

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

**and**

**AGENCY FOR TOXIC  
SUBSTANCES AND DISEASE REGISTRY**

**convene the**

**OAK RIDGE RESERVATION HEALTH EFFECTS SUBCOMMITTEE**

*Oak Ridge, Tennessee  
June 3, 2003*

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**FINAL RECORD OF THE PROCEEDINGS**

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AGENCY FOR TOXIC SUBSTANCES  
AND DISEASE REGISTRY**

**OAK RIDGE RESERVATION HEALTH EFFECTS SUBCOMMITTEE  
*June 3, 2003*  
*Oak Ridge, Tennessee***

**Final Minutes of the Meeting**

The Department of Health and Human Services (HHS), the Centers for Disease Control and Prevention (CDC), and the Agency for Toxic Substances and Disease Registry (ATSDR) convened a meeting of the Oak Ridge Reservation Health Effects Subcommittee (ORRHES). The proceedings were held on June 3, 2003 at the U.S. Department of Energy (DOE) Information Center, 475 Oak Ridge Turnpike in Oak Ridge, Tennessee.

***Opening Session and Introductions***

Dr. Kowetha Davidson, the ORRHES Chair, called the meeting to order at 12:31 p.m. She welcomed the attendees to the proceedings and particularly recognized several presenters and guests: Dr. Henry Falk, the ATSDR Assistant Administrator; Dr. William Taylor and Ms. Melissa Fish of the Oak Ridge Field Office; and Dr. Steven Ahrenholz of the National Institute for Occupational Safety and Health (NIOSH). Dr. Davidson opened the floor for introductions; the following individuals were present to contribute to the discussion.

**ORRHES Members**

Dr. Kowetha Davidson, Chair  
Ms. Peggy Adkins  
Mr. Donald Box  
Dr. Herman Cember  
Dr. Robert Craig  
Mr. Don Cresia

Ms. Karen Galloway  
Mr. George Gartseff  
Mr. Jeffrey Hill  
Mr. David Johnson  
Mr. James Lewis  
Dr. Anthony Malinauskas  
Dr. Peter Malmquist

Mr. L.C. Manley  
Ms. Donna Mosby  
Ms. Barbara Sonnenburg  
Mr. Charles Washington, Sr.

**ORRHES Liaison Representatives**

Dr. Elmer Akin (EPA)  
Mr. Chudi Nwangwa (TDEC)  
Ms. Brenda Vowell (TDOH)

**Designated Federal Official**

Ms. LaFreta Dalton, Executive Secretary

**ATSDR Representatives**

Dr. Henry Falk, Assistant Administrator  
Dr. Paul Charp

Mr. Burt Cooper  
Ms. Melissa Fish (OR Field Office)  
Mr. Jack Hanley  
Ms. Sandy Isaacs  
Dr. Karl Markiewicz  
Ms. Theresa NeSmith  
    [via conference call]  
Ms. Lorine Spencer  
Dr. William Taylor (OR Field Office)

**Presenters and Guests**

Dr. Steven Ahrenholz (NIOSH)  
Mr. Gordon Blaylock  
Dr. Timothy Joseph (DOE)  
Ms. Faye Martin (Public)  
Mr. John Richards (EPA)

***Agenda Review, Correspondence and Announcements***

Agenda Review. In addition to the project update, work group reports, public comment periods and other standard ORRHES agenda items, Dr. Davidson announced that the following topics would be presented and discussed during the meeting:

- Overview of ATSDR's collaboration with ORRHES by Dr. Falk.
- Presentation on public health and radiation safety standards by Dr. Herman Cember.
- Update on the NIOSH Occupational Energy Research Program by Dr. Ahrenholz.
- Follow-up presentation on ATSDR's chemical screening process for surface water and groundwater by Dr. Karl Markiewicz.

None of the work groups would be presenting formal recommendations for ORRHES to consider; "Work Group Recommendations" were not scheduled on the agenda. Ms. Sandy Isaacs of ATSDR would present the project update during the "Unfinished Business" agenda item. Mr. Jerry Pereira, the ORR Project Manager, usually presents the report but he was unable to attend the meeting.

Correspondence. The following communications were displayed on the table of meeting materials. Dr. Paul Charp of ATSDR sent an e-mail message to Ms. LaFreta

Dalton, the Designated Federal Official, to respond to an action item raised by Ms. Susan Kaplan during the previous meeting. Mr. Alfred Brooks, Chair of the Oak Ridge Environmental Justice Committee (OREJC), sent a letter dated May 20, 2003 to Mr. Pereira. The letter outlines several reasons for OREJC's opposition to ATSDR's proposal to produce an abbreviated public health assessment (PHA) for radioactive discharges from White Oak Creek (WOC).

Announcements. Dr. Elmer Akin, the ORRHES liaison to the U.S. Environmental Protection Agency (EPA), will no longer serve in this capacity after the current meeting due to his retirement from the agency. Mr. John Richards will begin serving as the EPA liaison to ORRHES at the next meeting. The June 3, 2003 edition of the *Knoxville News Sentinel* contains an article stating that Y-12 uranium releases are not judged to be a health threat. Several ORRHES members are quoted in the article.

### ***Review of the April 2003 ORRHES Meeting Minutes***

Dr. Davidson entertained a motion to approve the previous meeting minutes. Comments submitted by Ms. Theresa NeSmith were noted in the draft minutes; the changes will be incorporated into the final document. A motion to approve the minutes with Ms. NeSmith's revisions was properly made and seconded by Dr. Craig and Mr. Hill, respectively. There being no abstentions, opposition or further discussion, the April 22, 2003 ORRHES Meeting Minutes were unanimously approved.

### ***Review of Current ORRHES Action Items***

Ms. Dalton provided a status report of action items raised during the previous meeting.

1. ATSDR provided ORRHES with data on the uncertainties of air releases modeled in the Task 6 Report. [Completed]
2. ATSDR distributed copies of the letter from Senator William Frisk to former HHS Secretary Donna Shalala. [Completed]

3. ATSDR signed the letter on health statistics reviews (HSRs) that will be sent to Dr. Toni Bounds, Director of the Tennessee Department of Health Cancer Registry. [Completed]
4. ATSDR mailed CDC's report of the 1998 health study of the Scarboro community to ORRHES following the April 2003 meeting. [Completed]

Several members were divided on the status of action item 1. On the one hand, Mr. Hill and Ms. Sonnenburg pointed out that the status should be changed from completed to pending. Ms. Kaplan made the request, but she was not present to confirm her satisfaction with ATSDR's response. On the other hand, Dr. Davidson and Mr. Lewis noted that the action item was indeed completed because ATSDR provided the information Ms. Kaplan requested. ORRHES agreed that the status of the action item should be changed from completed to pending.

