DEPARTMENT OF HEALTH AND HUMAN SERVICES

and

CENTERS FOR DISEASE CONTROL AND PREVENTION

convene the

SAVANNAH RIVER SITE
HEALTH EFFECTS SUBCOMMITTEE

Charleston, South Carolina
March 13-14, 2003

FINAL RECORD OF THE PROCEEDING

TABLE OF CONTENTS

EXECUTIVE SUMMARY

List of Acronyms:

ATL	Advanced Technology Laboratory
ATSDR	Agency for Toxic Substances and Disease Registry
CDC	Centers for Disease Control and Prevention
DOE	Department of Energy
GDNR	Georgia Department of Natural Resources
NIOSH	National Institute for Occupational Safety and Health
SRSHES	Savannah River Site Health Effects Subcommittee

During the **opening session** of the SRSHES meeting on March 13-14, 2003, the September 5-6, 2002 meeting minutes were unanimously approved with the changes as noted and submitted into the record. A status report was provided for all current action items. SRSHES members whose terms will expire on June 30, 2003 and are interested in continuing to serve should submit completed application packages to CDC by March 31, 2003.

The **history of the SRS** is chronicled in a book that was released in June 2002. *Savannah River Site at Fifty* is divided into five parts: the history of atomic energy; the SRS construction era; the history of SRS technology, and SRS's transition period. SRS newspapers, national publications and a collection of SRS artifacts were used as data sources. Efforts are currently being made to appropriately house, preserve and exhibit SRS artifacts collected for the book and other historical items in SRS buildings. The preservation plan should not interfere with current efforts to de-commission, decontaminate and destroy these facilities.

After **ATL** was awarded the dose reconstruction in August 2002, CDC changed the scope of work to eliminate the screening process. Modifications were made to the rural, migrant and urban family scenarios. The number of source and receptor locations will be decreased from 20 to 10. In its technical approach, ATL will base releases on the Phase II report; apply generic environmental models; calculate endpoints of dose, risk and organ doses as needed; use SRS-specific characteristics to revise established models; review many exposure and source locations for each receptor; and evaluate quantitative and qualitative aspects of uncertainties associated with dose and risk.

Dose calculations will be based on an existing risk assessment model and will include release, transport, exposure and consequence assessments. ATL plans to conduct separate studies to calculate acute short-term releases because spikes are averaged over one year and will not be precisely reflected. If ATL is unable to select solid figures, conservative values will be chosen. ATL has initiated computerized analyses with the GENII version 2 computer code to specify the transport of radionuclides in the environment and exposure variables of persons. The computation size for the study is extremely large with >300 million data points.

ATL is proposing to combine air and water release points and merge exposure locations to make the model simple, tractable and representative of actual doses. ATL added source terms for unspecified alpha and beta releases; added to or deleted from isotopes listed in the Phase II report; and partitioned some radionuclide releases into one isotope to address several outstanding issues in the Phase II report. ATL is attempting to develop a source term that can be divided by the flow in the Savannah River to address environmental holdup of releases. All findings will be compiled in a draft report. SRSHES unanimously passed a resolution in response to ATL's revised scope of work.

Monitoring data collected by **GDNR** show that radionuclide concentrations in the vast majority of samples from all pathways have been below detectable limits. SRS, Plant Vogtle and other facilities are monitored once or twice per month. Matrices tested around SRS include direct radiation samples from thermoluminescent dosimeters; air samples from filters, charcoal cartridges for iodine-131 and silica-gel cartridges for tritium; water samples from river water, ground water and precipitation; soil and river sediment; vegetation, crops, milk and game; and fish and seafood. SRS, Chernobyl and weapons testing were the most common sources of radionuclide concentrations. GDNR expects to publish an updated environmental radiological monitoring report in the next month.

The role of the **Advisory Board on Radiation and Worker Health** is to advise the Secretary of the Department of Health and Human Services on the Energy Employees Occupational Illness Compensation Program Act. Guidance is also given on the scientific validity and quality of dose reconstruction as well as radiation-exposed employees at DOE facilities for which a dose reconstruction would not be feasible and radiation exposure may have endangered health. DOE, NIOSH and the Department of Labor are mandated to determine whether workplace toxic chemicals contributed to illness, reconstruct doses of claimants, and identify recipients for compensation. NIOSH established the Office of Compensation Analysis and Support to interact with and serve as a point of contact for claimants. Of 1,302 requests for worker monitoring and workplace data submitted by the Office of Compensation Analysis and Support to SRS, 499 responses have been provided.

Of 18 dose reconstructions completed in January 2003 for all DOE sites, no awards have been made. Compensation is made if the probability of cancer causation is calculated to be >50% at a 99% confidence interval based on an overall probability of cancer distribution for each organ and different exposures to each organ. **ATSDR** requested SRSHES to compile comments on the final internal version of the health education needs assessment and develop a plan to collectively submit revisions. **NIOSH** recently completed several extramural projects among DOE workers to study heat stress, glycophorin biodosimetry of patients treated with iodine-131, solvent-related hepatotoxicity, and lung fibrosis.

NIOSH's three new grants awarded in 2002 will focus on occupational exposure health effects, radiation carcinogenesis, and susceptibility to occupational radiation risks. Several research projects of DOE workers are expected to be completed and communicated in

2003. These studies will address health effects of ionizing radiation, beryllium disease, uranium milling and plutonium exposure among others. During the **SRS workgroup reports**, the Scenario Workgroup made several recommendations in response to the ATL status report.

Assumptions should be well documented and ATL's results should be compared to existing monitoring data. Drinking water pathways from rain and river water, a family living by the water and an elderly individual should be added to the scenarios. Scenarios should reflect worst-case realistic scenarios. Dose contributions from non-SRS source terms should be identified and SRSHES should be allowed to comment on ATL's protocol. An explanation should be provided for the discrepancy between the number of source terms in the Phase II report and those identified in ATL's technical approach. SRSHES passed a resolution by a majority vote for the workgroup's recommendations to be submitted as a guidance document to CDC and ATL for a response.

The Epidemiological Data Workgroup expressed concerns about ATL's plans to use overly conservative estimates. This approach is unlikely to generate findings at a significant level that would justify an epidemiological study. Instead, doses with higher levels and longer exposure periods should be used in ATL's calculations.[1] The workgroup suggested that an updated review of current epidemiological data impacting SRS be presented by an epidemiologist at the next meeting. SRSHES unanimously passed a resolution for CDC to distribute ATL's monthly progress reports to SRSHES. The Outreach Workgroup distributed mock copies of the new SRSHES brochure. Each SRSHES member will receive 100 copies of the brochure for distribution to community members, local groups and local media. SRSHES unanimously passed a resolution to use the mock copy as the official version of the brochure after minor changes are made.

The Agenda Workgroup will consider three epidemiologists to make a presentation at the next meeting. The workgroup is compiling a list of outstanding agenda items to identify topics that are still relevant versus those which should be removed from the SRSHES agenda. A report on these findings is expected to be presented at the next meeting. During a discussion of **new SRSHES business**, action and agenda items raised during the meeting were reviewed and votes were properly taken for consensus recommendations. The Chair opened the floor for public comment at all times as designated on the agenda. The next SRSHES meeting will be held on September 4-5, 2003 in Savannah, Georgia. The following SRSHES meeting is scheduled for March 25-26, 2004 in Columbia, South Carolina.

[1]One SRSHES member noted that the observations by the Epidemiological Data Workgroup reflect a misunderstanding of ATL's use of the word *conservative*. Use of conservative values in dose calculations will generate higher doses.

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

Summary of the Meeting

List of Acronyms:

ABRWH	Advisory Board on Radiation and Worker Health
ATL	Advanced Technology Laboratory
ATSDR	Agency for Toxic Substances and Disease Registry
CDC	Centers for Disease Control and Prevention
DOE	Department of Energy
GDNR	Georgia Department of Natural Resources
HESs	Health Effects Subcommittees
HHS	Department of Health and Human Services
NCEH	National Center for Environmental Health
NIOSH	National Institute for Occupational Safety and Health
OCAS	Office of Compensation Analysis and Support
SCDHEC	South Carolina Department of Health and Environmental Control
SRS-50	*Savannah River Site at Fifty*
SRSHES	Savannah River Site Health Effects Subcommittee

HHS and CDC convened an SRSHES meeting on March 13-14, 2003 at the DoubleTree Guest Suites in Charleston, South Carolina. The September 5-6, 2002 meeting minutes were unanimously approved with changes as noted and submitted into the record. Current action items were completed by placing meeting notices in local publications and scheduling an agenda item. SRSHES members whose terms will expire on June 30, 2003 and are interested in continuing to serve were encouraged to complete and submit application packages to CDC by March 31, 2003.

SRS-50 is a historical narrative of SRS that examines a unique culture and technology within 20th century American history; the book was released in June 2002. Part 1 is the history of atomic energy; the establishment of the Atomic Energy Commission; predecessors to DOE; the history of DuPont at SRS; and biographies of SRS personnel. Part 2 is a chronicle of the construction era; a description of engineering achievements; and an overview of SRS cultural impacts. Part 3 is a history of the technology. Parts 4 and 5 are summaries of SRS's transition and the establishment of Westinghouse. *SRS-50* contains an index, chronology, full citations, topography maps of SRS communities, and an appendix of cemetery locations where burials were relocated.

The *Saturday Evening Post*, *Time Magazine*, SRS newspapers, and a collection of SRS artifacts DuPont donated to a museum were used as data sources. Efforts are being made with South Carolina and local repositories to appropriately house, preserve and exhibit SRS artifacts collected for the book. Plans are also being made to consult with the South Carolina historic preservation officer to preserve artifacts in historical buildings at SRS. The

preservation plan should not interfere with current efforts to de-commission, decontaminate and destroy onsite facilities that are no longer used, but are extremely expensive to maintain.

In August 2002, CDC awarded ATL the dose reconstruction contract to conduct screening with an endpoint of screening-level dose estimates for receptors in scenarios approved by SRSHES. In October 2002, CDC changed the scope of work and charged ATL with developing detailed release, transport and exposure models with endpoints of dose and cancer risks for target organs and the whole body. The new scope of work increased the size of the study and will require additional research and computer programming of ~260 variables. ATL reviewed and modified scenario locations recommended by SRSHES. For the air exposure pathway, the rural family in Clark Hill Lake will be combined with and moved to Augusta, Georgia. An additional rural family will be placed in Williston, South Carolina due to exposures in this area.

