ROPE ACCESS TECHNOLOGIES

Conducting plant and facility inspections using rope access technology offers a number of important advantages, including the following benefits:

- Cost-effective—Using rope access technology can eliminate the need to erect expensive scaffolding;
- Efficient—Rope access systems can be installed and removed quickly, and typically require fewer personnel;
- Versatile—Custom rope access solutions can be easily designed to meet the needs of unique inspection environments;

- Minimal downtime—Rapid deployment of rope access technology minimizes disruption of normal operations and attendant downtime;
- Increased safety—Rope access technology has an exemplary safety record, with no fatalities and few lost-time incidents.

### ROPE ACCESS TECHNICIAN CERTIFICATION

SPRAT is a professional organization involved in the development of industrial rope access standards in the United States. SPRAT has also established a technician certification program, and offers three levels of certification, as follows:

- Level I Technician (Rope Access Worker): Level 1 certified technicians can only work under the direct on-site supervision of Rope Access Lead Technician or Supervisor
- Level II Technician (Rope Access Lead Technician): Level II certified technicians are responsible for physically conducting rope access operations and the maintenance of rope access equipment
- Level III Technician (Rope Access Supervisor): Level III certified technicians are responsible for the overall rope access work site

Additional details about the requirements for SPRAT certification are available in "Certification Requirements for Rope Access Work," published by SPRAT and available at [http://www.sprat.org/certification\\_guidelines.pdf](http://www.sprat.org/certification_guidelines.pdf).

### CONCLUSION

Rope access technology offers significant advantages over conventional access methods when conducting inspection and testing of hard-to-reach plant facilities and system components. Rope access is an efficient and versatile approach that ensures effective inspection and testing, even in the most demanding circumstances. And rope access technician certification programs support the safety goals of both industry and inspection organizations.



View our Rope Access video at [www.petrochemintl.com/videos](http://www.petrochemintl.com/videos). ■

## 2011 PetroChem Events

### DATES SET FOR PETROCHEM CORPORATE FALL OPEN HOUSES

PetroChem Inspection Services is pleased to announce its Fall Open House line up.

<b>SEPTEMBER 21, 2011</b> <b>CHICAGO, IL</b> <b>Click here</b> to register or call Clarence Windle at 815-727-6345	<b>OCTOBER 12, 2011</b> <b>BEAUMONT, TX</b> <b>Click here</b> to register or call Jimmy Higgs at 409-842-2297	<b>OCTOBER 17-18, 2011</b> <b>PASADENA, TX</b> <b>Click here</b> to register or call Patty Sweeten at 281-884-5187	<b>OCTOBER 27, 2011</b> <b>NEW ORLEANS, LA</b> <b>Click here</b> to register or call Clint Hobby at 504-731-1195
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The Open House format will include informative presentations, workshops, demonstrations, and discussions on a wide range of non-destructive testing techniques used in the petrochemical industry, including the following:

- Real-Time Radiography
- Small Controlled Area Radiography (SCAR)
- Guided Wave Ultrasonics Phased Array (GUL)
- Digital Radiography (DR)
- IRIS and Eddy Current Testing (ECT)
- Magnetic Flux Leakage (MFL)/Saturated Low Frequency Eddy Current (SLOFEC)
- Helium Leak Testing
- Automatic Ultrasonic Testing (AUT)



The Pasadena Open House will provide industry professionals with an excellent opportunity to learn more about PetroChem's wide range of testing and assessment services and capabilities, and to discuss individual testing challenges with PetroChem technical experts in an informal setting.

Please register online at: <http://tuvamerica.com/PetroChemevents>, contact Patty Sweeten at 281-884-5187, or [Patty\\_Sweeten@PetroChemIntl.com](mailto:Patty_Sweeten@PetroChemIntl.com), if you

### PETROCHEM TRADE SHOW CALENDAR

#### ASNT FALL CONFERENCE AND QUALITY TESTING SHOW, PALM SPRINGS, CA OCTOBER 24-28, 2011

The American Society for Non-Destructive Testing (ASNT) Fall Conference and Quality Testing Show showcases the latest advances in the area of non-destructive testing. For additional information, go to [www.asnt.org/events/conferences/fc11/fc11.htm](http://www.asnt.org/events/conferences/fc11/fc11.htm).

