



Lockheed Martin Idaho Technologies Company
P. O. Box 1625 Idaho Falls, ID 83415

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Distribution

**MINUTES OF THE DOE CONTRACTOR HEALTH PHYSICS INSTRUMENTATION
COMMITTEE MEETING HELD ON APRIL 28 – 30, 1998**

Meeting of the Department of Energy (DOE) contractor Health Physics Instrumentation Committee (HPIC) was held on April 28-30, 1998, at the Bally's Hotel Casino in Las Vegas, NV. Discussion was on issues related to performance and standardization of HP instruments and practices at the DOE calibration facilities. The topics included were:

- An introduction and review of the HPIC Agenda
- An update and status on the AMUG Committee
- An update on the HPIC Home Page
- A discussion on the recent progress on ANSI N323, Sections A-D
- A review of the new 10 CFR 835 Implementation Guide
- A report on HP instruments Buy-on-Agreements status and HPIC procurement issues
- A discussion on the web-based Technical Basis Document development
- Nominations and voting for the HPIC Co-Chairman and HPIC Secretary
- A discussion on the evaluation and testing of Hand & Foot Monitors at the Rocky Flats Facility
- A discussion on the MDA Calculations for HP instruments, Static vs. Scanning
- Presentations given by SAIC, Siemens, Bicon-NE (ALOKA), and Eberline on Direct Reading Dosimeters (DRDs).
- An update on testing and recent issues on the Eberline RO-20
- An update on recent enhancements (data logging) to the NE Electra
- A discussion on monitoring for radioactive materials at Steel Mills

- A discussion on Scalers (Smear Counters) being used at DOE facilities and survey sheet results
- An open forum discussion on the current/anticipated HP instrument issues at the DOE facilities

Attendance of HPIC Committee members and visiting observers were as follows:

<u>Name</u>	<u>Representing</u>	<u>Fax #</u>	<u>Work #</u>
Gary LaBruyere	LMITCO/INEEL	208-526-7020	208-526-5081
Dave Trombino	LLNL	925-422-5176	925-423-2648
Billy Smith	Alpha Group	303-604-2589	303-604-1133
Larry Auman	Pantex	806-477-4198	806-477-4502
Radoslav Radev	LLNL	925-422-6551	925-422-3065
Marsha Beekman	WIPP	505-234-6040	505-234-8495
Murari Sharma	DOE HQ/EH-52	301-903-7773	301-903-4359
Michael Murphy	Bechtel Nevada NTS	702-295-3662	702-295-4432
Paul Zahra	BNL/BSA	516-344-7497	516-344-7727
Dan Dotson	TJNAF	757-269-5048	757-269-7551
Ted de Castro	LBNL	510-486-7207	510-486-5256
Pete Chiaro	ORNL	423-574-1249	423-576-4598
Conan Wade	THI/BHI	509-372-2079	509-376-9040
Elliott Lesses	SafeSites of Colorado	303-966-3029	303-966-5726
William Martinez	LANL	505-665-7686	505-667-7248
Jim Hallgren	Battelle/Columbus	614-424-3538	614-424-7961
Paul Ruhter	LMITCO/INEEL	208-526-7020	208-526-4088
Danise Gilsdorf	LMITCO/INEEL	208-526-7020	208-526-2026
David Sinton	Sandia National Lab	505-844-1551	505-844-8703
Morgan Cox	LRRRI	505-473-1468	505-471-1370
Michelle Johnson	PNNL	509-376-2498	509-376-5624
Jeffrey Lively	MACTEC/ERS	970-248-6725	970-248-7780
George Hughes	BNL/BSA	516-344-5809	516-344-3120
Shawna Eisele	LANL	505-665-6071	505-665-4010
Charlotte Sowell	DOE/NV	702-295-2261	702-295-0188
Dave Hickman	LLNL	925-422-5176	925-422-8958
Bill Crownover	LMITCO/INEEL	208-526-7744	208-526-1857
H. Dale Snowder	Alpha Group	303-604-0902	303-966-2933

A summary of the meeting minutes is provided herein for your information.

TOPIC: ***An update and status on the AMUG Committee and AMUG's generated Standard Specs. for CAMs given by Morgan Cox/LRRRI.***

Morgan Cox/LRRRI and Pete Chiaro/ORNL attended the last AMUG Meeting which was held April 20 – 23, 1998 in Augusta GA. The AMUG Executive Committee consists of:

- Chairman – Steve Epperson (SRS)
- Chair to Be – John Rodgers (LANL)
- Past Chairs – Roger Blum/Mike Ford
- Coordinator – Mark Hoover/LRRI

The Alpha CAM Specifications that are in progress are:

- IEC Draft Standard (Morgan has a copy upon request)
- Frenquelli Document (Rocky Flats)
- Procurement issues at LANL

The AMUG has been granted ABHB continuing education credits, which, could be used by CHP's toward re-certification for participating in the AMUG Committee. Subsequently, ABHP continuing education credits have also been applied for the HPIC meetings but not officially approved of yet. Morgan Cox will report more information on the ABHB credits at the next HPIC meeting.