The migrant family will be placed in New Ellenton, South Carolina. For the milk exposure pathway, the dairy location for the urban family will be moved from Aiken, South Carolina to New Ellenton. The number of source and receptor locations will be decreased from 20 to 10. In its technical approach, ATL will base releases on the Phase II report; incorporate scenarios developed by the Scenario Workgroup; apply generic environmental models; calculate endpoints of dose, risk and organ doses as needed; use SRS-specific characteristics to revise established models; review many exposure and source locations for each receptor; and evaluate quantitative and qualitative aspects of uncertainties associated with dose and risk. Dose calculations will be based on an existing risk assessment model and will include release, transport, exposure and consequence assessments.

Federal Radiation Guidance 13 will be used to qualify risk, such as probability of cancer incidence or cancer death. ATL plans to conduct separate studies to calculate acute short-term releases because spikes are averaged over one year and will not be precisely reflected. The potential for total dose buildup in soil concentrations and other factors will be used to account for variability in annual releases. If ATL is unable to select solid figures, conservative values will be chosen. ATL has initiated computerized analyses with the GENII version 2 computer code to specify the transport of radionuclides in the environment and exposure variables of persons. The computation size for the study is extremely large with >300 million data points: 39 years, 30 radionuclides, 4 exposure pathways, 10 transport pathways, 25 receptors, 10 release points and 30 exposure locations.

ATL is proposing to combine air and water release points and merge exposure locations to make the model simple, tractable and representative of actual doses. To address several outstanding issues in the Phase II report, ATL added source terms for unspecified alpha and beta releases; added to or deleted from isotopes listed in the Phase II report; and partitioned some radionuclide releases into one isotope. ATL is attempting to develop a source term that can be divided by the flow in the Savannah River to address

environmental holdup of releases. Modeling these parameters is difficult because the environment may store contaminants, liquid pathway releases and air releases in contaminated soil.

To support the main computation, ATL will perform auxiliary analyses for air dispersion, surface water transport and soil buildup. All findings will be compiled in a draft report. SRSHES unanimously passed a resolution in response to ATL's revised scope of work. A Letter Writing workgroup should be formed to outline concerns about CDC's lack of communication on ATL's revised scope of work and technical issues these changes may cause in the future.

GDNR's Environmental Radiation Monitoring Program was initiated in 1977 and monitors SRS, Plant Vogtle and other facilities once or twice per month. Matrices tested around SRS include direct radiation samples from thermoluminescent dosimeters; air samples from filters, charcoal cartridges for iodine-131 and silica-gel cartridges for tritium; water samples from river water, ground water and precipitation; soil and river sediment; vegetation, crops, milk and game; and fish and seafood. Radionuclide concentrations in the vast majority of samples collected from all pathways have been below detectable limits.

SRS, Chernobyl and weapons testing were the most common sources of radionuclide concentrations based on GDNR's monitoring data. GDNR, SRS, the state of South Carolina and the city of Savannah are closely tracking any changes in tritium releases in the Savannah River. GDNR, Georgia Power, SCDHEC and SRS share findings twice per year. Data collected by the agencies are generally found to be consistent. GDNR expects to publish an updated environmental radiological monitoring report in the next month. The document will contain GDNR's dose calculations, risk estimates and technical approaches.

ABRWH is chartered to advise the HHS Secretary in three specific areas: guidelines for implementing the Energy Employees Occupational Illness Compensation Program Act; the scientific validity and quality of dose reconstruction; and a class of employees exposed to radiation at DOE facilities for which a dose reconstruction would not be feasible and radiation exposure may have endangered health. DOE is mandated to establish a panel of physicians to determine whether workplace toxic chemicals contributed to illness. Claimants with a positive diagnosis are to be referred to the state workers= compensation program.

With assistance from NIOSH, the Department of Labor is mandated to reconstruct doses of claimants and identify recipients for $150,000 in compensation. NIOSH established OCAS to interact with and serve as a point of contact for claimants. As of December 31, 2002, 6,825 requests for worker monitoring and workplace data were sent to DOE. Of 1,302 requests for worker monitoring and workplace data submitted by OCAS to SRS, 499 responses have been provided. As of January 2003, 10,472 claims had been submitted and 18 dose reconstructions were completed, but no awards were made as of that time. Compensation is made if the probability of cancer causation is calculated to be >50% at a

99% confidence interval based on an overall probability of cancer distribution for each organ and different exposures to each organ. A contractor will collaborate with ABRWH to assist in performing quality reviews of dose reconstruction calculations.

ATSDR asked SRSHES to compile comments on the final internal version of the health education needs assessment and develop a plan to collectively submit revisions. NIOSH recently completed several extramural projects: heat stress associated with remediation work by carpenters at Hanford; glycophorin biodosimetry among patients treated with iodine-131; surveillance methods for solvent-related hepatotoxicity among painters, carpenters and millwrights at Hanford; and a lung fibrosis study among plutonium workers at Los Alamos and Rocky Flats. NIOSH awarded three new grants in 2002: health effects of occupational exposures among Paducah Gaseous Diffusion Plant workers; stochastic models for radiation carcinogenesis to identify temporal factors and dose-rate effects; and susceptibility and occupational radiation risks. This cohort will include SRS workers.

Several research projects are expected to be completed and communicated in 2003: an epidemiological evaluation of cancer among Rocky Flats workers; an ionizing radiation and mortality study among Hanford workers; an assessment of radon and cigarette smoking exposure among Fernald workers; cohort mortality studies of workers at three different DOE sites; several beryllium disease studies among exposed workers; epidemiological studies to evaluate health effects of uranium milling; an analysis of corrections in measurement errors of radiation exposure; an uncertainty analysis to characterize plutonium exposure and improve lung cancer risk estimates; and a dose reconstruction of Chernobyl liquidators. Completed and ongoing research projects of workers at SRS and all other DOE sites can be accessed on the NIOSH web site.

The Scenario Workgroup made several recommendations in response to the ATL status report. Assumptions, the basis for assumptions and the impact of any exclusions should be well documented, including the modeling process and computer codes. Results should be benchmarked against actual monitoring data collected by GDNR, SCDHEC and WSRC when practical. SRSHES's concerns about merging data and eliminating the screening process should be addressed. Drinking water pathways from rain and river water should be added to the scenarios.

Scenarios should reflect worst-case realistic scenarios. Dose contributions from non-SRS source terms should be identified and quantified if applicable. SRSHES should be provided an opportunity to comment on ATL's protocol. An elderly individual should be included in one scenario. An explanation should be provided for the discrepancy between 11 radionuclide source terms in the RAC report and >30 radionuclides in ATL's technical approach. SRSHES should be provided an opportunity to develop a scenario for a family living by the water. SRSHES passed a resolution with a majority vote and one abstention for the workgroup's recommendations to be submitted as a guidance document to CDC and ATL for a response.

The Epidemiological Data Workgroup reviewed its charged and determined that an updated review of current epidemiological data that may impact SRS should be presented by an epidemiologist at the next meeting. The workgroup expressed concerns about ATL's plans to use overly conservative estimates in the dose reconstruction project because this approach is unlikely to generate findings at a significant level that would justify an epidemiological study. Doses with higher levels and longer exposure periods should be used in ATL's calculations instead of a mid-point of lower and upper ranges.[2] SRSHES unanimously passed a resolution for CDC to distribute ATL's monthly progress reports to SRSHES.

The Outreach Workgroup distributed mock copies of the new SRSHES brochure. SRSHES was asked to edit the mock copy and submit additional changes to ATSDR by the end of the meeting. The workgroup will provide each SRSHES member with 100 copies of the brochure for distribution in their respective communities, city councils, school boards, hospitals, other local groups and local publications. A total of 5,000-10,000 copies are expected to be printed. The brochure will also be translated into Spanish. CDC will assist the workgroup in improving the SRSHES web site and will explore the possibility of establishing an SRSHES mailbox to receive e-mail messages from the public. SRSHES unanimously passed a resolution to use the mock copy as the official version of the brochure after minor changes have been made.

The Agenda Workgroup will convene a face-to-face meeting to discuss three epidemiologists the Epidemiological Workgroup recommended to make a presentation at the next meeting. The workgroup is compiling a list of outstanding agenda items to identify topics that are still relevant versus those which should be removed from the SRSHES agenda. A report on these findings is expected to be presented at the next meeting.

SRSHES reviewed new action and agenda items raised during the meeting. Votes were properly taken for all consensus recommendations. The Chair opened the floor for public comment at all times as designated on the agenda. The next SRSHES meeting will be held on September 4-5, 2003 in Savannah, Georgia. The following SRSHES meeting is scheduled for March 25-26, 2004 in Columbia, South Carolina.

[2]One SRSHES member noted that the observations by the Epidemiological Data Workgroup reflect a misunderstanding of ATL's use of the word *conservative*. Use of conservative values in dose calculations will generate higher doses.

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

SAVANNAH RIVER SITE HEALTH EFFECTS SUBCOMMITTEE
March 13-14, 2003
Charleston, South Carolina

Draft 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 March 13-14, 2003 at the DoubleTree Guest Suites in Charleston, 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. Thomas Sanders III
Dr. Warren Umansky
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. Steven Ahrenholz (CDC/NIOSH)
Ms. Linnel Griffiths (ATSDR)
Ms. Sherry Moore (CDC Contractor)
Ms. Theresa NeSmith (ATSDR)
Ms. Dora Rainey (CDC/NCEH)
Mr. Tony Towns (DOE)
Mr. Charles Wood (CDC/NCEH)

Presenters and Guests
Mr. Cliff Blackman (Georgia DNR)
Ms. Felicia Brown (SCDHEC)
Mr. Howard Dawson (Public)
Mr. Norman Eisenberg (ATL)
Ms. Heather Kaufelds (SCDHEC)
Mr. William Lawrence (American Legion)
Mr. Vernon McDougall (ATL)
Mr. Ron Menchaca (*Post & Courier*)
Mr. Jeffrey Newman (WSRC)
Ms. Mary Beth Reed (NSA)
Mr. Murray Riley (CAB)

***Opening Session*.** Dr. Sergio Bustos, the SRSHES Chair, called the meeting to order at 8:43 a.m. on March 13, 2003 and welcomed the attendees to the proceedings. He recalled that during the previous meeting, several members expressed concerns about the future role and direction of Health Effects Subcommittees (HESs). To address these issues, Drs. Bustos and Crawford were invited to attend a Radiation Studies Branch (RSB) meeting. Dr. Bustos made a presentation on SRSHES's function, mission, completed projects and ongoing activities, particularly the development of scenarios for the dose reconstruction.

