

**DEPARTMENT OF HEALTH AND HUMAN SERVICES**

**and**

**CENTERS FOR DISEASE CONTROL AND PREVENTION**

**convene the**

**SAVANNAH RIVER SITE  
HEALTH EFFECTS SUBCOMMITTEE**

*Hilton Head Island, South Carolina  
September 5-6, 2002*

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**FINAL RECORD OF THE PROCEEDINGS**

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## EXECUTIVE SUMMARY

### List of Acronyms:

ATSDR	—	Agency for Toxic Substances and Disease Registry
NCEH	—	National Center for Environmental Health
OBT	—	Organically-Bound Tritium
SRSHEs	—	Savannah River Site Health Effects Subcommittee

During the **opening session** of the SRSHEs meeting on September 5-6, 2002, the June 6, 2002 meeting minutes were unanimously approved with the changes as noted in the record and a status report was provided for all current action items.

**Environmental monitoring and surveillance programs** have been established by SRS, Georgia and South Carolina. All three programs conduct the following activities: collect samples from a variety of environmental media; evaluate contaminant pathways that may affect the public; assess samples on a weekly, biweekly or monthly basis; analyze samples for ions of interest and all radionuclides; publish data results in annual reports; and disseminate the findings to the public. Since tritium is a major contributor to all contaminant pathways at SRS, all three programs specifically focus on tritium.

SRSHEs is an advisory committee chartered under the **Federal Advisory Committee Act** that must meet requirements for public announcements of meetings, charter renewals, detailed minutes, balanced membership, conflicts of interest, public participation, as well as roles and responsibilities for the designated federal official, chair and members.

ATSDR reviewed data, addressed uncertainties, filled data gaps, developed dose calculations and formed an expert panel to determine the feasibility of conducting a **health consultation on tritium exposures**. Total annual doses of tritium and OBT were found to be below levels of public health concern. Protective assumptions were found to be adequate to account for uncertainties in monitoring and estimating dose. Estimated tritium doses were not found to warrant the collection of additional OBT data. Actual OBT releases from SRS were found to be negligible.

**ATSDR** will finalize and distribute the iodine-131 case study during the next SRSHEs meeting; collaborate with the Outreach Workgroup to develop site-specific health education materials; and assist in updating and disseminating the SRSHEs brochure.

The **SRSHEs workgroups** made the following reports. The Community Summary and Proactive Workgroups have been eliminated. The Outreach Workgroup will present updated versions of both the SRSHEs brochure and web site at the next meeting. The Membership Workgroup will poll 12 members whose terms expire on June 30, 2003 to determine their interest in reapplying for another three-year term. The Epidemiologic Data Workgroup will follow up on several outstanding issues to determine whether SRSHEs should become involved in epidemiologic activities related to SRS.

The Agenda Workgroup will gather previous meeting minutes to identify outstanding agenda items and determine whether any topics are still relevant. The Scenario Workgroup described current profiles for the rural family, urban/suburban family, delivery person and outdoors person scenarios. SRSHES agreed by consensus to forward the four scenarios to NCEH for further evaluation in the screening process. The workgroup is still gathering information for the family living near the river and migrant worker family scenarios. NCEH will refine the existing scenarios by developing a range of historical doses persons received from the site.

During a discussion of **new SRSHES business**, action and agenda items raised during the meeting were reviewed; topics to be placed on the next agenda were agreed to by consensus. The Chair opened the floor for public comment at all times as designated on the agenda. The next SRSHES meeting is scheduled for March 13-14, 2003 in Columbia, South Carolina; Aiken, South Carolina; Charleston, South Carolina; or Atlanta, Georgia. The following SRSHES meeting is scheduled for September 4-5, 2003.

# CENTERS FOR DISEASE CONTROL AND PREVENTION SAVANNAH RIVER SITE HEALTH EFFECTS SUBCOMMITTEE

## Summary of the Meeting

### List of Acronyms:

ATSDR	—	Agency for Toxic Substances and Disease Registry
CDC	—	Centers for Disease Control and Prevention
DOE	—	Department of Energy
FACA	—	Federal Advisory Committee Act
GEPD	—	Georgia Environmental Protection Division
HESs	—	Health Effects Subcommittees
HHS	—	Department of Health and Human Services
LLNL	—	Lawrence Livermore National Laboratory
NCEH	—	National Center for Environmental Health
NIOSH	—	National Institute for Occupational Safety and Health
OBT	—	Organically-Bound Tritium
SCDHEC	—	South Carolina Department of Health and Environmental Control
SEMP	—	SRS Environmental Monitoring Program
SRSHEs	—	Savannah River Site Health Effects Subcommittee

HHS and CDC convened an SRSHEs meeting on September 5-6, 2002 at the Crowne Plaza Hotel on Hilton Head Island, South Carolina. The June 6, 2002 meeting minutes were unanimously approved with the changes as noted in the record. Current action items were completed by making follow-up contacts, scheduling agenda items or disseminating information.

SEMP was established in 1953 to characterize and quantify contaminants, demonstrate compliance with applicable standards, calculate radiation exposures to the public, and assess any effects on the local environment from SRS releases. SEMP evaluates all contaminant pathways from several environmental media that may affect the public, including air, liquid effluents, fish, deer, hogs and gamma radiation. Samples are collected and analyzed on a weekly, biweekly or monthly basis for tritium, particulate matter, iodine, plutonium, cesium, other ions of interest and all other radionuclides.

SEMP's 2001 data showed that tritium was a major contributor to all contaminant pathways and accounted for 42% of airborne radionuclide releases, 51% of airborne doses, 99% of liquid radionuclide releases and 38% of liquid doses. In comparison to the U.S. Environmental Protection Agency drinking water standard of 4 mrem per year, the concentrations of radionuclides in the Savannah River would result in a drinking water dose of 0.06-0.07 mrem per year.

Maximally exposed individual dose levels at the SRS site boundary from 1990-2001 have been steady and low at a range of 0.28-0.18 mrem. SRS airborne and liquid releases to the environment continue to decline. The SEMP 2001 Annual Report will be completed and distributed on a CD-ROM within the next ten days. SRSHEs noted that cumulative

doses over a long period should be monitored and doses to humans should be tracked in addition to environmental media.

GEPD will conduct its 2002 environmental sampling program to assess whether radioactive materials released from SRS affected Georgia. Samples will be collected from air, tritium-in-air cartridges, thermoluminescent dosimeter monitoring locations, land- and water-based platforms, soil and vegetation. Analyses will be conducted on a weekly, biweekly, monthly or annual basis to detect iodine-131, gross alpha and gross beta activity, gamma-emitting radionuclides, strontium-89/90, plutonium-238/239 and tritium. GEPD will also collect fish, sediment and groundwater samples in 2002. The data results will be reviewed in 2003 for a health consultation and public information summary. SRSHEs expressed an interest in reviewing historical environmental data collected by GEPD.

SCDHEC created the Environmental Surveillance and Oversight Program in 1995 to verify that SRS programs adequately detect environmental and public health impacts. Samples are collected from air, groundwater, radiological and non-radiological surface water and sediment, edible and non-edible vegetation, milk, fish, macroinvertebrates, deer and feral hogs. Analyses are conducted on a weekly, biweekly, monthly or annual basis to detect volatile and semi-volatile organic compounds, pesticides, PCBs, gross alpha and beta activity, tritium, strontium-90 and gamma-emitting radionuclides. The SCDHEC environmental monitoring report is published each year and available to the public. SRSHEs raised the possibility of SCDHEC comparing SRS environmental monitoring data to other sites.

FACA was enacted to enhance accountability of advisory committees to the public; protect against undue influence of special interest groups; and reduce wasteful expenditures of public funds. FACA outlines requirements for public announcements of meetings, charter renewals, detailed minutes, balanced membership and conflicts of interest. FACA defines roles and responsibilities for the designated federal official, chair and members of advisory committees. Congress submits annual reports of advisory committees to the General Services Administration. The documents are available to the public.

ATSDR responded to a request by the LLNL community to evaluate tritium exposures and OBT. ATSDR first needed to address uncertainties and fill data gaps before conducting this type of assessment. An expert panel was formed in this effort with input from the LLNL and SRS communities throughout the entire process. Energy of decay, effective biological half-life, whole body mass, radiation weighting factors, environmental concentrations and other components were incorporated into tritium dose calculation models. Data showed that past tritium concentrations were on the order of 100 times current tritium activities.

Annual tritium doses from SRS releases to the offsite community were evaluated in drinking water, food, water in food, OBT in food, food decay as water, food decay as OBT, and food plus water for a total dose. ATSDR concluded that total annual doses of tritium and OBT were below levels of public health concern. Protective assumptions were found to be adequate to account for uncertainties in monitoring and estimating dose. OBT will

increase a tritium dose by a multiplier of 1.3 to 1.5, but estimated tritium doses were not found to warrant the collection of additional OBT data. OBT is produced in the environment, but actual releases from SRS were found to be negligible.

