SUBCOMMITTEE ON CONSEQUENCE ASSESSMENT AND PROTECTIVE ACTIONS (SCAPA)

2004 ANNUAL MEETING

Washington, D.C.
May 6, 2004

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0.0 EXECUTIVE SUMMARY

The Department of Energy (DOE) Subcommittee on Consequence Assessment and Protective Actions (SCAPA) convened its annual meeting at the Wyndham Washington Hotel in Washington, D.C., on Thursday, May 6, 2004, in conjunction with the Emergency Management Issues Special Interest Group (EMI SIG) meeting. Thirty-seven (37) individuals from the public and private sectors participated.

The primary purpose of the annual meeting was to continue to provide a forum for SCAPA members and its associates to review its accomplishments, products, and projects since the May 8, 2003 meeting in Las Vegas, Nevada, and to also discuss its present and future mission and its implementation. Several technical presentations of interest to the membership, including those from the three active SCAPA working groups, were delivered.

Dr. Al Feldt, NA-41 SCAPA DOE Advisor, welcomed everyone and reviewed the important points that were discussed and decisions that were made during the May 2003 SCAPA Meeting in Las Vegas, Nevada. A year has now passed since Jim Fairobent, Director, DOE Office of Emergency Management, made a decision to move the SCAPA program under the EMI SIG umbrella. At that time, Cliff Glantz, Pacific Northwest National Laboratory (PNNL), was appointed as the SCAPA Coordinator. These decisions appear to be good decisions, as the past year has been a very productive one for the SCAPA program.

Carl Mazzola, Shaw Environmental, briefly discussed the report on the Las Vegas, Nevada SCAPA meeting, as well as the open action items and their disposition.

Marcus Weseman, Oak Ridge Institute for Science and Education (ORISE), provided an overview of the Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS) program that provides a clearing house for the collection of studies aimed at identifying chronic effects of toxicological exposures. Paul Tobin, EPA, discussed the work that was performed last year to develop Acute Exposure Guideline Limits (AEGLs). There has been significant progress in the development of AEGLs over the past year. AEGLs are acute exposure limits for chemicals for at least five exposure periods. After Paul's presentation, Al Feldt encouraged the DOE/National Nuclear Security Administration (NNSA) sites to submit priority chemicals to EPA through him for consideration during the next round of AEGL development.

Darryl Randerson, Air Resources Laboratory/Special Operations and Research Division (ARL/SORD), briefed everyone on the work that was accomplished over the past two years by the DOE Meteorological Coordinating Council (DMCC), which works closely with the SCAPA program, focusing on operational meteorological programs, atmospheric sciences research and development, and assist visits of meteorological monitoring and modeling capabilities.

Doan Hansen, Urban Health Incorporation, followed with an update on the activities of the American Industrial Hygienist Association (AIHA) regarding its work on the Emergency Response Planning Guides (ERPGs). There are now 112 chemicals with ERPGs with 37 more chemicals in the development and consensus process. Doug Craig reported on the development of Temporary Emergency Exposure Limits (TEELs), which now total 2,519, with the issuance of Revision 20. Rocky Petrocchi, Washington Group International, reported on the work being performed on the Health Code Numbers (HCNs). Work on Revision 21 to the TEELs and Revision 20 to the HCNs has been initiated.

Doug Craig then reported on the activities of the Chemical Exposures Working Group (CEWG), while Rocky Petrocchi reported on the activities of the Chemical Mixtures Working Group (CMWG). Cliff Glantz reported on the ongoing work of the Consequence Assessment Modeling Working Group (CAMWG), which is developing recommendations for additional models to the consequence assessment model toolbox and has initiated a User's Advisory Group (UAG) between National Atmospheric Release Advisory Center (NARAC) and its DOE/NNSA user community.

Cliff Glantz also made a presentation that discussed the recent significant upgrade to the SCAPA Web page. Now that SCAPA has become part of the EMI SIG, the existing EMI SIG Web page is providing a platform for the augmented SCAPA Web page.

John Wade provided excellent insights into biohazards emergency response, discussing several programs at Battelle Columbus that are focused on providing solutions to the highly complex issues associated with this type of emergency response for such a unique hazard.

