



THE BILLET STC NEWSLETTER

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OFFICIAL NEWSLETTER of the SOUTH TEXAS CHAPTER of the HEALTH PHYSICS SOCIETY

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2010 Texas Radiation Regulatory Conference a Success

Jennifer Watson, MS; and Michael Charlton, CHP

More than 400 people attended the 2010 Texas Radiation Regulatory Conference held September 2–3 in Austin, Texas. The conference was sponsored and administered by the STC-HPS; the technical programs were organized and provided by the three Texas state agencies that regulate the different uses of radiation in Texas: the Texas Department of State Health Services (DSHS), the Texas Commission on Environmental Quality (TCEQ), and the Texas Railroad Commission (RRC).

The two-day regulatory conference provided updates on the regulations and policies of the U.S. Nuclear Regulatory Commission (NRC), DSHS, TCEQ, and RRC.

The day before the conference and at the same



General Session of the 2010 Texas Radiation Regulatory Conference.

venue, the NRC hosted a Public Comment Meeting on the Implementation Guidance for Title 10 of the Code of Federal Regulations Part 37, *Physical Protection of Byproduct Material*. The Public Comment Meeting was highly attended by numerous licensees across the U.S. and proved to be a great kickoff to the Regulatory Conference.

STC President Karen Blanchard began the meeting by welcoming all attendees and introducing the events of the day. Following the introduction, Lynne Fairbent of the American Association of Physicists in Medicine gave an update on medical events in the United States. After Lynne's presenta-

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2011 Nuclear Power Topical Meeting

January 14–15, 2011 ★ San Antonio, Texas

Go to www.stc-hps.org to register online!

Want to know the latest on the advancements in nuclear power? Read about the upcoming Nuclear Power Topical Meeting on page 11 of this issue of *The Billet STC Newsletter*.


★ ★ ★ WELCOME NEW STC MEMBERS, listed on page 7. ★ ★ ★

New STC Lapel Pins

John P. Hageman

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The new design and production of the NEW LAPEL PINS for the STC has been completed.

The pin is shown in the image to the right. The whole Chapter wants to thank *Stan Bravenec* for all his good work to make this happen. Plan on buying several new pins at the next meeting. 

Thanks again, Stan!



Donations to STC-HPS Student Scholarship Funds

Pete and Karen Myers

G

Generous donations to STC-HPS Educational Funds were made during April-June 2010 by the following:

Will Pate
UT Health Science Center
San Antonio

Rob O'Donel
Suntrac Services

Fizza Mahdi
Science Fair Winner

John & Melissa Hageman

InterState X-Ray



The Executive Council, South Texas Chapter of the Health Physics Society, offers its most sincere thanks for making contributions important to the viability of the Chapters' funds, which provide significant assistance to students preparing for their futures.

T

The South Texas Chapter of the Health Physics Society (STC-HPS) is a professional society that was organized and chartered in 1964. Its objectives are to:

- **Develop scientific knowledge** in the study of radiation
- **Devise practical means to protect people and their environment** from harmful effects of radiation
- **Provide and support meetings to discuss scientific endeavors**
- **Encourage scientific research and education** dedicated to the science of radiation protection
- **Aid in research and education opportunities** in health physics and radiation protection for college and university students

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The SOUTH TEXAS CHAPTER of the HEALTH PHYSICS SOCIETY, INC.

welcomes our

NEW MEMBERS & APPLICANTS



Edgar Aviles

*CTS, Inc.
Student*

Robert Binovi

*Prudent Environmental Svcs.
Affiliate*

Bryan Bittner

*Texas State Technical
College - Waco
Student*

John Bliss

*Los Alamos National Lab
Regular*

Jim Bolling

*Pathfinder Energy Services
Regular*

Dennis Brewer

*B. J. Services
Regular*

Tommy Cardwell

*Cardwell's Radiation
Consultants
Regular*

Richard Charles

*Texas State Technical
College - Waco
Student*

Ruben Cortez

*Texas DSHS
Regular*

Quinton Crocker

*Texas State Technical
College - Waco
Student*

Daniel Didier

*SET Environmental, Inc.
Regular*

Kayla Evans

*Texas DSHS
Regular*

Marc Goldsmith

*Texas State Technical College
Student*

Mark Harvey

*Texas Southern University
Student*

Donald Heard

*Tracerco
Regular*

Eddie Horace, Jr.

*UT Health Science
Center - Houston
Regular*

Jim Keasbey

*Ametek
Regular*

Wendy McCoy

*University of Texas-San Antonio
Student*

Oliver McDonald

*RasGas Company
Student*

Chuck McLendon

*Texas Commission
on Environmental Quality
Regular*

Edwin Miles

*Landauer, Inc.
Affiliate*

Curtis Nesbit

*University of Texas - San Antonio
Student*



Jeremy Northum

*Texas A&M University
Student*

Robin Phillips

*Texas A&M University
Student*

Ahyana Polete-Brooks

*Lexicon Pharmaceuticals, Inc.
Regular*

Mark Randolph

*Delphi Groupe, Inc.
Regular*

Harvey Richey IV

*University of Texas - Austin
Regular*

Maksudur Sardery

*The Methodist
Hospital System
Regular*

Edward Selig

*Advocates for Responsible
Disposal in Texas
Regular*

Mario Silva

*Texas Tech University
Health Sciences Center
Student*

Saverio Strangis

*Cyclotope
Regular*

Elizabeth Valdez

*The Methodist
Hospital System
Regular*

Doug Van Cleef

*ORTEC
Regular*

We wish them well in all their endeavors and especially hope that their association with the South Texas Chapter will be long and mutually rewarding!