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

- Page 7: Change "the information is probably minimal" to "the data are probably minimal."
- Page 16: Change the spelling to "McDuffie" County.

Ms. Newell submitted written changes into the record; Dr. Crawford's revisions submitted to CDC and the SRSHES Chair in January 2003 were not reflected in the current draft. Mr. Phillip Green, the SRSHES Designated Federal Official (DFO), explained that corrections must be presented to all members at the following meeting before draft minutes can be finalized. Dr. Lee pointed out that SRSHES only receives draft copies of the minutes; corrected final versions are never distributed to the members. Mr. Green clarified that final versions of the minutes with changes approved by the full SRSHES are sent to Dr. Bustos for his signature. Approval of the September 5-6, 2002 meeting minutes was tabled until Dr. Crawford's changes were circulated, reviewed and accepted by SRSHES.

Review of Current Action Items. Mr. Green and Ms. Sherry Moore, of Visions USA, provided a status report of the current action items.

- High costs prevented CDC from announcing the current SRSHES meeting with a full advertisement in the *Charleston Post and Courier.* However, a meeting notice was placed in the community events section of this paper as well as in the South Carolina Black Media Group's weekly newspaper.
- The Agenda Workgroup will discuss the possibility of speakers from other groups presenting at SRSHES meetings.

Ms. Dora Rainey, the RSB Committee Management Specialist, provided an update on the SRSHES membership. Application packages were sent to 12 SRSHES members whose terms will expire on June 30, 2003 as well as to persons on the RSB mailing list. Current members and new candidates must submit the completed application package and an up-to-date résumé to RSB by March 31, 2003. Application packages were also displayed on the table of meeting materials for members of the public.

In terms of the selection process, Mr. Green explained that the Membership Workgroup will review all applications and select potential candidates. These recommendations will then

be forwarded to RSB for further review and discussion. RSB's recommendations submitted to the CDC Committee Management Office will be forwarded to the CDC Director for final selection and approval. Mr. Wade Waters, the Membership Workgroup Chair, announced that 11 of 12 current members whose terms will expire on June 30, 2003 have expressed an interest in extending their terms.

Mr. Green conveyed that Ms. Dolly Stills is one of the 12 SRSHES members whose terms will expire on June 30, 2003. Ms. Stills is now employed by a federal government agency and is no longer eligible to serve on SRSHES due to the HES charter that limits participation to community members. Mr. Green provided a status report of another outstanding issue. All SRSHES meeting minutes from 1995-June 2002 were compiled in a notebook and displayed on the table of meeting materials. A sign-up sheet was also available for members who were interested in receiving previous meeting minutes in hard copy, e-mail or CD-ROM.

***History of the SRS*.** Ms. Jane Perry, the SRSHES liaison representing the Georgia Division of Public Health, introduced Ms. Mary Beth Reed of New South Associates (NSA). Ms. Reed is the primary author of *Savannah River Site at Fifty* (*SRS-50*). The >600-page high-quality book was released in June 2002 and contains outstanding maps, graphics and other visual images. The book can be easily read by diverse audiences. The American Cultural Resources Association recognized *SRS-50* with the 2002 award for the nation's best product. The award is given to projects that represent outstanding research and a commitment to the nation's cultural resources.

Ms. Reed distributed a copy of *SRS-50* for the members to review since the book provides a historical framework for SRSHES's future activities. *SRS-50* is a historical narrative that examines a unique culture and technology within 20th century American history. The SRS plant changed the surrounding area and created a new identity in some aspects. For example, the SRS plant served as an affirmative action program and introduced the Republican Party in some SRS counties. *SRS-50* is framed in an anthropological format in which an oral history, archival research, historical photographs, maps and other information are chronologically presented. One of the most important features of the book is a detailed production history when SRS was a plant instead of a site.

SRS-50 is divided into the following sections. Part 1 is the history of atomic energy; the establishment of the Atomic Energy Commission; predecessors to the U.S. Department of Energy (DOE) at SRS; the history of DuPont at SRS; and biographies of SRS personnel. This section is complimented by SRS's premier collection of 20th century black and white historical photographs. NSA hopes the photographs will be maintained by the National Archives for viewing by researchers and the public. DOE has asked to use portions of part 1 as training materials for new employees.

Part 2 is a chronicle of the construction era; a description of engineering achievements; and an overview of SRS cultural impacts. SRS shifted the economical focus in the area from agriculture to industry and became the major employer in South Carolina. Part 3 is a history of the technology. Parts 4 and 5 are summaries of SRS's transition and the establishment of Westinghouse. These sections cover the 1980s-1990s and contain the least amount of historical information. However, parts 4 and 5 provide a basic framework for researchers to fully chronicle SRS's environmental history in a future book. *SRS-50* contains an index, chronology, full citations and topography maps illustrating SRS communities, but no alphabetical bibliography was developed for the book. The appendix contains a listing of cemetery locations where burials were relocated.

Although NSA reviewed the *Saturday Evening Post*, *Time Magazine* and other secondary materials, SRS's tremendously informative newspapers were a critical data source for the book. In 1989, DuPont donated a collection of materials on SRS and other DOE sites to the Hagley Museum. These items were eventually indexed and served as NSA's major data source in developing *SRS-50*. Unlike Hanford, Oak Ridge and other sites in the DOE complex, SRS had a surrounding community and received a fair amount of media attention. DOE plants were previously established in secrecy.

In terms of post-publication activities, NSA is currently consulting with South Carolina to identify locations that can appropriately house and maintain SRS artifacts collected for the book. Efforts are being made to partner with local repositories that can exhibit these historical items. Plans are also being made to consult with the South Carolina historic preservation officer to preserve artifacts in historical buildings at SRS. This process will include large-format photography, additional historical research of a technical nature, and instructions to operate buildings far into the future. Some of these properties are eligible for the National Register, but are being threatened by a federal undertaking. Many facilities scheduled for destruction contain a tremendous amount of information that should be documented.

Ms. Reed emphasized the importance of submitting historical items to repositories to ensure artifacts are properly archived and preserved. In addition to *SRS-50*, she distributed newspaper articles, photographs, cultural artifacts and other SRS historical items for the members to review. She was pleased to announce that SRSHES is referenced in the book in Chapter 20. This section describes SRS's interaction with CDC contractors, the public and other groups. Instructions on ordering *SRS-50* from the Government Printing Office (GPO) were included in the briefing books, but Ms. Perry gave members a copy on CD-ROM.

Mr. Waters expressed concern with efforts to preserve historical buildings at SRS. Over the past few years, a major focus of the Citizens Advisory Board (CAB) has been to de-commission, decontaminate and destroy facilities that are no longer used, but are extremely expensive to maintain. Ms. Reed clarified that the preservation effort is focused

on retaining valuable historical information rather than actual buildings. DOE is aware of this initiative and is beginning to take action on the preservation plan. She pointed out that this activity is not intended to and should not interrupt CAB's efforts.
Mr. Lockridge asked about the percentage of classified historical materials unavailable to NSA. Ms. Reed replied that DOE required security clearances in 1998 for NSA to review historical materials and conduct research onsite. However, all historical SRS documents DuPont donated to the Hagley Museum were available to review. NSA realizes that certain information from any DOE site will not be published in materials to be released to the public.

After the September 11th terrorist attacks, DOE deleted specific facility locations, building materials and other information originally scheduled to be included in the book. Overall, Ms. Reed was confident that *SRS-50* provides a sufficient historical narrative of SRS's production and its impact on public policy and other DOE sites. Ms. Drye inquired about efforts to announce the book to the public. Ms. Reed mentioned that DOE issued several news releases and advertised the book through GPO. *SRS-50* will also be reviewed in journals. Dr. Bustos recessed the meeting for a break from 9:50 a.m.-10:24 a.m.

Status Report by Advanced Technology Laboratory (ATL). Mr. Vernon McDougall, Project Manager of the CDC contract for the SRS dose reconstruction, reported on the change in work scope and ATL's progress to date. ATL is an environmental health and safety consulting firm located in Maryland. The company has been operating for eight years and serves several government clients, including CDC, DOE, Nuclear Regulatory Commission, Occupational Safety and Health Administration, and U.S. Environmental Protection Agency (EPA). ATL's areas of expertise include environmental science, health physics, nuclear safety, occupational safety and health, modeling and scientific computing.

ATL was awarded the dose reconstruction contract in August 2002 and submitted the draft protocol to CDC the following month. In October 2002-February 2003, ATL attended a meeting and participated on several conference calls with CDC to revise drafts of the protocol in response to CDC's changing needs. Since October 2002, ATL has been intensively focusing on the data analysis, modeling and computer programming. In the original scope of work, ATL was contracted to conduct screening based on the International Atomic Energy Association (IAEA) Safety Series No. 19 that provides a screening model for dose reconstructions. The endpoint from the model would be screening-level dose estimates for receptors in scenarios approved by SRSHES.

In October 2002, CDC changed the scope of work and required ATL to develop detailed release, transport and exposure models. The revised task would result in endpoints of dose and cancer risks for target organs and the whole body. The new scope of work also called for a statistical analysis of uncertainty effects. The modifications increased the size of the study and affected the philosophy of the overall project because the screening would have produced conservative results and erred on the side of overestimating dose. The

revised scope of work is designed to provide realistic dose and risk estimates and will also evaluate uncertainties, particularly in parameter values. ATL realizes that the new tasks will result in several practical issues.
Realistic models are more difficult to properly apply. Additional research and computer programming will be needed to justify ~260 variables. The amount of data generated will be extensive. The statistical analysis of uncertainties will increase the size and scope of the project for computer analysts. Scenario locations recommended by SRSHES during the September 2002 meeting were reviewed by ATL. The Scenario Workgroup was commended for clearly describing each scenario. ATL made every effort to honor SRSHES's recommendations while managing a tremendous amount of data, but some scenarios were modified. To determine the process by which meteorological conditions in the SRS area influence the migration of contaminants off-site, ATL will use 16-directional models that result in 22.5-degree arcs for exposures.