ATSDR has solicited feedback from health professionals on its iodine-131 case study. The document is currently being revised based on this input and is expected to be finalized and distributed to SRSHEs during the next meeting. Data are currently being collected from the Hanford HES to develop site-specific health education materials. ATSDR will closely collaborate with the Outreach Workgroup to design the SRS materials as well as to update and disseminate the SRSHEs brochure. Recommendations made by SRS residents during the environmental health education needs assessment will be used to revise and distribute the SRSHEs brochure.

The Community Summary Workgroup has been dissolved with the completion of the final document. The Proactive Workgroup was eliminated and the three members were reassigned. The Outreach Workgroup will present updated versions of both the SRSHEs brochure and web site at the next meeting. Several mechanisms were suggested to more widely publicize SRSHEs and its activities, such as grand rounds in local hospitals; specific brochures targeted to medical providers and patients; poster displays at local health departments and community health centers; newspaper announcements; and youth involvement. SRSHEs suggested that representatives from citizen's groups be recruited to assist in outreach activities.

The Membership Workgroup will poll 12 members whose terms expire on June 30, 2003 to determine their interest in reapplying for another three-year term. The Epidemiologic Data Workgroup followed up on several outstanding issues. Assistance from Georgia and South Carolina technical advisors is still needed. Dose reconstruction documents should be reviewed to determine whether SRS workers are being compensated for certain cancers. Efforts should be made to identify tests that can routinely examine persons residing near SRS for radiation exposure. SRSHEs suggested that the current epidemiologic data set be summarized by a non-SRS expert and disseminated to the public. The database should also include non-SRS epidemiologic data.

The Agenda Workgroup will gather electronic versions of previous meeting minutes to identify outstanding agenda items and determine whether any topics are still relevant. NCEH will first verify consistency between electronic versions and final certified paper copies before releasing the documents. The Scenario Workgroup described current profiles for the rural family, urban/suburban family, delivery person and outdoors person scenarios. Data have been collected on locations of residences, schools, milk, other food sources, jobs, churches and other activities for each scenario.

SRSHEs agreed by consensus to forward the four scenarios to NCEH for further evaluation in the screening process. The workgroup is still gathering information for the family living near the river and migrant worker family scenarios. Agreement was reached for the workgroup to produce a draft of the remaining two scenarios and distribute the

documents to SRSHER for review and comment within the next 30-45 days. SRSHER raised the possibility of advancing from the screening activity to the actual dose reconstruction project due to budget and time constraints.

NCEH will refine the existing scenarios by developing a range of historical doses persons received from the site. SRSHER reviewed new action and agenda items raised during the meeting and properly took a vote to place suggested topics on the next agenda. The Chair opened the floor for public comment at all times as designated on the agenda. The next SRSHER meeting is scheduled for March 13-14, 2003 in Columbia, South Carolina; Aiken, South Carolina; Charleston, South Carolina; or Atlanta, Georgia. The following SRSHER meeting is scheduled for September 4-5, 2003.



# DEPARTMENT OF HEALTH AND HUMAN SERVICES CENTERS FOR DISEASE CONTROL AND PREVENTION

## SAVANNAH RIVER SITE HEALTH EFFECTS SUBCOMMITTEE *September 5-6, 2002* *Hilton Head Island, South Carolina*

### Final Minutes of the Meeting

The Department of Health and Human Services (HHS) and the Centers for Disease Control and Prevention (CDC) convened a meeting of the Savannah River Site Health Effects Subcommittee (SRSHEs). The proceedings were held on September 5-6, 2002 at the Crowne Plaza Hotel on Hilton Head Island, South Carolina. The following individuals were present to contribute to the discussion.

#### SRSHEs Members

Dr. Sergio Bustos, Chair  
Dr. William Adams  
Mr. Cyril Banick  
Dr. Todd Crawford  
Dr. Rebecca Dawson  
Mr. Gerald Devitt  
Ms. Mary Drye  
Ms. Emily Guess  
Mr. Warren Hills, Sr.  
Ms. Jeanne Kato  
Dr. Patricia Lee  
Mr. James Lockridge  
Mr. Wade Waters  
Mr. William Wills  
Dr. Michael Wilson

#### SRSHEs Liaison Representatives

Ms. Jane Perry (GDPH)  
Ms. Kim Newell (SCDHEC)

#### Designated Federal Official

Mr. Phillip Green,  
SRSHEs Executive Secretary

#### Federal Agency Representatives

Dr. Mark Evans (ATSDR)  
Ms. Judy James (CDC/NCEH)  
Ms. Helen Kuykendall (CDC/MASO)  
Dr. Michael McGeehin (CDC/NCEH)  
Dr. Charles Miller (CDC/NCEH)  
Ms. Theresa NeSmith (ATSDR)  
Ms. Dora Rainey (CDC/NCEH)

#### Presenters and Guests

Ms. P.J. Atherton (Public)  
Mr. Jim Brownlow (SCDHEC)  
Mr. William Lawrence (American Legion)  
Mr. Bob Lorenz (WSRC)  
Mr. Al Mamatey (Public)  
Mr. Jeffrey Newman (WSRC)  
Mr. Murray Riley (CAB)

**Opening Session.** Dr. Sergio Bustos, the SRSHEs Chair, called the meeting to order at 8:57 a.m and welcomed the attendees to the proceedings. He recognized and thanked two senior officials from the National Center for Environmental Health (NCEH) for attending the meeting: Dr. Michael McGeehin, Director of the Division of Environmental Hazards and Health Effects, and Dr. Charles Miller, Chief of the Radiation Studies Branch.

Review of Meeting Minutes. Dr. Bustos entertained a motion to approve the previous meeting minutes; the following changes were noted for the record.

- Page 9: Change the sentence to "... since SRS employees are physically larger than an average international population."
- Page 9: Change the sentence to "... large amounts of tritium were present at beaver ponds on the work site" in the *Public Comment Period*. [Editor's Note: The sentence as noted in the draft minutes is an accurate reflection of the speaker's public comment and cannot be changed.]
- Page 16: Change the sentence to "Dr. Crawford on the Technical Advisory Committee" in the *Consensus Recommendations*.

Dr. Crawford moved to accept the minutes as corrected; Mr. Hills seconded the motion. **There being no further discussion, the June 6, 2002 Draft SRSHEs Meeting Minutes were unanimously approved with the changes as noted in the record.**

Review of Current Action Items. Mr. Phillip Green, the SRSHEs Designated Federal Official (DFO), provided a status report of the current action items.

- The DFO is currently reviewing previous SRSHEs meeting minutes to identify outstanding agenda items. A report of these findings is expected to be presented at the next meeting.
- The DFO committed to providing two-sided copies of meeting minutes and other materials whenever possible.
- A hard copy of the Phase I report and diskette of the Phase II report were displayed on the table of meeting materials. Both reports can be downloaded from the NCEH web site, but members may also request hard copies or diskettes of the documents from NCEH.
- The DFO is currently collaborating with Ms. Kim Newell, the SRSHEs liaison representing the South Carolina Department of Health and Environmental Control (SCDHEC), to identify staff to provide technical expertise to the Epidemiologic Data Workgroup. This task is expected to be completed by the next meeting.
- The DFO has been unable to reach Dr. Mildred McClain, the former Outreach Workgroup Chair, to gather comments provided to her on the SRSHEs brochure. Ms. Jane Perry, the SRSHEs liaison representing the Georgia Division of Public Health (GDPH), has been editing the brochure and soliciting input from workgroup members. Dr. Michael Wilson has been selected as the new Outreach Workgroup Chair.
- The DFO ordered the *History of the Savannah River Site* and will display the book at the next meeting. Information for members to order personal copies of the book was included in the pre-meeting packets.

Ms. Drye confirmed that Dr. McClain expressed her interest and willingness to continue to collaborate with the Outreach Workgroup in finalizing the SRSHEs brochure.

**Overview of the SRS Environmental Monitoring Program (SEMP).** Mr. Bob Lorenz, of the Westinghouse Savannah River Company (WSRC), reported that SEMP was established in 1953 and is implemented under four guiding principles: a comprehensive database of SRS environmental monitoring data collected since the early 1950s; an annual review to ensure correct media and frequencies are evaluated; a thorough knowledge of types and quantities of releases; and a clear understanding of dose impacts to the public. Baseline studies of environmental monitoring activities were completed in 1951-1952 by the U.S. government and private companies. SEMP is designed as a living program that is updated and refined each year.

