OAK RIDGE RESERVATION
HEALTH EFFECTS SUBCOMMITTEE

CENTERS FOR DISEASE CONTROL AND PREVENTION
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Detailed Proceedings of the March 3, 2003 Subcommittee meeting

Call to Order/ Opening Remarks

The Oak Ridge Reservation Health Effects Subcommittee (ORRHES) convened on March 3, 2003 at the YWCA at 1660 Oak Ridge Turnpike, Oak Ridge, Tennessee. Chairperson Kowetha Davidson called the meeting to order at 12:19 PM, welcoming all attendees. No other opening remarks

Introduction of Subcommittee Members

Kowetha Davidson asked the attendees to introduce themselves. The attendees present during the meeting were:

Kowetha Davidson, Chairperson, ORRHES
La Freta Dalton, DFO, ATSDR
Chudi Nwangwa, Tennessee Department of Environment and Conservation
Elmer Akin, Environmental Protection Agency (EPA)
Bob Craig, ORRHES member
James Lewis, ORRHES member
Don Creasia, ORRHES member
LC Manley, ORRHES member
Jeff Hill, ORRHES member
Barbara Sonnenburg, ORRHES member
Donna Mosby, ORRHES member
Brenda Vowell, ORRHES member
Karen Galloway, ORRHES member
David Johnson, ORRHES member
Charles Washington, ORRHES member
Anthony Malinauskas, ORRHES member
George Gartseff, ORRHES member
Pete Malmquist, ORRHES member
Susan Kaplan, ORRHES member
Herman Cember, ORRHES member (by telephone)
Jerry Pereira, ATSDR
Burt Cooper, ATSDR
Karl Markiewicz, ATSDR
Theresa Nesmith, ATSDR
Lorine Spencer, ATSDR
Marilyn Palmer, ATSDR
Teresa James, Bechtel Jacobs
Jason Tarver, Q Systems

Deidre Tharpe, Q System
Kris Cutshaw, Q Systems
Gordon Blaylock, SENES
Ricky Gallaher, PACE 5-288
Norman Mulvenon, ORSSAB LOC/CAP
Tim Joseph, Oak Ridge Office, Department of Energy (DOE)
The recorder is Ken Ladrach, Auxier & Associates, Inc.

Agenda Review, Correspondence, and Announcements

Agenda Review

Kowetha Davidson reviewed highlights of the agenda for the meeting, dated February 20, 2003:

- Project update/administrative update presentation by Burt Cooper and Jerry pereira.
- Presentation and discussion of the Oak Ridge Environmental Information System (OREIS).
- Presentation by Tim Joseph on the DOE site annual environmental report.
- Work group presentations.
- Presentation by Karl Markiewicz on the ASTDR screening process for chemicals.
- Public Health Assessment Work Group presentation.
- Final public comment period of the meeting at 6:15 PM.
- Work group recommendations.

Correspondence

No correspondence to report since the December 3, 2002 ORRHES meeting.

Announcements

Dinner meal arrangements.
No other announcements.

Approval of December 3, 2002 ORRHES Meeting Minutes

A motion to approve the minutes of the December 3, 2002 ORRHES meeting was received and seconded. The minutes of the December 3, 2002 ORRHES meeting were approved by voice vote with none opposed.

Status of Action items – list provided

The list of action items was reviewed by the Subcommittee. La Freta Dalton highlighted that a copy of the Savannah River Site Needs Assessment was provided to the ORRHES members with the mailing for today's meeting; therefore, the action item for Theresa Nesmith from the Dec 3, 2002 ORRHES meeting to provide that document has been completed.

James Lewis commented that the action items list has many items listed as "ongoing" and asked to know the status of those items. La Freta Dalton responded that the status of ongoing or pending action items will be determined and reported to ORRHES members.

ATSDR Project and Administrative Update

Project update presentation by Burt Cooper:
Burt Cooper (ATSDR) reported that everything is on schedule per the project plan. Media specific chemical screening work is on schedule, the Y-12 uranium releases Public Health Assessment (PHA) is on schedule, the work on the mercury chemical specific PHA has begun, the work on the PHA for releases to White Oak Creek has begun.

James Lewis commented, regarding the project plan, that the completion status on the project plan distributed to ORRHES members does not seem to reflect the known degree of completion. ATSDR please update the project plan for ORRHES. Burt Cooper responded that ATDSR will provide an update completion summary to ORRHES members, and added that he has just verbally reported only on the status of PHA activities of the project plan. For example, the status of the Needs Assessment will be routinely reported by Theresa Nesmith.

James Lewis asked for a target date for the next list of references to be presented and the schedule for the next contaminant for PHA evaluation. Burt Cooper responded that he could provide those dates and the next PHAs will be for releases into White Oak Creek and releases of mercury, which are scheduled for presentation to the PHAWG on the same date April 7, 2003.

Barbara Sonnenburg asked is whether impacts of solid waste storage areas on groundwater are considered in any of the PHAs? Today's Knoxville newspaper reported on the impacts on the Clinch River and downstream reservoir of solid waste storage areas. Burt cooper responded that the PHA process will evaluate all of the groundwater systems. Bob Craig commented that the PHA for releases to White Oak Creek and the PHA for Melton Valley waste storage area releases will address those impacts. Burt Cooper confirmed that the initial discussion with the PHAWG for White Oak Creek is scheduled for April 7, 2003. Barbara Sonnenburg asked why these releases have not been considered by ORRHES earlier. Bob Craig responded that other PHA work has been assigned higher priority, beginning first with iodine, followed by uranium from Y-12 based on evaluation of the most serious threats and the past dose reconstruction work. The White Oak Creek and Melton Valley waste storage areas have begun.

James Lewis commented that Barbara Sonnenburg's question indicates that the general public and members of the Subcommittee who do not attend PHA Work Group meetings are not aware of PHA activities; therefore, the Subcommittee needs to get information about the PHA activities out to people so that they can participate as they may wish. Kowetha Davidson responded that the Communications and Outreach Work Group has responsibility for that communication.

Administrative update presentation by Jerry Pereira:

Jerry Pereira reported that Bill Murray has left the ATSDR field office in Oak Ridge and provided an updated plan for staffing of the ATSDR field office. Arrangements have been made for Bill Taylor to replace Bill Murray in the Oak Ridge field office. Bill Taylor is a toxicologist from the U.S. Food and drug Administration (FDA) who has worked for ATSDR in the past. Bill Taylor also is very community oriented and capable of writing health assessments. Hopefully Bill Taylor will begin work in the field office this month. Until Bill Taylor is present full time, the field office in Oak Ridge will be staffed by personnel from Atlanta including: Lorine Spencer, Marilyn Palmer (this week and next week). Perhaps the Federal Facilities Branch can provide a person during the third week of March. If Bill Taylor is not available the last week of March then Jerry Pereira will work with La Freta Dalton to arrange for staffing of the field office. The SEEP employee funding, plus additional funds from Dr. Falk, will be used to employ Melissa Fish on the project on a permanent, full-time basis at the field office along with Bill Taylor who will be full-time in the field office. Also on the project are Lorine Spencer at 60% to 70% of her time, La Freta Dalton at 60% to 70% of her time, and Jack Hanley full time working on the project. Thus, five ATSDR staff persons are working on the project full time or nearly full time. Office hours will be posted on the field office door each week this month. ATSDR will try to have the field office open as much as possible this month. This month, please call the field office before visiting to make sure it is open.

Charles Washington asked whether the field office will be filled with permanent staff at some time in the future. Jerry Pereira confirmed that two permanent persons will staff the field office full time, Bill Taylor and Melissa Fish.

Charles Washington cautioned Subcommittee members about making comments that include statements about exposures being of no concern to the community; it would be advisable to refrain from that because any radioactive particle can be of concern depending on the age of the exposed individual.

James Lewis expressed thanks to Lorine Spencer for her excellent work on community involvement tasks for the project thus far. Kowetha Davidson expressed appreciation for all of the time that Bill Murray has been in the ATSDR field office in Oak Ridge to date. Barbara Sonnenburg suggested that the Subcommittee thank Bill Murray in writing. Kowetha Davidson responded that she has already sent Bill Murray a card on behalf of the Subcommittee. There was also a reception in honor of Bill Murray.

Presentation and Discussion: Oak Ridge Environmental Information System

Presentation and Discussion:
Oak Ridge Environmental Information System (OREIS)
Deidre Tharpe – Program Manager, Q Systems, Inc.

Teresa James Environmental Information Management (EIM) Program manager for Bechtel Jacobs (BJC) first stated that OREIS is a BJC project within the BJC EIM Program. Teresa James expressed appreciation for the opportunity to visit ORRHES and demonstrate the OREIS application, and introduced Deidre Tharpe of Q Systems, OREIS Project Manager.

Presentation by Deidre Tharpe (project manager):
OREIS is a centralized, standardized, quality assured and configuration controlled environmental data management system. The database contains about 12 million analytical and field results and 25 gigabytes of GIS (geographic information system) data encompassing the Oak Ridge Reservation (ORR), Paducah site, and the Portsmouth site.

The OREIS application was first released in 1994 as a workstation application, and it was converted to a web based application in 1996. Sampling and field data are added to the OREIS weekly. OREIS was developed to fulfill Environmental information management obligations of DOE-ORO under the Federal Facilities Agreement (FFA). The parties to the FFA include U.S. EPA Region IV, U.S. DOE, and Tennessee Department of Environment and Conservation (TDEC). The mission of OREIS is efficient retrieval & long term storage of environmental and geospatial data. The primary users include DOE and its contractors/subcontractors performing environmental restoration and compliance activities, EPA, TDEC, other agencies.

