

HPIC 2005

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Charleston, SC

November 14-16, 2005

Camden Exchange Meeting Room

MONDAY MORNING SESSION - Chair – Kevin Reaves

Round robin facility status and updates

ORNL – Changes in organization structure going on at this time.

LANL – Dave Seagraves now running the calibration facility. Alpha 7Ls are working. New contractor to be announced very soon.

NTS – In the middle of contract negotiations.

WIPP – Calibration of rad instruments has been transferred to their maintenance group.

Y-12 – Issue this year was update of instruments

West Valley Demonstration Project – Their calibration facility is now run by contractor formed by former employees.

INL – New contractor-Battelle Energy Alliance. They just absorbed Argon National Laboratory.

BNL – Small calibration group. Looking for a radiation engineer/QA person. Went through budget restrictions.

SNL – Status quo

Thomas Jefferson NL – Just started a new division called ES&H. Budget looks good at this time.

SRS – Just completed a reduction in force. Fred voiced his appreciation regarding his request for source control information for SRS's source control organization.

LBL – Just went through a reduction in force. Going through accreditation process for calibration.

No LLNL attendance

Topical Area - Calibration Facility Operations

- **DHS testing program (Pete Chiaro, ORNL)**

Pete presented information about the efforts going on at ORNL regarding the testing and evaluation of radiation detection instrumentation for use in homeland security applications.

- **Update on LANL's neutron characterization results at DOE sites (Dave Seagraves)**

David Seagraves described where there are now and the equipment used for the characterizations. He discussed upgrades to the ROSPEC and showed a summary of DOE facilities visited to date including SRS, SNL, BNL, and PNL. Results included items such as room scatter and anisotropy. One slide represented measurements comparing calibration neutron spectra with field spectra from a specific facility. Travel and shipping costs are the only costs that need to be covered.

- **SRS perspective on LANL neutron characterization efforts (Fred Ogden)**

Fred related what SRS had gained from the work by LANL. He related to the group the quality of the effort including people and report, and discussed differences between NIST results and LANL results.

- **New Environmental Effects Laboratory at ORNL (Pete Chiaro)**

Pete presented information about changes and improvements that have taken place at the Environmental Effects Laboratory. These changes included the installation of a dust chamber, large environmental chamber extension, and a new anechoic chamber.

- **Leaking source at PNNL (Mark Murphy)**

Mark described the components of the high exposure facility stating that operations began in 1983 and that the system was built in-house. The leakage was discovered during normal entry following the protocol that is used by staff members. The leaked material was Co-60. Mark described the encapsulation method and the

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estimated number of cycles that the source had been exposed to. During the evaluation process, PNNL staff discussed theories with most believing that the cause may be associated with the free fall return of the source. Mark went over what they had learned stating that any amount of leakage can lead to very expensive cleanup and that there should be no impact forces associated with source movement systems. In follow up discussions amongst the committee, the topic came up of how to deal with source encapsulation qualifications that exceed the lifetime limit stated by the manufacturer.

- **1521-curie source stuck in Transfer Shield (Fred Odgen, SRS)**
Information was presented regarding the actions associated with their Co-60 source becoming stuck in a transfer cask during transfer. Fred talked about the recovery plan that was developed which involved multiple options as to how to return the source to a safe position.
- **Installation of source transfer system in Argentina (Pete Chiaro, ORNL)**
Pete discussed and presented photos from the installation of a Hopewell neutron irradiator carousel system in Argentina.