The U.S. Department of Energy (DOE) and WSRC have institutionalized an environmental philosophy to conduct SEMP. The components of this concept include zero violations; full compliance with all state and federal regulations; the "as low as reasonably achievable" (ALARA) principle; and open communication, data exchange and regular meetings with the public and state agencies in both Georgia and South Carolina. The Environmental ALARA Committee periodically meets to review past and planned releases with all facility representatives and ensure goals have been met. ALARA performance measures are published and distributed to each facility in a monthly internal report.

For purposes of SEMP, "effluent monitoring" is defined as the collection of samples or data from the point at which a facility discharges liquid or gaseous releases to the environment. "Environmental surveillance" is the collection of samples or data from air, water, soil, foodstuffs, biota and other media from the ambient environment. SEMP's goals are to characterize and quantify contaminants, demonstrate compliance with applicable standards, calculate radiation exposures to the public, and assess any effects on the local environment. In 2001, 12,000 samples were collected and 30,000 analyses were performed by SEMP for several environmental media, including ambient air, deer, drinking water, fish, food products, hogs, rainwater, sediment, soil, surface water and vegetation.

SEMP evaluates all contaminant pathways that may affect the public at the following locations: the building, sand filter, stack, area fence, site perimeter, 25-mile radius and 100-mile radius. Several surveillance programs have been established under SEMP to assess contaminant pathways. In the Air Monitoring Program, areas are selected for evaluation based on population size and most probable wind direction. Offsite air monitoring stations are located in Aiken, South Carolina; Augusta, Georgia; Highway 301 Welcome Center, Georgia; and Savannah, Georgia; 12-14 air stations have been placed around the perimeter of the site. Air monitoring samples are collected and analyzed for tritium, particulate matter, iodine, plutonium, cesium, other ions of interest and all other radionuclides. With the exception of collecting fish samples and conducting special studies, organically-bound tritium (OBT) is not routinely measured by SEMP at this time.

In the Liquid Effluent Monitoring Program, continuous water flow, water concentrations and rainwater are measured. Air and liquid effluent samples are alternately analyzed on a weekly, biweekly or monthly basis, but all stations are monitored each week to ensure proper operation. SEMP has the capability to gather a composite or average sample over

a certain period of time and the ability to collect a sequential sample to pinpoint releases in a particular time span. As a result of the December 1991 tritium release at SRS, SEMP established the Enhanced Tritium Monitoring Program (ETMP) to undertake three major tasks.

First, tritium discharged from SRS to the Savannah River is monitored by measuring concentrations at onsite stream locations. Second, river concentrations are calculated based on steam data from the RM-129 location. Third, timely notification is provided to down-river consumers of significant changes in Savannah River tritium levels. Samples are collected from ETMP three times a week, but the number of tritium source terms declined as operations ceased in certain locations over the past ten years. However, tritium is still released from the Effluent Treatment Facility that discharges to Upper Three Runs Creek. SEMP ensures that tritium concentration levels at Savannah River are maintained below 5,000 pCi/L.

The drinking water standard has been established at 20,000 pCi/L per day for 365 consecutive days. A tritium sampler has been placed south of the Plant Vogtle Nuclear Generating Station as well. Although SEMP has measured several peaks in tritium levels, discharges and transport to the Savannah River as well as tritium concentrations in drinking water have dramatically decreased overall. In the Fish Monitoring Program, samples are collected from 15 bass, 15 brim and 15 catfish from ten locations each year. Both saltwater and freshwater fish are caught since fish are a significant contaminant pathway to humans. To date, elevated cesium, strontium and tritium levels have been detected in fish caught near the site.

In the Deer and Hog Monitoring Program, onsite hunts are conducted for 20 days each year from various selected areas; 1,500-1,800 deer and hogs are harvested per animal hunt. SEMP places counters on hogs and deer to detect cesium-137 and calculates dose by assuming a hunter will consume 45%-50% of the animal. If a hog or deer does not exceed the DOE standard of 100 mrem, SEMP allows hunters to move animals offsite. SEMP has only had to confiscate one animal since the program was established. In the Gamma Radiation Monitoring Program, detectors similar to those worn by onsite personnel have been placed at air monitoring locations in selected areas. Samples are collected and analyzed on a quarterly basis.

SEMP's 2001 data showed that tritium was a major contributor to all contaminant pathways and accounted for 42% of airborne radionuclide releases, 51% of airborne doses, 99% of liquid radionuclide releases and 38% of liquid doses. Krypton-85 contributed to 58% of airborne radionuclide releases, but the low-dose fission product is a weak contributor to dose consequence. Cesium-137 was also a significant contributor to liquid dose due to high levels found in fish. In comparison to the DOE standard of 100 mrem per year for individual doses, individual doses to the offsite public in 2001 were calculated at 0.13 mrem for liquids and 0.05 mrem for air. In comparison to the U.S. Environmental Protection Agency (EPA) drinking water standard of 4 mrem per year, SRS drinking water

standards were calculated at 0.07 mrem in Beaufort-Jasper, South Carolina and 0.06 mrem in Port Wentworth, Georgia.

In general, maximally exposed individual dose levels at SRS from 1990-2001 have been steady and low at a range of 0.28-0.18 mrem. In particular, sportsmen doses for onsite hunters and creek mouth fishermen at Upper Three Runs are calculated separately from other individuals. At 14 mrem for onsite hunters and 0.26 mrem for creek mouth fishermen, the 2001 SRS dose calculations were well below the DOE standard of 100 mrem per year. Overall, SRS airborne and liquid releases to the environment continue to decline.

The SEMP 2001 in-depth data results are included in the annual report. The document is currently being completed and should be distributed within the next ten days. The SEMP 2001 Annual Report will be disseminated on a CD-ROM; data tables and annual reports for the Environmental Restoration and Solid Waste Programs will be included on the CD-ROM as well. However, hard copies can be mailed to individuals upon request. The SEMP summary pamphlet has been finalized and is now available to the public.

**Discussion.** Ms. Kato noted that beavers were not included in the list of environmental media from which samples are collected and analyses are performed by SEMP. Mr. Lorenz explained that beavers are considered "nuisance" animals and are not consumed by or released to hunters. Although beavers were previously monitored by SEMP, the sacrifice of these animals was found to be unnecessary since beavers would not play a role in dose consequence to persons. Ms. Guess asked if SEMP monitors locations that contain beaver ponds. She also inquired about the rationale for not placing a monitoring station at the bottom of Three Mile Creek.

To the first question, Mr. Lorenz confirmed that samples are collected from areas with beaver ponds since soil, fish, vegetation and sediment samples from streams are gathered from various locations. To the second question, he explained that a monitoring station has not been placed at Three Mile Creek because no source term exists below this sampling location. Mr. Lockridge asked about the probability of a short-term release occurring and traveling downstream before being detected in the weekly sample. Mr. Lorenz replied that the potential for this scenario is extremely low because ETMP tritium samples are collected and analyzed every three days.

Mr. Wills recalled that at the previous meeting, an onsite contractor informed SRS/HES of contaminated water traveling to the Savannah River while workers removed beaver dams containing radionuclides. He inquired whether SEMP has collected these samples. Mr. Lorenz responded that no differences in Savannah River concentration levels have been detected as a result of contractors removing beaver dams. Ms. Drye questioned whether cumulative doses in the actual hunter is being monitored in addition to deer and hogs. Mr. Lorenz confirmed that SEMP tracks hunters to ensure doses do not exceed the annual standard of 100 mrem. However, the program is designed to evaluate levels in humans in a one-year period of time rather than a cumulative dose over a longer time span.

Mr. Lockridge announced that the issue of cumulative dose has been incorporated into the outdoors person scenario and will be presented to SRSHERS for review and comment on the following day. Ms. Kato requested clarification on the "unidentified beta," "unidentified alpha" and "others" categories in the 2001 SRS dose calculations. She also inquired about SEMP's methodology to translate curies into dose since the two units are not comparable. Overall, Ms. Kato expressed concern about the large amount of assumptions made in the SEMP data since only 10-12 sampling locations are operating offsite.

Mr. Lorenz noted that the generic categories for "all alpha" and "all beta" emitters were developed due to the extensive cost and time required to evaluate each radionuclide separately. Consequences for unidentified alpha or beta emitters are calculated as plutonium-239 or strontium-90 doses, respectively. Mr. Lorenz pointed out that the SEMP 2001 Annual Report contains a chapter detailing the conversion methodology, assumptions and models. As a co-author of the dose calculation section, Dr. Lee added that computer models were developed to convert releases to exposure. The calculations incorporated actual onsite meteorologic data from atmospheric dispersions, wind direction, humidity and other factors. Dr. Bustos recessed the meeting for a break from 10:30-11:04 a.m.