Agenda Item	Discussion	Action
<p>President's Report <i>continued</i></p>	<p>The STC has been monitoring developments in the pending deactivation of the North Texas Chapter (NTC) so that we can extend an offer to welcome them into our Chapter or explore other alternatives. Based on information from the national HPS meeting and John White, member of the NTC and STC, the NTC is not actively functioning but they have not yet officially deactivated. The national HPS is attempting to establish a South Plains Chapter that would include the NTC, Panhandle Chapter, and Oklahoma folks who are interested in a Chapter.</p>	<p><i>Action Item:</i> We will continue to monitor and support as needed.</p>
	<p>The Chapter voted to amend the bylaws to allow for electronic voting for EC members. This information has been posted to the Web site. However, the information for EC voting is under section titled "amendments." This raises the question for routine (not amendments to bylaws) voting by the EC, which is what this amendment was intended for. Does this verbiage need to be removed, and if so, to what section of the bylaws?</p>	<p><i>Action Item:</i> EC will review bylaws and decide placement.</p>
	<p>Information presented at the Chapter Council meeting at annual meeting in Salt Lake City included:</p> <ul style="list-style-type: none"> • Chapter Volunteer Awards: We are already familiar with these and their process. • Correlation between the health of a Chapter and its link with student chapter(s). • A new Chapter: WCS and LES in West Texas (Andrews County area). • Bylaws and Charter: If revisions are made, it is not required (but it is strongly suggested) that the revisions are submitted to the Board for review. • Access to Chapter Web page available through HPS main page. Discussion of posting (with permission) videotape of speakers at Chapter meeting, possible CEUs, etc. • Chapter Special Activity grant program was not recommended for approval (HPS cost cutting). • Declining membership is an underlying theme in most talks at HPS. • Standard Procedure has been written for local planning committees for Annual/Midyear: it is in rules committee now. <p>Other information was also presented in a Chapter Leadership Workshop, most of which we are already familiar. In fact, South Texas Chapter was used repeatedly as an example.</p>	
	<p>A fact-finding subcommittee was developed to investigate the possibility of the STC somehow supporting a Chair at University of Texas Health Science Center San Antonio. That committee was scheduled to report at this meeting.</p> <p>Results – No consensus was reached. The subcommittee will further explore the cost/benefit analysis and research whether or not other Chapters have endowed a Chair.</p>	<p><i>Action Item:</i> Issued will be discussed further at January 2011 EC meeting.</p>
	<p>Eddie Selig, a new STC Affiliate from Advocates for Responsible Disposal in Texas (ARDT), asked Pete Myers if the Chapter would be interested in sending a letter to Texas Commission on Environmental Quality (TCEQ) encouraging them to hold a stakeholder's meeting for the WCS Rate Application Package.</p>	

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STCMinutes

Agenda Item	Discussion	Action
President-Elect's Report	South Texas Chapter Breakfast at National Meeting – Breakfast was an American Style Buffet in Salt Lake City. More than 30 attendees utilized the first ever electronic registration and online payment system for the STC. From all reports, the Breakfast went well.	
	National Chapter Report – The STC submitted its report to the National HPS for presentation at the National EC meeting. We also submitted a sub-report to our National representative, Ed Bailey.	
	Regulatory Conference – A big thank you to everyone who has donated numerous hours to prepare and set up for the RegCon 2010. These include Karen Blanchard, Pete and Karen Myers, David Fogle and Will Pate, just to name a few.	
Program Committee's Report	January 2011 Meeting – The meeting will be held in San Antonio on January 14–15, and the topic will be Nuclear Power. David Fogle and John Poston Sr. have been approached to arrange speakers on the subject of Nuclear Power. John Poston has contacts within the NRC Regional Office Personnel, at Comanche Peak in Nuclear Generation, and among the South Texas Project General Plant personnel. He stated we can possibly arrange for someone from the USNRC Regional office and/or TAMU professors for the Nuclear Power Institute, or from NPI to speak. In addition, this will be the meeting at which Kathy Pryor, National HPS President-Elect, will be speaking during lunch. If we wanted to secure additional speakers from some of these locations, we should plan terms of speaker compensation to ensure that we receive the educational content we need/want for our meetings.	
	Student Presentation and Annual Meeting – The meeting will take place April 22–23 in Waco, Texas, with Linda Morris coordinating the local arrangements. Thank you, Linda, for offering your assistance in all of the scheduling. The Chair will be working with the TAMU, San Antonio, TSU, and TSTC representatives to get plenty of speakers. In addition, TAMU seems to be interested in having student members join the STC-HPS.	
	Chapter Survey – The chair is creating an online survey to poll Chapter members on the cost of meetings and possible future projects.	
Treasurer's Report	The total assets of the Chapter are \$135,789.74, after an increase of \$21,774.92, due to membership dues, affiliate dues, scholarship donations, and teacher workshop donations. Motion to approve the Treasurer's Report Motion: Karen Blanchard Second: Pete Myers	<i>Committee Vote:</i> Approved
Secretary's Report	Lapel Pins – Motion to spend \$597.00 for 300 STC lapel pins made in accordance with the agreed-upon pin design #3, to be ordered by Stan Bravenec and paid for using the Chapter's credit card (coordinate with Treasurer). Motion: Karen Blanchard Second: John Salsman	<i>Results:</i> Unanimous Approval
	Pete and Karen Myers – Motion to pay for up to 3 hotel nights and waive the registration/banquet fees for Pete and Karen Myers for the Regulatory Conference. Motion: Karen Blanchard Second: John White	<i>Results:</i> Unanimous Approval