The meeting concluded with several technical presentations on various programs and consequence assessment models that were made by various individuals that have been associated with SCAPA program activities. John Nasstrom discussed recent improvements made to the NARAC program and the iClient system and the projects that NARAC has been involved with over the past few years. Mark Miller, National Oceanic and Atmospheric Administration (NOAA)/Hazmat, discussed Version 5.3 of the Areal Locations for Hazardous Atmospheres (ALOHA) atmospheric transport and dispersion model and demonstrated several new features of the model that is used throughout the DOE/NNSA complex for hazards assessments.

Lastly, Chip Lagdon presented on the DOE/Office of Environment, Safety, and Health (EH) Central Toolbox Registry and its efforts to provide a programmatic means to satisfy Defense Nuclear Facilities Safety Board (DNFSB) Letter 2002-1 and the embedded model Software Quality Assurance (SQA) issues.

Carl Mazzola recapped the meeting, reviewed the action items, and indicated when the next SCAPA meeting will be conducted. Three new action items were identified during the meeting to be addressed by NA-41 through conference calls and to be discussed at the next SCAPA meeting.

The next SCAPA meeting is scheduled on May 5, 2005, in conjunction with the next EMI SIG meeting and will be held in New Orleans, Louisiana.

1.0 OVERVIEW AND WELCOME FROM NA-41

A meeting of SCAPA convened in Washington, D.C., at 8:30 a.m. on May 6, 2004. The reasons for holding this meeting were 1) to present and discuss new DOE Office of Emergency Management (i.e., NA-41) and SCAPA initiatives with its membership and its associates and 2) to share the progress and results of recent SCAPA work products and accomplishments. In addition, several technical presentations of interest to SCAPA members and its associates rounded out the program. The agenda of this meeting and the meeting logistics are contained in Appendix A of this report.

The following lists the 37 individuals who attended the meeting and their respective affiliations. Each individual was given a brief opportunity to discuss his or her background and relate what role he or she played in the SCAPA program.

Individual	Affiliation
Steve Armoud	Portsmouth Gaseous Diffusion Plant (PGDP)
Dennis Armstrong	Los Alamos National Laboratory (LANL)
Ron Baskett	Lawrence Livermore National Laboratory (LLNL)
Larry Campbell	Fluor Hanford
Jeng Chang	DOE NA-41
Dorothy Cohen	Oak Ridge Institute for Science and Education (ORISE)
Doug Craig	Retired
Wayne Davis	Westinghouse Savannah River Company (WSRC)
Diana de la Rosa	Sandia National Laboratory (SNL)
Jim Fairobent	DOE NA-41
David Freshwater	Science Applications International Corporation (SAIC)
Cliff Glantz	Pacific Northwest National Laboratory (PNNL)
Doan Hansen	Urban Health Incorporated (UHI)
Eva Hickey	Pacific Northwest National Laboratory (PNNL)
Reed Hodgin	Alpha-TRAC Incorporated
Chuck Hunter	Savannah River Technical Center (SRTC)
Jim Jameson	Science Applications International Corporation (SAIC)
Debbie Johnson	Bechtel Nevada
Chip Lagdon	DOE/EH
Amber Martin	Westinghouse Safety Management Solutions (WSMS) Mid-America
Greg Martin	Science Applications International Corporation (SAIC)
Pete Matonis	Idaho National Environmental and Engineering Laboratory (INEEL)
Carl Mazzola	Shaw Environmental & Infrastructure (Shaw E & I)
Mark Miller	National Oceanic Atmospheric Administration (NOAA)/Hazmat
John Nasstrom	Lawrence Livermore National Laboratory (LLNL)
Michele Parker	Westinghouse Safety Management Solutions (WSMS) Mid-America

Rocky Petrocchi	Washington Group International (WGI)
Tony Pierpoint	Advanced Technologies Laboratory (ATL) International
Brenda Pobanz	Lawrence Livermore National Laboratory (LLNL)
Jim Powers	DOE NA-41
Darryl Randerson	NNSA/Nevada Service Office (NSO)
Paul Tobin	Environmental Protection Agency (EPA)
Tom Tuccinardi	Excalibur Associates, Incorporated
Gustavo Vazquez	DOE/EH-421
Steve Vigeant	Duke Cogema Stone & Webster (DCS)
John Wade	Battelle Columbus
Marcus Weseman	Oak Ridge Institute for Science and Education (ORISE)

Dr. Al Feldt, NA-41, welcomed all of the attendees and briefly described the NA-41 mission and objectives and where the SCAPA programs fit into these objectives. Dr. Feldt's welcoming slide is presented in Appendix B.