In the early 1990s the OREIS was user ID and password protected. These protections were later removed at the request of DOE and then reinstated after September 11, 2001. The OREIS website receives about 30,000 hits per month.

Deidre Tharpe next performed a thorough actual demonstration of navigation through the OREIS website for the Subcommittee (computer screen projection).

OREIS Website displays shown:
(http://www-oreis.bechteljacobs.org/oreis/help/oreishome.html)

- Contact information for: Teresa James, Deidre Tharpe, David Cardin (DOE)
- OREIS website home page active links for:
  - username and password,
  - users guides,
  - data submission file structures ready to load with data,
  - data dictionary,
  - spatial query tool user guide,
  - OREIS RTL data submission user guide,
  - user's environmental measurements data transmittal form,
  - user's geographic data transmittal form,
  - data submission release form,

- OREIS user support page link to give help to users
- special OREIS data product request link
- frequently asked questions (FAQ) link
- OREIS data base training request link
- ORESI staff contacts link
- Index of the website pages
- "what's new" page
- links to other related home pages

A feature of OREIS that was demonstrated is the ability to select and download data:

- select site (Oak Ridge, Paducah, Portsmouth) of interest
- select project of interest from a list,
- select sample media of interest,
- select analysis type for the media selected,
- select view as reports about the data or download the actual data records,
- select lab measurements or field measurements or biota,

Another feature of OREIS that was demonstrated is the data catalogue search function. A search keyword is entered, for example "mercury", and a listing is returned that shows everything in the OREIS that pertains to mercury. The listing tells where each item listed is physically located.

Jeff Hill asked who has access to OREIS? Deidre Tharpe responded that an access account has to be set up and approved. Tim Joseph commented that he can authorize ORRHES members to have access on the DOE group account.

Elmer Akin asked whether sample location coordinates are included in the OREIS database. Deidre Tharpe responded that the sample location coordinates are included with the data in the OREIS.

Susan Kaplan asked why the access to the OREIS is controlled and also asked for a copy of Deidre Tharpe's presentation handouts. Tim Joseph responded that access control was reinstated after September 11, 2001 because there is information in OREIS that is considered sensitive, for example GPS coordinates for site buildings at Y-12 are in OREIS, which could be used to zero in on those buildings during a terrorist attack. La Freta Dalton took the action to print and distribute presentation handouts to ORRHES.

Presentation by Kris Cutshaw (Geographic Information System (GIS) data manager): Kris Cutshaw demonstrated downloading of GIS map data fromm OREIS. The data for this capability are from two TVA fly-over studies, performed in 1993 and 1998. OREIS home page link is "View/Download GIS Data". This link allows access to GIS data maps for Oak Ridge, Paducah, or Portsmouth.

The OREIS contains data that people have submitted from environmental projects conducted at the sites. The database down loads are retrieved from the data base dynamically rather than from old files linked to the site, so the data are always up to date.

Kris Cutshaw performed a demonstration for the Oak Ridge site:

- select ORR (Oak Ridge Reservation),
- select "vector" data or "raster" data (vector data are points, lines, and polygons and raster data are photographs/pictures),
- selecting vector data displays the ORR as a map of fly-over tiles or areas of the ORR,
- map data are stored in "Arcinfo format" in OREIS and down loaded in "Arcinfo export format",
- select a single fly-over tile (area of the ORR),
- the selected tile can then be enlarged and the available layers of downloadable data are listed beside the tile map image,
- for example, layer types include building roof lines, "meta data" (which are descriptive data about other data),
- selecting raster data displays the tiles representing aerial photographs from the TVA fly-overs,
- select a single tile (area of the ORR),
- the selected tile can then be enlarged for viewing and the available layers of data are listed beside the tile photograph image,
- for example, a layer is available for "meta data" on the raster data file,

Barbara Sonnenburg asked whether there are any maps in OREIS that display downstream areas. Kris Cutshaw responded that there are some downstream data but it is not available on the web site application. For example, there are data for locations downstream in the Clinch River and those data can be obtained by requesting it from OREIS staff, because it is not available from the OREIS website application.

Charles Washington asked whether the public can access un-redacted data from the OREIS. Kris Cutshaw responded that the OREIS data are all un-redacted but a user must have an access account and password to use the system application.

Charles Washington asked whether the raster data are current. Kris Cutshaw responded that the most current available raster data are from the 1998 TVA fly-over.

George Gartseff asked whether the 1998 update is for the maps and pictures or for sample analytical data. Kris Cutshaw clarified that it is the map/picture data (GIS data) that are up to date through 1998 (TVA fly-over). The analytical data are dated whatever date they were completed.

Presentation of Spatial Query Tool by Jason Tarver

Jason Tarver presented a demonstration of the OREIS spatial query tool for the Subcommittee. The spatial query tool is accessible from an OREIS home page link. The tool is not project based, you don't have to have knowledge of particular projects to use the tool.

Jason Tarver performed a demonstration for the Oak Ridge site:

- select the spatial query tool link on the OREIS home page,
- select the ORR site,
- the initial image shows the entire ORR and shows all sample points as colored dots,
- available data layers are listed in the margin (activate or de-activate each as desired),
- refresh map to update the data layers as selected,
- select feature from toolbar at top of page for "zoom in" and use cursor to draw a box to capture a sub-area of interest to enlarge, repeat as desired,
- toggle between the data layers list and a legend display for the image,
- set a data layer "active" to perform queries of the data in that layer, for example set surface water as active and use the "identify" button on the toolbar, other layers include buildings, operable units, etc.,
- click a sample location in the image to view data/information about that sampling location (station name, medium sampled, station type),
- can draw a zoom box around a sub-area of sampling locations to view their distribution spatially and select them for down loading of the sample analytical data. The down load file is tab-delimited so it will import directly into an MS-EXCEL spreadsheet,
- use query toolbar button to refine query to be more selective (by medium and sample station etc.), then down load the data,

- can draw a custom polygon zoom box to select data locations as an alternative to using a box to select,
- can print a map of the selection with legend from the site toolbar.
- Have a spatial query tool user's guide feature to open and/or down load the user guide for the spatial query tool (pdf file format).

Jeff Hill asked about the maximum zoom out capability, in order to view downstream river locations. Jason Tarver responded that the presentation began with a display at the maximum zoom out capability, which did not extend as far southeast as Jeff Hill had expressed interest. Kris Cutshaw added that OREIS contains downstream data but that it is not accessible from the website application and it could be requested through OREIS staff.

Elmer Akin asked whether the sampling date was included with data presented in a query selection. Jason Tarver responded that during the down load selection process the user has the opportunity to pick the data fields to be down loaded for the selected samples, including sampling date.

Elmer Akin asked whether the OREIS data have been QA/QC checked in the database. Teresa James responded that the OREIS contains data qualifiers associated with the data records (lab qualifiers applied by the lab, result qualifiers assigned by the project that generated the data, high-level data validation qualifiers assigned to some data). The answer is that data QA/QC level varies, the data qualifiers are shown with the data that are select for download. These data qualifiers can be selected for inclusion in the data down load.

Kowetha Davidson asked how long data down loads take. Jason Tarver responded that OREIS has 12 million records so down load time ranges form seconds to 30 minutes or even longer. OREIS hard ware and software are being upgraded to expedite future down load speed. About 50,000 records would take less than 5 minutes to download depending on the speed of the internet connection of the user's computer.

Bob Craig asked whether there is any interface between the TDEC database and the OREIS database. Teresa James confirmed that they are two separate databases. Tim Joseph suggested that TDEC would probably be willing to assist ORRHES members to down load data from the TDEC database.

Follow-up announcement:

Chudi Nwangwa announced that TDEC is available to assist anyone on the ORRHES to use the OREIS database to access data. Get in touch with Chudi for that assistance.

Jeff Hill asked that an e-mail be sent to ORRHES members reminding them that they can obtain an access account for the OREIS database from Timothy Joseph (DOE) and they can obtain assistance navigating in the OREIS database from Chudi Nwangwa (TDEC). Kowetha Davidson took the action to distribute that e-mail to ORRHES members.

Public Comment

No comments from members of the public.

Break

Break occurred at 1:35 PM.

DOE Update: Annual Site Environmental Report

Presentation by Dr.Timothy Joseph, Senior Scientist, U.S. Department of Energy, on the DOE 2001 Oak Ridge Reservation Annual Site Environmental Report Summary (ASER). The work is currently in progress on the 2002 annual report.

The ORRHES members were given the report summary document and a CD containing:

- the full ORR ASER which includes all the tabulated data summaries,
- the summary report generated by Tim Joseph and a group of high school students,
- the raw data tabulated that were used in report calculations.

All of the data on the CD are included in the OREIS database.

The detailed presentation addressed East Tennessee Technical Park (ETTP), Y-12 plant, ORNL, and the entire ORR in that order.

<u>ETTP annual environmental data summary:</u>

- There are 900 facilities on ETTP property,
- There are 550 of the 900 are scheduled for demolition,
- Surface water bodies within ETTP include:
  - Poplar Creek
  - Mitchell Branch
  - Clinch River

  - Large onsite ponds
- The regulatory agencies involved include TDEC and U.S. EPA,
- Permits involved:
  - 2 National Pollutant Discharge Elimination System (NPDES) permits (TDEC)
  - 2 Clean Air Act permits (TDEC)
  - 3 Resource Conservation and Recovery Act (RCRA) permits (TDEC) including 2 at the Toxic Substances Control Act (TSCA) Incinerator
  - 1 PCB disposal approval for the TSCA Incinerator (EPA)
  - 2 underground storage tank (UST) permits (TDEC)

Storm drains - ETTP has 136 storm drains (primary and secondary) and a primary waste water discharge point on Polar Creek and the Clinch River. All are monitored. The ETTP powerhouse area also has monitored storm drains.