**Georgia Environmental Protection Division (GEPD) 2002 Sampling Plan.** Ms. Jane Perry of GDPH explained that the GEPD sampling program was first conducted in calendar year (CY) 2001. Findings from this activity were then published in the GEPD Annual Environmental Data Report in December 2001. In CY'02, GEPD will conduct environmental sampling to assess whether radioactive materials released from SRS affected Georgia. Sampling will be conducted from Augusta to Savannah within a one- to five-mile area of the Savannah River. Activities GEPD will conduct in the CY'02 sampling program are outlined below.

Additional thermoluminescent dosimeter (TLD) monitoring locations will be established to measure direct radiation levels with passive radiation monitors. Air and tritium-in-air cartridges will be gathered every two weeks to analyze air and every four weeks to analyze rainwater. Samples will be collected from land- and water-based platforms at least twice per month to analyze surface water. Soil samples will be gathered twice per year, vegetation samples will be collected on a quarterly basis and milk samples will be collected and analyzed each month. Up to five samples from four or five different crops will be gathered during growing season in the general vicinity of SRS. GEPD will analyze samples from several locations for a variety of releases, including iodine-131, gross alpha and gross beta activity, gamma-emitting radionuclides, strontium-89/90, plutonium-238/239 and tritium.

Additional activities GEPD will conduct in 2002 include the collection of samples from three different fish species from nine SRS locations twice per year. Georgia and South Carolina agencies jointly produce and disseminate a fish consumption advisory. Sediment samples from 52 locations will be gathered twice in 2002 and analyzed for tritium as well as gross alpha and gross beta activity. Groundwater samples will be collected and analyzed from private and industrial wells, existing locations, and public water systems within 25 miles of

SRS and five miles of the Savannah River. In 2003, GDPH will review the 2002 environmental data collected by GEPD and provide a health consultation to summarize the information for the public. A GEPD representative has made a commitment to attend the next SRSHEs meeting to present findings from the sampling program.

**Discussion.** Mr. Lockridge inquired about the type of monitoring Georgia conducted in the 1950s and 1960s. Ms. Perry replied that although GEPD maintains historical data on Georgia sampling activities, the data are probably minimal. Dr. Lee added that the Phase III dose reconstruction report contains an environmental surveillance section summarizing historical sampling activities. During GEPD's presentation at the next SRSHEs meeting, Ms. Kato requested that an overview of historical environmental data collected from Georgia be included as well.

**SCDHEC Monitoring at SRS.** Ms. Kim Newell of SCDHEC explained that the agency oversees regulatory and non-regulatory sampling, compliance, permitting, emergency response and complaints. These activities are conducted throughout South Carolina for air, drinking water, waste water, solid and hazardous wastes, and Federal Facility Agreement evaluation sites. Regulatory inspections are undertaken for all media areas to ensure permit compliance by a site. A five-member emergency response team has been created for each SCDHEC district to provide immediate assistance at a site. A 48-hour deadline has been established for SCDHEC to respond to complaints. SCDHEC's three regulatory programs at SRS are outlined below.

For air, two stations in Jackson and Snelling are monitored weekly for ozone, sulfuric oxide, nitric oxide and particulate matter. For drinking water, bacteriological monitoring is conducted quarterly and chemical samples are collected as required by EPA. For waste water, ambient streams are monitored for standard water quality, metals and sediments on monthly, twice yearly and annual bases, respectively. SCDHEC's waste water program must comply with the National Pollution Discharge Elimination System Permit. This regulation requires random sampling of more than 30 outfalls three to four times per year and a two-week federal inspection annually.

SCDHEC's program is only monitored at SRS and not throughout the DOE complex. Many states have an Agreement in Principal Program throughout the complex. SCDHEC's non-regulatory sampling program was initiated in the late 1980s and early 1990s and is administered throughout the DOE complex. The activity was launched in South Carolina in 1993 with the Nuclear Emergency Plan. The Environmental Surveillance and Oversight Program (ESOP) was later established in 1995 to focus on SRS activities; make recommendations to DOE; provide a forum for public input and education; supplement and compliment DOE's existing state programs in Georgia and South Carolina; and generate independent data for review by internal and external customers. The purpose of ESOP is to independently verify that SRS programs are protective of public health and the environment to adequately detect environmental and public health impacts.

In selecting sample locations for ESOP, decisions are based on public accessibility, proximity to the SRS perimeter and Plant Vogtle, specific SRS operations and population centers. Since the majority of ESOP locations are around the SRS perimeter to detect offsite releases, data collected by WSRC or DOE are used to evaluate onsite releases. Several activities have been developed for the ESOP monitoring network. Atmospheric samples collected from glass fiber filters, silica gel, rain water and TLD are analyzed on a weekly, monthly, bimonthly or quarterly basis. Samples are analyzed for gross alpha and beta, gamma-emitting radionuclides, tritium and beta-gamma activity.

Groundwater samples are collected from 78 wells within ten miles of the SRS boundary over a five-year cycle and analyzed for total and dissolved cations and anions, tritium, gamma spectroscopy and gross alpha- and gross beta-emitting radionuclides. Limited groundwater sampling is conducted for volatile and semi-volatile organic compounds (VOCs), pesticides and PCBs. Monthly composites of drinking water are gathered from three surface water treatment plants. Quarterly collections are taken from 18 groundwater federal municipal and large community systems surrounding SRS. Samples are analyzed for gross alpha and beta, gamma-emitting radionuclides and tritium.

Radiological surface water samples are collected weekly from 13 locations and analyzed for tritium. Monthly composites are gathered from nine areas and analyzed for gamma-emitting radionuclides and gross alpha and beta activity. Five creek mouth locations are sampled monthly for tritium. An enhanced tritium monitoring program was developed to provide advance notice of an SRS release. Samples are collected from six streams and Highway 301 three times a week and analyzed for tritium. Analyses are conducted on the same day as samples are collected. These results are then used to project tritium concentrations in the Savannah River. Radiological sediment samples are collected annually from various locations around SRS and are analyzed for gamma-emitting radionuclides.

Non-radiological surface water is monitored on a monthly basis for pH, temperature, dissolved oxygen, conductivity, ammonia and other factors; on a quarterly basis for heavy metals, VOCs and TOCs; and on an annual basis for pesticides and PCBs. Non-radiological sediments are monitored annually for pesticides, PCBs, nutrients, VOCs, percent moisture, and percent volatile solids and metals. Surface soil samples are collected annually from 16 perimeter, three 25-mile and two 50-mile locations and analyzed for various radionuclides. Non-edible vegetation samples are collected twice a year from Wax Myrtle, live oak and Carolina Laurelcherry from 16 perimeter, three 25-mile and two 50-mile locations. Samples are analyzed for tritium and gamma-emitting radionuclides.

Edible vegetation monitoring was initiated in May 2002 on wild plums, squash, cucumbers and potatoes collected from local farmers within a ten-mile radius of SRS. Samples were analyzed for tritium and gamma-emitting radionuclides. Monitoring can only be conducted on vegetation that is available during the particular season samples will be gathered. Dairy milk samples are collected monthly, analyzed for tritium and gamma-emitting radionuclides, and taken from three locations within a 50-mile radius of SRS. Quarterly dairy milk



composites are analyzed for strontium-90. Since the number of dairy farms are decreasing, consideration is being given to monitoring goat's milk in the future on a quarterly basis.

Fish samples from largemouth bass, white or channel catfish are collected annually from ten locations and analyzed for tritium and gamma-emitting radionuclides. Selected fish composites are analyzed for strontium-90. Deer and feral hogs collected by local hunters within a five-mile perimeter of SRS are monitored, but background samples that serve as controls are gathered from Bowman, South Carolina. Muscle tissue of game animals is analyzed for cesium-137. A macroinvertebrate study was conducted in 1999 with data collected from 20 multi-habitat rapid bioassessment locations.

EPT and other biological components were evaluated to determine radiological impacts of streams in macroinvertebrates that are intolerant to pollution. *In situ* water quality measurements were analyzed for temperature, conductivity, dissolved oxygen and pH. Surface water and sediment samples were analyzed for cesium-137 from 17 locations and tritium from 20 locations. Oversight monitoring and support activities are implemented to review documents; split soil samples for metals, VOCs, pesticides and herbicides; validate and report discrepancies in raw data; and oversee sampling at SRS. The SCDHEC environmental monitoring report is published each year and available to the public. Overall, environmental data collected by SCDHEC and SEMP have been consistent.

**Discussion.** Mr. Wills questioned whether SCDHEC gathered epidemiologic data that link SRS radiation releases to mortality. Mr. Jim Brownlow of SCDHEC replied that the agency has not conducted these type of studies, but cancer data are collected within South Carolina. Dr. Crawford announced that he had copies of a videotape of a television program focusing on SRS morbidity studies. He offered to distribute the videotape to interested SRSHEs members. Ms. Kato requested raw historical data from 1950-1991 on areas 2 and 7 within the game animal monitoring locations. Mr. Brownlow clarified that historical data during the 1950-1991 time period cannot be obtained from ESOP at this time because the program was only initiated in 1995. However, efforts are currently being made to build the existing database.