Topical Area - Instrument Issues

- **RMS3 and DA1-8 Update and Operating Notes (Fred Ogden, SRS)**
SRS has standardized on the RMS-3 and have had problems. These problems include water leaks into the DA1-8, source leakage, false criticality alarms, and RF communication. Fred talked about the calibration of the DA1-8 indicating that it has been problematic. The detector was never tested at 1000 R/hr due to limitations at Eberline in Santa Fe even though that exposure rate is part of the range of the device. Fred also showed photos of detector enclosure which appeared to have one seal instead of two that were present in previous units.
- **Are There Large Variations in Low-Energy Response among Your Bicron Micro-rem Survey Meters? (Mark Murphy, PNNL)**
Mark reported on variations in response using Am-241 primarily on the lower two scales. He stated that differences were as much as 80%. Problem may be hard to notice due to the use of Cs-137 during calibration. Mark provided recommendations for calibration to optimize the high voltage and cal pots, and informed the group that the electron tubes type 9924B32 PMT were the best replacement.
- **Phenomenon Involving the Change in Neutron Survey Meter Efficiency versus Accumulated Dose (Mark Murphy, PNNL)**
Mark described observations by NIST, then PNNL, indicating that the efficiency of many neutron survey instruments changes over time. It appears that the efficiency changes after being exposed for a period of time in a radiation field. He stated that the detector eventually recovers but it is inconsistent.
- **Evaluation of the next 'standard' Personnel Contamination Monitor (Robert Kellner, SRS)**
SRS did an evaluation of three different models of monitors; PCM-2, Canberra Argus-4, and Rados RTM-860. Robert went over the process involved for the evaluation that included field and maintenance personnel. He described the rating process which also included technical and field/maintenance items, and discussed positives and negatives for each system that was evaluated. Only one unit met all requirements for use at SRS and all are looking forward to an update at the next meeting.
- **Implementation of large area air proportional hand and foot monitor (Robert Murphy, LANL)**
The presentation was an update from last year's presentation. Robert showed photos of a redesigned Ludlum air proportional detector. He related to the group that with the redesign of the air proportional probes, the system is functioning well in the field.
- **Concept for next generation air proportional hand frisker (Robert Murphy, LANL)**
The current system is a Ludlum model 214 air proportional frisker system. There are roughly 1000 in use in

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the field at LANL. The system is old technology with limited capabilities. To replace monitors, a set of basic requirements were established.

- **Applied Gamma Spectrometry (Ron Smith, SRS)**

Ron discussed the effort associated with the spectral analysis of a gamma well. They used an HPGe and ISOCS system with the detector placed in a position where the exposure rate was approximately 2 mR/hr. Ron showed results from the low scatter room and a gamma well.

TUESDAY SESSION – Chair – Byron Christiansen

Canberra (David Gebbie)

Presentation included the iCAM air monitor, which uses a filter paper roll. He stated that they will soon have a system that will use a remote sampling head. That system will become available in December 05 as an integrated system. They also discussed the Radiagem 2000 and 4000 portable survey meter. Another new instrument that they will issue in early 2006 is the CSP: SX-2R for the detection of alpha, beta, gamma, and x-ray, which is being marketed for homeland security use. Other new products presented include a wireless shoebox for the mini-radiac, communication module for the new CSP, and an MIP-10 D survey meter for the CSP, and the STTC wide range remote dose rate CSP. Another instrument presented was the MCB2 “dedicated contamination meter”. This instrument is also being marketed to the homeland security market. The last instrument presented was the iMatic, which is an automatic, radon compensated, alpha/beta counting system. The iMatic uses PIPS silicon detector technology and doesn’t require a computer to run since it incorporates an embedded computer.

Some discussion over notifications being provided regarding the end of life of an instrument model. This discussion was in regards to the Alpha Sentry. Company representatives stated that they will find out the official position on the future of the Sentry.

General Atomic Electronic Systems (Thomas OMalley)

This is the first visit by General Atomic. Tom went over background of the company focusing on the Radiation Monitoring Systems (RMS) organization. They provide many devices for the commercial power plant market primarily for process and post-accident monitoring. He presented a moving filter air monitor which did not include alpha monitoring. Tom also stated that they have an agreement with RTS, formerly RADOS that provides environmental monitoring equipment. Tom presented an area monitor (LCU-05) and continuous air monitors including single filter and/or multiple filter units. Their CAM-01 has the ability to do alpha and beta monitoring. This system uses a multiple filter cam that incorporates an automatic filter change module which contains up to 31 filters in the stack. Another device was the RAM unit that is used at WIPP. Tom mentioned that the systems could be networked. He also presented the REM-2000 as an area radiation monitoring ion chamber. And the DOSE-GARD Microelectronic Dosimeter which measures accumulated dose.

Tom finished the presentation with a specific presentation on the CCAM-11 which is a self-contained air sampler. This is the unit approved for use at WIPP. It monitors alpha and beta emitters. The unit does come with a multiple filter change unit.

Hopewell (R. O. Rushton)

RO’s presentation included recent product development, homeland security applications, and continuing efforts with existing systems. He discussed the effort with a neutron irradiator for Argentina and also presented information on an effort to write programming for the calibration of E-600s.

An update was provided on the impact of homeland security on the health physics community. Included in RO’s talk was the development of a transportable monitoring system.

Lastly, RO talked about irradiator servicing.

Lab Impex (Neil Clark with Bill Tucker, Phoenix Scientific Sales)

They discussed lab impex air monitoring system. The cam is called the SmartCAM Alpha and/or beta cam. Lab Impex’s core area is installed systems. They have facilities in NM and the UK. The presenter went over the technical challenges associated with the detection of Pu and U in a radon environment. The cam uses a card mounted filter which can be barcoded. The system uses Windows CE as the operating system. The mechanical design of the

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collection head was very similar to that used in other in-line sampling heads. It was stated that units will be available for evaluation. Bill Tucker presented some information on Bladewerx devices including the breathing zone monitoring device and sample counter.