### ***Overview of ATSDR's Collaboration with ORRHES***

Dr. Falk conveyed that he attends community meetings on a regular basis to obtain first-hand input on ATSDR's site activities. He undertakes this effort to emphasize the importance and value of communities in the federal advisory process. ATSDR is involved with 500-600 sites per year throughout the country to assess exposures to persons from toxic chemicals and evaluate associated health effects. Although science is critical to ATSDR's mission, service is more important because data must be packaged in an appropriate format and interpreted for communities. ATSDR has not developed a standard approach to conduct site activities since all communities, exposures, pathways and other issues are different and require unique methods.

ATSDR's ability to conduct site activities depends on community involvement and a strong relationship with residents. For example, ATSDR's decision to establish ORRHES and the Oak Ridge Field Office was in direct response to the community's request to maintain communications with staff in Atlanta. Dr. Falk is aware of ORRHES's focus and input on several priority issues, including the HSR of Tennessee cancer registry data, the needs assessment and various PHAs for the site. In addition to these projects, ORRHES provides a forum for ATSDR to meet with the community and obtain advice on appropriate mechanisms to conduct site activities, communicate with the public and disseminate understandable materials.

In terms of the future, many federal agencies will experience budget decreases due to homeland security needs. ATSDR's FY'03 funding is \$82 million, but the President's

budget was proposed at a level of \$73 million for FY'04. Moreover, ATSDR's funding from DOE has steadily decreased each year from \$12 million in FY'99 to ~\$4 million in FY'03. Despite the budget cuts, however, ATSDR will maintain its strong commitment to continue to support the ORRHES process. PHAs and other activities at the site will be completed.

Another future change will be the consolidation of ATSDR's management and administration functions with the CDC National Center for Environmental Health (NCEH). The advantage to the new structure is that ATSDR will be linked to a larger, stronger and more recognized public health agency. The disadvantage is the perception that ATSDR's core mission and function will be lost in the larger CDC bureaucracy. Despite this concern, the HHS Secretary, CDC Director/ATSDR Administrator and other senior management are confident that the consolidation will be beneficial to both agencies. Because ATSDR was created by Superfund legislation, the agency's mission and mandate cannot be changed by the consolidation. Only Congress has the authority to modify the Superfund program.

The consolidation will result in one office with responsibility for ATSDR's and NCEH's environmental health programs. However, the agencies' missions, funding streams and operating units will remain separate. As with the future budget cuts, the consolidation will not diminish or detract from ORRHES activities. Dr. Falk emphasized that ATSDR continues to welcome ORRHES's valuable input. The time, effort, dedication and continued commitment of members in attending meetings, reviewing documents and making recommendations are greatly appreciated.

Dr. Cember inquired about ATSDR's relationship to NIOSH. Dr. Akin asked about opportunities the consolidation will provide in applying NCEH's expertise to the ORRHES process. Dr. Falk responded to the questions as follows. First, NIOSH is an institute within CDC that focuses on occupational safety and health. ATSDR closely collaborates with the agency on research, site activities and other initiatives. Second, the consolidation will foster greater collaboration between the two agencies. The common leadership will also provide opportunities for ATSDR and NCEH to share skills and expertise on a more frequent basis. Most notably, ATSDR will have more access to NCEH's laboratory after the consolidation, while NCEH will be able to rely more heavily on ATSDR's toxicology experts.

Mr. Lewis thanked Dr. Falk for establishing the Oak Ridge Field Office, forming ORRHES and responding to other community needs. He acknowledged Dr. Charp and Mr. Jack Hanley for generating the PHA on Y-12 uranium releases in a short period of time and distributing the document for ORRHES to review and evaluate. He also commended ATSDR for its excellent investigation of the Scarboro community. Health

concerns raised by local residents were quickly addressed and a report that was acceptable to the majority of the community was produced in a timely manner.

In contrast to these strengths, Mr. Lewis noted that one of ATSDR's weaknesses is interpreting and disseminating data to the lay public in a timely manner. He raised the possibility of the work group chairs meeting with Dr. Falk to discuss this issue and obtain guidance. Dr. Falk hoped the ORRHES process would address the community's longstanding concerns about the relationship between exposures from the site and the health status of Oak Ridge residents. He welcomed suggestions from the members on strategies ATSDR can implement to improve its production and distribution of documents to the public in a timely fashion.

Mr. Washington advised ATSDR to ensure that conclusions are accurately documented and supported by data. For example, the report of the Scarboro investigation did not mention that all of the sick children in the area were not examined. Dr. Davidson recognized the diligent efforts of other ATSDR staff who have made tremendous contributions to the ORRHES process: Mr. Burt Cooper, Ms. Dalton, Ms. Isaacs, Dr. Markiewicz, Mr. William Murray, Ms. NeSmith and Ms. Lorine Spencer. Dr. Davidson questioned whether ATSDR will maintain its commitment to complete Oak Ridge PHAs if funds continue to decrease over time.

Dr. Falk provided additional details about the budget to address this concern. ATSDR will protect its key projects by taking caution in undertaking new projects and becoming involved in long-term commitments. This approach will allow ATSDR to continue to support ongoing efforts. Moreover, the President's FY'04 budget has only been proposed at this time; the actual allocation from Congress may be higher. ATSDR is also making efforts to leverage support from other agencies. For example, CDC allocated funding and full-time positions to support ATSDR's involvement in terrorism and emergency preparedness activities. Dr. Falk reiterated that resources to complete Oak Ridge site activities are not expected to decrease.

### ***Public Health and Radiation Safety Standards***

Dr. Cember explained that the public health movement began in England due to the tremendous and rapid population growth in London from 960,000 persons in 1800 to 2.2 million individuals in 1840. Because the existing welfare system could not meet the needs of the city, the Poor Commission was established to explore alternative methods. In 1834, the Poor Commission issued a report stating that poverty causes disease and poor sanitary conditions lead to disease. The report recommended that the government



bear the expense of improving sanitary conditions; civil engineers and other qualified professionals design and supervise sewers, water treatment plants and other public improvements; and local health departments be established.

Similar public health recommendations were outlined in a report on the sanitary conditions of Massachusetts in 1859. Persons were believed to have an inherent right to a healthful environment. The first state board of health was later established in Massachusetts in 1869. Public health is society's collective actions to assure conditions in which individuals can be healthy and an organized community effort for disease prevention and health promotion. A community effort is needed to assure public health because an individual's ability to structure the environment rapidly decreases due to a population implosion.

Clinical medicine and public health differ in many areas. In clinical medicine, an individual is the patient and has a particular disease that is either present or absent. The patient's health status is evaluated by blood pressure, heart rate, body temperature and other factors. Clinical diseases can be caused by microbial agents, chemicals or trauma and are treated by medication or therapy. The individual pays for clinical care. In public health, the community is the patient and has all diseases at all times. Community health status is assessed by statistical and epidemiological data.