Jim Fairobent discussed the SCAPA program background and its present priorities. Fairobent indicated that SCAPA is a mature program which has its original roots in the late 1980s when the Subcommittee for Dose Assessment (SDA) was formed to support the Emergency Management Advisory Committee (EMAC). In 1992, SDA was renamed to SCAPA, which has gradually moved away from EMAC support, to support of the entire DOE emergency management community in consequence assessment and protective actions for emergencies involving radiological and chemical hazards. This year, SCAPA is poised to move into the area of biohazards. SCAPA was again reorganized in May 2003 and placed under EMI SIG. Cliff Glantz, PNNL was appointed SCAPA coordinator with Al Feldt as the DOE Advisor, as both positions are required under the EMI SIG protocols. Carl Mazzola retains his role as SCAPA administrator, providing logistic and technical support. Doug Craig, Rocky Petrocchi, and Cliff Glantz chair the three active SCAPA working groups.

Fairobent mentioned that the consequence assessment toolbox effort was a very important one, which exceeds the efforts in place for the development of TEELs and HCNs. There will be an upcoming change to DOE Order 151.1, the biggest of which is a change to the Contractor Requirements Document. Other changes will be in the areas of hazards screening criteria, Emergency Action Levels (EALs), and classification of operational emergencies. In addition to the DOE Order revision, all Emergency Management Guides (EMGs) are also in the process of revision. Jim Powers is managing the EMG revision effort.

In a recent development, Fairobent met with Darryl Randerson, Chairman of the DOE Meteorological Coordinating Council (DMCC), and initial discussions on the DMCC becoming part of the EMI SIG were fruitful.

2.0 REPORTS ON SCAPA PROGRAM INITIATIVES AND OTHER MATTERS OF INTEREST

2.1 Las Vegas, Nevada Meeting Report and Review of Action Items (Carl Mazzola)

Carl Mazzola reviewed the important points that were discussed and the decisions that were made during the May 2003 SCAPA Meeting in Las Vegas, Nevada. This meeting was another very successful and productive meeting and was attended by 27 professionals. The Las Vegas SCAPA meeting report has been posted on the SCAPA Web page (See Appendix C).

At the May 2003 Las Vegas, Nevada meeting, as well as from the previous meetings in San Francisco, California (May 2000), Las Vegas, Nevada (October 2000), Augusta, Georgia (April 2001), Richland, Washington (November 2001) and Charleston, South Carolina (May 2002), several action items have been opened. Over the past year, due to new efficiencies in the SCAPA program, many of these action items have been brought to completion. Mazzola briefly reported on the status of the open action items and had copies of these action items available. The 27 open action items at the time of this meeting are presented in Appendix D. Due to the invocation of periodic conference calls and the addition of new SCAPA members, the SCAPA program continuity has been enhanced and many of the action items have been closed.

During this meeting, three new action items were opened. Table 3-1 summarizes the action items that were opened in this meeting, while Table 3-2 identifies the status of the 29 SCAPA open action items, which also contains the action items opened in this meeting.

2.2 EPA IRIS Program (Marcus Weseman)

Marcus Weseman, ORISE, discussed the EPA's IRIS Program and the role that the ORISE organization plays in that program.

Weseman introduced the EPA IRIS Program, which has over 560 chemical substance records that have been compiled by the EPA Office of Research and Development (ORD). This enormous database represents EPA's consensus on carcinogen classifications, unit risks, slope factors, oral reference doses, and inhalation reference concentrations for chronic exposures to hazardous chemicals. The IRIS program focuses on human health risk assessment data and its records, with consistent analysis and evaluation of toxicological studies compiled from literature searches. All of the database entries are peer reviewed to ensure technical robustness.