There has been a lot of discussion in the past on the HPIC Committee about the inadequacy of Tritium Monitors to perform the job that they were designed for. In the past there were a significant number of weaknesses' in their performance. There is a group called the Tritium Focus Group, which is a separate group from the AMUG. The Tritium Focus Group is looking into the Tritium Monitor performances. Sharing of information on the Tritium Monitors and QA Testing Formats by the Tritium Focus Group and the AMUG, with the HPIC, will be an agenda topic at a future HPIC meeting.

Morgan extended an invitation to the HPIC members to attend the next AMUG Meeting, which will be held in March 1999, in Santa Fe, NM.

TOPIC: ***A discussion on the recent progress of the ANSI N323 issuance and the forthcoming revisions given by Morgan Cox/LRRI***

The latest revision to ANSI N323 separated the standard into four sections with the various committee chairmen and recent progress as follows:

- A. **Portables, ANSI N323A** (Jack Selby). Was published in 1997 but are still receiving comments for changes. Please send any comments you might have to Morgan Cox or Dale Snowden so they can be included. Danise Gilsdorf will attach a copy of the ANSI N323A-1997 with the minutes.
- B. **Low Levels, ANSI N323B**, “Requirements for Near Background Response of Portable Survey Instruments” (Ed Walker). Is still needing comments/input to be added.
- C. **Air Monitors, ANSI N323C**, “Air Monitoring” (Mark Hoover/Michelle Johnson). Has gone through three drafts.
- D. **Fixed Instrumentation, ANSI N323D** (Jim Hesh). Meeting in San Luis Obispo, June 23-25 (Eberline Users Group, 5-7 members present), slightly behind schedule.

It was suggested by the HPIC, based on the committee's past review, that the draft revisions should be addressed by the HPIC prior to the final issuance for any final comments and inputs. Dale Snowder, Michelle Johnson, Gary LaBruyere, and Morgan Cox are on the ANSI N323 Committees that represent the HPIC. Morgan will give the HPIC an update on the ANSI Standard updates at the next HPIC meeting.

TOPIC: ***A review of the new 10 CFR 835 Implementation Guide given by Dale Snowder***

LLNL, INEEL and Rocky Flats have had the Instrumentation Guide used as an Audit Document for their labs. Rocky Flats, INEEL, LANL, and LLNL have had their instrumentation program audited in the last 12 months. There were substantial issues, which needed to be addressed prior to the final issuance. Gary LaBruyere and Murari Sharma have been addressing those issues in the newest draft revision of the 10 CFR 835, Implementation Guide, line by line. Murari will report to the HPIC on the draft revision at the next HPIC meeting.

TOPIC: ***Status report on the HPIC WebPage given by Dave Hickman***

Lawrence Livermore National Lab (LLNL) has been providing a HPIC database for the past two years which consists of a HPIC Home Page. The purpose of the home page is to share information and new data with ease and without duplication. Dave Hickman and Radoslav Radev from LLNL will continue to support the HPIC Home Page.

The HPIC HomePage currently lists the upcoming HPIC meeting dates and the meeting minutes, the HPIC Charter, and a list of DOE contacts. A new addition is an Excel Spreadsheet which consists of the 1997 Instrument Inventory Survey and the Y-12 data. All of the files updated on the HomePage will be in HTML format, so that if you don't have WORD you can still read the files. Please send any updates you might have to Dave Hickman, and please specify which site the updates are from. The Buy-on-Agreements and the Instrument Field Manual still need to be added to the HomePage. Also, a new future addition added will be a link to the Technical Basis Documents. A question was asked by Dale Snowder, "Does the HPIC need to add a disclaimer in the HomePage, stating that the HPIC is not legally liable for the information itself that is supplied to the WebPage?" Answer : The WebPage itself has a standard DOE disclaimer, which makes the HPIC not liable.

TOPIC: ***Web-Based Technical Basis Documents given by Pete Chiaro/ORNL***

Information regarding the Eberline RO-20 ranges and results is available in a test summary on the ORNL's Home Page. It lists the evaluation dates, a summary on the tests performed, and comments. The evaluation dates were on 11/95, 08/96, and 12/97. The various tests performed by the ORNL on the RO-20's were Radio Frequency/Microwave, Magnetic Field, Electric Field, Temperature, Temperature Shock, Atmospheric Pressure, Relative Humidity, Interfering Radiations-neutron, and Vibration.

The Web-based Technical Basis Document Project is to provide a single location to obtain model specific information. ORNL will be developing a standardized format for a Technical Basis Document which will be web-based and linked to part of the HPIC site. ORNL would like to

make the TBD a living document where the users can update and can send out automatic notifications. The initial page will list the background and description and will link to the GOCO, EH, DP, NRC, NIST, etc. You will be able to pull down a selection menu that will link to their home pages and to select a specific instrument model as well as, sponsor and contact information. The Model-Specific Page will list the image, typical uses, probe configurations (as necessary), and the user list. It will also list instrument Calibration and Operation Procedures and Testing information which will list the instrument limitations (test based). Anyone can view the information. The database format will have automatic entry availabilities, show e-mail addresses, and instrument models used. The advantages of membership to the GOCO-HPIC will be listed and the user can enter comments or other information at that time. The Web-based Technical Basis Document will show instrument selections, have a comment entry, comment validation, and E-mail notifications under the automated capabilities section.