For the air exposure pathway, ATL determined that SRSHES did not recommend a family for the Williston, South Carolina area. This location is directly downwind from the site and had clear exposures. Meteorological data collected over the past 20 years showing wind rose in the Williston area were the justification for this determination. Based on this finding, CDC suggested that air exposures for the rural family in Clark Hill Lake be combined with and moved to Augusta, Georgia. With this change, ATL would be able to include an additional rural family in Williston, South Carolina. SRSHES also had not identified a location for the migrant family scenario. ATL suggested to CDC that this family be placed in New Ellenton, South Carolina as an additional receptor in the wind rose area.

In examining the home, school and church, ATL selected the home as the location for the air exposure pathway in five of the six scenarios. This approach was not taken with the rural family because the home was located in Gerard, South Carolina, but the school was located in Waynesboro, South Carolina. In this scenario, the school was selected as the location for the air exposure pathway. To further justify locations for the air exposure pathway, ATL used meteorological data to calculate relative air concentrations and deposition rates at ten miles from the site in several sectors.

For the milk exposure pathway, ATL proposed that the dairy location for the urban family scenario be moved from Aiken, South Carolina to New Ellenton. The plausibility of the revised air and milk exposure pathways was supported by the county Farm Bureau. Another major change was the number of scenarios proposed. SRSHES recommended 20 receptor locations, but ATL determined that some areas are similar in terms of distance from the site. To simplify the analysis, ATL proposes to use no more than ten air release locations. This strategy will reduce the number of computer runs by ~66%. Even with this streamlined approach, however, 24-hour/day computer modeling for 60 days will still be needed.

Mr. Norman Eisenberg, Senior Advisor of the CDC contract, reported on ATL's technical approach and upcoming activities in the dose reconstruction project. ATL will base releases on the Phase II report; incorporate scenarios developed by the Scenario Workgroup; apply generic environmental models; calculate endpoints of dose, risk and organ doses as needed; use SRS-specific characteristics to revise established models; review many exposure and source locations for each receptor; and evaluate quantitative and qualitative aspects of uncertainties associated with dose and risk. The technical approach is designed to limit the number of apparent source and receptor locations to ten while still obtaining representative doses.

ATL's overall approach to dose calculations is based on an existing risk assessment model. Variables that will be incorporated into the calculation include release, transport, exposure and consequence assessments. The model is designed to determine the amount of a contaminant released by a source; the volume of concentrations in the environment; levels of exposure to persons by ingestion, inhalation or direct contact; the time history of the release; and risks to persons based on an individual dose.

ATL will perform the risk assessment model for each exposure location and source. Federal Radiation Guidance 13 (FRG 13) will be used to qualify risk, such as probability of cancer incidence or cancer death. These figures are the most recently approved data from EPA. To address uncertainties, ATL will input releases and other variables in the risk assessment model, including uptake of radionuclides by breathing rate, vegetation and water consumption levels, and the impact of age on radiation sensitivity and consumption level. These calculations will generate both dose and risk.

Ms. Kato was not confident ATL will be able to produce realistic dose and risk estimates, particularly in light of uncertainties and other flaws in currently available data. She pointed out that results may be associated with plus or minus orders of magnitude in some cases. She asked ATL to provide SRSHES with a clear justification of all values selected. Ms. Kato also requested a clear distinction of the selection process, *i.e.*, values based on CDC decisions versus those limited by current technologies. Mr. Eisenberg explained that estimating dose and risks in the revised scope of work will most likely generate much higher results than actual exposures. Uncertainties in releases and other parameters incorporated into dose models will be analyzed. CDC is interested in basing decisions on assessments that are as realistic as possible.

Mr. Eisenberg agreed with Ms. Kato's observation that the figures will represent plus or minus orders of magnitude in some instances. In an effort to address this issue, ATL will conduct a point estimate evaluation of doses and risks for all persons in each scenario. All values selected will be clearly justified, but a distribution of point estimates for important variables will be established to represent uncertainties. However, the basis for distributions will also be provided to the extent possible. Mr. Lockridge requested that criteria for eliminating a particular radionuclide or pathway also be provided to SRSHES.

Mr. McDougall clarified that ATL is extensively relying on the Phase II report. Any radionuclide that was released based on these data will not be eliminated. ATL's computer models are primarily designed for regulatory purposes, were developed with conservative values, and contain ~260 variables that affect dose and risk. With the revised scope of work, ATL will need to adjust these values and describe the rationale for each variable. Dr. Lee's interpretation of the changed scope of work was that ATL will not conduct screening, but will immediately progress to estimating doses. The screening process was included in the project to focus SRSHES's efforts and more effectively use resources to identify pathways and radionuclides that are most important to dose. Overlooking this step in the process may result in ATL analyzing pathways and radionuclides of least concern. Dr. Lee asked CDC to describe the rationale for eliminating screening from the contract.
Mr. Devitt added that CDC never informed SRSHES of ATL's revised scope of work prior to distributing the briefing books. He was extremely unhappy about CDC's lack of communication with a group that was established to provide advice and guidance. Mr. McDougall confirmed that CDC's revised scope of work charges ATL with eliminating the screening process and advancing to the endpoint phase of the project. He pointed out that the revised tasks will result in the same results as the original scope of work. The change is merely CDC's effort to streamline the overall project.

Mr. Charles Wood, the CDC Project Officer of the ATL contract, mentioned that calculations will be performed for scenarios approved by SRSHES. Consensus recommendations by SRSHES on these issues were forwarded to CDC and extensively discussed by RSB and ATL staff. Ms. Kato noted that SRSHES reached consensus on the scenarios, but ATL's revised scope of work to eliminate screening was not a formal recommendation. Dr. Lee agreed with ATL's justification to change the scenarios because receptors will now be more evenly distributed. However, she emphasized the need to continue to develop the scenarios from a historical perspective. For example, SRSHES suggested Aiken as the dairy location because cows may have been in the area in the early 1960s when the majority of iodine releases occurred.

Mr. Cliff Blackman, of the Georgia Department of Natural Resources, proposed that the Shells Bluff area along Georgia Highway 80 be considered as the location for the air exposure pathway for the rural family instead of Waynesboro. He indicated that Shells Bluff would have had the largest population of maximally exposed persons. Ms. Kato recommended that the water family scenario be moved to the Martin-Millette area since ATL's data show greater surface water concentrations at this location. Mr. McDougall confirmed that ATL will take both these suggestions under advisement.

Mr. Devitt inquired about consistency between ATL's modeling of air concentrations and deposition rates versus monitoring data collected by Georgia, South Carolina and SRS prior to the site being established. He mentioned that calculations can differ by several orders of magnitude depending on variables incorporated into a model. Mr. McDougall

noted that ATL's calculations were compared to existing water data, but an evaluation of air data has not yet been conducted. He emphasized that modeling is the only feasible approach in the project because some levels of exposure are too low in the environment to be measured. ATL's modeling was found to be consistent with existing water data.

Dr. Lee questioned whether the proposed methodology will allow ATL to simultaneously input several release points into the risk assessment model. For example, SRS had five different releases at one time from five reactors. Mr. Eisenberg replied that the model allows for a finite number of releases in a single computer run. Ms. Guess specified that screening could have been used as a basis of comparison to existing modeling data. She agreed with Mr. Devitt that calculations can be influenced by variables incorporated into a model. The potential for uncertainties is minimized if models are compared to hard data.

Mr. Eisenberg addressed concerns raised by SRSHES members about the decision to eliminate a formal screening process from the dose reconstruction project. The objective of screening as outlined in the original scope of work was to reduce the number of radionuclides. The final outcome of the project will not be compromised with the revised tasks because ATL will perform calculations extremely similar to those that would have been conducted in the screening process. Under the modified scope of work, ATL will still review all releases to identify the most significant and least important pathways and radionuclides.

Another flaw in a formal screening approach is extreme assumptions. Some insignificant problems would be magnified, while important releases would be minimized. ATL's new technical approach is sound and will provide a more balanced perspective of realistic dose and risk at SRS. For example, ATL will use the actual distance between the source and receptor rather than IAEA assumptions. Mr. Eisenberg suggested that after base case computer runs have been generated, ATL and SRSHES collectively review the results and determine if some pathways can be removed. Ms. Kato pointed out that doses are cumulative. ATL's technical approach does not account for spikes in releases that occurred at certain times and in particular locations.

Mr. Eisenberg mentioned that ATL has considered the same limitation in its technical approach. Acute short-term releases are included in meteorological data and annual releases ATL will use to estimate doses, but the spikes are averaged over one year and will not be precisely reflected. ATL plans to conduct separate studies to calculate acute short-term releases, but the extent of this activity will depend on CDC. Despite this limitation in the modeling, doses of persons in scenarios will still be calculated throughout the entire life span. The inability to calculate doses due to the lack of available solid data on exact times releases occurred presents another problem with including peaks in the models.

Dr. Lee was concerned that ATL's efforts to limit the number of source and receptor locations to ten may exclude impacted populations in the SRS area. This approach may

cause frustration among certain members of the affected public whose doses will not be calculated. Mr. McDougall conveyed that CDC informed ATL of resource, budget and time constraints associated with completing the dose reconstruction project. Reducing the number of sources and receptors from 20 to 10 is ATL's effort to perform the tasks within this framework. Dr. Umansky indicated that variability and assumptions may cause ATL to establish an extremely low probability value to generate significant findings. Mr. Eisenberg clarified that the level of confidence cannot be quantified in light of qualitative uncertainties. Instead of establishing a probability value, ATL will make these types of estimates based on judgment.

Mr. Hills inquired if actual off-site persons will be screened if the dose reconstruction identifies air, water, milk or vegetation pathways that resulted in heavier exposures, particularly areas with more cancer morbidity or mortality. Ms. Guess raised the possibility of randomly screening persons in the 50-mile SRS area created by SRSHES. This approach would serve to validate ATL's calculations and produce actual data. Mr. Eisenberg replied that ATL is contracted to complete only those tasks outlined in the contract; screening has been eliminated from the project. CDC will then decide whether to undertake a more rigorous dose reconstruction study to determine whether SRS caused health problems in the area. However, he acknowledged the difficulty in randomly screening actual persons due to unknown sources and variations in dose history for each individual.