ETTP waste water and storm water monitoring results showed 4 NPDES non-compliance events in 2001 (4200 waste water sample data points and 3600 storm water data points), two of these were for chlorine, one was for a bypass from machinery, and the last was a mis-sampling.

Waste water sample analytes (two discharge points) include gross alpha and beta radiation, uranium, transuranic radionuclides (TRU), Tc-99, volatile organic compounds (VOC), metals, toxicity, PCBs, pH, flow, additional parameters.

Storm water sample analytes (136 outfalls) include oil and grease, suspended solids, chlorine, pH, flow. Annual storm water characterization includes gross alpha and beta radiation, uranium, TRU radionuclides, Tc-99, VOCs, metals, PCBs.

Surface water monitoring locations at ETTP are on the Clinch River, Poplar Creek, Mitchell Branch, and onsite ponds. Sampling resulted in 2540 data points analyzed for gross alpha and beta radiation, uranium, TRU radionuclides, Tc-99, VOCs, metals, dissolved oxygen, pH, temperature, and flow. Also monitor biological parameters including fish bioaccumulation, toxicity studies, biodiversity, caged clams, benthic macroinvertebrates, and fish communities.

There are 920 data points from sampling at the TSCA incinerator. Analytes include uranium isotopes, TRU radionuclides, and Tc-99. There is air emission stack sampling performed at the K-33 building and analyzed for uranium isotopes. There is ambient air sampling performed at the ETTP (220 data points) resulting in analyses for uranium isotopes, TRU radionuclides, Tc-99, arsenic, beryllium, cadmium, lead, and chromium. Bob Craig asked whether the air analyses include PCBs. Tim Joseph responded that the analyses do include PCBs.

ETTP actual versus allowable air emissions comparison: 0.11 mrem versus 10 mrem (26 stacks from 11 sources including the incinerator). The 0.11 mrem dose is calculated for the hypothetical maximally exposed individual via air pathways. Barbara Sonnenburg asked whether there are other sources, besides the 11 from ETTP, from the ORR or from

outside ORR but from within Oak Ridge. Tim Joseph responded that there are other such sources, but the data he has just presented only account for sources from ETTP.

ETTP TSCA Incinerator actual versus allowable air emissions comparison table in tons/year and percent of allowable. Only for mercury were emissions greater than 1% of the allowable level. Barbara Sonnenburg asked how many times per year in-stack tests are performed at the TSCA incinerator; how many sample tests are the percent of allowable emissions results based on? Tim Joseph responded that he will have to find out the sampling frequency but that there were 920 data points for the incinerator stacks.

Don Creasia asked whether the reported emissions are measurements of free chemicals or measured as they are bound to something such as particulates. Tim Joseph respond that he does not know and would have to check.

Susan Kaplan commented to Barbara Sonnenburg that at TSCA the sampling is continuous but the monitoring of the samples is not continuous. The samples are collected continuously but not always analyzed real time (some are collected over time and are analyzed later). Susan Kaplan commented that the sample parameters that are monitored real-time are not of much interest because those do not include analytes that the ORRHES is likely to be interested in like heavy metals. The technology for real-time monitoring of things like heavy metals at the TSCA is lagging behind. Tim Joseph added that the raw data for the air monitoring at the TSCA incinerator are included on the CD distributed to ORRHES.

Tony Malinauskas asked about the footnote (cites 1995 test) on the air emissions tables displayed for 2001. Tim Joseph clarified that the footnote in the table states that the test procedure used dates from 1995.

Bob Craig commented that the state of the art for stack sample analyses is at levels that are so low that you have to composite sample over time from stack air sampling in order to have enough sample material to perform the sensitive analyses. Analysis on an instantaneous basis is not feasible; the levels present in the stacks are too low.

<u>Y-12 annual environmental data summary:</u>

- There are 800 acres and over 500 buildings/structures,
- The monitoring budget is over $4 million (about the same for each of the three ORR plants),
- Permits involved:
  - 1 National Pollutant Discharge Elimination System (NPDES) waste water permit regulates numerous water discharges from Y-12 (TDEC)
  - 1 Industrial User's Permit is issued by the City of Oak Ridge to regulate discharges to the sanitary sewer
  - 36 Air permits regulate 117 air emission points (TDEC)

Water quality monitoring data for 2001 identified 9 non-compliance events for the Y-12 waste water permit from over 11,500 lab sample analyses and thousands of field observations. Two were for chlorine in water, a few were for oil and grease from parking lot runoff, and a few were for pH in runoff water.

Sanitary sewer discharge monitoring data for 2001 identified no non-compliance events for the Y-12 sewer permit from over 4000 sewer discharge sample data points.

Biological monitoring of East Fork Poplar Creek in 2001 shows improving biodiversity, the number of species, but ought to be higher. Charles Washington commented that the presentation display states that concentrations of mercury and PCB in fish of upper East Fork Poplar Creek are not decreasing and noted reading elsewhere that the mercury on the ORR is decreasing, suggesting that the mercury has been transferring into the fish over a long time. Tim Joseph responded that since the remediation of East Fork Poplar Creek the residual levels of mercury in fish has decreased and has now leveled off but it is still high. The residual mercury that is in fish now will take many more years to decrease from current levels.

Susan Kaplan commented that she has heard that the concentration of mercury in fish is actually increasing and increasing at a greater rate in fish further downstream in East Fork Poplar Creek. Tim Joseph acknowledged that this is quite possible, and likely the mercury is moving downstream. Charles Washington added that the concentration of mercury downstream should be more dilute. Barbara Sonnenburg asked whether radiological analytes were measured in fish. Tim Joseph responded that those data are in the monitoring report and are coming up in the presentation.

Air monitoring data for radiological air emissions show that all are well below EPA criteria. The calculated Y-12 air emissions dose is less than 1 mrem/year. The corresponding air emissions dose from the entire ORR is also calculated to be less than 1 mrem/year. Charles Washington asked where the air monitors are located. Tim responded that the air monitor locations are shown in the 2001 annual monitoring report.

Air monitoring data for non-radiological air emissions show that these emissions are primarily associated with the steam plant. None of these emissions are greater than 12% of allowable levels. Mercury in ambient air was monitored in 2001 and results are comparable to background levels, which are well below the EPA threshold.

Groundwater monitoring data for Y-12 show the presence of a plume that has migrated east across Scarboro Road into Union Valley. All groundwater use there is restricted, there are no potable water wells present (industrial land use area). Primary groundwater contaminants include volatile compounds, nitrates, trace metals, and radionuclides. Remediation is ongoing using a well to remove groundwater for treatment. Groundwater contaminant concentrations near source areas are decreasing since disposal ceased. Closure of disposal sites and capping of disposal sites in the 1980s accounts for the decreases in concentrations in groundwater.

Barbara Sonnenburg asked whether DOE adds/combines the effects from the different facilities, including local TVA steam plants. Tim Joseph responded that he is about to present total impacts from the ORR but that the impacts from the TVA steam plant at Bull Run is not included.

ORNL annual environmental data summary:

- Site contains over 400 buildings,
- Includes the High Flux Isotope Reactor,
- Includes a steam plant,
- Includes 3 waste water treatment facilities
- Permits involved:
  - 1 site-wide NPDES permit for 164 monitoring points (TDEC)
  - 12 Air permits (TDEC)
  - 3 RCRA permits (TDEC) including 1 storage tank permit and 2 container storage permits
  - 3 UST permits

Water quality monitoring data for 2001 identified 4 NPDES non-compliance events for ORNL from over 6500 lab sample analyses and field measurements. All four events were from suspended solids from runoff during storm events. Radiological monitoring at the 3 waste water treatment facilities, at 3 stream locations, and at 27 outfall locations showed that all analyses were below EPA action levels. Aquatic toxicity testing results were all in compliance with TDEC standards. Discussion between Charles Washington and Tim Joseph about the manner by which air permits are issued: by source of emission versus the entire facility.

ORNL actual versus allowable air emissions comparison table with percent of allowable. Carbon monoxide and nitrogen oxides were emitted at the highest percent of the allowable level (10% of their allowable levels).

ORR (combined facilities) annual environmental data summary:

There is a separate annual monitoring program for the entire ORR as a single emission source. Tony Malinauskas asked how the ORR is "defined" because for example livestock are not distributed on the ORR but this monitoring program reports doses attributable to food crops, milk, deer etc. Tim Joseph responded that the monitoring program accounts for what the ORR is emitting and accounts for food pathway exposures by calculation assuming hay is collected from the reservation and used and assuming that hunters catch fowl and consume it etc. This approach provides a worst case assessment of exposure.

The maximum calculated dose to a hypothetically exposed individual from all air and all liquid effluent pathways to humans is about 5 mrem for the year. The air pathways alone contribute about 0.8 mrem of that 5 mrem for the year. The allowable EPA limit from all air pathways is 10 mrem for the year.

Barbara Sonnenburg asked why the deer couldn't be hunted in 2001. Tim Joseph responded that there was no deer hunting allowed because of security concerns since September 11, 2001; did not want hunters on the ORR property. The reason was not because of contamination in the deer.

The maximum calculated dose to a hypothetically exposed individual using surface water as drinking water and for other uses is about 0.2 mrem for the year. Bob Craig highlighted this dose estimate as very illuminating of the impacts on surface waters from the entire ORR.

The maximum calculated dose to a hypothetically exposed individual consuming vegetables, beef, and milk from around the ORR is less than 1 mrem for the year. The worst case dose estimate is less than 1 mrem from ingestion pathways.