Agenda Item	Discussion	Action
Secretary's Report <i>continued</i>	<p>Student Awards – Motion to move forward and split the \$1,000.00 Associate Degree Award between the two candidates as requested by the Student Assistance Committee Chair (as they have shown outstanding character in their willingness to share).</p> <p>Motion: Karen Blanchard Second: Jennifer Watson</p>	<p><i>Results:</i> Unanimous Approval</p>
	<p>Meeting Registration for Students – Motion to waive the registration fee of \$20.00 for each of the four award recipients, extending them complimentary invitations to attend that conference to learn, network, etc., and to attend the banquet dinner where they will be recognized. This would give us an opportunity to support their professional growth. We would also allow them to bring one guest to the banquet at the cost of \$20.00.</p> <p>Motion: Karen Blanchard Second: Sam Daniel</p>	<p><i>Committee Vote:</i> Referred to the EC meeting due to an abstention</p>
Membership Report	<p>Current STC membership is at 244 members for 2010 with last year's total at 257 members. Voted on new members. Motion to accept members Motion: Jennifer Watson Second: Stan Bravenec</p>	<p><i>Committee Vote:</i> Approval of new STC members. Congratulations!</p>
<p>WELCOME NEW STC MEMBERS!</p>	<p>Robert Binovi – Prudent Environmental Services Edwin Miles – Landauer, Inc. Edward Selig – Advocates for Responsible Disposal in Texas Doug Van Cleef – ORTEC John Bliss – Los Alamos National Laboratory Ruben Cortez – Texas Department of State Health Services Kayla Evans – Texas Department of State Health Services Mark Harvey – Texas Southern University Elizabeth Valdez – Methodist Hospital System Bryan Bittner – Texas State Technical College - Waco Richard Charles – Texas State Technical College - Waco Marc Goldsmith – Texas State Technical College - Waco Jeremy Northum – Texas A&M University Robin Phillips – Texas A&M University Quinton Crocker – Texas State Technical College - Waco Edgar Aviles – CTS, Inc. Dennis Brewer – BJ Services Daniel Didier – SET Environmental, Inc. Wendy McCoy – University of Texas - San Antonio Oliver McDonald – RasGas Company Curtis Nesbit – University of Texas - San Antonio Ahyana Polete-Brooks – Lexicon Pharmaceuticals, Inc. Mario Silva – Texas Tech University Health Sciences Center Saverio Strangis – Cyclotope Jim Bolling – Pathfinder Energy Services Tommy Cardwell – Cardwell's Radiation Consultants Donald Heard – Tracerco Eddie Horace – University of Texas Health Sciences Center-Houston Jim Keasbey – Ametek Mark Randolph – Delphi Groupe, Inc. Harvey Richey IV – University of Texas - Austin Maksudur Sardar – Methodist Hospital System Chuck McLendon – Texas Commission on Environmental Quality</p>	

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Agenda Item	Discussion	Action
Web Master's Report	<p>Since early April 2010, the STC-HPS Web site has been updated a total of 35 times. Most updates were related to updates to the Affiliate roster. The July edition of <i>The Billet</i>, along with the second quarter TRAB Program Report, was made available on the STC-HPS Web site on July 29, 2010.</p>	
	<p>The new online payment system was tested to allow payment for the STC-HPS Annual Breakfast Meeting in early June. After working out some minor issues, the online payment and registration system was rolled out for the 2010 Texas Radiation Regulatory Conference in mid-June. To date, things seem to be going smoothly with more than 200 payments made through the online system. Comments and concerns regarding the process would be appreciated so we can improve for future conferences.</p>	
	<p>John Hageman questioned whether or not to include member applications and Affiliate applications in <i>The Billet</i> because they are being included as .pdfs on our Web site and payments are primarily being processed online in order to eliminate duplication of effort and potential for inconsistencies. The Chair asked for the EC's opinion on this matter.</p>	
	<p>A final issue that the EC should decide upon is the creation of an STC-HPS privacy policy. We had a question from one of our Affiliates asking to receive a list of conference registrants prior to the start of the conference so that they could send marketing material ahead of the conference. The online registration form did not provide registrants with an option to "opt-out," thus Pete Myers and the Web Master decided that it would be best to not provide the Affiliates with this information due to registration privacy concerns. Along with this issue came the realization that the STC-HPS does not have (or at least the Web Master is not aware of) a privacy policy for our Web site. With the increased usage of the STC-HPS Web site for conference registration as well as to pay dues, make donations, etc., how the collected information is used is of concern. National HPS does have a privacy policy stated on their Web site (http://www.hps.org/privacy.html). The Web Master recommends that we either create or adapt the National HPS privacy policy to suit our needs and include this privacy policy on our Web site so there is no ambiguity or question as to what we are doing with the information submitted via our Web site.</p>	
	<p>The Privacy Policy may be viewed in its entirety at the following link: http://www.hps.org/privacy.html</p>	
Legislative Committee	No report at this time.	

As a courtesy to our membership, the STC-HPS offers a list of the Health Physics-related positions available in South Texas on our Web site.

> www.stc-hps.org/hpjob.htm

Agenda Item	Discussion	Action
Affiliate Committee	<p>Since Early April, when the new Chair took over, we have had six Affiliates renew their memberships for 2010, and two new Affiliate Members joined the STC-HPS.</p> <p>Renewed Affiliates:</p> <ul style="list-style-type: none"> • ADCO Services • ORTEC • Alpha Neutronics • ARDT • The Delphi Groupe • Waste Control Specialists, LLC <p>New Affiliates:</p> <ul style="list-style-type: none"> • Landauer, Inc. • Prudent Environmental Services (2011) <p>For the 2010 Texas Radiation Regulatory Conference, we have 14 Affiliates registered as vendors. Two Affiliates generously contributed a total of \$350.00 toward sponsoring the ice cream break during the conference. We look forward to visiting our Affiliates during the conference breaks.</p>	
Nominations Committee	No report at this time.	
Publications Committee	<p>Coordinated publication in <i>The Billet</i> (Vol. 31, No. 2, July 29, 2010) of:</p> <ul style="list-style-type: none"> • SRCPD to Pilot Tracking System for Machine-Based Medical Events • Congratulations to Alice Rogers for being elected Chairperson, CRCPD • Donations to STC-HPS Educational Funds • New Members and Applicants • U.S. NRC Seeks Public Comment on Several Rules and Policy Statements • Condensed version of 2nd Quarter State Agency Program Reports to TRAB 	
	<p>Coordinated Publication on STC-HPS' Web site of:</p> <ul style="list-style-type: none"> • State Agency Program Reports to TRAB's 2010 second quarter meeting. Excerpts were printed in <i>The Billet</i>. 	
	<p>Coordinated blast email on August 4, 2010, to STC members of the Department of State Health Services holding a public meeting to accept comments on the proposed revision of the section of their rules concerning use of radiation machines in the healing arts (25 TAC §289.227). Revisions to 25 TAC §289.277 include the following:</p> <ul style="list-style-type: none"> • Add requirements to establish a dose management program for interventional fluoroscopy. • Add requirements to establish a dose management program for computed tomography. • Address interval changes for measuring the radiation output of fluoroscopic and CT radiation machines. • Add requirements for electronic brachytherapy devices. 	
<i>The Billet</i>	Future Meeting Dates: January 14–15, 2011, in San Antonio, Texas. The Student Presentation and Annual Business Meeting will be held in Waco, Texas, April 22–23, 2011.	

