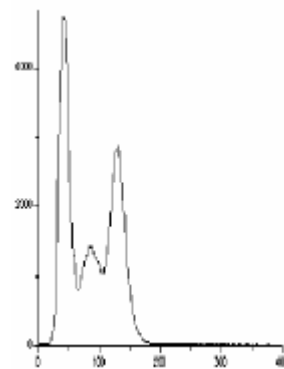




MIDWEST
CHAPTER

THE SPECTRUM

NEWSLETTER OF THE HEALTH PHYSICS
SOCIETY'S
MIDWEST CHAPTER
March 23, 2007
www.midwesthps.org



Spring Meeting, April 19, 2007

Sponsored by Protean Instrument Corporation

The Argonne Advanced Photon Source Speakers: J. Murray Gibson and Harold J. Moe

The Advanced Photon Source (APS) at Argonne National Laboratory provides high intensity, highly focused x-ray beams that enable scientists to visualize the atomic structures of materials. It has applications in the physical, chemical, and biological sciences. It has been used to enhance the understanding of life processes and to develop pharmaceuticals. Researchers from around the world come to use it.

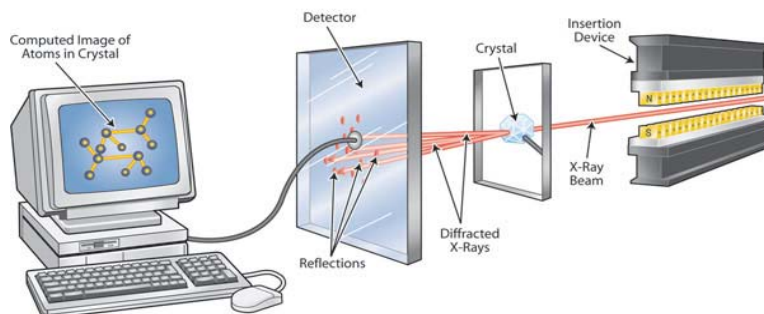
APS x-rays are produced by a set of interconnected components that include a 650 MeV linear electron accelerator, a 7 GeV circular electron accelerator (synchrotron), a 350 meter diameter electron storage ring, and magnetic insertion devices that undulate or wiggle the electrons so that they generate highly intense x-rays concentrated in a narrow energy band. Radiation fields in parts of the electron beam are in the megarad range, but doses to users are almost always below typical TLD detection limits (10 mrem).

The program will include an overview of the facility's scientific design and applications by APS Director J. Murray Gibson, a tour, and a discussion of radiological issues by health physicist Harold J. Moe.

In addition to directing APS, J. Murray Gibson is Argonne's Associate Laboratory Director for Scientific User Facilities. He has a Ph.D. in physics from Cavendish Laboratory in England and has been a leader in Argonne's materials science and nanoscience programs. His research has focused on the use of innovative electron diffraction techniques in the study of materials physics in thin films.

Harold J. Moe was responsible for the radiological design of the APS. He has been active in health physics for more than 50 years and is a charter member of the Health Physics Society. He played a leading role in the development of the Argonne radiation safety technician training manual – often called the "Moe Handbook" – and its variants. These were widely used in the nuclear industry and became Argonne's most popular report series.

Mr. Moe will discuss the means developed to mitigate potential APS radiological hazards such as bremsstrahlung and synchrotron radiation, beam dumps, induced activity, skyshine, and the production of radioactive and noxious gases.



(Illustration courtesy of Argonne National Laboratory)

Harold J. Moe: A Career of Accomplishment

by Gerald Davidson



Harold J. Moe received a B.S. in physics from Loyola University of Chicago in 1954. He began an AEC fellowship in health physics at Vanderbilt University in 1954 and performed his Master's thesis work at Oak Ridge National Laboratory. In June 1955, he attended the meeting at Ohio State University that led to formation of the Health Physics Society and became a charter member.

Harold was hired as a Health Physicist at Argonne National Laboratory in April 1956 by John Novak. John assigned him to technician training in 1958. The training consisted of hour-long classes held approximately weekly for a year to complement on-the-job monitoring training. Harold developed lessons from material in published literature and reports. In 1962, Novak decided that material should be written up as an ANL report. It was published in 1964 as *Radiation Safety Technician Training Course - Part 1* (ANL-6991) and contained 153 pages. The content consisted of basics: atomic structure, radioactivity, radiation types and sources, dosimetry, biological effects; protection standards; protection against external radiation (time, distance, and shielding); and internal dosimetry.