Causes of public health diseases include ecological issues, poverty, ignorance, poor housing and other social ills. Engineering, medical, mechanical, educational or social therapy is applied to correct the underlying pathology. Society or the community pays for public health care. Public health problems have dramatically changed over time. In previous eras, one agent caused tuberculosis, diphtheria, typhoid fever, bubonic plague or another disease that was clearly related to the agent and easily identifiable. The disease typically lasted for a short period of time and could be easily measured based on the number of sick or dead persons.

Absence of the disease was used to evaluate the health status of the population. The control objective with historical public health problems was to reduce the incidence of morbidity and mortality. Environmental control measures were clearly indicated. In the current era, asthma and other conditions last for a long period of time and do not have a unique relationship to an agent. Instead, diseases have a complex etiology that can be caused by multiple factors. The number of deaths or illness from current public health problems can only be measured statistically. The control objective with current public health problems is to increase the effectiveness of life. Control measures are not shown by relationships, such as plutonium workers who smoked or inhaled other toxic materials.

Radiation is a public health problem because individuals cannot structure their environments. Moreover, radiation health effects are not unique and are detected only statistically. Public health is translated into policy based on scientific information and societal acceptance. Although current knowledge is limited about biomedical effects from radiation on humans, more data have been collected on this public health problem than any other noxious agent.

Information has been gathered on occupational exposures among physicists, radiologists, dentists, radium dial painters, uranium miners and atomic energy workers. Data have also been collected on medical exposures from radiation therapy, diagnostic radiology, irradiation of the spine and diagnostic nuclear medicine. Studies have been conducted on several radiation events as well, including atomic bomb victims and survivors, nuclear weapons debris fallout, natural background radiation and nuclear accidents.

Radiation exposure will not necessarily lead to disease or death because adverse health effects are determined by the size and severity of the dose. Radiation data on occupational exposures, medical exposures and certain events have been instrumental in establishing current radiation safety standards. However, previous medical practices have caused cancer or other adverse health outcomes. For example, cancer of the thyroid gland was found among a significant proportion of adolescents whose severe acne was treated with low-energy x-rays. Thyroid cancer was detected in 7% of infants with an irradiated thymus.

An increased incidence of brain cancer was identified in patients who received a radiation dose of  $\geq 140$  rads when the scalp was irradiated for ringworm. A 26-fold increase in breast cancer was seen in female study participants who received weekly radiation doses from fluoroscopy for one year. The average radiation dose to an individual from radioactive materials in the ground, inhaled radon daughters, cosmic radiation and all other forms of background radiation is  $\sim 360$  mrem/year in the United States, but background levels vary based on the part of the country or region of the world.

Concentrations in Denver are twice those in Chicago, while levels range from 2,000-5,000 mrem/year on the West Coast of India. No data have been collected to date demonstrating that geographical differences in background radiation cause more or less exposure to humans. Genetic effects from background radiation have not been seen in any human population exposed at any particular time, dose level or part of the world. In contrast to low doses from background radiation, high radiation doses are known to cause damage.

A dose of <100 rads will primarily affect bone marrow; a whole-body dose of 400 rads from x-rays will result in a 50% probability of death within two months; and doses of 1,000 to >2,000 rads will damage the gastrointestinal tract or central nervous system and certainly lead to death in no more than one week. In a hemopoietic syndrome with a dose of hundreds of rads, bone marrow can be replaced and the patient will survive. Other acute radiation effects include skin burns, loss of hair, cataracts, and temporary or permanent sterility among both males and females.

Genetic effects, cataracts and retarded growth from early exposure are among the delayed biomedical effects from radiation exposure. Several studies have conclusively shown that leukemia and cancers of the bone, lung, breast and thyroid are also caused by radiation. A definite relationship has been established between atomic bomb survivors and several health effects, including leukemia; thyroid, breast and lung tumors; lymphocyte chromosomal aberrations; lenticular opacities; microcephaly and mental retardation following *in utero* exposure; and retardation of growth and development following exposure during early life.

A population is currently being studied to identify an association between accelerated aging and atomic bomb survivors. Women who were irradiated compared to those in the control group experienced an earlier onset of menopause by three years. Data show that 75,991 atomic bomb survivors with known radiation doses of  $\pm 15\%$  are five times more likely to develop certain types of cancer than unexposed populations. Among atomic bomb survivors, the excess number of cancer cases is ~500 and the observed cancer thresholds are 10 rads to bone marrow for leukemia and 40 rads for solid tumors. A linear dose-response relationship was seen in all cases above the observed threshold. Additional information on radiation effects can be obtained for free from the Radiation Effects Research Foundation.

The linear no-threshold (LNT) model is used to establish safety standards, while the collective dose concept is used to apply data into public policy. Using radiation as an example, the number of excess cancer cases in a group would be determined by adding all doses in the cohort. The model is based on a theory that for every 1 million person-rads, 120 excess cancer cases will develop regardless of the distribution of person-rads. The collective dose concept cannot be verified because the annual variation in cancer cases is larger than the number of excess cancer cases outlined in the theory. The inability to confirm the model results in uncertainty.

The collective dose concept was applied in a study of atomic bomb survivors to identify the risk of mouth cancer. A full-mouth examination with dental x-rays showed doses of 8,380 mrad to the skin and 1,202 mrad to salivary glands. Using a risk coefficient for salivary glands cited in the third report of the Biological Effects of Ionizing Radiation Committee, every 1 million person-rads would result in 0.5 cases of salivary gland

cancer. The study further speculates that six additional cases of salivary gland cancer would develop for every 10 million individuals who receive a complete mouth examination.

Data from atomic bomb survivors was used to calculate risks per rem of dose. An 8.3% cancer risk was estimated based on 3,435 cases among 41,719 exposed persons. A 7.3% cancer risk was calculated for 2,499 cases among 34,273 residents in other cities, military personnel who were absent at the time of the bombing and other non-exposed persons. The excess cancer rate of 1% was determined by subtracting the cancer risk of the exposed population from the control group. The collective dose in the exposed population was 1.3 million person-rems. The calculation demonstrates a probability of three chances in 10,000 of one individual developing cancer from a single rem.

The International Commission on Radiological Protection (ICRP) used the LNT dose-response model to establish a nominal risk coefficient for lethal cancer at  $5 \times 10^{-4}/\text{rad}$ . The ICRP made several observations of risk estimates in making this recommendation. First, risk estimates should be regarded only as an upper limit of risk. The risk per unit dose at very low doses is unlikely to be any greater than at high doses and will probably be much less. Second, risk estimates are developed for doses less than those at which quantitative information had been obtained. Third, risk estimates may lead to a gross overestimate of the incidence of effects and some effects may not occur at all.