All the DP facilities have the same format in TBD's. SafeSites of Colorado's TBD's format is set, it would be hard to change it. The information that the HPIC generates is the testing information, which is added to the HPIC minutes and is entered onto the HPIC Home Page. A question was asked whether or not this information ever gets segmented out into the test data for that particular model of instrument? Do we dissect that piece of information out and put it into that specific model? It was suggested by Dave Hickman/LLNL to keep the HPIC's Technical Basis Documents in their original format and to not make links in that instance. Regarding TBD's, there are certain segments that must be provided just on the instrumentation and certain segments that must be provided just on site. To have the TBD's re-formatted should be an action item for a sub-committee for the HPIC. The consensus is to create/recommend a standardized TBD format, a site-specific as well as, standardized, such as Part I (Site Specific) and Part II (general). Should the Web-site TBD's be used for information only or should the Web-site be used for TBD's (10CFR835)? The response from the committee was to use the Web-site for information only, the TBD's can be developed from the Web-site information.

ACTION: The following goals are to be accomplished by the TBD Sub-committee and report back to the HPIC at the next meeting of those accomplishments:

- 1.) Draft TBD format
- 2.) Define information entry guidelines
- 3.) Define protocol for repetitive test results

The TBD Sub-committee consists of:

Dave Hickman/LLNL
Pete Chiaro/ORNL

TOPIC: ***Nominations and Voting on HPIC Co-Chairman and Nominations and Voting on HPIC Secretary***

The HPIC Co-Chairman shared responsibilities (to be determined by the HPIC Chairman) will be as follows:

- Substitute for Chairman when needed

- Coordinate Agenda Set-up
- Track the progress of HPIC Action Items
- Coordinate HPIC Meetings
- Review HPIC minutes and data
- Coordinate the HPIC w/commercial and govt. agencies

The nomination process is:

- 1.) Submit nominations based on;
 - A.) Experience on HPIC
 - B.) Availability
 - C.) Management/Company support
 - D.) Involvement in HP instruments discipline
- 2.) Vote
 - A.) Only HPIC Authorized Voters can vote
 - B.) 2/3rds majority
 - C.) Current HPIC Chairman will abstain his vote to maintain impartiality

Nominations are made by one for each lab. **Nominations for the HPIC Co-Chairman were as follows:**

- Gary LaBruyere/INEEL
- Pete Chiaro/ORNL
- Dave Hickman/LLNL

By a show of 2/3rds vote; there will be two co-chairman.

Gary LaBruyere/INEEL and **Pete Chiaro/ORNL** will be the two acting co-chairman for the HPIC.

Nominations for the HPIC Secretary were as follows:

Danise Gilsdorf/INEEL

By a show of unanimous votes;

Danise Gilsdorf/INEEL will be the acting HPIC Secretary

TOPIC: **MDA Calculations for HP instruments – Who is using what, which ones work, static vs. scanning given by Morgan Cox**

At the last HPIC meeting it was suggested we would need to discuss MDA calculations. There are 3 sets of calculations, (a) Stationary, (b) Scanning, and (c) a combination of these two. The MDA calculations become very important to the Auditors. No single MDA calculation works for all situations or instruments. There is no standard MDA formula that can effectively be used to

encompass all of the variables in changing field conditions and measurements and MDA formulas are best utilized in stationary controlled environments only.

The Lovelace Respiratory Research Institute (LRRI), formerly ITRI, uses the following logic and methodology to calculate MDA's for Eberline Alpha-6 CAMs:

- Question (1): Why does LRRI care about minimum detectable activity? It should be determined what the CAM will measure or detect, implying that some testing is required to determine how well the CAM quantifies the concentration of airborne radioactive contamination.
- Question (2): Why do we care about false alarm rates? The Air Monitoring Implementation Guide, IV (E,3) says: Excessive numbers of false alarms will reduce the CAM's credibility as an early warning device in the eyes of the worker. False alarms should not exceed one per month per unit. So the IG provides some guidelines for LRRI to follow.
- Question (3): What flexibility does the LRRI have in selecting an alarm setpoint? In the past alarm set points have been established at 8 DAC-h, so the IG provides some wider flexibility in terms of setting alarm points.
- Question (4): What are the materials and methods used? The alpha detector is generally coupled to a multi-channel analyzer, usually 256 channels.
- Question (5): How do you calculate the MDA and an appropriate alarm set point?
- Step 1. Evaluate the overall efficiency of the CAM (cpm per DAC-h).
 - Step 2. Determine the standard deviation of the plutonium count rate in the presence of realistic concentrations of radon and thoron progeny.
 - Step 3. Select an acceptable false alarm rate and calculate the corresponding alarm set point.
 - Step 4. If the alarm set point is unacceptable, consider changes in the CAM operating parameters such as integration time.

Using a moving source the MDA is calculated using the following formula or a slight variation of it: for instance, an analog instrument would use 2 RC time constants for the variable "T".

$$MDA = \frac{\frac{R^B}{SF} \frac{R^B + Eff \times MDA}{T}}{Eff}$$

MDA is not fully expressed without also stating the associated FALSE ALARM PROBABILITY and the CONFIDENCE LEVEL (or Probability of Detection) associated with MDA. A reference background and geometry should also be stated.

Although the COUNT TIME is not directly affected by a moving source (or detector), the

instrument operator should consider scanning speed and source-to-detector geometry when selecting a count time interval.