The limited run of the publication was quickly snatched up and additional copies were authorized by the Laboratory. An expedited effort was made to include material of operational interest such as instrumentation, hot cells, nuclear reactors, and particle accelerators. The expanded version had 359 pages and was published in 1966 as *Radiation Safety Technician Training Course* (ANL-7291). Following this release, the book was translated into Chinese and Italian. Later, problems were added to the text, and the book was put out in 1972 as ANL-7291 Rev. 1 (517 pages). An expanded and updated version was prepared between 1985 and 1987. It was first published in 1988 and is currently available as *Operational Health Physics Training (Corrected)*, ANL-88-26 (1992, 929 pages). Personnel in the ANL Publications Department have estimated that more than 20,000 copies of versions of the Moe manual have been distributed over the years.

The status of the Moe manual in the health physics community is indicated by a description on <http://www.nukeworker.com/study/hp/moe/> : *Before there was a CORE Study Guide, before there was a NEU Study Guide, there was Moe... if you look in the references section of practically every HP book, you'll find it listed. In my opinion, it is one of the BEST reference materials for HP Technicians... It's a "Must Read."* The full 929-page text of the latest version of the manual can be downloaded from the site as a set of pdf files totaling 50 MB.

Harold also developed the Argonne Pu training course and wrote its manual (*Plutonium Safety Training Course*, ANL-76-30, 1976).

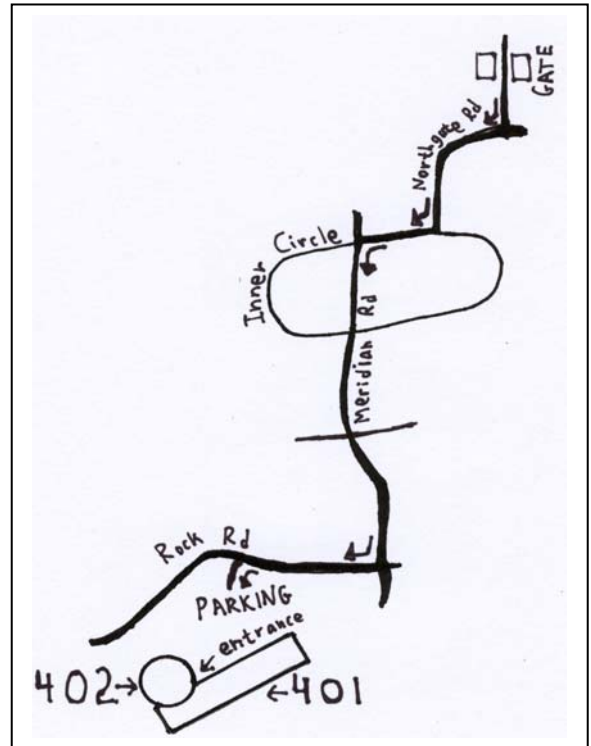
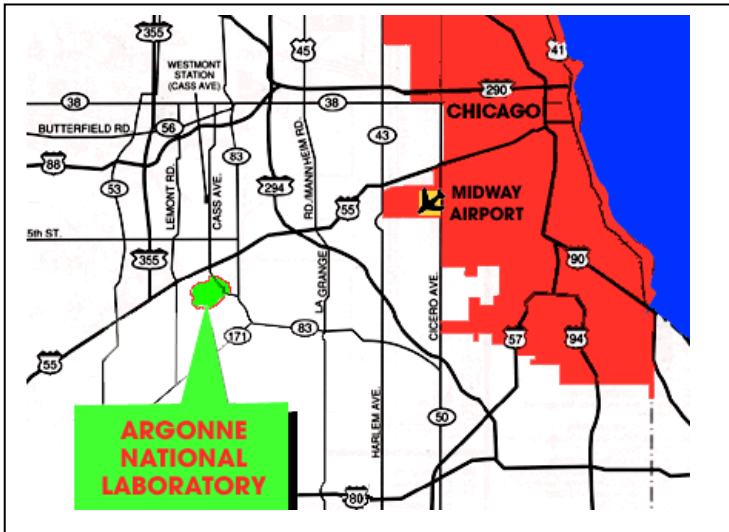
Another major accomplishment in Harold Moe's career was the radiological design of the Argonne Advanced Photon Source. In 1984, Bob Wynveen asked Harold to investigate radiological issues for the project's conceptual design report. Harold researched the discovery and explanations of synchrotron radiation and operational reports on existing synchrotron light sources. He quickly realized that the APS could present problems not found in many existing facilities because of its higher energy. Harold had almost sole responsibility for the APS radiological design. The scope of his considerations is indicated by his many publications on APS. Topics he addressed included shielding, activation of components, environmental impact, noxious and radioactive gas production, and the maximum credible accident. The almost complete absence of measurable radiation exposures to users is evidence of the success of his design.