Since SRS self-regulated its radiological releases, Mr. Lorenz planned to determine whether DOE will release historical game monitoring data to the public. Ms. Guess expressed concern that SCDHEC is monitoring environmental media rather than individuals. Dr. Wilson inquired whether the SRS-specific data are being compared with other sites around the country. Mr. Brownlow acknowledged that a comparison of ESOP data to other DOE sites would be useful, but SCDHEC is only focusing on SRS at the present time. Dr. Lee noted that a comparison of environmental data throughout the DOE complex may not serve any purpose since the missions, types of releases and concentration levels vary by site. For example, tritium was the major contaminant of concern at SRS, while iodine-131 played a significant role at Hanford.

Despite the differences among sites, Mr. Waters pointed out that interactions throughout the DOE complex are continuing to increase. For example, a workshop on VOCs and other soil contaminants was recently held at SRS. Paducah, Portsmouth, Oak Ridge and SRS were represented at the meeting because problems detected at all four sites were similar. Mr. Lorenz announced that WSRC will be sponsoring a four-day environmental monitoring workshop on October 22-25, 2002. The SEMP 2001 Annual Report, groundwater issues and other environmental monitoring concerns will be addressed during the conference. The meeting is not open to the public.

**Public Comment Period.** The Chair opened the floor for public comments; no attendees responded. Dr. Bustos recessed the meeting for lunch at 12:00-1:35 p.m.

**Review of the Federal Advisory Committee Act (FACA) Charter.** Ms. Helen Kuykendall, of the Committee Management Office (CMO) for CDC and the Agency for Toxic Substances and Disease Registry (ATSDR), explained that FACA was enacted on October 6, 1972 under Public Law 92-463 as a system to create and operate advisory committees in the Executive Branch of the federal government. Congress created FACA to enhance accountability of advisory committees to the public; protect against undue influence of special interest groups; and reduce wasteful expenditures of public funds. Advisory committees are defined by FACA as “any committee, board, commission, council, conference, panel or task force established or utilized by the federal government for the purpose of obtaining consensus advice or recommendations on issues or policies.”

Committees subject to FACA are established or controlled by the federal government; have other than full- or part-time federal employees; provide consensus advice; and have a specific purpose, organized structure and fixed membership. In addition to FACA, advisory committees are governed by the General Services Administration (GSA) Final Rule and departmental and agency policies. The *General Administration Manual* further defines responsibility for each departmental agency; HHS is outlined in Chapter 9 of the document. FACA requires advisory committees to have a charter, public access and balanced membership in terms of points of view represented and functions to be performed.

Advisory committee meetings must be announced in the *Federal Register* at least 15 days prior to the proceedings. The public must be allowed to speak or file written statements during these sessions. Detailed minutes must be created and maintained for each advisory committee meeting. The documents must contain the meeting date and location; an attendee list; complete and accurate descriptions of discussions and conclusions; and advice or recommendations provided by the committee. Verbatim transcripts are also created and maintained for some advisory committees, but this document is not required by FACA and cannot substitute detailed minutes. Working papers, transcripts, drafts and all other materials shared among an advisory committee must be made available for public inspection as long as the group exists.

Citizens Advisory Committees (CACs) were created to provide recommendations and advice to the CDC Director/ATSDR Administrator on Public Health Service activities and

research at DOE sites. CACs provide a forum for community, American Indian Tribal and labor interaction and serve as a vehicle for these groups to express concerns and provide advice and recommendations to CDC and ATSDR. The charter calls for the establishment of up to six CACs at DOE sites; SRSHES is one of the four CACs currently in existence. FACA requires advisory committee charters to be renewed every two years or the group will be terminated.

CMO met with ATSDR, NCEH and the National Institute for Occupational Safety and Health (NIOSH) to renew the SRSHES charter in 2002. The agencies consulted with HHS, GSA and the Office of General Counsel (OGC) to explain the need to continue SRSHES and describe the plan to ensure fairly balanced membership. After approval by CMO, the charter renewal must be filed with the GSA Secretariat, standing committees of Congress with legislative jurisdiction and the Library of Congress. The renewal notice must be published in the *Federal Register* when filed. Based on the GSA Final Rule, advisory committees are structured with three components.

First, the DFO or Executive Secretary supervises day-to-day operations of the advisory committee; approves meeting agendas; attends all committee meetings; and ensures all meeting notices are published in the *Federal Register*. Second, the chair presides over committee meetings; determines the operation of meetings in conjunction with the DFO; ensures public participation; and certifies the accuracy of meeting minutes. The chair is selected by the agency and also serves as a committee member. Third, committee members represent fairly balanced points of view; are appointed as special government employees and must comply with conflict of interest statutes. Members serve overlapping four-year terms up to four years.

HHS policy further states that committee members must be equitably distributed in terms of geographical, ethnic and gender representation so long as the effectiveness of the group will not be impaired. Committee members must be selected with no discrimination toward age, ethnicity, gender, sexual orientation, disability, culture, religion or socioeconomic status. Appointments must be made to ensure an orderly rotation of terms. FACA defines a "special government employee" as a private citizen appointed by the agency head, Secretary, HHS or President. Appointments are based on an individual's expertise that will contribute to the objectives of the advisory committee. Members serve with or without compensation for 130 days or less per year; the SRSHES charter provides for compensation on a daily basis.

Members are appointed to express personal opinions only, but are held legally accountable for ethical issues and financial interests. Advisory committee recommendations are provided from workgroups to the subcommittee or parent committee; the parent committee communicates recommendations to the DFO; and the DFO conveys recommendations to appropriate agency officials. However, Health Effects Subcommittees (HESs) are unique, operate under an umbrella charter and do not report to a parent committee. Since workgroups are not subject to FACA rules, workgroup discussions or recommendations must be presented to the full subcommittee or parent committee in an open session.

In terms of FACA management, working relationships are established between the advisory committee and the DFO; CMO and the DFO; and OGC and CMO. Reports are then made to the CDC Director/ATSDR Administrator, the HHS Secretary and GSA. Annual reports of advisory committees are submitted to Congress by GSA. Additional information on FACA as well as meeting minutes and annual reports for SRSHEs and other advisory committees can be accessed at [www.gsa.gov/committeemanagement](http://www.gsa.gov/committeemanagement). Annual reports outline operating costs, projected expenditures, membership and frequency of meetings. Chapter 9 of the HHS *General Administration Manual* contains policies governing advisory committees. The document can be accessed at [hhs.gov/hhsmanuals](http://hhs.gov/hhsmanuals).

**Discussion.** Mr. Lockridge inquired about the initial trigger for an agency to establish an advisory committee. Ms. Kuykendall replied that justification would be based on the needs of a particular agency. For example, a discretionary committee is established at the discretion of the agency head; a non-discretionary committee is mandated by legislation or statute; and a presidential committee is created by the President or Congress. After functions for a proposed discretionary committee are adequately justified to HHS and GSA, CDC would receive approval to form the group. ATSDR, CDC and NCEH used the DOE/HHS memorandum of understanding to justify the need to establish SRSHEs. Ms. Kuykendall invited SRSHEs members to contact her at [htk0@cdc.gov](mailto:htk0@cdc.gov) or 404/498-0090. Mr. Green added that SRSHEs was formed because of public interest about the site and NCEH's interest in organizing community members to assist in the agency's mission.

**Environmental Tritium Evaluations.** Dr. Mark Evans of ATSDR conveyed that the purpose of this activity was to respond to a request by the Lawrence Livermore National Laboratory (LLNL) community to evaluate tritium exposures in general and OBT in particular. Concerns were raised about existing tritium monitoring activities excluding OBT in regular environmental measurements and neglecting a particular component of the radiological dose. Before addressing these concerns, however, ATSDR first noted three major problems in conducting a tritium dose assessment. First, tritium is present in several different forms in the environment, *i.e.*, gas, water and organic forms. Second, past and current monitoring programs do not directly measure OBT. Third, the effective dose of OBT may be greater than water since most dosimetry models assume all tritium is present as water.

ATSDR also noted uncertainties in an OBT dose assessment, such as lack of data on specific activity ratios between OBT and water; the possibility of a longer biological half-life creating a larger tritium dose; and the potential for OBT decay to have a relatively greater impact than water decay. To effectively evaluate tritium in the environment, ATSDR needed to first identify appropriate questions for the data to produce useful answers. ATSDR will only recommend or conduct environmental sampling if warranted by public health. To respond to the LLNL community, ATSDR would need to know the expected levels of OBT in the environment, appropriate analytical methods for anticipated levels and biological media to test. ATSDR formed an expert panel to assist in formulating questions

for the assessment, identifying significant public health issues with respect to OBT, and conducting environmental monitoring or undertaking other public health actions.