Two principal factors that affect EFFICIENCY in a moving measurement should be considered:

- GEOMETRY (source/detector size and source-to-detector distance).
- RESIDENCE TIME (Time that the source is in the viewing field of the detector, especially as the residence time relates to the count time)

TOPIC: *A Presentation give by Dale Snowden and Elliott Lesses on the evaluation and testing of Hand & Foot Monitors at the Rocky Flats facility.*

An evaluation was performed on four Hand & Foot Monitors (HFMs) at the Rocky Flats Facility. Three of the HFMs evaluated were gas proportional type detectors and the fourth HFM was a dual scintillation type. The HFM models that were evaluated were:

- Ludlum Model 49-12-1 (gas flow)
- Ludlum Model 49-12S (dual scintillation)
- NE/Bicron Model HFM7A (gas flow)
- Eberline Model HFM-7A (gas flow)

Ludlum Model 49-12-1 and Ludlum 49-12S evaluation were as follows:

- The 49-12-1 base cost per unit is \$14,500.00 with typical spare parts costs of \$875.00
- The 49-12S base cost per unit is \$18,775.00 with typical spare parts costs of \$875.00
- Uniformity was +/- 25% on both HFMs
- Turn around time for spare parts from Ludlum was 30-60 days
- There were no observable effects of radio frequency on either HFM unit
- The 49-12-1 and the 49-12S are basically the same overall design except that the step-up/step-down distance for the foot detectors is only 3" on the 49-12-1 because of its gas flow detector design
- The 49-12-1 had numerous openings for dust/contaminant invasion on the cover and no dust covers over the printed circuit boards which will require more cleaning
- The drop down keypad on the 49-12-1 was convenient and easy to access but contained no lock protection for sabotage/unauthorized access
- The 49-12-1 used more P-10 gas than the other two HFMs evaluated, approximately 60% more (due to connectors/system leakage)
- Calibration time on the 49-12-1 was approximately 2 hours (using keyboard) and the 49-12S took roughly 2.5 hours (due to plateau cal.)
- Both of these HFMs had bar code capabilities, the manufacturer technical and sales support (past history) has been below average
- The hand openings were small compared to the other two HFM's and the edges catch on cuffs/hands
- Ludlum 49-12S dual scintillator is a prototype and had no field experience
- The Sensitivity measurements for the 49-12-1 were 122 dpm with 1.4%/97% (hand) and 667 dpm with 1.4%/97% (foot)

- The 49-12S Sensitivity measurements were 109 dpm with 2.6%/98% (hand) and 635 dpm with 2.4%/97% (foot)

NE-Bicron HFM7A evaluation is as follows:

- The base cost is \$15,450.00 with spare parts cost as \$6,399.00 (which is significantly higher)
- The turn around time from NE-Bicron on spare parts was up to 8 weeks
- This HFM is an attractive, modern looking unit that is constructed of a unique polyurethane foam shell for lightweightness, durability, and designed to meet European standards for RFI protection.
- It has easy access for the detector internals but does require a 8"-12" clearance behind it to open the cover, which means that the HFM would have to be moved away from a backwell each time access was needed.
- Minimal penetrations exist for dust/contaminant invasion but no dust covers were supplied for the printed circuit boards so cleaning frequency is questionable.
- No safety problems appear likely with the 2" step-up and no sharp edges are present for accidental cuts.
- One significant weakness on the foot detectors is the large grid openings which will provide better sensitivity but alternately are more susceptible to damage.
- The gas bottle storage is secured by a single nylon strap and no niches for bottle support on the floor plate.
- The hand frisker is of good quality and well designed but the gas supply lines are cumbersome and unsecured, creating a potential tripping/snagging problem for personnel.
- The circuit boards are accessible only by removing all circuit boards above them due to the fact that they are "stacked" one on top of another. They appear to be very susceptible to damage from the more frequent handling and have delicate lock-down clips that break easily.
- The uniformity was +/- 25%
- There were no observable effects for radio frequency
- This HFM has separate and distinct 5 alarms/chimes which could be confusing (too many)
- Calibration time was 2 hours (using keyboard)
- This HFM has bar code capability.
- Manufacturer technical and sales support was rated as average
- Overall the NE-Bicron HFM is a nice unit with some unique design features. Many of the lower scoring evaluation issues may be easily correctable with minor design changes and the Technical Manual provided is well above average in technical content and drawings.

The Eberline HFM-7A Gas Flow evaluation is as follows:

- This HFM scored the highest evaluation points due to the design, durability, and technical support provided with it.
- Access to the HFM internals is easy with a frontal swing out cabinet and the hand detectors are easily removed from the front for repair/inspection. The grids over the hand detectors are sturdy and provide good protection from damage.
- Dust covers are normally provided with this HFM but none were present at the time of