Harold has also performed work on Argonne's Intense Pulsed Neutron Source and on D&D projects. Harold has worked at Argonne since 1956, except for two years with the NRC. He is author or co-author of more than 70 publications and presentations.

Harold currently works part-time at Argonne. In his spare time, Harold tutors grammar school and high school students in mathematics. He is an avid golfer.

Directions to the Gallery at Argonne's Advanced Photon Source

Argonne National Laboratory is located 25 miles southwest of Chicago's loop. The main entrance is accessed from Cass Avenue. From I-55, take the Cass Ave. South exit and turn right at the Argonne sign (which is a few hundred feet south of I-55) onto Northgate Rd. Stop at the main gate to show a photo ID. From the gate, turn right and follow the curve in Northgate Rd. until it ends at Inner Circle Rd. Turn right. Go left at the next stop sign (Meridian Rd.). Turn right at the next stop sign (Rock Rd.). Go about a half mile to the Advanced Photon Source. You will see two multistory white buildings—one rectangular (401) and one round (402)—behind a parking area. Turn left into the parking area. The main entrance is where the two buildings intersect. Go through the revolving doors, turn right, and follow signs to the Gallery (down one level).



From the President's Desk

Spring is here and it's time to get out of the house and become reacquainted with your neighbors after a long dark winter. There's no better time to join your colleagues for a fascinating tour of a unique device. Please seriously consider attending this tour of the Advanced Photon Source.

Most of you received the email from Eli Port asking for volunteers to run for one of the Chapter officers. These positions do not take up much of your time, but are very fulfilling. I urge you to consider Eli's request seriously and let him know soon if you are interested. We need a full slate for the upcoming elections.

Bruce J. Sanza, CHP

Midwest Health Physics Society

Chapter Officers

President: Bruce Sanza
President-Elect: Gerald Davidson
Secretary: John Schrage
Treasurer: Bernard P. Kelly
Past President: Eli Port

Affiliate Members

Global Dosimetry Solutions
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ORTEC-AMETEK
Canberra
Image Technology, Inc.

Midwest Chapter Health Physics Society
P.O. Box 513
Westmont, Illinois 60559

Spring Meeting

Sponsored by Protean Instrument Corporation
The Argonne Advanced Photon Source (APS)
Speakers: J. Murray Gibson and Harold J. Moe

Date: Thursday, April 19, 2007

Time: 6:00 – 7:00 pm Buffet Dinner Served
7:00 – 7:30 pm Overview of APS
7:30 – 8:30 pm Tour of APS
8:30 pm Radiological Design of APS

Location: In the Gallery in Building 402 at the APS
Argonne National Laboratory
9700 S. Cass Ave.
Argonne, IL 60439
630-252-2000
(see p. 3 for directions)

Cost: \$22 per person (member and spouse)
\$25 per person (others)

Menu

Gourmet Buffet Dinner Catered by Argonne Guest House

Freshly baked bread and butter.

Seasonal mixed green salad with tomatoes, onions, cucumbers and croutons.

Finger Tuscan steak sandwiches on focaccia bread topped with Provolone cheese.

Chicken salad on fresh baked croissants.

Roasted new potato salad with rosemary, scallions, pancetta and bell peppers.

Dessert bar. Coffee, tea and soft drinks. Cash bar.

Site Access & Reservations: Contact Vernetta Carten at 630-252-3355 or dosimetry@anl.gov .
U.S. Citizens: Request site access and make reservation by 4 pm MONDAY, April 16. Your name must be on the access list and you must have a photo ID to enter the site.
Non-U.S. Citizens: Contact Vernetta as soon as possible. The site access approval process can be lengthy (possibly two weeks or more).