The maximum calculated dose to a hypothetically exposed individual consuming fish from the Clinch River is 0.04 mrem for the year. This estimate is based on measured contaminant concentrations in fish from the Clinch River. The PCB concentrations in catfish are high and as a result there has been a long-standing TDEC consumption advisory for the Clinch River. Charles Washington commented that the 0.04 mrem dose from eating fish has to account for the size of the fish eaten and the organ/tissue in the fish in which the radionuclides would accumulate. Tim Joseph concurred and responding that different radionuclides will accumulate in different target tissues. Barbara Sonnenburg asked for an estimate of the number of fish eaten by a person that translates into this dose estimate. Tim Joseph responded that the fish consumption rates used in the calculation are very generous. Kowetha Davidson asked whether the calculations use EPA exposure factors handbook values. Tim Joseph confirmed that the EPA values are used for these calculations.

The maximum calculated dose to a hypothetically exposed individual consuming geese and turkey from around the ORR is less than 1 mrem for the year. This estimate is based on measured

In summary, the worst case exposure to all pathways from the ORR is about 5 mrem for the year, far less than average annual background radiation exposure. This would include consumption of all impacted foods and water.

Graphs for the impact of the entire ORR were shown depicting:

- airborne dose trend from ORR from 1996 through 2001 (leveled off at 1 mrem/year or less),
- all pathway maximally exposed individual dose trend from ORR from 1996 through 2001 (leveled off at about 5 mrem/year)

The summary report for the ASER was prepared by a class of Karns High School students for use by the public. Each year a class in applied communications or a class in creative writing is involved to produce the summary of the ASER. The format/style of

the written ASER summary is in the form of an interview of a fictitious character named professor Rad who explains radiation and answers questions about radiation and exposure to radiation. Examples are included that compare levels of radiation exposure (e.g., a diagram of a stack of books depicting the variety of levels of radiation exposure in life). In addition, a chart/form is included for a any person to use to calculate their own estimated annual radiation dose.

LC Manley asked about the dose estimate for Scarboro community on the colored-coded dose map in the handout. Comparison of various locations shows that in the Scarboro community the value is up to 0.8 mrem and is about 10 times higher than in surrounding locations on the map. What would the explanation be for that comparative difference? Tim Joseph responded that a variation with location is evident and it reflects less air emissions of radionuclides landing on some areas (e.g., south of ORNL) than landed on the Scarboro area. The levels are very low in both areas. Charles Washington added that if the Scarboro community received comparatively higher doses in 2001 then in the past (1940s, 1950s, 1960s etc.) the Scarboro community may have received quite a lot more dose when overall emissions from facilities were higher. Barbara Sonnenburg and Charles Washington asked how that question could be answered and how the old emissions are documented. Bob Craig commented that the dose reconstruction contains those estimates. That question is part of what the ATSDR PHA process is to address.

Elmer Akin asked about the Upper East Fork Poplar Creek mercury level that has reportedly leveled off and asked whether there is a fish advisory for that creek. Tim Joseph responded that the fish advisory is for the Clinch River not East Fork Poplar Creek, which is not populated by many fish of edible size.

Work Group Sessions

AGENDA WORK GROUP

Barbara Sonnenburg reported that future topics for discussion before the Subcommittee should be presented to the Agenda Work Group before future ORRHES meetings. Jerry Pereira's and Burt Cooper's reports (Administrative update/project update) will be a part of every ORRHES meeting. Jeff Hill commented that the Agenda Work Group has done well arranging agenda for ORRHES meetings to date.

GUIDELINES AND PROCEDURES WORK GROUP

On behalf of Karen Galloway, Kowetha Davidson reported that the Guidelines and Procedures Work Group does not have a report.

HEALTH EDUCATION NEEDS ASSESSMENT WORK GROUP

Theresa Nesmith reported that the focus groups of the Needs Assessment have been completed and the information from the focus groups will be added to the information from the telephone surveys and the key resource interviews to compile the final Needs Assessment report. The final Needs Assessment report should be available May 30, 2003. The plan is for the Needs Assessment Work Group to have the opportunity to look at the report before it is made available to the entire Subcommittee.

The Savannah River site Needs Assessment report has been circulated to the ORRHES, and a copy of another health education needs assessment report was distributed to ORRHES members (Fallon, Nevada site in Churchill County). This is another example of a needs assessment that used focus groups. Theresa Nesmith encouraged Subcommittee members to look at these reports and the processes and recommendations of those needs assessments. This can be useful for discussions about the format of the Oak Ridge needs assessment.

Barbara Sonnenburg asked when the Needs Assessment report will be made public. Theresa Nesmith responded that it will be made public after the Needs Assessment Work Group reviews the report (as previously requested by ORRHES). Barbara Sonnenburg asked if the report could be presented to the entire ORRHES. Theresa Nesmith responded that that would be fine, and asked that direction be given whether to provide the report to the Needs Assessment Work Group or the Subcommittee, or both. James Lewis commented that the report could be given to both the work group and the Subcommittee or to the work group first before it is brought before the full Subcommittee. Kowetha Davidson suggested that the work group review the report first before it is brought to the Subcommittee, in the same manner that public health matters are addressed by the PHA Work Group before they are considered before the full Subcommittee.

Barbara Sonnenburg asked for the final titles of the focus groups and how many people were in each focus group. Theresa Nesmith responded that she does not know how many people were in each focus group and knows only in general the focus groups that were conducted. Theresa Nesmith has not been involved in the details of the focus group recruitment and conduct and has not asked for the exact names of the focus groups because that information will be in the report. This is consistent with ATSDR trying not to be too involved in the needs assessment process so that the process does not go through the ATSDR internal review board (IRB) process. Barbara Sonnenburg asked that ATSDR request that the final report list the titles of the focus groups. Theresa Nesmith responded that she will ask that the report list the focus groups that were recruited. Kowetha Davidson commented that the Subcommittee can ask for the listing of the focus groups in the report if it is found during review that the report does not list them, but if the George Washington University IRB will not allow release of the list of focus groups them the Subcommittee will not be able to get that information.

Tony Malinauskas asked whether a draft of the needs assessment report will be available for public comment. Theresa Nesmith responded that usually the needs assessment reports are not open for public comment, but sometimes feedback from the participants in the needs assessment is obtained. If the report were sent out for public comment there would not be much room for them to make comments because of the nature of the content of the report (e.g., results of telephone surveys). Tony Malinauskas also noted that if the Subcommittee would request that the focus groups be identified in the report then the responsibility would be with the authors of the Needs Assessment report to justify why they do not want to include that information in the report.

Barbara Sonnenburg noted that the Needs Assessment Work Group expended much effort identifying what focus groups they thought were important and what "key informants" should be contacted and the work group would like to know whether the work groups and key informants that they identified were actually used/contacted. Theresa Nesmith responded that in the December 2002 ORRHES meeting she distributed a list of the categories for the focus groups, which can be compared to the focus groups identified by the work group to see which groups were recruited. In addition, most likely the key resource interviewee identities are kept confidential in accordance with the specifications of the IRB. Barbara Sonnenburg responded that the work group would simply like to know how many of its submitted suggestions were contacted. Theresa Nesmith responded that she can get an answer to that question. Theresa Nesmith added that the input provided by the work group was substantially used.

Regarding the Needs Assessment, James Lewis commented that: 1) the timeliness of getting information on the Needs Assessment back to the ORRHES has been a problem, 2) the Needs Assessment is excessively secretive/mysterious, making it very difficult for the Subcommittee to endorse the Needs Assessment as a means for communication with and education of the public. James Lewis expressed frustration at not being able to get answers to questions about the Needs Assessment or even find out the costs involved in the Needs Assessment. James Lewis reviewed the sample needs assessment report (Savannah River Plant) provided by ATSDR and in the recommendations in the example Needs Assessment found recommendations/issues that the ORRHES Needs Assessment Work Group has discussed. The Subcommittee should be provided something concrete back from the Needs Assessment process, which has been ongoing for about two years. Theresa Nesmith encouraged that Subcommittee members review the report when it becomes available and at that time comment and request any information that the Subcommittee believes should be included. Reiterated the confidentiality issue for the Needs Assessment as part of why info on the Needs Assessment has not come to the ORRHES during the process.

Pete Malmquist asked where the focus groups were held and whether the health needs assessments performed by each county's health department were incorporated into the ATSDR Needs Assessment? Theresa Nesmith responded that the results of the county health department health needs assessments were reviewed during the ATSDR Needs Assessment. Theresa Nesmith reminded Subcommittee members that the confidentiality

aspects of the needs assessment are used to encourage people to participate, and that the needs assessment process is different from other assessment processes.

Elmer Akin commented that the issue being discussed is an issue of trust and ORRHES needs to be able to trust the needs assessment process and report. Elmer Akin suggested that perhaps there is something that can be done to increase the level of trust that the Subcommittee has in the needs assessment. Theresa Nesmith encouraged the Subcommittee to wait for the report to determine the extent to which Subcommittee input was used. Theresa apologized for not having much knowledge of details personally.

COMMUNICATIONS AND OUTREACH WORK GROUP

James Lewis reported that the Communications and Outreach Work Group (COWG) has met twice since the December 2002 ORRHES meeting. The work group has developed six recommendations to possibly vote on today:

- ATSDR, in collaboration with ORRHES, develop a briefing book to be provided to the media and key groups, and provide periodic updates to the briefing book.
- ATSDR, in collaboration with ORRHES, develop a semi-annual newsletter for program overview and updates.
- ATSDR, in collaboration with ORRHES, develop an issue-based cross-referenced index of key issues, based on the various agenda from meetings, to be placed on the website.
- ATSDR place a summary of the project plan on the website and place the public health assessment process flow sheet for public health assessments on contaminants of concern, depicting ATSDR and ORRHES work group interactions, on the website.
- ATSDR supply resources needed to develop briefing papers for focussed PHAs on each contaminant for distribution prior to public release and ORRHES meetings.
- ATSDR make a presentation for each contaminant of concern in one central location (no specific community). If interest is expressed for another presentation in another community, the request will be made to ORRHES and the ORRHES will determine the need for another presentation.