- evaluating. A metal cover plate over the circuit boards does minimize dust invasion significantly even without the plastic dust covers.
- P-10 Gas usage is about normal @ 30 cc/min. average. The connections are of good quality, which will prevent leakage. The HFM-7A had the best gas management system for minimizing gas usage.
 - The base cost for this HFM is \$15,700.00 with spare parts costs at \$1,920.00
 - Turn around time for spare parts from Eberline is 1 – 2 weeks
 - The uniformity was at +/- 25%
 - There were no observable effects on radio frequency using hand held radios
 - The HFM has 2 chimes which is the same as PCM-2s
 - Calibration time was 1.5 hours (using a Laptop)
 - This HFM had bar code capability, the manufacturer technical and sales support was average
 - The sensitivity measurements measured at 209 dpm with 2.8%/97% (hand) and 214 dpm with 1.2%/97% (foot)
 - This HFM has a spare detector inside the hand & foot counter that is purged and ready for immediate replacement, thus significantly minimizing maintenance time
 - The Eberline Technical Manual for the HFM is above average as is the NE-Bicron Manual

The overall recommendation from Rocky Flats Facility was:

<u>Ranking</u>	<u>Manufacturer</u>	<u>Unit</u>
1	Eberline	HFM-7A Gas Proportional
2	NE-Bicron	HFM7A Gas Proportional
3	Ludlum	49-12-1 Gas Proportional
4	Ludlum	49-12S Dual Scintillator

TOPIC: ***A presentation was given by Matt Rackensteine/SAIC on the SAIC Direct Dosimeters (DRDs) Model PD-3I***

- The PD-3I is a 2nd generation dosimeter and has been around for 3 years with 30,000 – 40,000 out in the market
- This dosimeter uses AA batteries that can be locked in place. All information is retained after changeout to new batteries by use of a EEPROM.
- The PD-3I needs to be more simplified and SAIC is going to be addressing that issue
- It has a dual board with a digital display
- The PD-3I is durable and fits into a Motorola case which can be purchased from Radio Shack in a variety of case colors
- This unit is waterproof and has a variety of clips available
- The mother/daughter board is easily replaced
- The size of the PD-3I is 48mm x 72mm x 17mm
- Weight - <90 grams w/batteries
- Dose Range – 0 MicroR to 999R
- This dosimeter has visual, audible, and alarms, a chirp function, and an audio alarm earpiece

- Source checking w/reader installed check source (optional)
- SAIC did the testing as well as, other labs
- There is a vibrating alarm packet
- The PD-3I has an internal transmitter
- Modular package is removable
- It is economical
- Passed the following ANSI N13.27 – 1997 regulations:
 - 6.1.6.2 Audible Alarm
 - 6.3.3 Response Time
 - 6.3.7 Angular Dependency
 - 6.3.8 Rate Response
- Passed radio frequency field interference tests
- Where is PD series headed?
 - ASCi driven – size, price, capability and reprogramming
 - Looking at all energy's (beta, gamma, alpha, and neutron)
 - Looking at pulse height discrimination (3rd generation) something other than a Geiger, maybe using templates
 - Will not rely on shielding
 - Will be manufactured in San Diego
- Standard firmware can be used without the reader
- SAIC has not tested for pulse, the pulser is definitely a drawback
- Security features – is possible to re-sequence but it is password protected, a flag will come up on the display if this instrument has been tampered with

TOPIC: Status of Currently Applicable Standards for Electronic and Quartz Fiber Dosimeters given by Morgan Cox/LRRI

Morgan Cox from LRRI gave a presentation on Electronic and Quartz Fiber Dosimeters. Listed below are the types of dosimeters that were discussed which included their status, a brief history, and applicable ANSI Standards.

Film Dosimeters

- Over fifty years old
- Relatively inexpensive from services and popular with Medical/Dental users
- Relatively short useful lifetime
- Measures Beta, Photons, and Neutrons
- Can provide a “Permanent Record”
- Should suffice for a time
- Limited measurement range/requires processing

Thermoluminescence Dosimetry

- Thirty plus years old
- Tissue/Air equivalent-flat energy response
- Can be reused many times
- Measures Beta, Photons, and Neutrons

- Wide measurement range/many applications
- Widely used by many
- Requires processing

Quartz Fibre Dosimeters

- About fifty years old
- Measure Photons (penetrating) only
- Limited measurement range (600 + r)
- A supplementary dosimeter
- Selling price ~ \$200 + each
- Largely replaced by electronic types
- Neutron QFD under development
- IEC CD 45B (1991), Direct reading personal dose equivalent and/or dose rate monitors for x, gamma, and high-energy beta radiations.
- ANSI N322-1997, inspection, test, construction and performance requirements for direct reading electrostatic and electroscope type dosimeters.

Electronic Dosimeters

- Born in ~ 1972 –3
- Use GM or SS detectors (which is better?)
- Measure Betas and Photons
- Measure dose/dose rate simultaneously
- Measure in real time (no processing)
- Multiple alarms/memory
- Available with telemetry
- Some energy dependence/\$300 each
- ANSI N42.20-1995, performance criteria for active personnel radiation monitors.

Other types of Dosimeters

- Track ETCH - for fast Neutrons
- OSLD - being developed by Landauer, et al
- Bubble Dosimetry – from Chalk River
- Electrets – for Radon Measurements
- Direct Ion Storage – by Rados
- Glass Dosimeters
- Colorimetric Types

TOPIC: ***A report on HP instruments Buy-on-Agreements status and HPIC procurement issues given by Bill Crownover/INEEL***

As of April 1998 the Buy-on-Agreements are up to date for Eberline. NE-Bicron's pricing should be up to date the 1st part of May. Bill still needs to talk with Ludlum and W.B.Johnson on updating their Buy-on-Agreements. INEEL is currently working on listing the BOAs on the HPIC Home Page. Dale will keep the HPIC up to date on the BOAs. It was suggested to check

with other HPIC members before making an order, it could be that orders could be combined for more of a price break. If you have any questions, please contact Bill Crownover/INEEL at 208-526-1857 if you have questions regarding the BOA's.