In terms of rule-making, EPA establishes basic radiation safety standards, while various regulatory agencies enforce the standards and adapt guidance to specific needs. Radiation dose limits have been established at 5-50 rems/year for occupational exposures and 0.1 rem/year for an individual member of the public. In general, an activity that will result in  $<1/10,000$  probability of serious injury or death is accepted by society as "safe." "Risk" is objective and can be quantified, while "safety" is subjective and cannot be measured.

Ms. Sonnenburg noted that the past practice of measuring children's feet for shoes with x-rays may have also resulted in adverse health effects from radiation. Dr. Cember confirmed that children received large radiation doses from x-rays of the feet, but he was not aware of any studies to identify associated health effects. In the interest of time, Dr. Davidson tabled further deliberations until the "Unfinished Business" agenda item. Alternatively, an open discussion could be scheduled for the next meeting.

## ***Update on the NIOSH Occupational Energy Research Program***

Dr. Ahrenholz explained that ATSDR, NCEH and NIOSH are the three agencies conducting site activities under the DOE/HHS memorandum of understanding (MOU). In terms of NIOSH's organization, the Health-Related Energy Research Branch (HERB) is housed within the Division of Surveillance, Hazard Evaluations and Field Studies. Dr. Ahrenholz extended apologies on behalf of Dr. David Utterback, the HERB Chief, who was unable to attend the meeting.

HERB's role and function are often confused with another NIOSH program. HERB conducts intramural and extramural studies of the DOE workforce and has served in this capacity since 1991. After a project is finalized, HERB develops a one-page synopsis outlining the context of the project, study results, contact information for principal investigators and instructions to obtain additional information. The findings are first communicated to DOE, site managers, and former and current DOE workers and then released to the general public. The Office of Compensation Analysis and Support was established in 2000 to process dose reconstruction claims submitted under the Energy Employees Occupational Illness Compensation Program Act.

HERB recently completed several intramural and extramural studies. The Portsmouth Gaseous Diffusion Plant project was an update of a mortality study NIOSH conducted in the 1980s. In the more recent activity completed in October 2001, HERB assessed exposures to several chemical contaminants found at the site; analyzed internal and external ionizing radiation exposures; and used a nested case control group to examine cancers of interest identified in the first study. Eight DOE grants and cooperative agreements administered by NIOSH were communicated to workers in the summer of 2002. Most of these activities were methodological and did not involve data from a specific site.

A lung fibrosis study among plutonium-exposed workers at Rocky Flats was completed in November 2002 and an epidemiologic evaluation of cancer and occupational exposures among Rocky Flats workers was completed in April 2003. For both extramural and intramural projects, HERB attempts to analyze ionizing radiation and non-radiological exposures. Similar to other federal agencies, NIOSH is also experiencing budget constraints and other resource limitations. As a result, several criteria were used to prioritize projects for FY'04. For example, the study has been underway for some time, is close to completion, is being implemented with a full project team, or will influence another activity.

NIOSH's intramural project priorities are cohort mortality studies at the Idaho National Engineering and Environmental Laboratory (INEEL) and the Portsmouth Naval Shipyard (PNS); a study of chemical laboratory workers; an internal epidemiological data system; a multiple myeloma study at the K25 facility in Oak Ridge; a leukemia case control study; and a leukemia study among PNS workers. Additional details about these projects are outlined below.

INEEL is the largest DOE facility for which no study has ever been conducted; the cohort will include 64,000 workers. The PNS site is not a part of the DOE complex, but many workers were exposed to external ionizing radiation. Health physics and industrial hygiene data are being incorporated into HERB's epidemiologic data system. The database is being designed in a uniform format and will then be used to conduct cross-site studies, update study populations or select certain criteria among workers to increase statistical power. The new system will also allow HERB to develop a more complete occupational profile, such as whether the worker has records at multiple DOE sites, if the worker is living or deceased, or the date the employee's work history was completed. In addition to the multiple myeloma study at the K25 facility, Oak Ridge cohorts will be included in the chemical laboratory worker study and the leukemia case control.

NIOSH does not have sufficient funds to release a request for grant applications in FY'03, but three new grants were awarded in 2002. 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 Canada and 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. Differences in cancer and other health effects based on an individual's age at the time of radiation exposure will be examined in a cohort of ~22,000 Savannah River Site workers. The study is being conducted because some studies have suggested that older workers with exposures to ionizing radiation may be at greater risk. One hypothesis is that this may be because the capacity of repair mechanisms is thought to decrease as a person ages. As a result, individuals who receive radiation doses at an older age may be at greater risk than younger persons.

Despite decreases in HERB funding, staff and other resources, several research projects are still expected to be completed and communicated to workers in 2003:

- 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.
- Follow-up case control studies on leukemia and lung cancer among PNS workers.
- A study of beryllium disease natural history and exposure response.
- A study of chronic beryllium disease among 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 among Rocky Flats workers.
- A dose reconstruction of Chernobyl liquidators.
- An evaluation of time-related variables in occupational epidemiologic studies.

Manuscripts for many of the FY'03 studies have already been submitted for publication. With respect to the future direction 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. Dr. Ahrenholz encouraged ORRHES to visit the HERB web site at [www.cdc.gov/niosh/2001-133.html](http://www.cdc.gov/niosh/2001-133.html) to access completed and ongoing research projects of workers at Oak Ridge and all other DOE sites. The Occupational Energy Research Program book contains study results, one-page summaries and full reports. Grantees, award periods and project summaries for studies are listed as well.

Dr. Akin noted that the ability of HERB's epidemiological data system to pool data from multiple sites can ultimately change conclusions about exposures. Dr. Ahrenholz agreed with this comment, but he pointed out that the Fernald, Hanford and Rocky Flats sites are currently being remediated. As other facilities are dismantled, the epidemiological data system will allow HERB to access dosimetry records, industrial hygiene data, work histories and other employee records after DOE sites cease to exist.

Mr. Lewis inquired about the trigger for NIOSH to conduct occupational studies and the funding mechanism for these types of projects. He mentioned that problems are created when federal agencies conduct activities in one area, but a nearby site in the community is ignored. For example, NIOSH may implement a study at a DOE facility, but an investigation in the surrounding community is not being performed. Dr. Ahrenholz explained that NIOSH's decision to conduct an occupational study is based on several research issues and questions.

For example, potential factors that may contribute to adverse health effects among workers are considered, such as handling radiological materials or working near certain chemicals. The decision is also based on occupational exposure criteria extracted from existing data, including studies on atomic bomb survivors and investigations of lung cancer and other health effects in the workforce. Requests for proposals are an additional mechanism for NIOSH to conduct occupational research projects of interest, *i.e.*, retrospective exposure assessments; studies on radiation- and chemical-related diseases; and evaluations of differences and errors in techniques used to define worker exposures.