Tony Malinauskas asked how members of the public learn about ORRHES meetings. James Lewis responded that the primary means is advertisements/announcements in various newspapers. Tony Malinauskas commented that he has not seen announcements in the Roane County News. La Freta Dalton confirmed that ORRHES meetings are advertised in the Roane County News, the Clinton Courier, and the Oak Ridger. Advertisements are run on Friday and Sunday. Press releases are submitted to other newspapers. The agenda for ORRHES meetings appear on the ORRHES website, the Federal Register includes ORRHES meeting announcements. The DOE newsletter also includes ORRHES meeting announcements.

James Lewis noted that a visit was paid to Kathy Daniels at the Oak Ridger. Kathy Daniels related that she can not spare the 8 hours of time to attend an ORRHES meeting,

she needs a more detailed agenda to narrow down when she might attend for particular topics or presentations. La Freta Dalton confirmed that detailed the ORRHES meeting agenda are posted on the website.

James Lewis also emphasized the need for ORRHES to develop an infrastructure to communicate to the public. Kowetha Davidson commented that some segments of the public are not addressed, particularly those members of the public who are not "electronically connected". Kowetha Davidson asked how the Subcommittee can get information out to the people that are not electronically connected. Bob Craig commented that the recommendation for a semiannual newsletter is a very good idea. Lorine Spencer added that the COWG had the idea of placing copies of the briefing book in the public libraries and putting the libraries on mailing lists for newsletters and ORRHES activity announcements. Kowetha Davidson added that there is a need to develop mailing lists and distribution mechanisms for the briefing book and newsletter recommended for development. Lorine Spencer responded that distribution process is being addressed but a proposal will be reported to ORRHES at a subsequent meeting.

Brenda Vowell asked whether the COWG had considered sending presenters to speak to groups representing the elderly such as the American Association of Retired Persons (AARP) about The ORRHES. The AARP is well represented in many communities. James Lewis responded that the COWG is compiling a list of numerous groups to visit for presenting outreach information from ORRHES, the AARP is an appropriate group to include in that outreach list.

David Johnson commented that the proposed briefing book would be something tangible to the community that would help increase their "trust" in the Needs Assessment. In addition to targeting information and presentations to the AARP it would be useful to target groups such as small rural churches and persons who are "turned off" by computers and prefer to talk to a person face-to-face or by telephone. It is possible to use community volunteer resources to accomplish some of this (e.g., Boy Scouts, Girl Scouts, 4-H, etc.). These efforts will gain credibility and visibility for the ORRHES process.

James Lewis added that it is beneficial for ORRHES members to print information from their computers and post the printed information where it can be seen by the public.

Brenda Vowell commented that each county has an active health council, representing a good cross section of the community in its membership. These people could be used as a means for distributing information to communities. Lorine Spencer asked ORRHES members to write down any ideas for target groups or individuals that could be used to help distribute ORRHES information to the public and forward those ideas to her.

Don Creasia asked how many people (members of the public) visit the ATSDR field office in Oak Ridge and whether people are getting information about ORRHES via visits to the field office. Perhaps the resources spent in the ATSDR field office on communication with the public is not really an effective way to get information out to people in the community, if people do not visit the field office. Kowetha Davidson

responded that ORRHES needs to do a better job of getting information out to the public so that more people will make use of the field office, attend work group meetings, and attend Subcommittee meetings.

Presentation and Discussion: ATSDR Chemical Screening for Current and Future Exposures (Surface Soil and Sediment Pathways)

Presentation by Dr. Karl Markiewicz on the ATSDR chemical screening process for current and future exposures from soil and sediment.

Overview of Screening Process

Karl Markiewicz presented the process flow diagram for the ATSDR chemical screening process. The process, as described in previous ORRHES meetings, includes the following steps:

- Collection of environmental sample analytical data
- Identify chemicals from the environmental data
- Compile media-specific, chemical-specific comparison values
- Apply the comparison values to the environmental data to filter the list of chemicals
- Determine which chemicals are eliminated from further review and which are carried further in the health assessment process

Subsequently, the exposure assessment for chemicals that carry through the comparison value filter is refined, adding more realism to the exposure assessment values. This leads to determination which of chemicals will be carried into the public health implications portion of the PHA. In the public health implications phase, the weight of evidence of chemical toxicity is evaluated to examine the studies on which the chemical specific screening values are based. This information is used to assess whether the final calculated exposure dose represents a public health problem.

The screening process using comparison values is an assessment phase that is designed to be very conservative. The exposure is assumed to be at the maximum level of chemical concentration, maximum bio-availability of the chemical, maximum duration of exposure, and maximum rate of exposure. that the Comparison values include EMEGs, RMEGs, CREGs. An EMEG is an Environmental Media Evaluation Guide. ATSDR has these EMEG values for drinking water, soil, and air. The following hierarchy of comparison values is used:

- start with ATSDR EMEG comparison values (based on MRL)
- EPA comparison values RfDs (reference doses) and RfCs (reference concentrations)
- other EPA comparison values besides RfDs and RfCs such as soil screening guidance.

The EMEG for soil is calculated as: EMEG in mg/g = (MRL x BW)/IR
where MRL is minimal risk level in mg chemical/kg BW/day, IR is ingestion rate in grams/day, and BW is body weight in kg (child is 10 kg, adult is 70 kg). The ATSDR MRLs are derived in a similar manner as the EPA RfDs and RfCs. ATSDR lists its MRLs and default screening IR values on the ATSDR website.

An example EMEG calculation was presented for arsenic ingestion in soil for an adult:

MRL = 0.0003 mg/kg/day (no adverse health effects)
BW = 70 kg
IR = 0.0001 kg soil/day
EMEG = 210 mg arsenic/kg soil (210 parts per million, ppm)

Don Creasia asked whether laypersons accessing the ATSDR website will know what an MRL is. Karl Markiewicz responded that the concept of an MRL is explained on the website, but concedes that it is not easy concept for laypersons to understand in detail. Exceeding the EMEG screening level does not indicate that health effects occur. The EMEG is a screening level not a health effect level. Charles Washington commented that the units are confusing and meaningless in mg/kg/day, could the expression use so many sized fish consumed per day? People in the area consume a lot of local fish and locally grown foods so there should be site specific IR values. Karl Markiewicz responded that in the public health assess stage ATSDR does relate the units in a more meaningful way, and that in the PHA ATSDR collects site specific IR values for fish, meat, milk, vegetables.

Barbara Sonnenburg asked how ATSDR tests for contaminants in the body in target organs. Karl Markiewicz discussed target organs of various contaminants. ATSDR sometimes tests body tissues (e.g., urine, blood) for chemicals but does not routinely test. The tissue that would need to be tested depends on the chemical of concern. For example, lead is a bone seeking chemical while uranium goes to the kidney along with most heavy metals. Kowetha Davidson commented that the amount of a chemical in the blood generally tells what is bio-available for distribution to tissues in the body that may be affected by the chemical. Chemicals deposited in the bone for example are not available, they remain in the bone and release from the body slowly over time.

Soil Screening Summary Statistics

Karl Markiewicz presented a summary of the results of the ATSDR screening of chemicals in soil:

- Soil sample analyses yield 363 different chemicals found in soil (297 of them were found offsite and 305 were found onsite)
- The maximum concentration was above the respective comparison value for 27 chemicals found offsite and 49 chemicals found onsite

- There is no comparison value for 51 of the chemicals (17 offsite and 38 onsite). For example, bromobenzene does not have a comparison value.

A comparison value for a similar chemical (for example another halogenated benzene as a surrogate for bromobenzene) is used when no comparison value is available, taking into account the toxicity information and weight of evidence for the chemical of interest and the surrogate chemical. The surrogate comparison values is used to derive a comparison value for the chemical of interest.

Kowetha Davidson asked whether the comparison value is the same as the screening value. Karl Markiewicz responded that the MRL for a chemical is the comparison value, and the MRL is used to derive the screening value.

Example chemical-specific maps of the seven-county vicinity depicting locations of sample results were displayed for the Subcommittee. These example chemicals included antimony (Sb), arsenic (As), lead (Pb), mercury (Hg), trichloroethylene (TCE), and thorium (Th). For each chemical, a map was shown depicting locations of all detections and non-detections followed by a map depicting only those locations where sample results exceed the comparison value. This illustrates the result of the screening process. Next, a determination is made whether each location exceeding the comparison values is offsite or onsite.

Screening values for these example chemicals in soil are:

- Antimony = 20 ppm
- Arsenic = 0.5 ppm
- Lead = 400 ppm
- Mercury = 20 ppm
- TCE = 1.6 ppm
- Thorium = no screening value

Barbara Sonnenburg asked whether a map is available that depicts all soil sample locations for all chemicals analyzed. Karl Markiewicz responded that he does not have that map and added that such a map would appear as a field of black dots covering the site because thousands of soil samples have been collected. Barbara Sonnenburg pointed out that the maps shown seem to reveal a relative lack of soil sample locations in some portions of the counties shown. Karl Markiewicz responded that some chemicals are sampled in certain locations more than in other locations. For example, the TCE sample locations are biased toward the known sources of TCE at the Oak Ridge site.