TOPIC: ***A presentation given by Pete Chiaro/ORNL on Monitoring for Radioactive Material at Steel Mills***

Pete Chiaro/ORNL was asked to meet with the DOE Steel Team Leader to provide a recommendation on a monitoring system based on "active" detection. They reviewed a proposal from Lawrence Berkeley. The problem with LBL's view was existence of shielded sources and that available technology was not sensitive enough. Their proposal was to design an active radiation monitoring system based on gamma and/or neutron.

The Steel Manufacturers Association (SMA) concerns were exposure to radioactive materials from the ferrous scrap supply. Radioactive sources were shielded in lead. Pipe used in the oil drilling operations were contaminated with trace residues from oil drilling. Scrap from decommissioned nuclear power and U.S. Department of Energy (DOE) facilities arrives by truck, rail, or vessel. The perceived risks are a health and safety concern to the workers and the environment.

Pete's recommendation to DOE-OIT was to listen directly to the industry and learn, to form a small, focused workshop, which would include steel industry representatives, interested national laboratories and instrument manufacturers. From that outcome, Pete became an organizing committee member, which met in Auburn, NY in February. DOE-OIT chose to move ahead with the workshop led by LBL. The workshop is planned for June in Dallas. The workshop objective is to generate a report and list the possible outgrowth. Please let Pete Chiaro know if you have any information on monitoring for radioactive material at Steel Mills.

TOPIC: ***An update on the testing and recent issues on the Eberline RO-20 given by Gary LaBruyere/INEEL***

At the last HPIC meeting held at Cocoa Beach, Ron Ulbrich/Eberline discussed RO-20 issues. Temperature Shock Testing, Operational Amplifier Substitute, and replacement kits were discussed. INEEL sent 20 of their RO-20's back to Eberline for the repairs, the INEEL observed QA problems with Eberline's repair work. The mylar was not tight on the chambers. About 7 had offset problems. Eberline is going to come back to INEEL to address the QA issues. The results of the RO-20 testing will be posted on the HPIC HomePage. Newly developed instruments sold by Eberline will be CE-certified as will most other vendors.

TOPIC: ***HP Instruments classified as M&TE***

The issue of whether HP instruments should be classified as Measurement & Test Equipment (M&TE) was addressed. The following two facilities out of fifteen have classified their HP instruments as M&TE:

- Hanford/Battelle – Adapted the M&TE into their program which includes any instruments quality Level II (portable) that they don't calibrate. Their instruments have

- been considered M&TE for 7 yrs. so far.
- INEEL – Used HP instruments classified as M&TE with the last audit in June 1997, which made the audit smoother. The INEEL has assigned its HP instruments as Quality Level III for the last 2 years.

Qualified Vendors are a Level III. The HPIC needs to look at M&TE as a future topic. If anyone would like to look at the protocol procedures that need to be used, please let Gary know and he can get them to you.

TOPIC: ***A presentation was given by Richard Palatine/Robert Fletcher on the Siemens Direct Dosimeters (DRDs) (Ver. 4-6, 11-12, 1, & 2)***

The historical problems with Siemens EPD's are distribution, expense, battery problems, and complete system inte/gration. To correct those problems Siemens will be direct selling more, competing head-on, adding access control and wireless products, and establishment of a U.S. office. The battery problem has been corrected.

Siemens has delivered over 25,000 Electronic Pocket Dosimeters (EPDs) and sales are increasing. Some deliveries for example were to Savannah River (1,100), Rocky Flats (250), Los Alamos (200), Brookhaven (200), Oak Ridge National Lab (50+), and WIPP (50).

The EPDs radiological characteristics are:

- The EPD's response is to X-ray, Gamma , and Beta
- The Dose Threshold is 0.1 mrem
- The Direct readout has deep and shallow dose equivalent quantities and calibrations
- The EPDs energy performance has been tested to ANSI 13.11 performance tests and passed categories 3,4,5,6,7, and 9
- The calibration is checked annually
- It is proven reliable, only 50 failures in >200,000 entries to RCA (0.02%)
- BGE program for 1998 accreditation
- NVLAP performance completed
- NIST calibration completed
- Plant access control systems
- Dosimetry access control, runs under ORACLE and interfaces w/other exposure management systems

Siemens Tele Trak Tele-Dosimetry System:

- The goals of this system are:
 - It can be used in a large number of field units;
 - Improved range (distance)
 - Has a drop and go range extension;
 - Has generic transmitters;
 - Has an effective repeater system; and
 - Can be configured without the need for multiple base stations

- The system's capabilities are:
 - An extended range of (3000 ft. line of sight)
 - Two-way communication
 - Repeaters can be linked together in series to form virtually limitless site wireless networks
 - Has smart transmitters (a roaming feature) with 15 other option features for roaming

- Applications are for:
 - Traditional personnel use
 - Area monitors – up to 8 detectors thru 1 transmitter
 - Environmental-site monitoring
 - CAMS
 - Non-rad monitors