ATSDR solicited input from the LLNL community during all phases of the expert panel process, including formulating tasks, identifying areas of expertise for the panel, nominating members, participating in meetings, and reviewing and commenting on both the report and health consultation. The California State Health Department and residents from the LLNL and SRS sites assisted ATSDR in obtaining community input. Agreement was reached for the expert panel to address two major questions: (1) Are potential total tritium exposures at SRS and LLNL at levels of public concern that warrant the collection and analysis of OBT data? (2) If warranted, what media should be sampled and what would be appropriate analytical procedures?

ATSDR then released a request for proposal with six criteria for the nomination and selection process. The five expert panel members who were selected presented with the most expertise in radiochemistry of tritium; sampling and analysis of tritium or hydrogen in environmental media; human uptake of environmental radiological contaminants; partitioning of organic hydrogen compounds in humans and animal models; dosimetry of OBT, tritium health effects or other low-energy beta emitters; and uncertainty analyses. For purposes of the evaluation, "OBT" was defined as non-interchangeable tritium bound to carbon. OBT production is biochemical in bacteria or food, has no direct transformation in air from gas or water, and is a chemical process similar to methylation. The effective half-life of OBT varies by type of organic molecule.

Several components are incorporated into models to calculate tritium dose, including energy of decay, effective biological half-life, whole body mass, radiation weighting factor, dose and dose rate effectiveness factor (DDREF), environmental concentrations and intake rates. Due to the absence of documented morbidity and mortality cases from tritium exposure, ATSDR acknowledges the complexity in calculating dose from low environmental levels of radionuclides and identifying associated adverse health effects. Because of these data gaps, ATSDR's model included radiation exposures from Hiroshima, Nagasaki and other releases with extremely high doses. Adjustments were then made to convert extremely high radiation doses to low-level environmental radionuclides.

The expert panel developed ranges for parameters underlying the dosimetry process to make probable dose estimates. The panel concluded that the weighting factor for tritium was between 1 and 3 with the most likely value being 1.3 to 1.5. The DDREF was found to vary between 0.10 and 1 with the most likely value being 0.40. To calculate SRS doses for environmental tritium activities, the expert panel made the following conservative assumptions based on data in the SEMP 1999 Annual Report. Tritium activity in water was calculated at ~40 Bq/L with a mean drinking water value of 37 Bq/L and a maximum value of 60 Bq/L. Water from the Savannah River at the site boundary was ingested at the rate of 2 L/day. Tritium activity in food was calculated at ~10 Bq/L with a range from non-detectable limits to 90 Bq/L; the mean value was calculated at a range of 4-12 Bq/L.

Tritium activity in food was measured as water in vegetation-free water; 100% of food was assumed to be from locations near SRS.

The expert panel incorporated corrections for OBT in the dose calculations and also reviewed historical tritium activities. Data showed that past concentrations were on the order of 100 times current tritium activities. Annual tritium doses from SRS releases to the offsite community were evaluated in drinking water, food, water in food, OBT in food, food decay as water, food decay as OBT, and food plus water for a total dose. Values established for the public and ATSDR's minimal risk level for tritium of 100 mrem per year were compared to the expert panel's dose calculations.

ATSDR used the expert panel conclusions to make decisions about conducting the OBT health consultation from a public health perspective. First, total annual doses of tritium and OBT were found to be below levels of public health concern. Second, protective assumptions were found to be adequate to account for uncertainties in monitoring and estimating dose. Third, OBT will increase a tritium dose by a multiplier of 1.3 to 1.5, but estimated tritium doses were not found to warrant the collection of additional OBT data. Fourth, OBT is produced in the environment, but actual releases from SRS were found to be negligible.

**Discussion.** Dr. Bustos pointed out that the most damaging action by tritium would be genetic effects in the cell nucleus rather than the whole body. Dr. Evans noted that although whole body is the standard process to evaluate tritium health effects, the expert panel report contains a section on reproductive impacts, risks and decays. Mr. Lockridge requested details on OBT production at SRS. Dr. Evans explained that OBT is produced in the environment or the body and is not released from SRS to any significant degree. However, he reiterated that OBT has been excluded from routine environmental monitoring activities.

Dr. Bustos added that OBT would be generated in any instance where tritium attaches to a molecule in the body, hydrogen is present and can be exchanged. Ms. Kato questioned whether the role of VOC releases at SRS in OBT uptake was considered during the expert panel evaluation. She acknowledged that SRS annual releases are low, but cumulative effects from air, water and other sources increase the potential for adverse health effects. Ms. Kato noted that the expert panel report stated the increase in OBT dose was 100% in all normal diets and 16%-35% in fresh plants. She mentioned that these data were based on doses to an average sized male rather than a smaller female, infant or fetus.

Dr. Evans confirmed that the release of tritium as OBT may have been caused by VOCs from SRS. Although this source is probably insignificant, the expert panel did consider VOCs during the assessment. Tritium accounts for more than 50% of the total dose around SRS, but he agreed that cumulative doses from all sources must be considered. With respect to OBT consumption, Dr. Evans clarified that a large proportion of ingested OBT may be excreted or enter the human body as water rather than OBT. Data show that retention and ingestion of OBT in the human body affect dose and vary by individual.

He also agreed that the evaluation was flawed in some areas. For example, the expert panel questioned the reliability of one study and the assessment did not include acute tritium doses. As a result, ATSDR followed up the LLNL evaluation by developing an acute tritium release scenario for the site. Nevertheless, several laboratory studies and solid research conducted around SRS on OB/T in deer served as strong data sources to support tritium and OB/T processing by mammalian bodies. These references are listed in the expert panel report.

Ms. Guess inquired about research that has been conducted to determine if OB/T binds with molecules in the human body more than in water or other environmental media. Dr. Evans explained that data have been collected demonstrating some doses are greater from OB/T than water due to the time of residence in the body. While water remains in the human body no more than 30 days, OB/T can reside in the body up to 300 days.

**Update on ATSDR Activities.** Ms. Theresa NeSmith returned to some outstanding issues from the status report ATSDR presented at the previous meeting. First, the CD-ROM of training activities by the American College of Preventive Medicine (ACPM) at its 2001 annual conference was included in the meeting packets. Second, ACPM's potassium iodide presentations can be accessed at [www.acpm.org](http://www.acpm.org). Third, ATSDR's effort to solicit feedback from health professionals on its iodine-131 case study is completed. The document is currently being revised based on this input and is expected to be finalized and distributed to SRS/HES members during the next meeting.

Fourth, ACPM has attended meetings for all HESs with the exception of Oak Ridge; data are currently being collected from the Hanford HES. After completing this process, ATSDR plans to circulate the documents to all HESs, tailor materials for the particular site and develop site-specific health education data. Fifth, ATSDR plans to follow up the SRS needs assessment by closely collaborating with the Outreach Workgroup to design SRS/HES-specific health education materials. Sixth, ATSDR will assist the Outreach Workgroup in updating and disseminating the SRS/HES brochure. Recommendations made by SRS residents during the needs assessment on effectively distributing documents and collaborating with communities will be incorporated in the revised SRS/HES brochure. Ms. NeSmith encouraged the members to contact her at 404/498-0515 or 888/422-8737.

**Discussion.** Dr. Miller informed SRS/HES members that the final version of the Hanford Thyroid Disease Study (HTDS) can be accessed on the NCEH web site. Ms. Perry cited the ATSDR SRS needs assessment as an excellent document that can serve as a useful tool for SRS/HES to address community needs. She emphasized the importance of the Outreach Workgroup collaborating with ATSDR and utilizing the needs assessment results to conduct a demonstration project.

**Public Comment Period.** The Chair opened the floor for public comments; no attendees responded. Dr. Bustos recessed the meeting for a break from 2:50-3:25 p.m.

Before the meeting was recessed for the workgroup breakout sessions, SRSHEs clarified some assignments. Dr. Bustos proposed that the three-member Proactive Workgroup be dissolved. Dr. Lee and Mr. Hills would serve on the Agenda Workgroup, while Mr. Waters would continue to serve as the Membership Workgroup Chair. No members objected to this suggestion. Dr. Dawson reiterated her interest in serving on the Membership Workgroup; Dr. Bustos had no objections to this request. Ms. Dolly Stills served as a lead reviewer for a Scenario Workgroup scenario, but she recently moved out of the state. Since she expressed an interest in continuing to serve on the workgroup, Dr. Bustos confirmed that a decision will be made before the next meeting on filling this position.