Charles Washington asked how the soil screening values relate to TLVs (threshold limit values). Karl Markiewicz responded that TLVs are standard occupational exposure values, which are different from the soil screening comparison values. The sample locations where the result exceeds the corresponding comparison value/screening value indicate the locations where a chemical passes through the screening process.

Charles Washington asked why the maps depict more thorium exceeding the comparison value at Y-12 than at ORNL. Karl Markiewicz responded that there appears to have been no sampling for thorium at ORNL, and asked LC Manley whether he had a response that accounted for the presence of thorium at Y-12 versus not at ORNL. LC Manley commented that, historically, there was thorium oxide powder at ORNL (X-10).

Handouts of summary statistics for chemical screening in soil and in sediment were distributed. Those handouts identify the names of all chemicals detected above their comparison values, offsite and onsite.

Sediment Screening Summary Statistics

Karl Markiewicz presented a summary of the results of the ATSDR screening of chemicals in sediment:

- Sediment sample analyses yield 352 different chemicals found in sediment (334 of them were found offsite and 269 were found onsite)
- The maximum concentration was above the respective comparison value for 42 chemicals found offsite and 56 chemicals found onsite
- There is no comparison value for 34 of the chemicals (18 offsite and 28 onsite).

For each chemical, ATSDR uses the same screening value for soil as for sediment for ingestion pathway purposes (inadvertent human consumption).

Example chemical-specific maps of the seven-county vicinity depicting locations of sample results were displayed for the Subcommittee. These example chemicals included antimony (Sb), arsenic (As), lead (Pb), mercury (Hg), trichloroethylene (TCE), and thorium (Th). For each chemical, a map was shown depicting locations of all detections and non-detections followed by a map depicting only those locations where sample results exceed the comparison value. A determination is made whether each location exceeding the comparison values is offsite or onsite.

Charles Washington asked how soil is distinguished from sediment because surface soil can be washed down stream and become sediment and soil samples are collected at depths specified by the sampling program. Karl Markiewicz responded that ATSDR considers material from wetland and stream bed locations to be sediment and that the depths at which soil or sediment are sampled are taken as entered into the data base by the investigators. ATSDR typically uses the sample results from the top few inches of soil or sediment for calculation of chemical exposure. If the sampling depth is not specified, the data are sometimes considered to be from the top few inches unless it is known that the samples are deeper cores.

Charles Washington added that it is important to sample sediment after storm events because the heavy water flow and runoff will stir up sediment (scouring) from deeper layers. Karl Markiewicz acknowledged that for a given chemical, sediment detection

locations are geographically distributed farther than for soil, due to the greater physical movement of sediment by erosion.

Parameter Values for Exposure Dose Calculations

For chemical screening calculations, initially the maximum value of each calculation parameter is used (detected chemical concentration, exposure duration, exposure frequency, and bio-availability). As the screening process proceeds, the parameter values are refined to be more realistic. For example, ATSDR will use the 68th percentile of the chemical concentration as the exposure concentration, which captures one statistical standard deviation about the mean of the chemical concentration data set.

For normally distributed data sets, Karl Markiewicz cited the definition of one standard deviation (1-sigma) as 68% of the data set, two standard deviations (2-sigma) as 95% of the data set, and three standard deviations (3-sigma) as 99.7% of the data set. In the environmental field, it is often accepted that environmental data approximate a lognormal distribution (few data points at high values and most data points at low values) rather than a normal distribution. However, ATSDR retains the use of one standard deviation (1-sigma) assuming a normal distribution in the data set. It can be argued that lognormal data distributions may be an artifact of inadequate/unrepresentative sampling. Sampling efforts often are biased toward the locations associated with higher chemical concentrations. The exposure patterns of humans are more normally distributed and do not routinely place people at the locations of highest chemical concentration. This is the reasoning behind ATSDR's use of a normal distribution of the data.

Estimated Exposure Dose Calculations

The equation for calculating exposure dose = C x IR x EF x ED/(BW x AT).

C = chemical concentration (mg/kg soil [ATSDR uses 68th percentile value])
IR = ingestion rate (kg/day for soil)
EF = exposure frequency (days/year)
ED = exposure duration (years)
BW = body weight (default 70 kg for adult, default 10 kg for child)
AT = averaging time (product of EF and ED = days)
$AT_{carcinogen}$ = product of 365 days/year and 70 years = 25,550 days
$AT_{non\text{-}carcinogen}$ = product of 365 days/year and ED years = days

Karl Markiewicz presented the results of exposure dose calculations for arsenic in soil or sediment as examples, using the existing sample data for soil and sediment concentration. The results of these were presented on vertical bar graphs ("thermometer graphs") to show relative levels of exposure risk. A chemical that passes through the chemical screening process to the exposure dose calculation stage (public health implications phase) is examined in this level of detail and even greater detail. Two thermometer

graphs were displayed; one for long term exposure (greater than 14 days exposure) and one for short term exposure (less than 14 days exposure). Each graph presents exposure dose in mg/kg/day, and labels corresponding to various effects are positioned beside the vertical exposure dose bar. The thermometer graphs are on logarithmic scale rather than linear scale in order to fit on one page for display.

The thermometer graph presented for ingestion of arsenic included lethal exposure dose levels, LOAELs in animals (lowest observed adverse effect level), NOAELs in animals (no observed adverse effect level), the apparent threshold level for cancer induced in humans, and the ATSDR oral MRL level. The estimated exposure dose for the site is well below the ATSDR MRL, meaning that arsenic would not be carried completely through the health assessment process for soil or sediment.

The thermometer graph presented for ingestion of antimony included lethal exposure dose levels, LOAELs, NOAELs, and the EPA RfD level. There are a variety of comparison values available and they span orders of magnitude, illustrating the variety of safety factors built into them to protect sensitive sub-population groups.

Karl Markiewicz demonstrated a spreadsheet-based exposure dose calculator for the Subcommittee to illustrate the effect on the calculated exposure dose when a parameter value is changed. The parameters (C, IR, EF, ED, BW, AT) are entered into the spreadsheet and the exposure dose is calculated (EXCEL spreadsheet). For example, changing the BW from 70 kg to 10 kg the exposure dose changes proportionately. Karl Markiewicz will leave this exposure dose calculation spreadsheet CD in the ATSDR Oak Ridge field office for ORRHES members to work with if they wish (Subcommittee members, please do not save any changes you make when exiting the spreadsheet).

Charles Washington asked how ATSDR accounts for synergistic effects of multiple chemicals. Karl Markiewicz responded that the evidence indicates that for chemicals below health screening levels (NOAEL levels) there are not synergistic interactions. Thus, ATSDR takes the position that there is no synergy among chemicals that are below their screening levels. This is supported by research studies. Charles Washington hypothesized simultaneous exposure to lead, uranium, and mercury, at levels that are slightly below their screening doses. Karl Markiewicz responded that he considers combinations of chemicals that target the same organ or tissue, which would be the kidney for uranium and mercury exposure (lead at typical environmental doses does not affect the kidney). He then considers the combination of uranium and mercury and how they impact the target tissues, and whether they are below their screening values. Thus, combinations of chemicals are considered. This is the approach at ATSDR for accounting for mixtures of chemicals. Kowetha Davidson added that it is inappropriate to assume synergism (enhanced effect of a chemical by combination with other chemicals), usually the effect of mixtures is additive, unless proven otherwise. Charles Washington commented that the absence of synergism has not been proven by research. Karl Markiewicz offered to provide references concerning the issue of mixtures of chemicals.

Dinner Break

Distribution of box meals 5:12 PM.

Work Group Sessions (continued)

PUBLIC HEALTH ASSESSMENT WORK GROUP

Bob Craig reported that ATSDR is about to issue the first Public Health Assessment (PHA), on uranium releases from Y-12. Bob Craig presented an overview of the PHA screening process (refer to the Process Flow Sheet for Providing Input into The Public Health Assessment Process).

The Public Health Assessment Work Group (PHAWG) has had a series of five meetings in which it has been involved in the development of this PHA. The PHAWG reviewed the references and the work performed by ATSDR on this PHA. This PHA has been officially transmitted to the Subcommittee for review. Following incorporation of Subcommittee review comments this ATSDR PHA will be made available for public review and comment. Following the public comment this PHA will be issued, by ATSDR, as the final PHA for uranium releases from Y-12.

The primary authors of this PHA (Paul Charp and Jack Hanley) are not present in the Subcommittee meeting. Herman Cember joined the Subcommittee discussion by telephone.

Overview of the draft PHA:

The PHA examines past exposures (1944 to 1990) separate from current exposures, and evaluates exposure pathways for uranium from Y-12. Past radiological exposure pathways evaluated include:

- Air pathway
- Surface water pathway
- Soil pathway

Past chemical (non-radiological) exposure pathways evaluated include:

- Air pathway
- Ingestion pathways (soil, foods, biota)

Task 6 of the Oak Ridge Dose Reconstruction was used as the primary source of data for past releases of uranium from Y-12. This reliance on the Dose Reconstruction was agreed to by the Subcommittee previously.

Current exposures are evaluated using data from EPA, Florida A&M University primarily from the Scarboro community, OREIS data, and TDEC data. The current radiological and non-radiological exposure pathways evaluated are the same as the pathways evaluated for past exposures.

ATSDR Conclusions for Past Exposures:
The total lifetime radiation dose to the maximally exposed person from uranium from Y-12 is 84.5 mrem. This is below the ATSDR MRL 100 mrem/year screening level and well below the 5000 mrem over 70 years screening level. All chemical concentrations for inhalation were much less than the intermediate duration inhalation MRL. All chemical ingestion doses were less than those for which health effects have been observed. The conclusion of ATSDR is that there is not a public health concern from past exposures. This means that although people were exposed, the exposure is unlikely to cause health effects.