Ludlum (Robert Ludlum, Dwane Stevens, and Randal Stevens)

The presenter went over the handout they provided. The information included ANSI tests, new instruments, energy response curves, and some other information. He discussed some of the efforts they are doing with or for LANL on air proportional detectors – Model 215 air proportional glove box monitor/frisker. The model 2363 with model 42-41 (Priscilla neutron detector) was also presented. Ludlum is working towards ISO 9000 compliance and that they are still interested in doing development work. He discussed how all manufacturing is based in Sweetwater, TX. They have authorized calibration laboratories including the newly formed MJW, which was the company formed by former employees of West Valley.

MGPI (Sergio Lopez and Jim Kost)

The presenter provided an overview of all products and specifically for two models. They have 5 product lines and have now added a few companies. Sergio stated that they obtained Rados but that the bulk of their business in the US is related to their electronic dosimeter. The model GN EPD is their latest version of 2000 GN which is a neutron detector. He presented information about the latest version of a wireless communication system called WRM2. One of the systems he presented was an area monitor called the DRM-1D that uses a gamma compensated GM tube. The system can include a remote display capability that can be mounted nearby the detector. The ABPM293-M air monitor was also presented that is a cart based alpha/beta cam. He stated that there are units available for testing. The displayed alpha energy range was shown as 2.2 to 4.4 MeV, which didn't make sense.

Thermo Electron (Adam Grose, David Nice, and Mike Shepherd)

Adam Grose initiated the discussion. He is the global sales director for Thermo RMP. He went through the integration of other businesses into Thermo. A service update was provided by John Lesica who is the global service director. He mentioned that Jim Doyle is the new service manager. John mentioned changes and a goal for spare parts which he stated was unacceptable in the past. He showed a soon to be available online order status tracking program and mentioned that the service center is setting a goal of an average lead time of 2.5 weeks for instrument repair turnaround.

David Nice talked about R&D and New Products. David stated that they are planning to spend substantial funds for R&D in 2006. Starting in 2006, they plan to work on advanced PCM development, EPD function and feature updates, and next generation portal platform. David provided information on the Identifinder Ultra which is being evaluated by ORNL for DHS. The other product is the RadEye PRD and G. If interested in seeing the unit, contact "your" sales manager.

RADeCO (Keith Lovendale)

Radeco is now located in Connecticut. He didn't have any new instruments to discuss but did mention the systems used at ORNL, which is the 810. Keith did state that their samplers are now UL listed.

WEDNESDAY MORNING SESSION – Chair - Robert Murphy

Topical Area – Air Monitoring

- **Alpha 7-L CAM implementation (David Wannigman, LANL)**

David stated that they are preparing to deploy the Alpha 7-Ls in LANL. They have approximately 200 alpha CAMS in the Pu facility.

David then provided background as to how LANL selected the Thermo Electron Alpha 7L. They purchased 300 CAMS in late 2002, installed first CAMs in Feb 04 then suffered their first failure in May 2004.

David described and demonstrated the LANL response test which consisted of two distinct portions; operability check (daily) and performance check (monthly). The check source is specifically designed to allow air flow with the check source disk in place.

David also described the May 2004 failure, which involved the lack of an alarm for a low-level airborne release. The slow alarm had a program problem that was addressed by Thermo. Because of this event, they

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have a more detailed acceptance test procedure which requires the testing of 35 CAM functions. It is performed on the first 10 CAMs whenever there's new software/hardware, then 10% of CAMs with different profiles. David stated that as they find program bugs, they notify Thermo who make the changes. The operational program is Version 2.0.0.2.

To test all alarms, they use an incremental "exposure" device.

David mentioned that false alarms do occur. When the Alpha 7Ls were first installed, they had about 1 per month. They do expect to reduce that rate to near zero.

The presentation also included discussions regarding response time. LANL has arranged for aerosol testing at Lovelace Respiratory Research Institute to evaluate the low and high level alarm activation.

- **Challenges and Victories with 2-inch barcode air samples (Robert Kellner, SRS)**

The presentation described the SRS effort to establish a method to track air samples. They began developing software in-house in the 90s. They are handling approximately 3000 samples per week. Bob described the SRS centralized counting facility and the personnel involved with the effort. The key to the system is the use of a bar-coded accountability card as the data record. Through scanning the barcode, a filter is assigned to a specific facility. For CAM filters, they use a stick-on barcoded filter holder.