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Agenda Item	Discussion	Action
Science Teacher Workshop	<p>We had a booth and a one-hour workshop slot (4:30-5:30 p.m. on Friday) at CAST-10 in the Brown Convention Center, Houston, held November 11–13.</p> <p>We have also accepted an invitation to participate in the ARASE Science Seminar on September 18 at UTHSCSA at San Antonio. Ken Krieger and the Chair are handling this. The Chair would like to find one or two more participants.</p>	
Student Assistance Committee	<p>Education Grant Winners – TSTC students Bryan Bittner and Quinton Crocker both applied for the Associate Degree Grant. Since they are good friends, they decided to split the award, regardless of who won. Accordingly, the STC will present each with a \$500 check. Bryan and Quinton are both Radiation Protection Technology majors and serve as President and Vice-President of the TSTC Student Branch. Marc Goldsmith and Brandon Hartzell will be assisting as needed with the Regulatory Conference. TSTC appreciates the STC “comping” of student rooms for the meeting.</p> <p>Guan Fada, a Health Physics graduate student at Texas A&M University, is being awarded the Graduate Education Grant. He has been active at STC student meetings, and presented a paper at the College Station Conference last year. He will be attending the banquet tomorrow evening.</p>	
	<p>Neff-Poston Award – Acacia Ashley Ho was selected by TAMU Nuclear Energy (NE) faculty advisor Karen Vierow to receive the Neff-Poston Endowed Scholarship. Acacia is entering her fourth year as a Radiological Health and Engineering major at TAMU.</p>	
	<p>Science Fairs 2011 – Let’s start thinking about asking Chapter members to volunteer as science fair judges for 2011. Last year we did not have enough volunteers to participate in all fairs. The dates for 2011 are as follows:</p> <ul style="list-style-type: none"> • Central Texas Science & Engineering Fair in Waco, Texas, on Feb. 22–23, 2011 • Austin Energy Regional Science Festival on Feb 23–26, 2011 • Alamo Regional Science & Engineering Fair on March 6–8, 2011 • ExxonMobil Texas Science & Engineering Fair on March 31– April 3, 2011 • Science and Engineering Fair in Houston on April 7–9, 2011 <p>Interested Chapter members are asked to contact Linda Morris at 254-867-2952 or Linda.morris@tstc.edu for more information.</p>	
	<p>Annual Meeting and Student Presentations – Scheduled for April 22–23, 2011, in Waco. The meeting will be held at the IDEAS Center on the TSTC campus. This is the same venue as in previous years. The hotel has not yet been selected.</p>	
Special Topics	<p>Need to recruit new Chair for Nominations Committee.</p>	
Adjournment	<p>8:15 p.m. Motion: Karen Blanchard Second: Sam Daniel</p>	

SOUTH TEXAS CHAPTER *of the* HEALTH PHYSICS SOCIETY, INC.

2011 Nuclear Power Topical Meeting

& *Special Address by Kathy Pryor, National HPS President-Elect*

January 14–15, 2011 ★ San Antonio, Texas

*CEUs
Awarded
for LMPs,
MRTs**

* Number of CEUs awarded will be determined at a later date, dependent upon actual hours of presentations

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Want to know the latest on the advancements in nuclear power? Exciting talks are planned, with a special address from the President-Elect of the National Health Physics Society (HPS), Kathy Pryor. A happy hour is scheduled for Friday, January 14, with

Special address to be presented by Kathy Pryor, National HPS President-Elect on January 15.

Hotel registration deadline is **January 1, 2011**

STC Meeting pre-registration deadline is January 2, 2011

discounted drinks from 5–8 p.m. in the hotel bar, where members can network and get to know each other.

The luncheon is set for Saturday, from 12:00–1:00 p.m., followed by Kathy Pryor speaking.


Register online for the 2011 Topical Meeting at stc-hps.org

The luncheon buffet includes:

- Fiesta Salad with Iceberg Lettuce, Jicama, Cheddar Cheese & Avocado
- Chile con Queso and Hot Salsa with Tortilla Chips
- Cheese Enchiladas with Guajillo Pasilla Sauce
- Spanish Rice, Peppers, Carrots, and Peas
- Beer-Marinated Chicken Fajitas with Pico de Gallo, Cheddar Cheese, Sour Cream & Tortillas
- Sweet Nachos with Chocolate Sauce
- Peanut Butter Fondue
- Strawberry Coulis, Coffee, and Iced Tea

A block of 20 rooms is reserved for Friday night at the La Quinta Inn & Suites on the Riverwalk in San Antonio. The nightly rate is \$119 plus tax for single, double, triple, and quad occupancy rooms with a

reservation deadline of January 1. Located in the heart of downtown, the La Quinta Inn & Suites San Antonio Convention Center is in the middle of all that San Antonio has to offer: the picturesque River Walk and historic Alamo, Market Square, Henry B. Gonzalez Convention Center, SeaWorld, Six Flags Fiesta Texas, San Antonio Zoo and Botanical Gardens. There are many eateries nearby and plenty of shopping at Rivercenter and North Star malls, and San Marcos Outlet stores. For reservations phone: 1-866-527-1498, option 1.

Use reservation code "STC-HPS." Hotel registration deadline is January 1. Meeting pre-registration deadline is January 2. 

Go to www.stc-hps.org for meeting agenda, information, and registration details.

SAVE TIME & MONEY Get your issue of *The Billet STC Newsletter* the E-WAY!
UPDATE your contact information on the STC-HPS Web site.

Transportation Regulations and the A_1/A_2 Values

Dwaine Brown • Brown Consulting Services LLC • Waller, Texas

The International Atomic Energy Agency (IAEA) estimates that between 18 and 38 million packages containing radioactive materials are transported each year throughout the world. This material may be radioactive waste, medical isotopes, industrial radiography sources, well logging sources, research materials, and of course nuclear fuel cycle materials. These shipments are made by land transport, air, or by sea.

There are various agencies that regulate the commercial movement of radioactive materials and with minor variations primarily related to how a shipment is documented. The requirements are consistent for the control of exposure to radiation between the International Civil Aviation Organization (ICAO) as implemented through the International Air Transport Association (IATA) regulations, the International Maritime Organization (IMO) as implemented through the International Maritime Dangerous Goods (IMDG) Code, and specific country regulations that address the ground transportation of radioactive materials such as the United States Department of Transportation (US DOT).