ATSDR Conclusions for Current Exposures:
The inhalation lifetime radiation dose to the maximally exposed person from uranium from Y-12 is several orders of magnitude below the ATSDR MRL of 100 mrem/year and below the 5000 mrem over 70 years screening level. Regarding ingestion, the average uranium surface water concentrations are well below the EPA MCL (maximum contaminant level) for uranium and soil concentrations were indistinguishable from background. The non-radiological air concentrations were several orders of magnitude below the EPA action level. The non-radiological exposure doses from ingestion of uranium in soil were less than the MRL. The conclusion of ATSDR is that there is not a public health concern from current exposures. This means that although people were exposed, the exposure is unlikely to cause health effects.

Overall ATSDR conclusion:
ATSDR concludes that the levels of uranium released from Y-12 in the past and currently would not result in harmful health effects for adults or children, and the site is characterized as having "no apparent public health hazard" from exposure to uranium from Y-12. This means that people could be or were exposed but the level of exposure would not likely result in adverse health effects. ATSDR recommends that the community be informed of the evaluation of uranium releases from Y-12 and that there is no public health hazard from past and current exposures. ATSDR will work with ORRHES to determine the best way to communicate the results of this PHA to the people of the community.

Don Creasia asked how the lung dose from uranium was calculated. Herman Cember responded that he hasn't seen the calculations but believes it to be based on the ICRP 30 3 compartment lung model for the respiratory tract, which gives the average dose to the

lungs as a whole. This is the standard calculation method, which typically assumes a 1 micron particle size for conservatism, accounts for the solubility of the inhaled uranium, estimates fractional deposition of activity, estimates clearance from each model compartment, and uses the uranium radiation energies to calculate total radiation dose to the lungs. Herman Cember pointed out that the ICRP 66 model goes into more detailed calculation (for each portion of the lung), but in this case the ICRTP 30 model was used.

Charles Washington asked what was used to estimate uranium emissions for years when records were not kept of the annual uranium emissions from the entire plant. During those years workers worked three 8-hour shifts per day, for 40 hours per week. Bob Craig responded that those uranium emissions are based on the Task 6 Oak Ridge Dose Reconstruction estimates for 1944 to 1990. Herman Cember commented that he believes that there were air monitors in town at stations that would measure the radionuclide concentrations in the air to which people were exposed offsite, and it is the exposure concentration rather than total emission that is needed to estimate exposure.

Charles Washington commented that the locations for such monitors must be placed so that they account for local meteorological conditions and the effect on transport of the uranium particles in air. Herman Cember agreed, and stated that he believes those meteorological factors were taken into account when the air monitoring was performed. Further, Charles Washington noted that the uranium concentrations measured in the Scarboro community (the closest community to Y-12) locations are several orders of magnitude higher than at any other locations outside the plant and asked whether that factor was considered in the PHA. Herman Cember responded that although the Scarboro community measurements were the highest, the concentrations are extremely small (femtocuries per cubic meter) compared to levels of concern in air (picocuries per cubic meter).

Charles Washington asked what the long-term effect of this exposure to small concentrations would be on the community over the 50 to 60 years of exposure, considering DOE operated multiple sites at over the years (multiple sources of emission). Bob Craig responded that the PHA document states that the lifetime effect is the 84.5 mrem from past exposures presented for the maximally exposed person. Kowetha Davidson asked whether Charles Washington was implying that emissions from other sources would have produced higher concentrations in Scarboro than Y-12 would have. Charles Washington responded that the emissions from all sources would have impacted the Scarboro community. Herman Cember asked how the air monitoring data can be used to distinguish between uranium releases from Y-12 versus uranium releases from the other plants. Tony Malinauskas acknowledged Herman Cember's question and pointed out that this PHA addresses only releases from Y-12. Bob Craig responded that Jack Hanley and Paul Charp (ATSDR) will be asked Herman Cember's question: how does the PHA distinguish only the uranium releases from Y-12 using the air monitoring data at locations in the community. Charles Washington added that there is a significant difference between plant operation at 100 % capacity and operating at 25% to 35% of capacity.

Elmer Akin commented that EPA received an early copy of this PHA document and EPA will make comments independent of the Subcommittee. The issue may be brought out that EPA has another way of deriving a "safe level" of radiation that is different from the ATSDR 100 mrem value that is in this PHA document. The EPA level is a risk based value which will be lower than the ATSDR 100 mrem value. Bob Craig added that the issue of using a dose based versus risk based value will likely come up in discussions and comments. There is a difference of opinion on which basis to use to present the results of the PHA.

Charles Washington cautioned the Subcommittee on the wording in the ATSDR conclusion "…would not result in harmful health effects." Kowetha Davidson pointed out that today the ORRHES is considering the PHAWG comments on the ATSDR PHA, the Subcommittee is not deciding today whether or not to endorse the PHA and its conclusions and recommendations.

Herman Cember, commenting on how to present the results of the PHA to the public, urged that the best way to present the results is to compare to the uranium exposure people are exposed to routinely anyway in the absence of emissions from the plants. The use of units such as mrem, femtocurie, picocuries etc. will likely confuse the public and lack meaning.

Bob Craig read the recommendation to the Subcommittee from the PHAWG:
As part of our review of the ATSDR draft "Public Health Assessment Y-12 Uranium Releases," the ORRHES recommends the attached comments to ATSDR for their consideration and response.

Overview of the PHAWG comments on the draft PHA:

Tony Malinauskas reported on details of the PHAWG comments. The PHAWG reviewed the draft PHA for 2 weeks and then compiled comments. Two categories of comments were compiled: editorial comments and issue-related comments. The PHAWG then discussed its review comments. Skipping the editorial comments, the technical comments/issues are:

Technical Issues/Comments:

Comment 1:
If the releases of uranium from Y-12 have a greater effect in the Scarboro community due to Scarboro's proximity to Y-12, then this serves as the limiting case. If not, then the title may need to changed to releases from the DOE facilities (not just Y-12).

Comment 2:
Does the ATSDR's estimate of the dose include natural background contribution or is it only the contribution from the Y-12 plant? Barbara Sonnenburg asked whether uranium contributions from coal plants (Kingston and Bull Run) are included. Tony Malinauskas

responded that the measurements conducted in Scarboro would include contributions from all sources including the local coal burning power plants (TVA). Herman Cember commented that this is a potential contributing source and presumes they impact the air measurements.

Comments 3, 4, and 6 (similar):
If the impacts on the Scarboro community are safe then the PHA document should emphasize this strongly because of long standing community concerns about health impacts.

Comment 5:
The relationship and differences between the MRL and the screening level should be clarified.

Comments 7, 8, and 9 (similar):
The ATSDR 5000 mrem over a 70 year period and 71.4 mrem/year appear to be used equivalently in the PHA document and are used as the MRL. The appropriateness of these values for use as the MRL has been argued at previous ORRHES meetings. It has been argued that this MRL is not conservative and not acceptable as a screening level. The use of the MRL for radiation exposure needs to be better defined and justified.

Comment 10:
Appendix C to the PHA document is difficult to understand and needs re-writing for a layreader.

These PHAWG recommends to the Subcommittee that these comments be submitted to ATSDR for consideration. ATSDR would be required to respond to each of these comments.

Barbara Sonnenburg asked whether both editorial and technical comments are being proposed for submittal to ATSDR. Tony Malinauskas responded that both the technical comments and the editorial comments from the PHAWG are to be submitted to ATSDR.

Jeff Hill commented that the ATSDR recommendation in the PHA does not include a statement that the impacts from plants/releases other than Y-12 will be considered by ATSDR. The text leaves the question in the reader's mind whether or not the combined effect of all releases will ever be assessed. Tony Malinauskas responded that the first PHAWG comment asks ATSDR to substantiate the assumption that Scarboro is the maximally impacted community from uranium from Y-12. Bob Craig commented that a uranium release PHA will be performed for each plant and that ATSDR will ultimately consider cumulative releases from the plants.

Elmer Akin revisited the issue of trying to distinguish uranium from Y-12 from uranium from other sources when measurements are collected in the Scarboro community. Perhaps the ATSDR approach regarding uranium is to determine whether uranium in Scarboro is safe (and assumed to be entirely from Y-12); therefore, uranium levels in all

other communities are safe. Is this the thinking of ATSDR on uranium? Bob Craig responded that first PHAWG comment on the PHA addresses exactly Elmer Akin's question. ATSDR must prove that Scarboro is the most heavily impacted community from Y-12. Herman Cember asked whether there are air monitoring data from other communities around the DOE plants and why so many samples were taken in Scarboro. Bob Craig responded that air monitoring data in other communities were not nearly as extensive, but there may be some data. In the technical comments, the PHAWG is asking ATSDR to examine available data (Scarboro and other community areas) and demonstrate more clearly either that all of the uranium in the measurements is from Y-12 or that other sources contribute, and demonstrate whether Scarboro is the most highly impacted community from uranium releases. LC Manley reported that he has often asked the question "Why were so many more samples collected in Scarboro than elsewhere and why aren't other areas sampled extensively as well?" LC Manley does not know the rationale behind this sampling bias. Herman Cember suggested that perhaps it was suspected that Scarboro would likely be the worst case offsite area (most highly impacted). Tony Malinauskas added that ATSDR used data that were available to them from other efforts and did not perform additional sampling of their own for this PHA.

Regarding the bias toward sampling more extensively in Scarboro, Charles Washington reported that more sampling was performed in Scarboro because that was the closest community to the property line of the Y-12 manufacturing plant. In addition, DOE records show that originally the Scarboro community area was planned as an upscale white community and subsequently that plan was changed and the community was ear marked to be a minority community when scientists became aware of the possibility of a catastrophe.