***Public Comment Period*.** The Chair opened the floor for public comments; no attendees responded. At SRSHES's request, Dr. Bustos delayed the last presentation of the day and the workgroup sessions until the following day to accommodate the remainder of ATL's progress report. He recessed the meeting for lunch at 12:00-1:25 p.m.

***Status Report by ATL* [continued]**. Mr. Eisenberg continued describing ATL's technical approach by outlining additional assumptions and underlying factors that will be considered in the dose calculations. Radionuclides transported by air, surface water and food chains will be included. Existing computer codes will be realistically adapted and used to implement models. Figures for variables as close as possible to actual conditions in the SRS area will be selected. Uncertainties associated with realistic values will be considered when important variables are identified. If ATL is unable to select solid figures, conservative values will be chosen. The potential for total dose buildup in soil concentrations and other factors will be used to account for variability in annual releases.

Dose-significant characteristics will be modeled for each scenario, such as socioeconomic, living and working conditions of persons. Risks and doses will be estimated by radionuclide, year, receptor, pathway and other factors. This type of aggregate approach will allow ATL to understand the occurrence and importance of the dose and identify flaws in data, models or computer codes. After dose estimates are calculated with a best case calculation and randomly selected variables from distributions to represent uncertainties,

sensitivity, uncertainty and auxiliary analyses will be performed. Ratios of doses from each radionuclide will be taken from the total dose. This calculation will identify radionuclides with the largest contributions to total dose that result in health effects. The model will also characterize environmental pathways that are most effective in transporting radionuclides to receptors.

ATL will use these data to evaluate factors, identify important stochastic variables, quantify dose and risk uncertainties, and understand technical issues. For example, sensitivity, uncertainty and auxiliary analyses could hypothetically determine that cesium-137 contributes 47% of the total dose; dose is most sensitive to uptake of cesium-137 by fish; and large acute releases may require a separate study. ATL will review the hypothetical findings to identify the most important results. In another calculation, ATL will define the mean value and confidence limits of dose and other outputs. To date, ATL has formulated a technical approach; evaluated and encoded release data; analyzed transport assessment issues; interpreted scenarios for calculation; and developed a quality assurance process for all aspects of the study.

ATL has initiated computerized analyses with the GENII version 2 code, other software and additional programs to specify the transport of radionuclides in the environment and exposure variables of persons. The computation size for the study is extremely large with >300 million data points: 39 years; 30 radionuclides released by air and water pathways; four exposure pathways from inhalation, ingestion, immersion and ground play; ten transport pathways from air, water and several food chains; 25 receptors; ten release points; and 30 exposure locations. The extraordinary task of computing, managing and analyzing a tremendous amount of data is further incentive for ATL to limit the number of receptor locations and release points to ten while still preserving the integrity of the dose calculations.

ATL selected GENII as the computer code for the study because it uses FRG 13 procedures and risk factors and is based on computer codes established >20 years. GENII is a complex system developed by Pacific Northwest Laboratory for EPA. In each step of the modeling process, ATL will need to specify variables that will impact outcomes. The variables will be thoroughly analyzed to identify the best values that represent practices and conditions at SRS. ATL has identified four major technical issues that will need to be addressed during the study. First, the model should be simplified, tractable and representative of actual doses. This problem can be resolved by combining air and water release points and merging exposure locations.

For example, the F & H combined stack could be merged with another point source for air releases, while streams and diffuse sources onsite could be combined for surface water releases. Second, completion of the release database identified several outstanding issues in the Risk Assessment Corporation (RAC) Phase II report. Zeroes associated with some releases could have represented missing data. Unspecified alpha and beta releases were

not included. Releases were specified by element in some cases rather than by isotopic partitioning. ATL resolved these problems by adding source terms for unspecified alpha and beta releases; adding to or deleting from isotopes listed in the Phase II report; and partitioning some radionuclide releases into one isotope. For example, cesium-134 and -137 will be modeled as cesium-137 since this isotope results in a higher dose.

Third, environmental holdup of releases are difficult to model because the environment may store contaminants, liquid pathway releases and air releases in contaminated soil. Exposures may persist for years after the release that caused environmental concentrations. As a result, doses based on year of release may be incorrect. Seepage basins may delay exposures and releases from previously contaminated sediments and biota may also be delayed as well. ATL is making efforts to resolve these problems by developing a source term that can be divided by the flow in the Savannah River. A similar calculation would be made for Lower Three Runs Creek. Site releases will be used as the sole basis for doses from air and water pathways.

Doses from global fallout or other sources as well as residual SRS concentrations from natural radioactivity will not be considered. GENII does not account for environmental holdup of releases. ATL will perform auxiliary analyses to determine if the computer code should be modified or whether environmental holdup of releases actually needs to be modeled. Fourth, GENII may not precisely reflect acute versus average releases. For next steps, ATL will complete the computer analysis and programming, including the post-processor, statistical analysis, tests and evaluation of codes, and production runs. The data will then be analyzed and interpreted.

To support the main computation, ATL will perform auxiliary analyses for air dispersion, surface water transport and soil buildup. All findings will be compiled in a draft report. Throughout the project, ATL will be committed to generating a product of high technical quality; responding to questions, concerns and recommendations raised by CDC and SRSHES; and striving for results that will be useful to the community in understanding risks.

Mr. Lockridge asked if ATL's uncertainty analysis will identify limitations in the computer code, such as an inability of GENII to address resuspension of particulate soil matter. He advised ATL to clearly outline flaws in the computer code to ensure this issue is transparent to the public. Mr. Eisenberg confirmed that GENII has the capacity to address resuspension doses, but the code does not automatically track deposition in the soil from earlier years. ATL identified this flaw early in the study and is considering the possibility of slightly modifying the computer code. However, this undertaking may be an ineffective use of time and effort since the total dose is only changed by 10% with resuspension. Mr. Eisenberg confirmed that the rationale for using GENII and the methodology for applying the computer code in dose calculations will be fully described in ATL's report.

Dr. Crawford suggested that an individual drinking from the river below the Lower Three Runs Creek confluence be included in the water family scenario. Both Dr. Lee and Mr. Lockridge expressed concerns with ATL's proposal to merge air and water release points. This approach may result in less information than is published in *SRS Annual Environmental Reports*. Mr. McDougall acknowledged that some RSB staff have expressed the same concern. To address this issue, ATL is currently conducting a separate study that should be completed by March 31, 2003. ATL will then submit a proposal to CDC outlining the process and rationale to combine air and water release points and potential impacts of this merger on SRS.

Ms. Drye asked if the results from ATL's dose reconstruction project will be usable. Mr. Eisenberg replied that inherent assumptions, uncertainties in releases and other limitations may decrease the utility of the study in some instances. Nevertheless, the project will still reflect a state-of-the-art assessment of doses received from the site over the 39-year time period. Mr. Jeffrey Newman, of the Westinghouse Savannah River Company (WSRC) reported that the organization incorporated KDs into the GENII code using defaults, the published literature and SRS-specific data. He encouraged ATL to review WSRC's model.

Dr. Lee expressed an interest in reviewing parameters ATL will incorporate into its models. She reported that CDC previously charged SRSHES with compiling SRS-specific variables, such as a greater level of fish consumption compared to other areas. Dr. Wilson inquired about the time frame for ATL to complete the project. Mr. McDougall replied that due to the revised scope of work, the study will not be completed in August 2003 as originally projected. ATL anticipates that an additional four to five months will be needed. Mr. Eisenberg agreed with Ms. Kato's suggestion for SRSHES to list topics that should be covered in ATL's status report at the next meeting. Dr. Bustos recessed the meeting for a break from 2:45 p.m.-2:55 p.m.

Before introducing the next agenda item, Dr. Bustos yielded the floor to an invited guest. Ms. Felicia Brown is a Community Program Manager in the South Carolina Department of Health and Environmental Control (SCDHEC). She was informed by Ms. Kim Newell, the SRSHES liaison representing SCDHEC, about the Epidemiological Data Workgroup's request for technical assistance from an environmental epidemiologist. The staff member who filled this position retired from SCDHEC; the position is not expected to be refilled in the near future due to budget cuts. However, Ms. Brown offered to facilitate an SCDHEC epidemiologist attending a future SRSHES meeting.

***Georgia Department of Natural Resources (GDNR) Monitoring Data for SRS*.** Mr. Cliff Blackman announced that GDNR's Environmental Radiation Monitoring Program was established in 1976 through the Georgia Radiation Control Act and was initiated the following year. GDNR's Environmental Radiation Laboratory (ERL) was established in 1977 at Georgia Tech through a cooperative agreement. GDNR is also responsible for radiological safe drinking water testing and emergency response. In addition to SRS,

GDNR monitors Plant Vogtle and other facilities once or twice per month. Matrices tested around SRS include direct radiation samples from thermoluminescent dosimeters (TLDs); air samples from filters, charcoal cartridges for iodine-131 and silica-gel cartridges for tritium; water samples from river water, ground water and precipitation; soil and river sediment; vegetation, crops, milk and game; and fish and seafood.

ERL tests several radionuclide groups, including alpha/beta, gamma, iodine-131, iodine-129 at Four Mile Creek only, tritium, strontium-89/90, plutonium-238/239, americium-241 and TLD dose. For the air pathway, GDNR collects rainfall samples to determine the amount of materials deposited. Air monitoring data showed the following results. Alpha/beta was found at normal background levels from naturally occurring lead-210, bismuth-210 and polonium-210. Gamma was primarily non-detectable, while strontium-89/90 and plutonium-238/239 have not been found since GDNR was established. Tritium has been routinely sampled since 1996 and was not found at significant doses. Exceptions to the air results are Chernobyl, peaks in cesium-137 releases and nuclear weapons tests in China.

Some periodic spikes in gross beta concentrations may be related to incidents, but the majority of increases were associated with changes in atmospheric conditions. One peak in manmade gamma concentrations was attributed to Chernobyl, but GDNR could not determine whether another spike involving xenon-133 was from the SRS area or other sources. GDNR believes that a cesium-137 spike was from a source within a 25-radius of SRS, but the increase was not determined to be significant. The maximum tritium dose calculated at the highest location was 0.003 mRem. The calculation was based on EPA data of dose factors multiplied by the average breathing rate of an individual.