Each agency has adopted requirements for the control of package contents and external radiation levels based on the criteria presented in IAEA Safety Standards Series, *Requirements, No. TS-R-1* (ST-1 Revised), and it is the basis of these regulations that will be discussed in the following.

Prior to 1959, the U.S. Interstate Commerce Commission regulations served as the basis for the various national and international controls for the transport of radioactive materials. Shortly after its formation, the rapid growth of the nuclear industry made the development of controls for the transport of all types and quantities of radioactive materials the highest priority of the IAEA. The general outline of these regulations was:

- Introduction
- Definitions
- General Provisions
- Activity Limits and Material Restrictions
- Requirements and Controls for Transport
- Requirements for Radioactive Material and for Packagings and Packages
- Test Procedures
- Approval and Administrative Requirements

This article will discuss the development and implementation of the Activity Limits commonly referred to as the A_1 and A_2 values for specific isotopes. Therefore, the first order of business will be to define the A_1 and A_2 values as well as a selected few additional terms prior to entering into a discussion as to how these values were derived.

- A_1 – The maximum activity of *special form* material that is permitted in a type of package called a Type A package.

- A_2 – The maximum activity of *other than* special form (also called normal form) material that is permitted in a Type A package.

Special Form – Either an indispersible solid radioactive material or a sealed capsule containing radioactive material that has undergone very stringent testing to confirm that if the material was released in an accident the physical integrity of the special form capsule would make it unlikely that there would be any associated contamination hazard from the radioactive contents of the capsule. This allows larger quantities of special form material to be shipped in any Type A package.

Type A Package – Designed and tested to provide a safe and economical means of transporting Type A (A_1 or A_2) quantities of radioactive material. These packages must maintain their integrity under the kind of abuse or mishandling that may be encountered *under normal conditions of transport*. The testing of these packages simulates transportation-related events that a package could be subjected to in handling or accident conditions.

The objective of the regulations is to provide assurance of the protection of individuals, property, and the environment from any harmful effects of radiation during the operations surrounding the transport of radioactive materials. Foremost in the provision of this assurance is the well-defined limits of quantities of material that may be contained and transported in specific package designs, specifically the A_1 and A_2 quantities of materials. The A_1 and A_2 quantities for each isotope define the amount of any material that may be transported in each type of container be it Excepted packaging, Type A packaging, or Type B packaging. Stated in another way, the regulations as written provide guidance toward maintaining the exposure to individuals, property, and the environment As Low As Reasonably Achievable (ALARA).

There are basically 3 limits imposed relative to the activity of a package with radioactive contents:

- A_1 and A_2 in Bq (or multiples thereof).
- Activity concentration for exempt material in Bq/gram.
- Activity limits for exempt consignments in Bq

For this presentation we will focus on the A_1 and A_2 value determination and save any discussion of exempt packages or consignment for a later date.

The values of A_1 and A_2 presented in the regulations evolved from what was known in the late 1970s as the Q-System. The Q-System was developed in support of the 1985 edition of the regulations to provide justification from a dosimetric standpoint for the A_1 and A_2 values and has been retained through the current regulations.

The limits presented within the regulations to control and mitigate the release of radioactive material from trans-

port packages are based upon the activity limits for Type A packages. These same limits are also used for specifying Type B and Type C package activity leakage limits LSA materials, and “excepted” package content limits.

Initially radionuclides were segregated into 7 groups for transport purposes with each group having a package content limit for special form radioactive material and for material in all other forms. In 1973 the regulations the group classification system evolved into the A_1/A_2 system where each nuclide had 2 Type A package content limits, A_1 and A_2 .

The dosimetric basis of the A_1/A_2 system relied on a number of assumptions. A whole body dose limit of 3 REM (30 mSv) was assumed in deriving the A_1 . In calculating the A_1 values, the exposure was limited to 3 R (≈ 30 mGy) at a distance of 3 meters in a period of 3 hours, an intake of 10^{-6} x A_2 was assumed in the derivation of A_2 as the result of a median accident. This intake would result in one-half of the maximum permissible intake for a radiation worker. The median accident is defined as one that for a Type A package results in a complete loss of shielding and to a release of 10^{-3} of the package contents in such a manner that 10^{-3} of the released material was subsequently taken in by a bystander.

The Q-System developed for the 1985 regulations, reassessed and modified for the 1996 regulations, considers a broader range of specific exposure pathways than the earlier A_1/A_2 system. The Q-System continued to use the same assumptions as those used in the original Q-System; however, in exposures related to the intake of radioactive material, use was made of new data and concepts recommended by the International Commission on Radiological Protection (ICRP). Particularly subjective assumptions were made regarding the extent of package damage and release of contents without reference to the median accident.

The Q-System considers a series of exposure routes for individuals in the vicinity of a Type A package involved in a severe transport accident. This led to five contents limit values:

- Q_A for external photon dose
- Q_B for external beta dose
- Q_C for inhalation dose
- Q_D for skin and ingestion dose due to contamination transfer
- Q_E for submersion dose

The A_1 value for special form material was the lesser of the 2 values Q_A and Q_B , while the A_2 value for non-special form radioactive material was the lesser of A_1 and the remaining Q values.

The exposure pathways used in the determination of Q values are based on the following radiological criteria:

1. The effective or committed dose to an individual exposed near a transport package following an accident should not exceed a reference dose of 50 mSv.
2. The dose or committed dose equivalent received by individual organs, including the skin, of an individual involved in the accident should not exceed 0.5 Sv, or in the special case of the lens of the eye, 0.15 Sv.

3. An individual is unlikely to remain at 1 meter from the damaged package for more than 30 minutes.

The Q-System lies within the domain of exposures that are not expected to be delivered with any certainty but may result from either an accident at a source or from an event or sequence of events such as equipment failure and operating errors.

The earlier reference dose of 50 mSv used in the development of the A_1/A_2 values used in the 1985 regulations is no longer valid for these exposures; however, this value has been retained within the current Q-System with the consideration that historically actual accidents involving Type A packages have led to very low exposures. These exposures may be considered once-in-a-lifetime exposures since most individuals will never be exposed. When considered with the previously cited dose limits, the limiting dose rate from a damaged Type A package for whole-body photon exposure is assumed to be 100 mSv/h at a distance of 1 meter.