Dr. Ahrenholz conveyed that although DOE funds HERB research projects, NIOSH selects occupational studies to conduct. Dr. Falk added that Dr. Ahrenholz's presentation was limited to the CDC/NIOSH occupational research program for workers; the CDC/NCEH environmental health research program focuses on communities. Under its research agenda, NCEH has conducted dose reconstructions, a thyroid disease case control study and other activities in communities near DOE sites.

Dr. Cember acknowledged that radiation and chemical doses cannot be combined. He asked about HERB's methodology to consolidate data on health effects from both radiation and chemicals. Dr. Ahrenholz replied that HERB performed this type of investigation at the Portsmouth plant. External and internal radiation exposures of workers were analyzed along with exposures to nickel, uranium and fluorides due to a possible association with lung cancer and kidney problems. At PNS, HERB is conducting a nested case control study of exposures to both external ionizing radiation and asbestos among workers.

In both of these projects, NIOSH assembled chemical and radiation data to characterize worker exposures that could be used to evaluate dose response analyses. This may use logistic regression analysis or other types of analytical models to characterize worker exposures and identify associated health outcomes. At sites with chemicals and ionizing radiation, exposures are assigned to specific groups. Mr. Washington inquired about actions ORRHES can take to increase HERB's involvement in Oak Ridge. Lead, beryllium, cadmium, uranium and many other chemicals may be related to kidney dysfunction, heart disease, tumors and other health conditions that have been identified at the site. He indicated that further investigation at Oak Ridge may provide HERB with more conclusive findings.

Dr. Ahrenholz clarified that many of HERB's projects include Oak Ridge cohorts. For example, exposures from the K25 and X10 facilities are being examined in the multiple myeloma and chemical laboratory worker studies, respectively. NIOSH needs additional funding, personnel and other resources to conduct more occupational studies at Oak Ridge. Most notably, NIOSH is scheduled to receive another budget cut of 15%-



20% in FY'03. Dr. Timothy Joseph of DOE recalled that in 2000, ATSDR led a multi-agency effort in developing a compendium of all health-related research studies at Oak Ridge. He raised the possibility of HERB updating the document with more recent projects. Dr. Ahrenholz was not aware of the compendium, but he explained that the NIOSH web site contains all completed and ongoing worker studies for Oak Ridge since HERB's involvement with DOE sites in 1991.

Mr. Gartseff noticed that the PNS and Rocky Flats cohort mortality studies both refer to the healthy worker effect. He questioned whether HERB would anticipate the same outcome in a mortality study of Oak Ridge workers. He also asked if investigations of populations at other sites would be relevant to the Oak Ridge workforce. Dr. Ahrenholz replied that the workforce is generally healthier than comparison populations. HERB always expects this outcome because certain individuals in the general public are not included in the workforce, such as persons who are elderly, ill or disabled. As a result, attempts are made to further define the general U.S. population before a comparison is made to the workforce, such as stratifications by age, gender and other factors.

In addition to national comparisons, smaller breakdowns are made by state or region to stratify by race/ethnicity, job transfers to other DOE sites and other variables. Despite these efforts, however, concerns have still been raised about the appropriateness of populations that are used as comparison groups for the workforce. With respect to DOE sites, HERB has found that workers are generally healthier than those in other industries. Employment at DOE facilities typically requires a clearance that prohibits abuse of alcohol or illegal drugs. Many DOE workers are also highly skilled or educated, enrolled in ongoing medical surveillance programs, and receive higher pay.

Dr. Cember reported that based on his review of the literature, education is the most significant contributor to good health. Low mortality ratios among atomic energy workers are most likely attributed to high education levels in this workforce rather than the healthy worker effect. Mr. Hill announced that he and other Oak Ridge union health and safety representatives recently participated in a conference call with HERB senior management. The workers were asked to provide HERB with suggestions on areas to study in Oak Ridge because the HHS/DOE MOU will soon expire. Mr. Hill encouraged ORRHES to now consider recommendations for Oak Ridge occupational research projects that can be submitted to HERB.

Dr. Ahrenholz confirmed that HERB is interested in feedback from workers on the NIOSH research agenda. Any recommendations should be submitted to Dr. Utterback for consideration. Ms. Adkins questioned whether HERB has conducted studies on spouses and children of workers at atomic energy or nuclear plants. Dr. Ahrenholz responded that one project examined an increase in leukemia among children of nuclear weapons facilities workers. Another NIOSH program conducts research on

take-home exposures of asbestos, beryllium, lead, pharmacological agents and other contaminants to identify health effects among family members of workers.

### ***Public Comment Period***

The Chair called for public comments; no attendees responded.

### ***ATSDR Chemical Screening of Surface Water and Ground Water***

Dr. Karl Markiewicz of ATSDR conveyed that he would use Scarboro data to review and illustrate ATSDR's chemical screening process since this data set is smaller and more manageable than those for other media. Data collected for current and future screening of various media include 131,592 records for soil, 142,748 records for sediment, 585,770 records for surface water and 1.1 million records for groundwater. Sampling by EPA and Florida A&M University (FAMU) in the Scarboro community resulted in the collection of 5,940 records for surface soil, sediments and surface water.

Of the chemicals analyzed in Scarboro, 40 were detected in soil, 32 in sediment and 23 in surface water. Several chemicals identified in Scarboro media were above comparison values: four in soil, two in sediment and two in surface water. To identify chemicals with completed or exposure pathways, an exposure dose was estimated and compared to a health guideline. No chemicals above cancer screening guidelines were detected in Scarboro soil, sediment or surface water. No chemicals of concern were found in sediment, surface water, air or biota.

Arsenic, heptachlor epoxide and iron in soil were identified above non-cancer screening guidelines and will be included in the public health implication section of the PHA. These three chemicals are of concern due to exposure to children or children with pica behavior. Pica is an abnormal appetite for soil, starch or other non-food items. ATSDR used default assumptions for pica established by EPA in the screening process. To determine the likelihood of adverse health effects from arsenic, heptachlor epoxide and iron, exposure doses in soil were reviewed. A child with soil pica behavior will have an exposure dose above ATSDR's chronic oral minimum risk level of 0.0003.

Health effects from ingesting arsenic have been determined by calculating lowest observed adverse effect levels (LOAELs) and no-observed adverse effect levels in animals; lethality in humans; and LOAELs in humans as recognized by EPA. This level is also in the range of the human body's capacity to detoxify arsenic. Using these data, the dose was estimated to be below the LOAEL in humans. During the screening process of a child with soil pica behavior, ATSDR made a number of conservative assumptions. The child was assumed to absorb 100% of arsenic, but bioavailability of the chemical in soil will actually be less than 100%.