For the rainfall pathway, precipitation is collected each month. While SRS uses a no-ion exchange column to concentrate rainfall, GDNR runs the sample without pre-treatment. Precipitation monitoring data showed the following results. Alpha/beta was routinely detected in samples, but these concentrations varied with rainfall dilution and were primarily associated with naturally occurring lead-210, bismuth-210 and polonium-210 in the air. No strontium-89/90, plutonium-238/239 or manmade gamma concentrations were found. Tritium was routinely detected, but these levels are declining on an annual basis as SRS effluents decrease. Tritium concentrations in precipitation were not found to be dose-significant at $\leq$0.5 mRem per year if consumed.

For the soil pathway, cesium-137 was detected in most samples and was primarily assumed to be from nuclear weapons testing. However, concentrations in soil from sources within a 25-mile radius of SRS were not easily determined because no correlation was made with distance. Cesium-137 levels are declining with time at a much faster rate than radioactive decay. Soil sample data show that cesium-137 contributes <0.05% of the soil-related direct radiation dose. Plutonium-238 was not detected in any samples, but plutonium-239 was found in a few samples with higher cesium-137 levels. These concentrations do not appear to be associated with SRS or decrease with distance. The

strong correlation between plutonium-239 and cesium-137 may indicate a common origin and relationship with fallout from weapons testing.

Strontium-90 was below detection limits in most soil samples. Shorter-lived gamma seen in the 1970s and early 1980s were primarily from weapons testing. For naturally occurring long-lived radionuclides, parent or daughters were detected in all soil samples, including potassium-40, radium-226 from the uranium-238 chain, and radium-228 from the thorium-232 chain. These radionuclides in soil are important because of contributions to most direct radiation doses under normal conditions. The materials result in a 0.4% dose from cesium and >99% dose from natural origins.

For direct radiation testing, TLDs are placed on telephone pools, trees and other inconspicuous locations for one-quarter periods. Upon heating, TLDs emit light in proportion to cumulative doses and measures both natural and manmade doses. GDNR has used two TLD systems over its 26-year monitoring period with slightly different field responses and calibration. The old system was calibrated with radium-226 and showed an average of 55 mRem/year of radiation, while the new instrument measures with cesium-137 and shows an average of 58 mRem/year. Several minor elevated readings of unknown origin were detected in one quarter, but these results may be due to tampering. A TLD that showed elevated radiation levels near a medical center may be attributed to x-rays or a nuclear medicine patient. No long-term concentrations were seen at SRS or Plant Vogtle.

For the vegetation/grass pathway, cesium-137 detected in ~25% of samples was primarily assumed to be from weapons testing. Some portion may be due to SRS releases, but this result does not appear to be correlated to the site. Cesium-137 concentrations in grass are declining with time at a rate equal to natural radioactive decay. If grass was consumed as a leafy vegetable, the cesium-137 dose would be $\leq$0.2 mRem/year. A solid correlation was seen with tritium at a distance indicating an origination from SRS. Tritium concentrations in grass are declining with time at a rate equal to airborne effluents and have not been detected over the past four years. If grass was consumed as a leafy vegetable, the tritium dose would be $\leq$0.01 mRem/year.

Strontium-90 was detected in several grass samples at levels roughly equal to cesium-137, but does not appear to be correlated to SRS. Concentrations were most likely related to weapons testing. Grass samples with higher strontium-90 and cesium-137 ratios indicate enhanced plant uptake or increased deposition of strontium-90. If grass was consumed as a leafy vegetable, the strontium dose would be $\leq$1.1 mRem/year. Plutonium-238/239 and strontium-89 were not detected in grass. Several nuclides detected in the late 1970s and early 1980s were from Chernobyl and weapons testing. Doses from these sources were relatively minor at 0.5 mRem for an effective dose and 3 mRem for a thyroid dose.

For the milk pathway, samples are collected on a monthly basis from up to 10 regional dairies. Tritium was detected in many samples, but levels are declining with tritium

emissions from SRS. Tritium is currently non-detectable in the majority of milk samples and was found at a dose of only <0.02 mRem/year. Cesium-137 from weapons testing was routinely detected in milk samples with a low-level counting procedure that provides solid sensitivity. Iodine-131 detected in milk in 1983, 1984 and 1986 from one dairy was possibly from a local source rather than SRS. Low doses were found at <0.25 mRem/episode. Strontium-89 found in one milk sample in 1986 potentially originated in the Girard area instead of the site. Strontium-90 was not detected in any milk sample.

River sediment is typically collected with a Ponar dredge. GDNR prefers high clay-silt content samples over sandy samples because these measurements have better absorption and retention characteristics. Elevated cesium-137 concentrations detected in river sediment samples upstream of Augusta, Georgia and SRS were primarily due to waste operations and problems with a reactor at SRS. Cesium-137 levels in river sediment were found to be a strong predictor of concentrations in fish. Cobalt-60 levels were found in both upstream and downstream locations of Plant Vogtle and were attributed to SRS reactor operations and Plant Vogtle. Cobalt-58 and short-lived manganese-54 concentrations were detected and attributed to Plant Vogtle.

Plutonium-238/239 and americium-241 were found in a few river sediment samples and attributed to SRS or weapons testing. Naturally occurring radionuclides from the uranium, thorium and potassium series were detected as well. River sediment consists of a sand, silt and clay mixture and results in highly variable radionuclide samples. The variability increases the difficulty of establishing trends. For the river water pathway, the following locations are monitored: Augusta, Georgia; upstream and downstream of SRS and Plant Vogtle; Savannah, Georgia; Plant Vogtle at the Georgia Power Company; and the SRS area encompassing Upper Three Runs Creek, Beaver Dam Creek, Four Mile Creek and Lower Three Runs Creek. River water samples are collected weekly.

Tritium was detected in most samples, but levels are generally declining in downstream samples. Increases were recently found at some effluent locations and historical spikes were seen in river water samples as well. Elevated levels of tritium that appear to be approaching the drinking water standard are near the mouth of the creek and do not appear downstream after being diluted by the Savannah River. Water in creeks are not consumed by persons and do not present a risk to the population. Some higher peaks detected in tritium were due to GDNR's enhanced monitoring program of testing more frequently and over a shorter time period. GDNR, SRS, the state of South Carolina and the city of Savannah are closely tracking any changes in tritium releases in the Savannah River. Based on annual averages for each year since 1977, the highest historical downstream level at the Savannah ID Water Plant was $\leq$4,000 pCi/L or 20% of the drinking water limit. Some periodic fluctuations in tritium from Plant Vogtle were related to electrical outages or maintenance work. Alpha/beta was typically found near the detection limit and is not easily correlated with SRS or Plant Vogtle. Strontium-89/90, plutonium-238/239 and gamma concentrations were generally not detected. For the fish and seafood pathway, cesium-137

was detected in most samples with the highest results from Upper Three Runs Creek and Lower Three Runs Creek at SRS. Strontium-90 was found in most samples with the highest results between Beaver Dam Creek and Four Mile Creek at SRS.

Tritium was detected in most samples with the highest results between Four Mile Creek and Steel Creek. Overall, concentrations of radionuclides in fish and seafood were below GDNR's trigger of $\geq 10^{-5}$ for an advisory. The level of concern is based on average annual consumption for both radiological and non-radiological substances, but GDNR realizes its methodology may result in slightly lower calculations than other agencies. GDNR, Georgia Power, SCDHEC and SRS share findings twice per year. Data collected by the agencies are generally found to be consistent. Special projects are also conducted in which independent samples are gathered to determine if the agencies will obtain the same results. GDNR expects to publish an updated environmental radiological monitoring report in the next month. The document will contain GDNR's dose calculations, risk estimates and technical approaches.

Overview of the Advisory Board on Radiation and Worker Health (ABRWH). Dr. Todd Crawford, an SRSHES member, explained that ABRWH is chartered to advise the HHS Secretary in three specific areas: guidelines for implementing the Energy Employees Occupational Illness Compensation Program (EEOICPA); the scientific validity and quality of dose reconstruction; and a class of employees exposed to radiation at DOE facilities for which a dose reconstruction would not be feasible and radiation exposure may have endangered health. EEOICPA was enacted by Public Law 106-398 in 2000. On December 7, 2000, Presidential Executive Order 13179 established responsibilities for DOE, ABRWH and the Department of Labor (DOL) to implement EEOICPA.

DOE is mandated to establish a panel of physicians to determine whether workplace toxic chemicals contributed to illness. Claimants with a positive diagnosis are to be referred to the state workers' compensation program. With assistance from the National Institute for Occupational Safety and Health (NIOSH), DOL is mandated to reconstruct doses of claimants and identify recipients for $150,000 in compensation. To fulfill its role in EEOICPA, NIOSH established the Office of Compensation Analysis and Support (OCAS) to interact with and serve as a point of contact for claimants. OCAS receives 80-100 telephone calls per day. As of January 31, 2003, 10,472 claims had been submitted and 14,017 telephone calls had been made. OCAS also conducts dose reconstructions.

During the claims process, the claimant receives an acknowledgment letter from OCAS, an introduction letter from Oak Ridge Associated Universities (ORAU), a letter and summary of the telephone interview, an ORAU dose reconstruction initiation letter, and draft and final dose reconstructions for the claimant's signature. ORAU is contracted to perform the dose reconstructions. In an effort to obtain worker monitoring and workplace data from DOE sites, 6,825 requests were sent to DOE through December 31, 2002. Of 1,302 requests for worker monitoring and workplace data submitted by OCAS to SRS, 499 responses have

been provided. As of January 2003, 18 dose reconstructions were completed, but no awards were made as of that time. For claims approved after a claimant's death, compensation is made to survivors.

EEOICPA awards are made based on the following criteria. The dose reconstruction results in a probability distribution of exposure for each organ. Epidemiological data provide a probability distribution of cancer causation for different exposures to each organ. The two distributions are combined by random sample to yield an overall probability of cancer distribution. Compensation is made if the probability of cancer causation is >50% at a 99% confidence interval of the combined distributions. In February 2003, ABRWH held its 11th meeting since January 2002. At this time, ABRWH reviewed and approved an adjustment to the probability of cancer causation software.