Current Q value assumptions:

- **Q_A – External dose due to photons**
Calculated using the complete X-ray and gamma emission spectrum for each radionuclide from ICRP Publication 38
- **Q_B – External dose due to beta emitters**
Calculated using the complete beta spectra for each radionuclide from ICRP Publication 38
- **Q_C – Internal dose via inhalation**

The accident scenario used in this determination assumed a storeroom or cargo handling bay with a free air volume of 300 cubic meters with 4 room air changes per hour. With an adult breathing rate of 3.3×10^{-4} m³/s, this resulted in an uptake factor of approximately 10^{-3} for a 30-minute exposure period. Alternatively, another accident scenario that may involve a transport vehicle with an interior free air volume of 50 m³ with 10 air changes per hour reveals an uptake factor of 2.4×10^{-3} , which is of the same order of magnitude as the warehouse/cargo bay scenario.

For accidents occurring outdoors, the dispersion parameters for a ground release with an exposure distance of 100 meters were used with resulting dilution factors of 7×10^{-4} to 1.7×10^{-2} , resulting in uptake factors in the range of 2.3×10^{-7} to 5.6×10^{-6} for the previously cited adult breathing rate. Reduction of the exposure distance to 10 meters increases these uptake factors by approximately a value of 30 indicating that as the point of exposure approaches a few meters, the uptake factors would approach the 10^{-4} to 10^{-3} range used in the Q-System.

Therefore, uptake factors in the range of 10^{-4} to 10^{-3} appeared to be reasonable for the determination of Type A package content limits.

When this range of uptake fractions is considered with the release fractions of 10^{-3} to 10^{-2} , the overall intake factor for a Type A package becomes 10^{-6} , representing a combination of releases in the range of 10^{-3} to 10^{-2} of the package contents as a respirable aerosol combined with an uptake factor of 10^{-4} to 10^{-3} of the released material.

The calculation of Q_C was made using the most restrictive chemical form and dose coefficients, and aerosol charac-

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Transportation Regulations *continued from page 13*

terization used an aerosol median aerodynamic diameter (AMAD) of 1 micron.

- **Q_D – Skin contamination and ingestion doses** This value is determined by considering the beta dose to the skin of a person contaminated with nonspecial form radioactive material during handling of a damaged Type A package. This is calculated using the assumption that:

- ◊ 1% of the package contents are spread uniformly over an area of 1 square meter
- ◊ Handling of contaminated debris results in contamination of the hands to 10% of the released quantity
- ◊ The affected individual was not wearing gloves but would be aware of the contamination potential and decontaminate the hands within a period of 5 hours.
- ◊ Beta spectra and discrete electron emissions from ICRP Publication 38 were used.

These same models were used in determining the estimate of the possible uptake of activity via the ingestion pathway.

It was assumed that an individual may ingest all of the contamination from 10 cm² of skin over a 24-hour period and that the resultant intake is 10⁻⁶ Q_D compared with the earlier derivation of 10⁻⁶ Q_C . Due to the consideration that the dose per unit intake for inhalation is generally of the same or greater order as that of ingestion, the inhalation pathway will generally be more limiting for internal contamination due to beta emitters.

- **Q_E – Submersion dose due to gaseous isotopes** The Q_E value for gaseous isotopes external to the body following their release in an accident is based on the following assumptions:

- ◊ 100% release of the package contents into a storeroom or cargo handling bay with a free air volume of 300 cubic meters with 4 air changes per hour.
- ◊ Resulting airborne concentration of $Q_E/300\text{m}^3$
- ◊ Ventilation decay constant of 4 h⁻¹ over a subsequent 30-minute exposure period resulting in a mean concentration of $1.44 \times 10^{-3} \times Q_E/\text{m}^3$

Earlier issues of the regulations cited 4000 x Derived Air Concentration (DAC), in Bq/m³, as recommended by the ICRP for 40 hours per week and 50 weeks per year for occupational exposure in a 500 m³ room. The use of the DAC was deemed to be inappropriate, and the modified Q-System uses an effective dose for submersion in a semi-infinite cloud from U.S. Environmental Protection Agency, *Federal Guidance Report No 12*.

The initial premise of the Q system utilized a maximum duration of transport of 50 days and thereby assumed that radioactive decay products with less than 10-day half-lives were in equilibrium with the longer lived parent. The Q values were then determined for the parent and progeny,

and the limiting value was used for the determination of the A^1 and A^2 values. For those isotopes whose progeny had a half life greater than 10 days or greater than the half life of the parent, these were then considered as a mixture. This criterion has been retained in today's determinations of A_1 and A_2 values.

Alpha emitting radionuclides do not warrant the determination of Q_A or Q_B values due to their relatively weak gamma and beta emissions. The 1973 edition of the regulations assigned an arbitrary limit of $10^3 \times A_2$ for this material with no dosimetric justification. Based on the latest values from the ICRP for alpha emitters that resulted in a reduction of the Q_C values, a tenfold increase in the arbitrary value was used in the modified Q system resulting in an additional Q value for alpha emitters Q_p , which is $10^4 \times Q_C$. With the evaluation of internal dose due to ingested alpha emitters, similar arguments to those of beta emitters apply regarding Q_D , and the inhalation rather than the ingestion pathway is always more restrictive.

The 1973 A_1 and A_2 values were subject to an upper limit of 37 TBq (1,000 Ci) to protect against the possible effects of Bremsstrahlung radiation. This value was retained in the current regulations, recognizing that this was an arbitrary cut off point, at 40 TBq (1081 Ci). Bremsstrahlung radiation, evaluated in a manner consistent with the determination of Q_A and Q_B , shows the aforementioned value to be reasonable. It does remain, however, that the explicit inclusion of Bremsstrahlung radiation within the Q system might limit A_1 and A_2 for some nuclides to about 541 Curies (20 TBq), a factor of 2 lower. The A_1 and A_2 values tabulated in the 1973 edition of the regulations have been retained within the current regulations.