HPIC Business meeting

- **Election of new Steering Committee members**

Fred Ogden and Dan Dotson will replace Bryan Christiansen and Robert Murphy as members of the steering committee.

- **Next meeting date/location**

Possible places – Morro Bay, CA; Estes Park, CO; San Antonio, TX; Orlando, FL

Dates – Early November, or last week of October.

- **Format for next meeting**

This year's format appeared to work well and should be used again. It was suggested to not have the vendor presentations next meeting and have more site presentations.

- **HPIC web site**

Paul Zahra suggested that we add a posting for HPIC members to place instruments that they would like to remove from the inventory. It was suggested that email would work best.

Pete Chiaro, who hosts the site, volunteered to revise the web page as soon as possible. The new web page will be simplified with pull down menus for labs and then contact information. It will contain links to minutes from previous meetings and an area for the announcement of the next meeting and a list of steering committee members.

Work in Progress and General Open Discussion

- **Tritium instrument calibrations with tritium gas (Robert Murphy, LANL)**

Robert asked who does gas calibration and where do they get the tritium gas. He mentioned Quantum Mechanical as a supplier of bottles.

- Robert Murphy reported on the status of the Priscilla neutron instrument. He stated that they use them intermittently in the field at this time. Robert did mention that the reference point should be the end of the detector cube instead of where it is defined by the manufacturer. The other reference position is not the center of the volume. Robert will provide an email about this. Robert also stated that they are going away from using the gamma rejection.

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- **ISO 17025 accreditation progress at LBNL (Dave Rodgers)**

Dave discussed efforts to establish an instrument tracking system stating that LBNL looked at COTS systems and the SRS-developed system, and decided to develop their own database tracking system. For the accreditation, they have identified a person to do a mock 2-day audit. They are using this to determine if they are going in the right direction. Dave stated that half the effort is quality assurance. The accreditation process that they are going through has helped them do things better.

- **Gamma spectrum measurements on Am-241 irradiator (Dave Seagraves, LANL)**

They had a system made by Hopewell. Dave described the system which included an AMPTEK PX4 digital pulse processor and power supply (USB based).

WEDNESDAY AFTERNOON SESSION- Chair – Fred Ogden

Topical Discussion – Uncertainty

Led by Fred Ogden, SRS

Uncertainty in calibration of reference radiation field (ANSI N323A section 6.1)

Fred presented information on the effort made to determine the uncertainty for gamma beams at the instrument calibration facility at SRS. He had a table that showed different components with associated maximum and typical uncertainty. The analysis was based on the Z540.2 guide for determining uncertainty.

Other topics that were discussed included uncertainty in the calibration of an instrument (ANSI N323A definition 2.43) and acceptance criteria for calibration results relative to the conventionally true value (ANSI N323A section 4.2).

Topical Area - Instrument Issues

- **Discussion on neutron bubble detectors**

LANL discussed the model ABC-1260 Bubble Counter. He described the Acoustical Bubble Counter noting problems associated with sensitivity and other items. Robert stated that changes are coming from the manufacturer that will hopefully improve the system.

- **JLAB discussion over the ABC Bubble Counter - Dan Dotson**

Dan reported that Jefferson Lab evaluated the system for use as a boundary neutron monitoring system at the site. He described the neutron and gamma sensitivity, temperature stability, and compatibility with the present system. A few more tests are going to be performed, but all looks positive.

- **E-600 software development (Kenneth Callahan, SNL)**

Ken described the current E-600 probe calibration process at Sandia. He then provided the method that they will use to improve the calibration process which included the elimination of manual calibrations and limits. The reading will now be done by entering readings directly into an Excel workbook. This improvement effort was done with the help of Hopewell.

The Hopewell process uses the output from the E-600 to directly place the information into the spreadsheet using Lab View. Ken went through the process using screen shots of the Lab View program. He also described future enhancements which included the ability to stop or continue the calibration process.

- **Review of detector technology developments at JLAB (Dan Dotson)**

Dan talked about his efforts to develop a Li6 and 7 detectors. The crystals and photo diodes fit into the same space as their existing He3 tubes. The tests were done both in and out of the Anderson Braun moderator. Dan also provided information about an on-line tritium monitoring system stating that the EPA guideline test will be completed March 06. Dan discussed his future projects including a portable water monitoring instrument that will measure alpha, beta, and gamma online. Other items include a 50 foot ion chamber and a neutron spectrum analyzer or Poor Mans Bonner Balls (PMBB) which is 50% complete.