ABRWH was involved with developing the claims process with NIOSH and DOL, but the members expressed concern about the lack of staff and delays in processing claims upon further review of the system. During its February 2003 meeting, ABRWH also reviewed and approved a request for proposals for a contractor to assist the members in performing quality reviews of dose reconstruction calculations. ABRWH identified several issues for further study: smoking adjustment for lung cancer; age and time of exposures; incorporation of background cancer risks and occupational studies; chronic lymphocytic and other leukemias; grouping of rare types of cancer; latency period for thyroid cancer and leukemia; dose rate effect factor and dose adjustments; risk transfer from the Japanese cohort; race/ethnicity adjustment for skin cancer; and interactions with other workplace exposures.

Dr. Umansky noted that the 99% probability level of cancer is extremely high, particularly in light of uncertainties. He indicated that perhaps this figure was established to limit the number of awards. He questioned whether an appeals process had been developed for denied claimants and survivors. Dr. Crawford clarified that the probability of cancer causation must be >50% with a 99% confidence interval. With these criteria, he was concerned some awards may be made in the absence of supporting epidemiological data. Mr. Hills reported that survivors of a deceased former worker with positive beryllium exposure from the Oak Ridge, Tennessee site received $150,000. Mr. Green announced that OCAS's extensive web site contains all ABRWH meeting minutes, reports and recommendations. The information can be accessed at www.cdc.gov/niosh/ocas.

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

There being no further discussion, Dr. Bustos recessed the SRSHES meeting at 4:45 p.m. on March, 13, 2003.

Dr. Bustos reconvened the SRSHES meeting at 8:57 a.m. on March 14, 2003 and entertained a motion to approve the previous meeting minutes. Mr. Wills so moved; Mr. Waters seconded the motion. There being no further discussion, the September 5-6, 2002 Draft SRSHES Meeting Minutes were unanimously approved with the changes as noted and submitted into the record.

Update by the Agency for Toxic Substances and Disease Registry (ATSDR). Ms. Theresa NeSmith of ATSDR distributed a CD-ROM to SRSHES that contained the final internal version of the health education needs assessment. She asked the members to compile their comments on the document and develop a plan to collectively submit revisions to ATSDR. Ms. NeSmith announced that other ATSDR activities involving SRSHES would be made during the Outreach Workgroup report.

Update by NIOSH. Dr. Steven Ahrenholz, of the Health-Related Energy Research Branch (HERB), reported that a new NIOSH Director and HERB Branch Chief were appointed in 2002. A vacancy announcement to fill the position of the Division of Surveillance, Hazard Evaluations and Field Studies Director closed on March 4, 2003. He described several extramural projects NIOSH recently completed. A study of heat stress associated with remediation work by carpenters at the Hanford site was completed in the summer of 2002. Challenges of the study included a small sample size and resistance by contract managers for workers to participate. A study of glycophorin biodosimetry among patients treated with iodine-131 was completed in the summer of 2002. No workers from DOE sites were included in this research project.

A cross-sectional study of surveillance methods for solvent-related hepatotoxicity among painters with mixed-solvent exposures, carpenters and millwrights at Hanford was completed in the summer of 2002. The goal of this project was to examine biomarkers and other parameters associated with liver function. A lung fibrosis study among plutonium workers at Los Alamos and Rocky Flats was completed in November 2002. With respect to the future of NIOSH's research agenda, CDC has modified its policy for peer-reviewed studies. Each intramural project will be reviewed at least once every five years in addition to the usual peer review of protocols and final reports.

NIOSH's priority intramural projects include cohort mortality studies at the Portsmouth Naval Shipyard (PNS) and the Idaho National Engineering and Environmental Laboratory (INEEL); a study of chemical laboratory workers; an internal epidemiological data system project; a K25 multiple myeloma study; a leukemia case/control study; and a leukemia study among PNS workers. SRS workers will be included in the chemical laboratory workers project and the leukemia case/control study. The epidemiological data system will serve as a single source for HERB to access worker data across all DOE sites.

In 2002, NIOSH awarded three new grants. The University of Louisville will study health effects of occupational exposures among Paducah Gaseous Diffusion Plant workers. The

University of Washington will develop stochastic models for radiation carcinogenesis to identify temporal factors and dose-rate effects. Existing data on workers from DOE sites will be collected and included in the research project, but actual workers will not be followed. The University of North Carolina will analyze susceptibility and occupational radiation risks; the cohort will include SRS workers.

Although HERB staff and other resources have been reduced, several research projects are still expected to be completed and communicated in 2003: an epidemiological evaluation of cancer among Rocky Flats workers; an ionizing radiation and mortality study among Hanford workers; an assessment of radon and cigarette smoking exposure among Fernald workers; cohort mortality studies among INEEL, PNS and Pantex Plant workers; a study of beryllium disease natural history and exposure response; a study of chronic beryllium disease among beryllium-exposed workers; a study of sensitization and disease caused by beryllium dose; epidemiological studies to evaluate health effects of uranium milling; an analysis of corrections in measurement errors of radiation exposure; an uncertainty analysis to characterize plutonium exposure and improve lung cancer risk estimates; and a dose reconstruction of Chernobyl liquidators.

NIOSH communicates its study results with a one-page synopsis on the context of the project, findings, contact information for principal investigators and instructions to obtain additional information. Completed and ongoing research projects of workers at SRS and all other DOE sites can be accessed on the HERB web site at www.cdc.gov/niosh/2001-133.html. In terms of future initiatives, HERB will more extensively collaborate with OCAS to identify completed and ongoing projects that may be useful to EEOICPA. OCAS will also inform HERB of its specific activities that may benefit the NIOSH research agenda. However, the strategy to share intra-agency research has not been developed to date.

***Workgroup Reports*.** Scenario Workgroup. Mr. James Lockridge, the Workgroup Chair, conveyed that the members used the breakout session to compile a list of comments and identify opportunities for improvement in the dose reconstruction study. He indicated that the recommendations were based on SRSHES's feedback to the ATL status report. The twelve suggestions are outlined as follows:

1. Assumptions, the basis for assumptions and the impact of any exclusion should be well documented, including the modeling process and computer codes.
2. Results should be benchmarked against actual monitoring data collected by GDNR, SCDHEC and WSRC when practical.
3. SRSHES's concerns about merging data should be addressed. For example, combining the FB Canyon, Seepage Basins and other source locations into one point source may not be conservative for receptors on or near the SRS boundary. If source points are merged, ATL's computer code should have capacity to separate individual source terms and receptors.
4. Drinking water pathways from rain and river water should be added to the scenarios for consideration.

5. Scenarios should reflect worst-case realistic scenarios.
6. SRSHES's concerns about screening should be addressed. For example, the impact of eliminating the screening process should be summarized and the screening process should be defined. The need to perform screening should be revisited. The screening process should be compared to similar efforts undertaken at other DOE sites.
7. Dose contributions from non-SRS source terms should be identified and quantified if applicable, such as Plant Vogtle and nuclear weapons fallout.
8. SRSHES should be provided an opportunity to comment on ATL's protocol, SRS-specific parameters and ATL's modifications to source terms developed by RAC.
9. An elderly individual should be included in one scenario.
10. An explanation should be provided for the discrepancy between 11 radionuclide source terms in the RAC report and >30 radionuclides in ATL's technical approach. Adherence to the RAC results should be considered because the cost savings from analyzing only 11 radionuclides could be used for the screening process.
11. The impact of significant acute historical releases from SRS should be considered in addition to annual averages.
12. SRSHES should be provided an opportunity to develop a scenario for a family living by the water; Ms. Kato to take the lead on this activity.

As a follow-up comment to recommendation four, Mr. Blackman pointed out that Waynesboro uses Briar Creek as a water source. Other water supplies use creeks as well. The water sources are neither upstream nor downstream from the Savannah River because the creeks are generally filled by rain. Mr. Blackman confirmed that he would provide GDNR data to SRSHES about historical usage of surface water supplies. As a follow-up comment to recommendation 12, Mr. Devitt noted that the water family scenario is unrealistic based on anecdotal reports from several former SRS workers and long-time community residents. Ms. Perry also advised SRSHES to be cautious in developing the water family scenario. Consistent with Mr. Devitt's findings in South Carolina, she did not locate this type of family in Georgia.

Ms. Kato clarified that the water family scenario would be persons who lived along the Savannah River and spent a fair amount of time in the water shed. The family would not have lived on a houseboat. Mr. Eisenberg confirmed that SRSHES still has time to add a water family scenario. Mr. Green reminded the members that CDC's request at the September 2002 meeting for SRSHES to finalize certain scenarios within a specified time period was not met. The record reflects that CDC planned to progress to the next step in the dose reconstruction project if SRSHES did not meet the deadline.

Based on the workgroup report, SRSHES is still revising scenarios. However, Mr. Green emphasized that consensus must be reached on this issue at some point, particularly since more than one year has passed in developing and finalizing the scenarios. Dr. Crawford conveyed that delays in finalizing the scenarios are primarily due to SRSHES only meeting

twice per year and the workgroups having no contact between meetings. SRSHES activities could be more efficiently and effectively completed if the workgroups convened more frequently. Dr. Lee raised the possibility of CDC establishing a deadline for SRSHES to finalize and submit the scenarios.

Mr. Guess was extremely upset and did not approve of CDC's lack of communication in changing ATL's scope of work to eliminate the screening process. The ATL contract was awarded in August 2002, but the SRSHES meeting was held the following month. Because SRSHES was established to advise CDC, the members should have been informed about the modified tasks at the meeting and asked to provide input. Ms. Guess believed that SRSHES's activities on the scenarios at the previous meeting were a farce since a decision had already been made to eliminate the screening process. She felt dishonest because she has informed persons in her community that screening would be performed.

Epidemiological Data Workgroup. Dr. Warren Umansky, the Workgroup Chair, conveyed that the breakout session was used to review the two components of the workgroup charge. First, the workgroup is to assist SRSHES in understanding challenges, logistics and limitations associated with performing epidemiological research. Second, the workgroup is to provide SRSHES with a review of current epidemiological data that may impact SRS. The review was presented during a previous meeting, but an update of these studies should be made at the next meeting. The workgroup expressed concerns about ATL's plans to use overly conservative estimates in the dose reconstruction project.