There being no further discussion, Dr. Bustos recessed the SRSHEs meeting at 3:34 p.m. on September 5, 2002.



**Workgroup Reports.** Dr. Bustos reconvened the SRSHEs meeting at 8:34 a.m. on September 6, 2002 and opened the floor for updates from the workgroup chairs.

Outreach Workgroup. Dr. Wilson explained that the goal of the workgroup is to inform persons near SRS about the role and function of SRSHEs. The members reviewed the brochure and plan to present a final draft of the document at the next meeting. Editorial and grammatical changes have been made; the list of members will be updated; and the logo will be revised to clearly illustrate SRS's location in South Carolina. The members made suggestions on updating the SRSHEs web site and expect to present the revised site during the next meeting. Links to CDC, ATSDR and SRS should be listed. Dates and locations for upcoming SRSHEs meetings should be posted. A form for the public to pose questions to SRSHEs members should be added. Biographies and photographs of SRSHEs members should be incorporated. The members agreed to review other HES web sites and obtain additional ideas.

The workgroup considered several outreach mechanisms to more widely publicize SRSHEs and its activities. Grand rounds could be conducted in local hospitals. The existing SRSHEs brochure could be modified and tailored to specific audiences, such as medical providers and patients. Representatives from citizen's groups could accompany workgroup members during visits to county councils involved with SRS. Posters with basic SRSHEs information could be displayed at local health departments and community health centers. A press release and group photograph of SRSHEs members could be placed in local newspapers. Youth could be engaged in SRSHEs outreach activities, such as designing logos and posters. The workgroup thanked ATSDR for committing its time, funding and resources to the outreach efforts.

Dr. Crawford announced that many SRS retirees are willing to make presentations on dosimetry effects and other site activities. He offered to secure speakers from Citizen's for Nuclear Technology Awareness (CNTA). Dr. Bustos reported that CNTA made a formal request to be scheduled on a future SRSHEs agenda. He planned to distribute



information on CNTA to SRSHEs and determine the members' interest in responding to the request. Ms. Kato mentioned that representatives from the Nuclear Control Institute and Physicians for Social Responsibility could also be placed on a future SRSHEs agenda. Mr. Green mentioned that NCEH will update the SRSHEs web site. Ms. Drye requested that McDuffie County high school students be involved in the youth outreach activities.

Dr. Bustos advised the workgroup to be cognizant of time constraints since outreach activities require a significant effort. For example, the process to develop and publish the first version of the SRSHEs brochure required two years. He pointed out that the need for all outreach products to be approved by SRSHEs consensus must also be considered during the planning stage. Dr. Wilson confirmed that the workgroup discussed time constraints and agreed to hold conference calls in between face-to-face meetings.

Membership Workgroup. Mr. Waters reported that 18 members currently serve on SRSHEs; 12 terms will expire on June 30, 2003, three on June 30, 2004 and three on June 30, 2005. Within the next two weeks, Mr. Waters will poll the 12 members whose terms will expire on June 30, 2003 to determine their interest in reapplying for another three-year term. The responses will be forwarded to the Chair for submission to the DFO.

Epidemiologic Data Workgroup. Ms. Guess reported on behalf of the workgroup chair who was absent from the meeting. The members discussed outstanding issues and potential follow-up actions. The workgroup reiterated its previous request for technical advisors from the Georgia Department of Human Resources and SCDHEC to assist the members. Dr. James Kirr of the North Augusta Resource Center should be contacted to determine if SRS workers are being compensated for certain cancers. Dose reconstruction documents should be reviewed to determine whether SRSHEs needs to address any issues. Efforts should be made to identify tests that can routinely examine persons residing near SRS for radiation exposure.

Mr. Lockridge suggested that SRSHEs's current epidemiologic data set be summarized in terms of relevance to SRS. Dr. Crawford supported this recommendation, but he stressed the importance of developing a document that will be credible to the public. This goal can be achieved by summarizing the data with a non-SRS expert and then disseminating the report to the public. Ms. Kato noted that the SRSHEs epidemiologic data set is currently limited to SRS. She reiterated her previous request for the database to be broadened to other sites. Dr. Lee agreed with this suggestion and recommended that the HTDS be included in the SRSHEs epidemiologic data set. Iodine-131 was the focus of the HTDS, but this contaminant was also released from SRS. Both Mr. Devitt and Ms. Kato have access to epidemiologic technical resources that can be shared with the workgroup.

Community Summary Workgroup. Dr. Bustos announced that the ad hoc group has been dissolved since the community summary has been finalized. The document will be distributed to SRSHEs before the next meeting.

Agenda Workgroup. Dr. Lee has asked Ms. Judy James, the SRSHER Senior Committee Management Specialist, to provide her with electronic versions of previous meeting minutes and agendas. The documents will be used to identify outstanding requests for agenda items and determine whether any topics are still relevant. Mr. Green clarified that NCEH must first verify consistency with final certified paper copies before electronic versions of meeting minutes can be released. He confirmed that this process is underway. NCEH will forward electronic versions of previous meeting minutes to the workgroup when the documents have been compared to final certified copies.

Scenario Workgroup. Mr. Lockridge reported that the workgroup plans to achieve three objectives in collaboration with CDC: develop radiological exposure scenarios to support the SRS dose reconstruction project, design a risk-based exposure ranking, and identify future activities needed. The workgroup will also review data for the six scenarios; identify locations of residences, schools, milk, other food sources, jobs, churches and other activities for each scenario; and establish a living format to present scenario data. At this time, the workgroup is requesting a consensus recommendation from SRSHER to approve submission of scenarios 1-4 to CDC. Profiles of all six scenarios are outlined below.

The rural family lived on a farm in Burke County, Georgia. Girard, Georgia was selected as the location, which is three miles west of the Savannah River, southeast from SRS and located in the SRS plume path. The population of the town was approximately 200 in the 1950s. The rural family had two parents and five children in the 1950s and two parents and three children in the 1960s. The children attended Girard Elementary or Waynesboro High School. Residents were employed as farmers who used peanuts, corn and cotton as cash crops and grew vegetables for family consumption. The rural family spent time at a local Methodist church.

In terms of food sources, 50% of meat and vegetables were grown on the farm in the 1950s and 25% in the 1960s. The majority of milk was from one of two Girard dairies, but the rural family had dairy cows as well. The rural family swam, went camping on a limited basis did no recreational boating, hunted and fished to a great degree, and trapped animals on a limited basis. The rural family fished two miles east of Girard in Briar Creek and hunted for deer, quail and dove. The rural family scenario was modified with the assumption that the milk source was most likely from local dairies near Girard, but the backyard cow was not excluded.

The urban/suburban family resided in Augusta, Georgia on Broad and Greene Streets with two parents and two children in the 1950s and two parents and three children in the 1960s. The father is assumed to have worked in the SRS F-Area Canyon Building from 1955 to 1992, while the mother worked onsite through the first trimester of pregnancy. The mother is assumed to have then stayed home to raise children. The urban/suburban family attended a local Augusta church and the children attended Augusta neighborhood schools.. Food and milk were obtained from local grocery stores; Aiken and Augusta area dairies served as local milk suppliers.

The urban/suburban family occasionally swam and boated in Clark's Hill Lake, fished two weekends per month in Clark's Hill Reservoir and did not hunt. The urban/suburban family scenario was modified with two assumptions. First, milk was obtained from a local grocery store in Augusta rather than the nearest dairy or a rural neighbor. A backyard cow was included for the purpose of dose modeling. Second, the mother worked at the site during the early months of pregnancy. The delivery person resided in Barnwell, South Carolina and routinely delivered beverages to various SRS locations on a weekly basis. The family had two parents and two children in the 1950s and two parents and three children in the 1960s. The children attended schools in the Barnwell school system.

The delivery person is assumed to have worked at the Allendale Coca-Cola Bottling Plant in Allendale, South Carolina and spent eight hours per week onsite. The delivery person attended a Baptist church in Martin, South Carolina and obtained food from Barnwell and Martin grocery stores. The delivery person swam, hunted and fished in the Lower Three Runs Creek area, boated and camped at Little Hell Landing on the Savannah River, and also fished at the Savannah River Smith Lake. The family of the delivery person drank a considerable amount of soft drinks. The delivery person scenario was modified with the assumptions that no dosimetry was issued and backyard chickens or rabbits were maintained at the residence.

The outdoors person resided in Jackson, South Carolina and worked as a hunter or trapper subcontractor to a prime SRS contractor or the U.S. Forest Service. The family had two parents and two children in the 1950s and two parents and three children in the 1960s. The children attended schools in the 29831 and 29803 zip codes and the family attended a Baptist church in Jackson, South Carolina. In terms of food sources, 50% of vegetables were locally grown and irrigated from a surface creek, 75% of meat was obtained from SRS, fish were obtained from the Savannah River and water was obtained from a private well on the property. The outdoors person swam, boated and camped in the Savannah River from the Jackson boat ramp. Deer and hogs were obtained from work as a trapper at SRS.