Noble gases, to which the Q_E value has been applied, are not incorporated into the body and their progeny are either a stable nuclide or another noble gas. The dosimetric routes, other than submersion within a radioactive cloud and the related whole body exposure, are realized when evaluating ²²²Ra where the lung dose is due to the inhalation of short-lived progeny. This exposure has received special consideration by the ICRP. The corresponding QC value in the original Q System was calculated to be 97 Curies (3.6 TBq) based on the 100% release of radon as opposed to the 10⁻³ – 10⁻² aerosol release incorporated into the Q_C model. This results in a reduction to a QC value in the range of 97.3 to 973 milliCi (3.6×10^{-3} to 3.6×10^{-2} TBq). Evaluating ²²²Ra as a noble gas resulted in a Q_E value of 114 milliCuries (4.2×10^{-3} TBq), which is near the low end of Q_C values, the value used for Type A packages.

Low specific activity (LSA) materials such as ²³⁸U, ²³²Th, ²³⁵U, ^{nat}U, and ^{nat}Th fall into a category of radioactive material where the specific activities are so low that it is inconceivable that an intake presenting a significant radiological hazard could occur. The model assumed that it was unlikely that an individual would remain in a dusty atmo-

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MEMBER and AFFILIATE APPLICATIONS are now ONLINE at www.stc-hps.org.

News in Radiation Safety Meeting in Houston

Danette R. Fennesy, Medical Physicist • Ben Taub General Hospital • Houston, Texas

On Tuesday, November 2, 2010, a group of Medical Licensees met to discuss the latest issues and News in Radiation Safety (NIRdS). Over ten different hospitals and institutions were represented.


Many years ago a similar group composed of Houston's Texas Medical Center RSOs met, but over the years the group dissolved. At the recent meeting in Austin, Texas, Dr. Charles Beasley and Danette Fennesy decided it was time to bring the group back to life — this time incorporating not just the RSOs, but all physicists and technicians who do the health physics day-to-day work.

Information circulated via emails and 25 people showed up to discuss the latest trends in inspections, new draft rules, release criteria of I-131 patients, and other items of interest.

Officer Robert Mireles from the Houston Police Department was in attendance and was introduced to the group. Officer Mireles is from the Fusion Center and is the local law enforcement agency (LLEA) contact for the Houston Medical Center. It was suggested that a future meeting might entail security issues with increased controls and/or responses to Radiological Emergencies.

A lot of emphasis was placed on the idea of what could be accom-

plished by this group, including response to draft rules or NRC stakeholder meetings. Dr. Bob Emery mentioned that as a nominee to TRAB, he would be very interested to hear what NIRdS had to say. Of course, the very eloquent Dr. Lou Wagner summed it up by stating, "The best idea is for the state to remove two regulations for every new one they create." This suggestion was approved by all.

The attendees would like to thank Betty Hail of Owens Scientific for the delicious lunch following the gathering. The next scheduled NIRdS meeting will be in the spring of 2011, and will be hosted by Warren Snell at the Methodist Research Hospital. 

Transportation Regulations *continued from page 14*


sphere long enough to inhale more than 10 mg of material with a resulting mass intake of $10^{-6} A_2$, which would not present a greater hazard than any quantity allowable for transport in a Type A package.

This model lends itself to an LSA criterion of $10^{-4} Q_C$ /gram resulting in a Q value for these materials below this limit as unlimited. Compliance with this criterion presents an effective dose equivalent of less than 5,000 millirem (50 mSv). Additionally, the latest calculations using current dose coefficients by the ICRP show that unirradiated uranium enriched to less than 20% will also satisfy this criteria. Irradiated reprocessed uranium A_1 and A_2 values must be calculated using the mixtures equation considering the uranium radionuclides and fission products.

Another consideration of LSA material was the Q_D derivation for skin contamination, and the model used was based on the assumption that 1 to 10 mg/cm² of dirt present on the hands would be readily visible and removed promptly by wiping or washing without regard to the presence of radioactivity. Based on this assumption, the upper extreme of the range for a cut-off resulted in an LSA limit of $10^{-5} Q_D$ /gram, which retains the unlimited Q value, for this value.

Key Points to Remember:

- The lesser of the values for Q_A and Q_B determines the limiting A_1 value for special form material.

- The least of the A_1 value and the remaining Q values determines the A_2 value for nonspecial form material.
- The A_1 limit is defined by Q_A , the external dose due to photons.
- The upper limit for alpha emitters where Q_F is substituted for Q_A determines the A_1 limit for alpha emitters.
- Q_B , the external dose due to beta emitters, determines the A_1 limit for beta emitters
- Q_C , the internal dose due to inhalation, defines the A_2 limit.
- The A_2 limit is defined by Q_D , the skin contamination and ingestion limit, or Q_E , the submersion dose due to gaseous isotopes
- Basically, if a radionuclide is in special form, larger quantities may be transported in a Type A package than the same radionuclide in nonspecial form; there are, however, some cases where the A_1 and A_2 values are equal.
- In all cases, however, the Q System and the derived A_1 and A_2 values have been structured in such a manner that, under most conditions incident to transportation, the potential exposure to material handlers, the general public, and the environment is maintained ALARA when material is properly classified, packaged, marked and labeled prior to shipment as shown in the preceding discussion. 

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“Ask the Regulator” Panel, left to right: Gary Smith (TCEQ), Jo Turkette (DSHS), Mike Dunn (DSHS), Richard Ratliff (DSHS), Barbara Taylor (DSHS), Helen Watkins (DSHS), Annie Backhaus (DSHS), and Darice Bailey (DSHS).

tion, there was a short break, which included networking with some of the leading vendors in radiation protection.

The meeting continued with Charlie Miller, from the NRC, giving an update on NRC’s new initiatives. This was followed by DSHS staff members providing updates on the DSHS regulations and policies from the licensing, standards, and inspections groups. Susan Jablonski then presented an update on the TCEQ regulations and policies.

Leslie Savage followed, providing an update on the RRC regulations and policies. Barbara Taylor, DSHS employee, gave an update on the increased controls compliance trends in Texas. The NRC provided presentations on the changes in the “Radiation Protection Standards,” along with the “National Source Tracking

System.” Dwaine Brown, Consultant to the Department of Energy, provided a presentation on the “Off-Site Source Recovery Program in the United States.” After a short break and visitation with the vendors and attendees of the conference, there was a session entitled “Ask Your Regulator.” This session allowed attendees to ask questions related to licensing, radiation-producing machines, inspections, and regulations.