- The consolidation and growth of dosimetry systems business is:
 - Supplemental HP, IT services
 - Radioactive materials license by July 1998
 - Leader in development of new solutions

- Tele Trak gives the best all around radiological performance
- It has been proven reliable environmental serviceability
- It is a complete system
- This Dosimetry System is first choice for DOE
- Special diodes are used for the detectors

TOPIC: ***A presentation given by Richard Oxford/Roland Hansen/Terry Hansen from NE-Bicron on the ALOKA DRD's***

The following ALOKA DRD's were presented to the HPIC. The DRD's do not require a charger, they have a separate battery that goes in them, and do not require a separate reader. These DRDs do not have rate indicators or alarms. All of the following DRD's detect gamma/X-ray except for the PDM-303 which detects neutron energies. Battery life if ~600 hrs. using lithium cell batteries, the weight on all of the below DRDs are ~50 grams.

PDM-102 – detects gamma/X-ray (1-9999 μ Sv)
PDM-107 - \$360.00 – low energy, has a high polar dependence
PDM-203 - \$290.00 – standard unit here in U.S.
PDM-253 - \$290.00 (has a rack which holds up to 10 units)
PDM-303 - \$850.00 (detects neutron energies from 0.025 eV to 15 MeV energy dependence is variable)

All four of these models are in stock (PDM-107, PDM-203, PDM-253, and PDM-303)
NE-Bicron is waiting to see if DOE will be interested in the above DRDs first before completing any ANSI testing.

TOPIC: **Recent enhancements (data logging) to the NE Electra presented by Terry Hansen/NE-Bicron**

Electra plus is:

- Designed in the UK
- Has U.S. and DOE required additional functions
- Will be launched in July 1998
- The Electra plus will have new hardware (more program and data memory, serial interface card, barcode scanner or I-button reader)
- The Electra plus has new software features
 - Data logging,
 - Peak hold “beep” after new peak, and
 - Automated set-up using PC
- The Data Logging has
 - 1500 record capacity
 - Is Year 2000 compliant
 - Can locate numbers, 0 to 999 (from I button or bar code)
- I-button is unique to the Electra plus
 - Contact sensor
 - Can attach to the front of Electra plus
 - Is compact, durable, tamperproof, and inexpensive
 - Has an internal battery life with 10 year life
 - Unique 48 bit ID code
 - Reader uses fraction of bar code wand current
- Serial Interface RS232
 - Download parameter file from PC
 - Transfer log data to PC
- The Cost is
 - \$450.00 to update Electra to Electra plus

The Endura Probe features are:

- Began early 1990's
- High performance alpha/beta phosphor
- Now in mfg. and will be launched July 1998 in US
- 50 – 100 sq cm probes for Electra series and Delta series instruments
- Phosphor upgrade kits for existing probes
- R&D and tooling costs > \$1 million
- \$450.00 cost on upgrade kits

Terry Hanson's E-Mail address is: Terry.Hanson@netech.co.uk
NE-Bicron has test data to provide if needed.

TOPIC: **E-600 with 43-10-1 Beta Energy Response Report from William Martinez/LANL**

Los Alamos National Lab performed further testing on the E-600 with the 43-10-1 Beta Energy Response. The testing was compared to the Model 2929 using two detectors. Environmental

testing was not done on the 43-10-1. Below are those results:

E-600	Model 2929
Thresholds:	Thresholds:
3 mV & 60 mV	5 mV & 195 mV
Det. 1 = 762V	Det. 1 = 725V
Det. 2 = 791V	Det. 2 = 745V
1% Beta to Alpha cross-talk with SrY-90	Negligible Beta to alpha cross-talk

E-600 Year 2000 issues discussed by Scott Lamb/Eberline

Scott stated that the E-600 keeps history files per time, not date, so therefore, this system is compliant to the Year 2000.

There is a problem with Year 2000 compliance. The next cal date is where the problem will be. If you select "ignore cal date" that will fix the problem. Eberline has not sent out a Technical Bulletin regarding the Year 2000 compliant issues. You can check on the Eberline Home Page for more information.

A crossover problem can exist when:

$$\frac{\text{When}}{= 1} \qquad \frac{\text{Cal const.}}{\text{All is OK}}$$

and crossover is used. When it doesn't equal 1 than the crossover does not work properly. The X file is available but it will not be on the Home Page, contact Scott Lamb. The individual labs will make the changeover themselves.

TOPIC: ***A presentation given by Scott Lamb/Eberline on the Fastrack System DD-300***

The features of the Eberline DD-300 Fastrack System are:

- The case design is rugged
- Water tight and submersible
- It has an integrated clip design
- The DD-300 is made out of a stainless steel loaded plastic (case)
- Compact size
- The DD-300 has a high sensitivity GM tube which has a shorter response time
- This system has a wide view display which displays dose, dose rate, units, alarms, and is programmable
- It has been ANSI 42.20 tested at which Eberline provide limited quantities
- It's capabilities are 99 R/h Dose Rate
 - 999 R Integrated Dose
 - Up to 4 Dose alarms (1 mR to 999 R)
 - 1 Dose Rate Alarm (1 mR/h to 99 R/h)

- 1 Elapsed Time Alarm (1 to 65,000 min)
- Dose History retention is 240 intervals at 1 min., 10 min., 1 hr. and 1 day
- It integrates into existing Eberline Systems
- The Programmable Chirp Rate is 0 to 255 mR/chirp
- The Battery life is 1000 hours, using 3.6 AA Lithium batteries that are easy to replace
- The sensitivity is (50 – 500 mR/h)
- The Dead time is (20 – 90 R/h)
- 10,000 Counts (+/- 2%)

The DD300M features are identical performance specifications as the DD-300. Can be turned on/off by the user and the dose is retained until reset by the user.