This approach is unlikely to generate findings at a significant level that would justify an epidemiological study.[3] To address this concern, the workgroup agrees with the Scenario Workgroup's suggestion to use worst-case realistic scenarios since these calculations are likely to be more significant than ATL's conservative estimates. The workgroup's position is that doses with higher levels and longer exposure periods should be used in ATL's calculations instead of a mid-point of lower and upper ranges. The workgroup presented two recommendations for SRSHES to consider.

First, SRSHES should be provided copies of ATL's monthly progress reports to CDC. Second, one of the three well-known epidemiologists the workgroup suggested to the Agenda Workgroup should be scheduled to make a presentation at the next meeting. The topics should include the logistics of performing epidemiological research; surveillance of cancer clusters, neurotube defects and other medical conditions in Georgia and South Carolina potentially impacted by SRS; and epidemiological research of chemical and radionuclide releases from nuclear sites conducted after 2000.

[3]One SRSHES member noted that the observations by the Epidemiological Data Workgroup reflect a misunderstanding of ATL's use of the word *conservative*. Use of conservative values in dose calculations will generate higher doses.

Dr. Lee was unclear about the workgroup's concerns with ATL's strategy to use conservative estimates since these calculations generate higher doses. Mr. Eisenberg clarified that ATL will input realistic values for the exposure assessment to reflect site-specific behaviors of persons in the scenarios. However, the computer code relies on many parameters for this calculation. He emphasized that ATL will not modify the scenarios to be realistic. Mr. Wood confirmed that ATL will select the high endpoint of real doses. In terms of the overall project, he announced that the FY '03 budget will not be adequate to cover all the activities ATL presented. However, all tasks could be accomplished after FY '03 with new dollars.

Dr. Crawford and Ms. Kato were divided on completing the dose reconstruction in FY '03 versus prolonging the study in anticipation of new dollars. On the one hand, CDC's budget for radiation health effects projects could be further reduced or totally eliminated in the future. On the other hand, demand for completion of the study would be high if the majority of activities are accomplished in FY '03. The dose reconstruction project should not rushed to completion; instead, ATL and SRSHES should be provided adequate time to gather sufficient data and obtain public input. Ms. Kato hoped the epidemiological research could be expanded to include data on radionuclides identified in the RAC Phase II report that have impacted sites other than SRS.

Outreach Workgroup. Dr. Michael Wilson, the Workgroup Chair, distributed mock copies of the new SRSHES brochure. He thanked Ms. NeSmith and Ms. Perry for their diligent efforts in completing this activity. Before the brochure is finalized, telephone numbers will need to be added and the membership roster will need to be updated. SRSHES was asked to edit the mock copy and submit additional changes to Ms. NeSmith by the end of the meeting. The workgroup will provide each SRSHES member with 100 copies of the brochure for distribution in their respective communities; 5,000-10,000 total copies are expected to be printed. Other dissemination efforts by the members could include presentations to city councils, school boards, hospitals and other local groups as well as reprints in newspapers and other local publications.

The brochure will also be translated into Spanish. CDC will support publication of the brochure, but mass mailings are not included in the budget. For web site distribution of the brochure, the workgroup reviewed the Hanford and Oak Ridge web sites. As models for consideration, some sites contain photographs and addresses in addition to the names of HES members. The SRSHES web site is limited to one page and needs to be improved. Mr. Wood has offered to assist the workgroup in this endeavor. SRSHES generally agreed to revise the brochure as follows:

- The point of contact will be listed in the brochure as "Mr. Phillip Green, Executive Secretary of the SRSHES," with his telephone number, the RSB mailing address and the SRSHES web site.
- Mr. Green's telephone number will also be listed in the other two sections of the brochure that direct persons to call for more information.

- He will explore the possibility of establishing an SRSHES mailbox to receive e-mail messages from the public.

Agreement was not reached on whether to list the web site addresses for ATSDR and NIOSH in the brochure or provide links to the agencies on the SRSHES web site.

Agenda Workgroup. Dr. Bustos, the Workgroup Chair, announced that the members will convene a face-to-face meeting to discuss potential speakers recommended by the Epidemiological Workgroup. The suggested presenters are Dr. Rush of Cambridge University; Dr. Takara of the University of Washington; and Dr. Steve Wing of the University of North Carolina. Dr. Lee is in the process of compiling a list of outstanding agenda items to identify topics that are still relevant versus those which should be removed from the SRSHES agenda. She expected to present this list during the next meeting, but she will first need agendas from all SRSHES meetings. Mr. Green reported that RSB does not have paper copies of agendas from the initial meetings. Dr. Bustos recessed the meeting for a break from 10:50 a.m.-11:15 a.m.

***SRSHES Open Discussion*.** Dr. Bustos opened the floor for comments on the preceding agenda items. Ms. Kato raised the possibility of SRSHES making a consensus recommendation for CDC to direct ATL to conduct screening rather than the modified scope of work. Dr. Lee did not believe this request would be reasonable, but she was in favor of sending a letter to CDC expressing SRSHES's concerns about the lack of communication related to ATL's modified scope of work. SRSHES's lack of participation in the decision-making process and technical issues that may arise in the future from the revised tasks could also be outlined in the letter.

Dr. Lee noted that some components of the study may be sacrificed if the screening process is eliminated and ATL progresses to a full dose reconstruction. For example, the 50-mile radius for the study locations may exclude two water treatment facilities, Columbia, South Carolina and other communities SRSHES previously identified in Phase I of dose reconstruction. Certain radionuclides, exposure pathways and other important factors may be de-emphasized as well. ATL's current approach could potentially cause members of the impacted public represented by SRSHES to voice concerns and become skeptical of the study findings. Dr. Lee asked ATL to present methods that will be used to prevent these technical issues from occurring. This information may assure SRSHES that the study will be conducted with the same rigor as outlined in the original scope of work.

Mr. Green was not involved in the technical aspects of revising ATL's scope of work, but he conveyed to CDC that SRSHES would express concerns with the changes. However, he emphasized that the modified tasks should not be interpreted as an intent to exclude SRSHES from the advisory process. ATL's activities were presented during the meeting for SRSHES to provide feedback to CDC. Mr. Green was extremely confident of CDC's strong commitment to the advisory process. Ms. Kato was concerned that SRSHES would be

unable to maintain pace with the study based on two meetings per year. She raised the possibility of increasing SRSHES's annual meetings to three while ATL is conducting the project.

To address this concern, Mr. Wood confirmed that comments on ATL's ongoing activities submitted by individual members would be considered by CDC. Informal suggestions can be sent to CDC by e-mail without a consensus vote. Dr. Bustos added that based on the review process for the Phase II report, SRSHES will be given ample opportunity to provide input on ATL's findings. Mr. Devitt suggested that a workgroup be formed to draft a letter and then circulate the document to the full SRSHES for comment and review before submission to CDC. This workgroup could also serve as an SRSHES liaison and point of contact with CDC and ATL for monthly communications.

Dr. Bustos emphasized that the letter should clearly delineate SRSHES's functions to serve as a vehicle for the impacted community and provide advice to CDC, NIOSH and ATSDR at DOE sites where research is conducted. Mr. Green reminded the members that consensus can only be reached when a quorum of the full SRSHES is convened. As a result, the new workgroup could not submit the letter to CDC as an SRSHES consensus recommendation. However, he clarified that a response to the letter will be provided to SRSHES regardless of the mechanism used for submission.

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

***New SRSHES Business*.** The action, agenda and consensus items raised during the meeting were reviewed by SRSHES and are outlined below.

Action Item

- The DFO to obtain the following documents from ATL and distribute to SRSHES: the protocol that will be used to guide activities and the proposal to CDC outlining the rationale to merge air release points, liquid release points and exposure locations.

Agenda Items

- Update by ATL, including parameters that will be incorporated into the model.
- Presentation by an epidemiologist. Topics to include logistics of performing epidemiological research; surveillance of cancer clusters, neurotube defects and other medical conditions in Georgia and South Carolina potentially impacted by SRS; epidemiological research of chemical and radionuclide releases from nuclear sites conducted after 2000; screening from an epidemiological perspective; and studies of radionuclides performed at sites other than SRS.

- Combined CDC presentation on budget issues and a response to SRSHES's letter outlining concerns regarding ATL's revised scope of work.
- Update by SCDHEC on results from historical air and water sampling data.

Consensus Recommendations

- SRSHES recommends that the mock copy of the *SRSHES Brochure* distributed at the March 2003 meeting be used as the official version after minor changes have been made. [Motion made by Dr. Dawson and seconded by Ms. Drye; motion unanimously carried.]

- SRSHES recommends that the Scenario Workgroup's list of "comments and opportunities for improvement" be submitted as a guidance document to CDC and ATL. SRSHES further recommends that CDC and ATL specifically respond to the document. [Motion made by Dr. Crawford and seconded by Mr. Wilson; motion carried with one abstention.]

- SRSHES recommends that a Letter Writing workgroup be formed to outline concerns about CDC's lack of communication on ATL's revised scope of work and technical issues these changes may cause in the future. The letter to be distributed to the full SRSHES for review and comment before submission to CDC. Dr. Lee to serve as chair of the Letter Writing Workgroup; Dr. Bustos, Dr. Crawford, Mr. Devitt, Ms. Guess, Ms. Kato and Dr. Umansky to serve as members. [Motion made by Dr. Lee and seconded by Dr. Crawford; motion unanimously carried.]

- SRSHES recommends that CDC distribute ATL's monthly progress reports to each member. [Motion made by Dr. Umansky and seconded by Mr. Waters; motion unanimously carried.]

***Closing Session*.** The next SRSHES meeting will be held on September 4-5, 2003 in Savannah, Georgia. The following SRSHES meeting is scheduled for March 25-26, 2004 in Columbia, South Carolina. Dr. Bustos was confident that members' terms expiring in June 2003 will be extended so long as the application package is submitted to CDC prior to the March 31, 2003 deadline.

There being no further discussion, Dr. Bustos adjourned the SRSHES meeting at 12:20 p.m. on March 14, 2003.

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

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Date Sergio E. Bustos, D.D.S., Ph.D.
SRSHES Chair