The dinner banquet featured Dr. Dale Klein, former Chair of the NRC. His presentation, entitled “A Nuclear Energy Update,” provided a look into the advancements of nuclear power.

The second day involved two concurrent sessions on radioactive waste management & disposal and the current DSHS computed tomography (CT) & fluoroscopy rule initiatives. The Radioactive Waste Management

& Disposal Session involved these presentations: “Status of Waste Management & Disposal in Texas,” “Waste Disposal Rate Setting Activities,” and “Waste Disposal Exemption Options.” The CT & Fluoroscopy Rule Initiative Session was an open comment session for the draft rules involving dose management programs, interval changes for physics surveys, interventional fluoroscopy definition, and recording patient dose.

In addition to the two-day regulatory conference, there were two special sessions with more than 150 attendees. The first special session was conducted Friday afternoon; it provided training for X-ray service providers on equipment performance evaluations of digital/pano units, pano/ceph combo units, and digital/ceph units, and updates on rules and enforcement. The second special session, on mammography, was conducted on Saturday with Dr. Debra Monticciolo from Breast Imaging at Scott & White who spoke about breast cancer screening. Other presentations were given, including “The History of Breast Cancer,” “Full Field Digital Mammography,” “ACR Full-Field QA Manual,” “Mammography Certifying Bodies,” “Inspection Trends,” and “Escalated Enforcement.”

Photos courtesy of UT Health Science Center San Antonio Environmental Health and Safety.



Susan Jablonski, TCEQ Director, Radioactive Materials Division; 2009 HPS Elda E. Anderson Award Winner.



Attendees networking with vendors.

Our student programs are funded by our Affiliates!

Partial Reprint of the
**State Agency Program Reports to the
Texas Radiation Advisory Board**
Fourth Quarter 2010
November 6, 2010

- I. Texas Department of State Health Services
- II. Texas Commission on Environmental Quality
- III. Texas Railroad Commission

Section I.

Department of State Health Services (DSHS)

General Program Information

The 2010 Texas Radiation Regulatory Conference was a great success. There were more than 400 attendees, and the evaluation responses were very positive. Retired DSHS employee Pete Myers and his wife, Karen, are to be commended for the volunteer work that they did to make the conference successful.

Radiation Safety Licensing Branch

Radioactive Material Licensing Group

- The Group is working to initiate and provide licensees with information and support in response to Nuclear Regulatory Commission (NRC) request for National Source Tracking System (NSTS) users to use the online access for NSTS transactions. A letter will be sent to NSTS licensees offering assistance.
- The Industrial Radiographer (IR) Certification Program has to date issued more than 1,500 radiographer trainer authorizations on certification cards. The schedule of Industrial Radiography testing dates for calendar year 2011 has been sent to IR licensees. Number of tests was decreased from 24 to 21 due to decrease in demand.
- The Group is continuing to address licensee's current financial assurance levels as needed. This was previously performed during the licensee's technical renewal.
- The radioactive material licensing group is fully staffed.

Radiation Machine Source Group

- The Radiation Machine Source Group (RMSG) staff continues to prepare for the implementation of the Laser Hair Removal (LHR) Registration Program. We are accepting applications for laser hair removal training programs and certifying entities only. Registration for laser hair facilities and individuals is pending.
- Ms. Tracie Miller has accepted the Environmental Specialist III (ES III) position for the Laser Hair Removal Program. The remaining three ES III positions are in the interview process. These positions will include the responsibilities of reviewing registration applications for facilities and individuals, reviewing procedures for training programs and certifying entities, and issuing certificates.

- A new Group Manager (Health Physicist II) position was approved and has been posted. The person selected for this position will supervise the Laser Program.

Radiation Policy, Standards, and Quality Assurance Group (PSQA)

- Barbara Taylor has been hired as the Radiation PSQA Group Manager effective October 1, 2010.
- PSQA staff members have completed the laser hair removal regulations mandated by HB449. The rules were adopted and published August 27, 2010. The rule went into effective on September 1, 2010.
- PSQA staff members continue to take comments of draft rules to implement new fluoroscopy and CT initiatives in current rule and to develop new rules for electronic brachytherapy. Numerous comments have been received on this draft rulemaking. The department conducted a stakeholder meeting on September 3, 2010, for further discussion and comments.
- The department hosted the NRC Licensing Procedures course and the NRC MARSAME course in September and the NRC Well Logging course in October. Hosting these courses typically allows us to have more staff members participate in the course than if the course were held elsewhere. This helps us get more DSHS staff trained in a more timely manner. Chris Myers has been instrumental in handling the logistics for the courses.

Radiation Inspection Branch

Radioactive Materials (RAM) Inspections Group

- There are currently 3 RAM Inspector vacancies due to recent resignations. Two vacancies are located in Houston and one is in Beaumont. One of the Houston vacancies has been exempted from the hiring freeze and is currently being advertised.

TRAB's

*Fourth Quarter 2010 Program Reports
to the Texas Radiation Advisory Board
full article from November 6, 2010
can be found at:*

www.stc-hps.org

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Check www.stc-hps.org for a color copy of *The Billet STC Newsletter*.

FUTURE *Meetings & Deadlines*

Date	Location	Topic	Newsletter Deadline
January 14–15, 2011	San Antonio, TX	STC Topical Meeting: Nuclear Power	NA
February 6–9, 2011	Charleston, SC	National HPS 2011 Midyear	NA
April 22–23, 2011	Waco, TX	STC Student Presentations & Annual Business Meeting	February 11, 2011
June 26–30, 2011	Palm Beach, FL	National HPS 56 th Annual Meeting	NA
February 5–8, 2012	Dallas, TX (pending)	National HPS 2012 Midyear	NA
July 22–26, 2012	Sacramento, CA	National HPS 57 th Annual Meeting	NA
January 27–30, 2013	Scottsdale, AZ	National HPS 2013 Midyear	NA
July 7–12, 2013	Madison, WI	National HPS 58 th Annual Meeting	NA

Go ONLINE to www.stc-hps.org for MEMBER and AFFILIATE APPLICATIONS,
to REGISTER and PAY for conferences, and for additional MEETING INFORMATION.