James Lewis commented that Scarboro may have been sampled more extensively because of all the media attention it always receives as a minority community that is located close to the plant fence line. Community members specifically asked EPA to sample in other areas; however, EPA failed to sample elsewhere and followed the mandate of a single group. James Lewis suggested that the Subcommittee needs to have the ATSDR authors of the PHA available to address these issues/comments about the PHA, and the ORRHES should stop trying to answer these questions themselves and ask the experts at ATSDR to provide the answers. James Lewis presented a slide of the ATSDR Process Flow Sheet for Providing Input into the PHA Process to emphasize the opportunities for the public and non-PHAWG ORRHES members to provide input into this PHA process through the PHAWG group (five PHAWG meetings on this PHA). Too few people are taking advantage of attending these PHAWG meetings. The details of the PHA are discussed in the PHAWG meetings, which are the best stage in the PHA process to raise issues and present comments. The proposed technical and editorial comments are from the PHAWG "pilot review" of the PHA. In addition to the PHAWG meetings, there will be opportunities to comment and provide input to the PHA when the public comment period occurs. At that time ATSDR will make a presentation about the PHA. Today the ORRHES is voting to approve transmittal of the current (preliminary review) PHAWG comments to ATSDR. Individuals will not be limited in their ability to

make comments on this PHA after this Subcommittee meeting. James Lewis emphasized the need to look at and make use of the opportunities built into the process.

Kowetha Davidson reiterated that the vote today will be whether or not to transmit the existing PHAWG comments on this PHA to ATSDR. The Subcommittee is not voting today on whether or not to endorse the PHA document. Kowetha Davidson emphasized that what is most important is getting approval from the sub-committee members to transmit these comments to ATSDR. She stressed that it was not up to the Subcommittee to endorse the PHA document. The comments include each work group member's comments in either the technical or editorial comments.

Tony Malinauskas and Herman Cember proposed amending technical comment 1 to ask that ATSDR state in the PHA document that the measurements in Scarboro represent uranium releases from all sources in the area and not only releases from Y-12. The PHA document fails to conclusively distinguish the source of uranium in Scarboro as being from Y-12. Herman Cember agreed and stated there was no way he saw in the report to distinguish between or identify the source of uranium release. He did state that the correlation between atmospheric concentrations and the amount of release from Y-12 during the period of 1986 to 1995 is good. The graph looks good and the R^2 value is greater than 0.9, which is excellent. This implies the level of activity that is being measured originated at Y-12 because it correlates so well with the emissions that came from Y-12. Herman Cember also noted that he does not know the accuracy of the emissions estimates. Other than by implication, there is nothing that really explicitly can identify the origin of the uranium that is measured in the Scarboro community.

Discussion of the schedule for the next ORRHES meeting date:

Barbara Sonnenburg requested that the Subcommittee consider the schedule for the next ORRHES meeting, which was previously scheduled for April 1, 2003. La Freta Dalton considered dates for the next ORRHES meeting, and proposed that the April 1st date is too soon. The ORRHES is currently also scheduled to meet on June 3rd which is a fixed date because Dr. Falk plans to attend that meeting. La Freta Dalton proposed Tuesday April 22, 2003 and the Subcommittee concurred with that date for its next meeting.

Public Comment

No comments from the public.

Break

Break occurred at 6:45 PM.

Work Group Recommendations

AGENDA WORK GROUP

The Agenda Work Group has no recommendations.

GUIDELINES AND PROCEDURES WORK GROUP

The Guidelines and Procedures Work Group has no recommendations.

HEALTH EDUCATION NEEDS ASSESSMENT WORK GROUP

The Health Education Needs Assessment Work Group has no recommendations.

COMMUNICATIONS AND OUTREACH WORK GROUP

RECOMMENDATION 1:

James Lewis reported the following recommendations from the Communications and Outreach Work Group.

ATSDR, in collaboration with ORRHES, develop a briefing book to be provided to the media and key community groups, and provide periodic updates to the briefing book.

This recommendation received a motion, was seconded, and passed by the Subcommittee by a vote count of 13 in favor and none opposed.

Kowetha Davidson asked that an action item be taken by the work group and ATSDR for development of a distribution strategy for the proposed briefing book, and for any work product that ORRHES prepares for public distribution.

RECOMMENDATION 2:

James Lewis reported the following recommendations from the Communication and Outreach Work Group.

ATSDR, in collaboration with ORRHES, develop a semi-annual newsletter for program overview and updates.

This recommendation received a motion, was seconded, and passed by the Subcommittee by a vote count of 13 in favor and none opposed.

RECOMMENDATION 3:

James Lewis reported the following recommendation from the Communication and Outreach Work Group.

ATSDR, in collaboration with ORRHES, develop an issue-based, cross-referenced index of key issues, based on the various agenda from meetings, to be placed on the website.

Herman Cember asked who identifies what constitutes a key issue. Kowetha Davidson responded that ATSDR and ORRHES will make those determinations. James Lewis commented that the intent of this recommendation is to make the ORRHES website more user friendly and to make it easier for people to find the key issues.

This recommendation received a motion, was seconded, and was passed by the Subcommittee by a vote count of 13 in favor and none opposed.

RECOMMENDATION 4:

James Lewis reported the following recommendation from the Communication and Outreach Work Group.

ATSDR place a summary of the project plan on the website and place the public health assessment process flow sheet for public health assessments on contaminants of concern, depicting ATSDR and ORRHES work group interactions, on the website.

This recommendation received a motion, was seconded, and was passed by the Subcommittee by a vote count of 13 in favor and none opposed.

RECOMMENDATION 5:

James Lewis reported the following recommendation from the Communication and Outreach Work Group.

ATSDR, in collaboration with ORRHES, make presentations on each contaminant of concern as necessary.

This recommendation received a motion, was seconded, and was passed by the Subcommittee by a vote count of 13 in favor and none opposed.

Regarding EPA sampling at Scarboro, Elmer Akin commented that EPA is on record that it will not unilaterally sample at other communities across the area because that level of sampling will be decided by the agencies involved in Oak Ridge (DOE, TDEC, and EPA). DOE will be the lead agency regarding conducting sampling.

PUBLIC HEALTH ASSESSMENT WORK GROUP

RECOMMENDATION 6:

Tony Malinauskas recommended the following amendment to the recommendation from the Public Health Assessment Work Group on the draft ATSDR Public Health Assessment for Y-12 Uranium Releases.

Amend the first technical comment to include the sentence: "Also, it should be noted that all the measurements in the Scarboro community represent uranium releases from all sources in the area and not only from the Y-12 facility."

This recommendation received a motion, was seconded, and was passed by the Subcommittee by a vote count of 12 in favor, none opposed, and 1 abstention.

RECOMMENDATION 7:

Bob Craig reported the following recommendation from the Public Health Assessment Work Group.

As part of our review of the ATSDR draft "Public Health Assessment Y-12 Uranium Releases," the ORRHES recommends the attached comments to ATSDR for their consideration and response.

This recommendation received a motion, was seconded, and was passed by the Subcommittee by a vote count of 12 in favor and 1 opposed.

Don Creasia commented that there was not sufficient time for review of the PHA for Y-12 uranium releases, and he voted today trusting in the effort of the work group. Kowetha Davidson responded that the Subcommittee members were asked to review only a portion of the PHA document in order to become familiar with it, rather than the entire document because of its size. A minimum amount was sent to Subcommittee members and the work group for review (the Executive Summary, Public Health Implications, and the Conclusions and Recommendations sections).

Regarding Don Creasia's comment, James Lewis commented that ORRHES should examine its information distribution mechanism and distribution schedule in light of the fact that the Subcommittee members will be reviewing a number of PHA documents.

Unfinished Business/New Business/Issues/Concerns

La Freta Dalton voiced a concern/reminder for Subcommittee members. This relates to the ethical responsibilities of ORRHES members when they have access to or are provided with data or information. As federal government employees ORRHES members are required to hold that information in confidence, unless specifically advised that the information may be shared. There has been some confusion regarding sharing knowledge of a data validation version that was shared with members of the PHAWG. Knowledge of a data validation version is considered knowledge only for federal agencies involved. Please keep such ethical responsibilities in mind in the future.

Identification of Action Items

The following action items were read by Kowetha Davidson:

ACTION 1: La Freta Dalton will provide an updated action items report including the status of items listed as ongoing or pending

ACTION 2: La Freta Dalton will print handouts for Deidre Tharpe's presentation and distribute them to ORRHES members.

ACTION 3: Kowetha Davidson will send an e-mail to ORRHES members to remind them that they can obtain an access account for the OREIS database from Timothy Joseph (DOE) and they can obtain assistance navigating in the OREIS database from Chudi Nwangwa (TDEC).

ACTION 4: Karl Markiewicz will obtain for the ORRHES a map of surface soil samples that shows all sample locations for all analytes.

ACTION 5: Karl Markiewicz will obtain for the ORRHES literature references regarding the effects of mixtures of contaminants.

ACTION 6: Karl Markiewicz will review soil and sediment data from the Bull Run and Kingston steam plants in conjunction with the Public Health Assessment Work Group.

ACTION 7: The Communications and Outreach Work Group and ATSDR will develop a strategy for distribution of any ORHHES work product to be released.

Housekeeping Issues and Closing Comments

All ORRHES members should review the distributed list of members of each of the work groups and provide any changes to La Freta Dalton or Marilyn Palmer.

The next ORRHES meeting will be on April 22, 2003.

The meeting was adjourned at 7:30 PM.