The model ADC-100 Automated Dosimeter Calibrator is fully automatic. It can calibrate 30 dosimeters at a time.

The model DR-200 Opt7 Response Check Station has an automatic decay correction. Adapts to any DR-200. Accepts DD-100, 200 & 300's. Is shielded with 5 mCi 137 Cs. The DR-200 is versatile. It features a PC bypass, dosimeter diagnostics, calibration, and normal dosimeter issue. The interface has a vacuum fluorescent display, a keypad/auxiliary input, and key lock security.

The Fastrak II Software (PC Software) has:

- Dose management/access control
- Very fast transactions
- Turbo Pascal language
- DOS
- Cost is \$500.00
- There are 2 versions available
- Can hold 5500 active employee records, 65,000 inactive records
- The open interface has LAN capabilities, can be bi-directional updated and have ASCII exchange files.
- It's versatile
- For accessories the Fastrak II System has an automated dosimeter calibrator, dosimeter storage racks and PC utility program

For additional information contact:

Scott Lamb
Product Manager – Portables/Dosimetry
Scottlamb@compuserve.com
505-741-3232 Extension 200

TOPIC: **The following Vendors were sent a letter of invitation to the HPIC meeting but either declined or had no response from the Vendor.**

Stephen Corp. - declined

Dosimeter Corp. - declined

Nuclear Assoc. - got no response

Merlin-Gerin - got no response. Michelle Johnson was able to get ahold of Merlin-Gerin

during this HPIC meeting. They fed-ex'd their information to Dale. Dale will report to the committee at a later date on their information or allow Merlin-Gerin to present their information at a later HPIC meeting.

TOPIC: **Open Forum Discussion**

Danise faxed out a Survey to each of you earlier on which DRDs you have at your facility and what scalers you have. Dale has received back 11 of the 25 that were faxed. Please fill one out if you have not yet and either fax it or send it to Dale or Danise. Dale will add all the information together and will report it to the HPIC at the next meeting. It was suggested by Jim Hallgren to add listings of available excess instruments to this list.

If anyone could provide information on criticality and response times on the Siemens DRDs, please contact Elliot Lesses. The use of the Siemens DRD's as criticality alarms are being looked at by the Rocky Flats facility.

Dan Dotson/TJNAF will be issuing a paper on radiation damage to various materials that was produced by high radiation fluxes at the TJNAF. If anyone would like that information please contact Dan.

Paul Zahra has several PM-7s. Anyone who has any information or experience with PM-7's please contact Paul.

It was voted unanimous not to support the initiative of the Spent Nuclear Fuel program in their purchase of Ludlum 2241-2's These are not a HPIC standardized instrument. The Model 2241 is the only configuration of this Ludlum model, that the HPIC recommends for standardization.

Question: How many use Nickel backed sources in scaler on instrumentation?
Battelle/OH
Los Alamos
Battelle/Northwest

Question: How many HPIC members don't use Planchets in counting smears in their
scalers?
LLNL
RF
LBNL (didn't know)

TOPIC: **Agenda Topics for the Next HPIC Meeting**

- Tritium Monitors
- QA Testing (CAMS)
- 10 CFR835 Implementation Guide
- BOA Updates
- Generic Format on the WEB
- M&TE Classification ANSI Z540.1
- Vendor support issues

- Characterization of box calibrators
- Benchmark data
- MDA's
- Topical Papers
- AMUG Issues, 2 CAM comments on ANSI N323A
- Monitoring data for the radiation doses at SL to 40,000'
- LANL of quartz fiber dosimeters – Morgan Cox
- Source Vendor Qualification
- Lappel Air Samplers (evaluation/use) –Conan Wade
- Coordination of HPIC w/commercial nuclear
- EPD's standardization
- Re-evaluate of HPIC goals and instruments
- Floor Monitors
- Glovebox Monitors – William Martinez
- BNFL Products
- Pipe Monitors
- Beta/gamma correction factors for small diameter sources – Michelle Johnson
- DOE Topical Steering Committee on Laboratory Accreditation update – Gary LaBruyere

TOPIC: **The date proposed for the next HPIC Meeting**

- 1st choice: November 3 – 5, 1998
2nd choice: November 10 – 12, 1998
3rd choice: October 27 – 29, 1998

TOPIC: **Location of the Next HPIC Meeting**

- 1st choice: Cocoa Beach, FL
2nd choice: San Diego, CA

H. Dale Snowder, HPIC Chairman, closed the meeting. If you have questions or comments concerning the April 1998 meeting minutes or need attachments, please contact me at 303-966-2933 or Danise Gilsdorf, HPIC Secretary, at 208-526-2026.

Sincerely,

H. Dale Snowder
HPIC Chairman

dag

GOCO HEALTH PHYSICS (HP) INSTRUMENT COMMITTEE (HPIC)
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