The outdoors person scenario was modified with the assumptions that hunting dogs were also family pets and some potential exposure occurred from trapping activities in streams and ponds. A hypothetical poacher was included in the scenario as well. The workgroup is still gathering data for the family living near the river and migrant worker family scenarios. Input is being solicited from SRSHER to address the plausibility of these two scenarios and determine appropriateness of the pathways. The workgroup made some general observations about the overall process. First, chemical source terms and scenarios should be evaluated with the same level of rigor in terms of health effects in offsite populations. The dose reconstruction scenarios are only radiological.

Second, synergistic effects of radiological and chemical scenarios should be considered. Third, limitations of computer models that may impact the scenarios should be clearly stated. For example, the rural family scenario will need to be evaluated for impact if the model has no soil resuspension capability. The workgroup noted that it could provide

further assistance to CDC after the radiological dose scenarios are completed. These activities would include developing and reviewing chemical scenarios; reviewing and ranking dominant radionuclides by risk; and reviewing screening analysis results in terms of community presentation. However, the workgroup acknowledged the need to first participate in a tutorial of the risk ranking process.

SRSHERS extensively discussed the outdoors person scenario; several modifications were suggested. The outdoors person should obtain a considerable amount of meat and fish from the site and present with sufficient credibility to represent the scenario. A game warden or U.S. Forest Service worker who hunts with a dog could fill this role. Assumptions should be made that both the worker and dog were immersed in SRS streams and were heavily exposed on a frequent basis. Dr. Lee's position was that SRSHERS is placing far too much emphasis on the small details of the scenarios since the screening activity is not the actual dose reconstruction. At this point, SRSHERS's only focus should be to identify potential contaminants of concern and determine exposure pathways that will be incorporated into dose reconstruction project. For the other scenarios, SRSHERS made the following recommendations.

- Replace "soft drinks" with "carbonated beverages" in the delivery person scenario.
- Include a family pet in all six scenarios rather than for the outdoors person only.
- Use Ms. Guess as an anecdotal data source for the family living near the river scenario.
- Distinguish between critical pathways for two scenarios: atmospheric exposure for the rural family and surface water exposure for the family living near the river, including fish consumption.
- Use the rural family scenario assumptions as a basis to reduce the exposure time by a certain percentage and develop assumptions for the migrant worker family scenario.

To avoid delays in the screening process, agreement was reached for the workgroup to produce a draft of the family living near the river and migrant worker family scenarios. NCEH will distribute the documents to all SRSHERS members for review and comment within the next 30-45 days.

***SRSHERS Open Discussion.*** Dr. Crawford recommended that efforts now be made to move beyond the screening activity to the actual dose reconstruction project due to a decreasing budget, time constraints and decreasing pool of SRS experts with historical knowledge. The screening process could be completed by incorporating additional radionuclides into existing dose reconstruction computer models. Dr. Miller made some observations in response to the recommendation. NCEH's letter describing budget issues was mailed to each SRSHERS member. The HES budget may be reduced to \$0 in the next few years due to lack of Congressional will for environmental activities. Similar to other

federal agencies, CDC is undergoing a significant transition in terms of increasing its focus and allocating more funds to bioterrorism activities.

NCEH will meet internally to discuss the best mechanism to use the existing scenarios, *i.e.*, new anecdotal data for the family living near the river scenario and incorporation of the migrant worker family into the rural family scenario. Rather than focus on screening data only, variables can be generated to identify uncertainties and refine the existing scenarios with a range of historical doses persons received from the site. NCEH will use its contractor to develop the historical dose ranges and make every effort to present the data to SRSHES for review and comment during the next meeting. However, adding this task to the existing contract will not be a priority for the CDC contracting office since the agency has been directed to award bioterrorism dollars first.

By developing the historical dose ranges at this time, SRSHES can produce and disseminate a reasonable and useful product to communities even if the budget continues to decrease. The project can also assist communities in the decision-making process while conducting other site activities with ATSDR or DOE. Dr. Miller thanked SRSHES for its diligent efforts in developing the scenarios. No members expressed opposition to taking the approach outlined by Dr. Miller. Dr. Bustos commended the Scenario Workgroup for its time in collecting the valuable data.

Ms. Perry offered to form a subgroup with SRSHES members who plan to read the *History of the Savannah River Site*. She invited interested members to contact her to discuss the possibility of reviewing the book at the next meeting. Dr. Dawson suggested that a post-evaluation form be developed for members to complete after speakers' presentations. The critiques could be discussed during workgroup breakout sessions. Mr. Green pointed out that written evaluations will increase the difficulty in recruiting speakers to present during SRSHES meetings. Instead, he suggested that SRSHES hold informal and internal discussions about a speaker's presentation.

Dr. Lee acknowledged that SRSHES and NCEH must be more specific when selecting speakers by clearly communicating discussion topics to include in presentations and describing the role and function of SRSHES. Dr. Bustos agreed that the Agenda Workgroup should undertake this responsibility. Stronger efforts will be made in the future to obtain a synopsis or abstract from speakers before presentations are made. Ms. James added that the briefing books are distributed to SRSHES in advance of meetings to provide members with an opportunity to review and comment on upcoming presentations. However, Ms. Kato pointed out that the briefing books are received only two weeks prior to meetings.

Mr. Waters supported Dr. Dawson's suggestion and saw no harm in an audience critiquing a speaker. Dr. Wilson indicated that all speakers should be encouraged to make presentations for the lay public. Ms. NeSmith reminded the members that SRSHES previously developed a form for speakers to describe discussion topics in upcoming presentations. She raised the possibility of using this existing tool to clearly communicate

SRSHERS's expectations to speakers. Dr. Bustos acknowledged that recent efforts to distribute the form have been limited because the majority of speakers did not complete and return the document. However, he was willing to reinstate the speaker's form with the hope that the response rate would improve.

Dr. Lee proposed that members who recommend a particular speaker take the responsibility for educating the presenter about SRSHERS and ensuring the speaker form is completed and returned. The members suggested several outreach mechanisms to more widely publicize SRSHERS meetings and other activities, such as an updated mailing list, letters to editors of local newspapers and media announcements. Mr. Green explained that \$40,000-\$50,000 is needed to facilitate, sponsor and conduct each SRSHERS meeting. Due to this constraint, non-essential services or items in addition to the actual proceedings are difficult to obtain.

**Public Comment Period.** The Chair opened the floor for public comments; no attendees responded.

**New SRSHERS Business.** The action and agenda items raised during the meeting were reviewed by SRSHERS. For the consensus recommendations, motions were entertained by the Chair, properly moved and seconded by voting members, and unanimously approved by SRSHERS with no opposition. The items are outlined below.

#### Action Items

- The DFO to follow up on SRSHERS's request to advertise future SRSHERS meetings in local SRS newspapers.
- The Agenda Workgroup to determine if speakers from CNTA and other citizen's groups are appropriate for the SRSHERS mission before scheduling these presentations on future agendas.

#### Agenda Items

- Status report by NCEH on historical dose ranges persons received near the SRS site. SRSHERS to discuss the feasibility of including these ranges in the dose reconstruction project scenarios.
- Overview by NCEH on its research agenda. Discussion topics to include the role of SRSHERS in the research agenda, public comments received to date, budget issues and suggestions for future research topics at SRS.
- Updates by all workgroups.
- Overview by Dr. John Till and HES members from other sites on lessons learned and experiences in the dose reconstruction project.
- Update by NIOSH on the Occupational Illness Compensation Program and use of dose reconstruction data to evaluate SRS workers for compensation.
- Review of the *History of the Savannah River Site* by the author or SRSHERS members who read the book.
- Presentation by GEPD on historical data from the Georgia sampling program.

Consensus Recommendations

- SRSHES recommends that the rural family, urban/suburban family, delivery person and outdoors person scenarios as presented by the Scenario Workgroup be forwarded to NCEH for further evaluation in the screening process.
- SRSHES recommends that the proposed agenda items be adopted.

**Closing Session.** The next SRSHES meeting is scheduled for March 13-14, 2003. Suggested meeting locations in order of preference were Columbia, South Carolina; Aiken, South Carolina; Charleston, South Carolina; or Atlanta, Georgia. The following SRSHES meeting is scheduled for September 4-5, 2003.

There being no further discussion, Dr. Bustos adjourned the SRSHES meeting at 11:35 a.m. on September 6, 2002.



I hereby certify that to the best of my knowledge, the foregoing minutes of the proceedings are accurate and complete.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Sergio E. Bustos, D.D.S., Ph.D.  
SRSHES Chair