The child's weight was assumed to remain at 10 kg for three years, but the body weight will actually increase and the exposure dose will decrease. The child's soil ingestion rate was assumed to be 2,000 mg/day for 291.2 days/year, but the rate will actually be much lower. Although arsenic was detected above the health screening value in Scarboro soil, the chemical was not found to pose a public health hazard. For heptachlor epoxide in soil, data extrapolated from a rat study demonstrated that exposure doses were 833 and 66 times below effect levels for a child and a child with soil pica behavior, respectively.

For iron in soil, a child with soil pica behavior receives five times the Food and Drug Administration recommended daily dose of 10 mg. However, only low levels of iron in soil are absorbed by the human body. ATSDR's highest assumption of 51 mg for a child with soil pica behavior is still well below the dose of 200 mg/event required to cause toxicity. ATSDR's estimate also assumed 100% iron absorption from the gut and an ingestion rate of 2,000 mg/day for 291.2 days/year.

As with arsenic, both iron and heptachlor epoxide were placed in the "no apparent public health hazard" conclusion category based on the bioavailability of the chemicals in soil and ATSDR's exposure assumptions. This finding means that exposure is now occurring and will occur in the future in Scarboro, but the chemicals are not expected to result in adverse health effects to adults, children or children with soil pica behavior. For groundwater screening of current and future exposures, 379 different chemicals were sampled; 302 were detected offsite; and 353 were found onsite. Maximum concentrations above the comparison value were identified in 52 offsite chemicals and 101 onsite chemicals.

Benzene will be used as a surrogate compound for 7 offsite chemicals and 56 onsite chemicals that did not have a comparison value. Exposure doses were calculated for carcinogenic and non-carcinogenic effects to identify chemicals of concern. Over 1.1 million data points were collected for mercury in groundwater from 1990 to February 2003. Samples taken in the 1980s will not be included in the chemical screening process; these data will be used in the analysis of historic exposures. ATSDR used a screening level of 1 ppb for mercury in groundwater.

For surface water screening of current and future exposures, 370 different chemicals were sampled; 321 were detected offsite; and 313 were found onsite. Maximum concentrations above the comparison value were identified in 33 offsite chemicals and 85 onsite chemicals; 26 chemicals did not have a comparison value. Over 585,000 data points were collected for mercury in surface water; ATSDR used a screening level of 1 ppb for this pathway as well.

ATSDR is still attempting to obtain data from the Bull Run and Kingston plants to review and consider for inclusion in the chemical screening process for mercury. The Tennessee Valley Authority and other agencies have been contacted in this effort because the information is not available electronically. Dr. Markiewicz confirmed that the chemical screening data will be peer reviewed by ATSDR staff and will also be submitted to ORRHES for review and comment. The chemical screening process for air and biota will be presented to ORRHES at future meetings.

Several ORRHES members asked questions and made comments about past exposures in Scarboro. Ms. Sonnenburg questioned whether ATSDR's public health conclusions would apply to children who lived in the community in the past due to changes in soil and water composition over time. Ms. Adkins believes past exposures from groundwater is the source of the high arsenic level of 469.6 Fg/l detected in her body. She suggested that ATSDR overlay the chemical screening data with limestone slabs in the area. For example, springs and wells in her community shared the same limestone slabs with the K25 facility and East Poplar Creek area. Moreover, crevices and sinkholes are present in the underground limestone formation.

Mr. Lewis asked whether the EPA and FAMU data can be used to determine if historical contamination was more than ATSDR anticipated. Dr. Markiewicz made some clarifying remarks to ORRHES's comments and questions. The public health conclusion from the chemical screening process only applies to current and future exposures from 1990 and thereafter. To obtain answers about past exposures, historical sampling data can be reviewed or modeling can be conducted. However, a much higher degree of uncertainty is associated with reconstructing past exposures and determining risk.

Seafood in the diet is the primary source of arsenic rather than ground water or soil. The level of concern for urinary arsenic is ~200 Fg/l. Arsenic levels in Scarboro groundwater were not found to be abnormal for the area, but individual wells in the community may have elevated concentrations. Identifying the migration of contaminated water and particles through underground crevices is extremely difficult. Nevertheless, ATSDR will attempt to examine this pathway in Oak Ridge and determine potential health impacts. Data collected from multiple media in Scarboro do not indicate historical contamination was a public health hazard.

Dr. Akin noted that the chemical screening process focuses on current and future onsite exposure pathways for contaminants detected in the EPA and FAMU sampling data. However, some ORRHES members are attempting to use these findings to clarify dose reconstruction. The chemical screening process was not designed to identify exposures in Scarboro prior to 1990. Dose reconstructions should be revisited when ORRHES has the appropriate data to discuss this issue. Questions about the chemical screening process should focus on the ability of sampling data to characterize the community; the capacity of the risk assessment process to determine health concerns; and the appropriateness of ATSDR's conservative assumptions to calculate exposure doses and pathways.

Dr. Joseph pointed out that a dose reconstruction may not be necessary initially. DOE has been collecting groundwater data for the past 15-20 years. The data include offsite and domestic well samples. He offered to provide this information to ORRHES to review. Dr. Davidson mentioned that current arsenic levels in the body are due to current exposures. The chemical does not remain in the body for a long time and could not be attributed to past exposures. Dr. Markiewicz added that arsenic remains in blood for less than two days and in tissue for 7-14 days; the chemical does not bind to bone. Alternatively, dioxin and lead remain in the body for ~9 and 20 years, respectively.

Ms. Adkins asked if studies have been conducted on cumulative exposures from chemicals. Dr. Markiewicz acknowledged that this area of scientific study is limited, but research on synergistic effects is emerging. No studies have shown additive effects from exposures to multiple chemicals that are below the LOAEL for non-carcinogenic effects. Data released in 2001 demonstrated that some chemicals will cancel others when multiple exposures are involved. Mr. Washington mentioned that when samples were taken, the Oak Ridge plant was not at full capacity compared to its 90%-100% operation prior to 1990. As a result, contamination levels in Scarboro media may be higher than those reported in ATSDR's chemical screening data. For example, uranium levels were found to be five to ten times higher in Scarboro than other areas.

Dr. Craig was not aware of any evidence demonstrating that uranium concentrations were five to ten times higher in Scarboro than other areas. He requested that the reference for these data be cited. Mr. Washington clarified that this rate is documented in a report and was previously accepted by ORRHES. He acknowledged that the elevated uranium levels in Scarboro still did not result in adverse health effects.