#### 5TH ANNUAL GLOBAL REFINING SUMMIT, HOUSTON, TX NOVEMBER 14-16, 2011

Get the answers to your key questions at the Global Refining Strategies Summit 2011, which attracts 350+ attendees annually. Now in its fifth successive year, Global Refining Strategies Summit is the premier event for senior executives working within the hydrocarbon, refining and processing industry. For additional information, go to [www.globalrefiningsummit.com/index.asp](http://www.globalrefiningsummit.com/index.asp).

## Tell us What you think of *PetroChem E-ssentials*

This is the third issue of PetroChem E-ssentials, the quarterly e-newsletter from PetroChem Inspection Services, a subsidiary of TÜV SÜD America. In order to continue to provide you with content that is relevant and informative, we like to invite you to complete a brief online survey.

It should take no longer than a few minutes to complete. To take the survey now, visit [https://www.surveymonkey.com/s.aspx?sm=15\\_2bK\\_2bZiKlAGaO\\_2bK9pUyieEABa\\_2beTdZmCnCnNl3vw1s\\_3d](https://www.surveymonkey.com/s.aspx?sm=15_2bK_2bZiKlAGaO_2bK9pUyieEABa_2beTdZmCnCnNl3vw1s_3d).



Your survey responses are completely confidential, and will only be used to help us improve the quality of PetroChem E-ssentials. If you have comments and suggestions that you'd like to share directly with us, please email [lvandorpe@tuvam.com](mailto:lvandorpe@tuvam.com). Thanks! ■

## Resources for Energy Industry Safety Professionals

Keeping up with the latest safety technologies and regulations can require a full-time effort. Fortunately, there are a number of professional and industry organizations and publications that offer energy industry safety professionals access to numerous technical papers, studies and reports through their websites. Here's a brief summary of those organizations and the information that's available.

### AMERICAN PETROLEUM INSTITUTE ([WWW.API.ORG](http://www.api.org))

The American Petroleum Institute (API) is the national trade association for the U.S. oil and natural gas industry, and its members include industry professionals from producers, refiners, pipeline operators, and marine transporters. The API website is most notable for providing visitors with direct access to more than 160 API technical and safety-related standards. The website also includes an extensive collection of industry and technology reports, including a newly added primer on hydraulic fracturing.

### AMERICAN SOCIETY OF MECHANICAL ENGINEERS ([WWW.ASME.ORG](http://www.asme.org))

The American Society of Mechanical Engineers (ASME) is the leading professional association for mechanical engineers, with more than 120,000 members in over 150 countries worldwide. The ASME website has an extensive knowledge base on energy-related topics, including more than 60 separate technical articles, as well as access to paid journals and a number of free electronic newsletters. The website also allows visitors to preview and purchase ASME standards.

### AMERICAN SOCIETY FOR NONDESTRUCTIVE TESTING ([WWW.ASNT.ORG](http://www.asnt.org))

The American Society for Nondestructive Testing (ASNT) consists of over 11,000 professional members and 500 corporate partners, and is dedicated to the promotion of Nondestructive Testing (NDT) technologies. The ASNT website provides a host of valuable resources for NDT technicians, including its "NDT Solution Archive," a collection of brief articles that demonstrates the use of specific NDT techniques in solving real-world problems.

### NATIONAL PETROCHEMICAL & REFINERS ASSOCIATION ([WWW.NPRA.ORG](http://www.npra.org))

The National Petrochemical & Refiners Association (NPRA) is a trade association representing petrochemical suppliers, distributors, and equipment manufacturers. The NPRA website provides access to an extensive online library of technical papers (free for NPRA members, a nominal charge for others), including papers presented at the NPRA's Annual National Safety Conference going back to 1995. The NPRA website also provides information on the Association's Annual Safety Awards Program.

### BIC MAGAZINE ([WWW.BICALLIANCE.COM](http://www.bicalliance.com))

Published 10 times a year, BIC Magazine reaches over 120,000 professionals in the petrochemical, refining, and power generation industries. The BIC Magazine website provides online access to the complete text of articles published from 2009 to the present, as well as a calendar of trade shows and other events of interest to industry professionals.

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