Dr. Cember inquired about ATSDR's safety factors that were incorporated into the comparative values. Dr. Markiewicz explained that safety factors are based on either human studies or animal data. Safety factors of 10 are added for extrapolations from animal data; studies with a LOAEL for a total of 100; and sensitive sub-populations for a

total of up to 1,000. Unlike a regulatory assessment, ATSDR reviews assumptions, toxicological profiles and epidemiological data when determining public health implications of calculated doses.

### ***Public Comment Period***

The Chair called for public comments; no attendees responded.

### ***Work Group Reports***

Public Health Assessment Work Group (PHAWG). Dr. Craig reported that a meeting was not held on the previous day. Instead, PHAWG members interacted with the public during ATSDR's public availability session on the Y-12 uranium releases draft PHA. During PHAWG's three meetings convened after the April 2003 ORRHES meeting, the members discussed the WOC PHA, radiation terms and issues, ATSDR's chemical screening process, and administrative matters. PHAWG emphasized the need to continue to provide ATSDR with solid guidance to ensure the PHAs are completed on schedule.

Mr. Lewis encouraged ORRHES members to attend PHAWG meetings. For example, some of the confusion about historical versus current and future exposures in the chemical screening process may have been eliminated if more ORRHES members were in attendance when Dr. Markiewicz presented these data to PHAWG. He also pointed out that PHAWG's critique of the chemical screening data was not known to other members because minutes are not posted on the ORRHES web site in a timely fashion.

Dr. Craig added that PHAWG meets on the first and third Monday of each month. The members and ATSDR staff extensively discuss the technical aspects of ATSDR activities at Oak Ridge as well as mechanisms to clearly communicate scientific data to the lay public. He joined Mr. Lewis in extending an invitation for ORRHES members to attend PHAWG meetings. Dr. Davidson clarified that even if PHAWG resolves an issue or concern during its meetings, these topics should still be presented to the full ORRHES.

Several members commented on the article in the *Knoxville News Sentinel* on Y-12 uranium releases. Mr. Washington asked for the source of the information because any information published about the study should be known by the full ORRHES due to its role as an advisory group chartered under the Federal Advisory Committee Act (FACA). Minority opinions that some ORRHES members may have should be reported as well. Ms. Spencer replied that the source of the article was the newspaper reporter's interview with Dr. Charp and Mr. Hanley.

Dr. Davidson conveyed that Dr. Charp and Mr. Hanley were the appropriate persons to address the media's questions about ATSDR's draft PHA of Y-12 uranium releases. ORRHES had previously provided its comments on the document; ATSDR is now gathering comments from the public. Dr. Davidson added that ORRHES was informed about ATSDR's public availability session and encouraged to attend, but only a few members were present.

Dr. Akin mentioned that the article quotes a former Oak Ridge worker who disagrees with ATSDR's conclusions on the PHA. Her position is that she was exposed during her employment at the plant. Some members of the public may be confused about the fact that ATSDR assesses risks to the community rather than workers. He urged the members to continue to reinforce the distinct roles and functions of ORRHES and the different agencies involved in Oak Ridge site activities. This approach will ensure that ORRHES maintains trust and credibility with the public. Dr. Craig clarified that the PHA is an ATSDR product rather than a FACA document. ORRHES has no authority or influence in ATSDR's responses to the media, comments made by the public or the publication of the article.

Communications and Outreach Work Group (COWG): Mr. Lewis reported that COWG's meetings focused on efforts to ensure information is being properly distributed to appropriate groups. Assistance provided by Mr. Hanley and Ms. Spencer in developing the briefing packets is greatly appreciated, but improvements still need to be made in ORRHES's communications and outreach activities. The ORRHES web site should be operational and documents should be posted on the site in a timely fashion. The web site should be viewed as a legacy of ORRHES's activities and a tool to maintain public involvement. Agendas should be more detailed to inform the public about presentations and discussions as well as to increase attendance. Consideration should be given to reducing the length of meetings, particularly since a local television station may broadcast videotapes of ORRHES meetings.

Ms. Dalton clarified that the ORRHES web site has been in operation for more than one year and is updated after each meeting. Minutes are posted on the web site after being approved by the members. ATSDR acknowledges that the web site is a work in progress and will continue to make improvements. However, expenditures for all

aspects of Oak Ridge site activities must be considered, including contractor costs to maintain the ORRHES web site. Dr. Davidson specified that many individuals do not use the Internet as an information resource. As a result, COWG should focus on other mechanisms to communicate with the public. She recalled that the members were charged with developing a briefing book targeted to community-based activist organizations and other groups.

Ms. Spencer announced that the briefing books were developed and circulated to several organizations. Further distribution will now be facilitated by Oak Ridge Field Office staff. Dr. Akin noticed that public attendance at ORRHES meetings continues to decrease. The absence of the public is inconsistent with ORRHES's role to obtain feedback from the community on its deliberations. The members will be viewed with skepticism if the public is separated from the ORRHES process. Several members suggested potential reasons for the lack of public involvement.

First, an eight-hour meeting may not be the appropriate format to engage the public. The public comment periods do not provide the community with an opportunity to interact with ORRHES. Second, public concern about potential exposures and adverse health effects in Oak Ridge may have decreased since the PHA on Y-12 uranium releases found no apparent health hazards at the site. Third, many individuals may define a "health assessment" as a clinical examination rather than an evaluation of a site. Public interest in ORRHES activities may decrease after this issue is clarified. Fourth, many members of the public have no knowledge of ORRHES's existence, role, purpose and activities. Several members made recommendations to increase public participation in ORRHES meetings.

- Convene a one-hour session during ORRHES meetings that is focused on a particular issue for the public.
- Hold ORRHES meetings in other counties and place items on the agenda that are of specific interest to the community. PHAWG could make recommendations on locations where future ORRHES meetings should be held in relation to a particular PHA. For example, ORRHES and PHAWG meetings on the WOC PHA could be convened in the Kingston area.
- Publish a comprehensive press release to announce upcoming PHAs and other major documents.
- Clearly outline the public's role in the ORRHES process by obtaining input on specific areas of interest to the community, such as iodine, mercury, PCBs and health outcome data.



- Stimulate public interest by informing the community of ORRHES's activities.

Agenda Work Group (AWG). Mr. Hill reported that AWG discussed ORRHES's adherence to meeting agendas. With the exception of reconvening after breaks, the members generally follow agendas. During the next AWG meeting, Ms. Sonnenburg plans to suggest that public comment periods be increased from 10 to 20 minutes. Two ten-minute public comment periods does not convey to community members that their attendance is desired at ORRHES meetings. If no one is scheduled to make a public comment during a meeting, the presentation or discussion on the floor can continue. Dr. Davidson confirmed that public comment periods can be increased to 20 minutes, but ORRHES's deliberations will be limited.

Guidelines and Procedures Work Group. Ms. Galloway reported that the members have not met since the last ORRHES meeting. Dr. Davidson explained that GPWG only convenes when charged by ORRHES to perform a specific task.

Health Education and Needs Assessment Work Group (HENA WG). Ms. Mosby reported that the draft needs assessment report was sent to HENA WG members by FedEx; a copy of the document will also be given to Dr. Davidson. HENA WG will convene its next meeting on June 12, 2003 from 6:00-7:30 p.m. to provide members with an opportunity to comment on the draft report and formulate recommendations. HENA WG is proposing that a follow-up meeting be held on June 16, 2003 from 6:00-7:30 p.m. Dr. Rebecca Parkin, of George Washington University, will participate by conference call. HENA WG plans to present formal recommendations on the draft needs assessment to ORRHES at the next meeting. Due to scheduling conflicts of some members, HENA WG agreed to change the time of the June 12 meeting to 7:00-8:30 p.m.

### ***Unfinished/New Business and Outstanding Issues/Concerns***

Ms. Sonnenburg asked whether a new work group should be formed to make recommendations for NIOSH to conduct an occupational research project in Oak Ridge. Dr. Davidson explained that ORRHES is not chartered to provide guidance on worker exposures. Instead, she suggested that NCEH make a presentation to ORRHES on its environmental health research agenda. Agreement was reached for PHAWG to discuss the research agendas of both NCEH and NIOSH during its June 16, 2003 meeting. Dr.

Craig confirmed that PHAWG would list potential areas of study for the agencies and present these suggestions to ORRHES for consideration.

Ms. Isaacs reported that the PHA project plan is on schedule. The chemical screening process for groundwater and surface water was presented to ORRHES and the draft PHA on Y-12 uranium releases was issued for public comment. The public comment period will close on June 20, 2003. As with all PHAs of DOE sites, the PHA on Y-12 uranium releases will undergo an external peer review process. ATSDR will revise the document based on public comments received and present the new version to ORRHES and PHAWG for further review and comment. ATSDR is now focusing on WOC releases and historical releases from mercury. Ms. Isaacs commended PHAWG for providing ATSDR with valuable advice on filling data gaps and communicating technical information to the lay public.

Dr. Craig mentioned that the release of the draft PHA on iodine-131 was delayed until April 2003 to allow ATSDR to review and incorporate new monitoring data into the document. However, this date was not met. Ms. Isaacs announced that Dr. Joseph has been collaborating with ATSDR to collect deer thyroid studies and data on offsite air monitoring stations. The review of this information is ongoing, but the iodine-131 PHA is still a priority issue for ATSDR. Ms. Isaacs confirmed that ATSDR technical staff would hold a meeting to reorganize the project plan and complete the document. Mr. Lewis advised ATSDR to also incorporate communications issues in the project plan. In particular, a schedule for the briefing packets should be developed.

Ms. Dalton proposed several future meeting dates for ORRHES to consider. The next meeting is scheduled for July 29, 2003, but ATSDR is considering a later date to allow PHAWG more time to discuss and provide input on the upcoming PHAs. August 19 or August 26 is being proposed for the next meeting, but August 26 is a better date for ATSDR staff members who provide logistical support. The following ORRHES meetings are being proposed for October 21 and December 2, 2003 and February 3, 2004. Ms. Dalton noted that the proposed meeting schedule can be adjusted based on deliverables.

Dr. Davidson confirmed that the suggestion to hold a shorter meeting specifically targeted to the public will be considered. As a future agenda item, Ms. Sonnenburg proposed that Dr. Joseph give a presentation on DOE's historical groundwater data. Mr. Hill made a motion for ORRHES to send a letter of appreciation to EPA acknowledging Dr. Akin's participation and contributions to the process. He further recommended that a similar letter be sent to the agencies of ORRHES's other non-voting liaison members. The motion was seconded by Ms. Sonnenburg and unanimously approved with no further discussion. Dr. Davidson will draft the letters.

### ***New Action Items***

Ms. Dalton reviewed the action items raised during the meeting.

- Ms. Dalton to provide ORRHES with a copy of Ms. Kaplan's initial e-mail message to Dr. Charp about the Task 6 Report.
- ATSDR to provide ORRHES with a copy of the letter to Dr. Bounds on the cancer registry.
- Dr. Charp to provide ORRHES with a copy of the article on cancer rates in the Marshall Islands.
- ATSDR to clarify with Dr. Joseph the suggestion to update the compendium of all health-related research studies at Oak Ridge.

### ***Housekeeping Issues***

ORRHES applauded Ms. Mosby for her efforts in facilitating lunch.

### ***Closing Session***

Dr. Akin expressed his appreciation for the opportunity to serve on ORRHES. He acknowledged the tremendous dedication and talents of the members. He wished ORRHES continued success in accomplishing its goals. As the new EPA liaison, Dr. Akin was confident that Mr. Richards's expertise in radiation and access to the agency's chemical and toxicology resources will benefit the ORRHES mission. Dr. Falk reiterated ATSDR's appreciation for ORRHES's time and effort in providing input. ATSDR plans to maintain its commitment to finalize PHAs and complete other activities at the site. He was pleased that ORRHES's efforts are leading toward a successful outcome.

There being no further business or discussion, Dr. Davidson adjourned the ORRHES meeting at 8:00 p.m.

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

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Kowetha A. Davidson, Ph.D., D.A.B.T.  
ORRHES Chair

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**Glossary Key**

ATSDR	—	Agency for Toxic Substances and Disease Registry
AWG	—	Agenda Work Group
CDC	—	Centers for Disease Control and Prevention
COWG	—	Communications and Outreach Work Group
DOE	—	U.S. Department of Energy
EPA	—	U.S. Environmental Protection Agency
FACA	—	Federal Advisory Committee Act
FAMU	—	Florida A&M University
GPWG	—	Guidelines and Procedures Work Group
HENAWG	—	Health Education Needs Assessment Work Group
HERB	—	Health-Related Energy Research Branch
HHS	—	Department of Health and Human Services
HSRs	—	Health Statistics Reviews
ICRP	—	International Commission on Radiological Protection
INEEL	—	Idaho National Engineering and Environmental Laboratory
LNT	—	Linear No-Threshold
LOAELs	—	Lowest Observed Adverse Effect Levels
NIOSH	—	National Institute for Occupational Safety and Health
OREJC	—	Oak Ridge Environmental Justice Committee
ORRHES	—	Oak Ridge Reservation Health Effects Subcommittee
PHA	—	Public Health Assessment
PHAWG	—	Public Health Assessment Work Group
PNS	—	Portsmouth Naval Shipyard
TDEC	—	Tennessee Department of Environment and Conservation
TDOH	—	Tennessee Department of Health
WOC	—	White Oak Creek