The peer reviews are conducted by toxicologists and reaffirmed with reviews at several levels within the EPA. This comprehensive review system ensures defensibility of the database. The entire process may take as long as two years.

Weseman elaborated further that IRIS toxicity values are used in assessing risks from hazardous substances at various locations and that these concomitant risk assessments are then used in making a range of risk management decisions. These risk assessments include, but are not limited to:

- Determining how much of a subject chemical an industry may discharge into a river
- Determining which substances may be stored at a hazardous waste disposal facility
- Establishing to what extent that a hazardous waste (e.g., RCRA, CERCLA) site must be cleaned up
- Setting proper permit levels for discharge, storage, or transport of chemicals
- Establishing appropriate levels of air emissions from facilities
- Determining allowable contamination levels (MCLs) in drinking water per 40 CFR 141 enabling regulations.

Weseman indicated that even though the IRIS database is primarily focused on chronic long-term exposures greater than 90 days and emergency response is more applicable to acute exposures, these may prove useful to the ongoing SCAPA efforts that are based on chemical toxicology. Essentially, the IRIS database is the source of consensus standards on human health risk and the IRIS toxicity values can prove useful in setting protective exposure levels for protective action recommendations. IRIS can also be applied to toxicological reviews since the database can provide detailed summaries of primary toxicological studies in support of derived values. IRIS also provides quantitative estimates of risk from oral and/or inhalation exposure (e.g., slope factors, unit risks, and tables of drinking water and air concentrations that result in particular risk levels).

Weseman then discussed the non-carcinogenic IRIS data that addresses toxic effects, other than carcinogenicity, of various hazardous and toxic chemicals, using the assumption of a “threshold” toxic dose. IRIS provides toxicological information on oral reference doses (RfDs) and/or inhalation reference concentrations (RfCs) for lifetime exposure. There was some discussion on the carcinogenic and non-carcinogenic entries in the IRIS database.

Weseman concluded his presentation with logistics on how to obtain additional information on IRIS by consulting the EPA risk information hotline. The phone number is (202) 566-1676; the fax number is (202) 566-1749; and the e-mail address is hotline.iris@epa.gov.

Weseman's presentation is located in Appendix E of this report.

2.3 Acute Exposure Guideline Limit Update and Chemical Classification System (Paul Tobin)

Paul Tobin provided an update on the EPA work in its development of Acute Exposure Guideline Limits (AEGLs). Information on the AEGL program can be accessed through the Internet at www.epa.gov/oppt/aegl.

Tobin discussed the three-tier AEGL health effects system. Below the AEGL-1 value is detectability, while between AEGL-1 and AEGL-2 is the discomfort range. Between AEGL-2 and AEGL-3 is the disabling range and above AEGL-3 is death. Therefore, AEGL-2 is most applicable to emergency response protective actions. All three AEGLs are developed for five exposure periods (i.e., 10 minutes, 30 minutes, 1 hour, 4 hours, and 8 hours). These AEGL values for each chemical can be used with appropriate atmospheric transport and dispersion models to calculate death, disabling, and discomfort vulnerability zones. The integration of the AEGLs with general health effects criteria makes it possible to establish threshold levels for various protective actions (e.g., donning OSHA-required personnel protective equipment [PPE]). However, Tobin cautioned that the re-entry level is not identified in these categorizations, and for some chemicals, such as carbon monoxide, the AEGL values are very sensitive to vulnerable zones. Recently, work being done in the Netherlands is attempting to establish a level of odor awareness.

Tobin provided insights into the vastness of the AEGL program in that it involves nine federal agencies, three industries, seven non-governmental organizations (NGOs), four universities, five states, and four countries outside of the United States. All nine federal agencies, inclusive of the Agency for Toxic Substances and Disease Registry (ATSDR), provide annual lists of chemicals for AEGL development consideration. Tobin identified Al Feldt, as the DOE representative to the AEGL program and the individual through whom DOE and NNSA submit the annual chemical priority list for the development of future AEGLs.

Tobin then provided a status of the AEGL program, which now involves 137 separate chemicals:

- Final AEGLs (25), inclusive of hydrogen cyanide, phosgene and aniline

- Interim AEGLs (54), inclusive of 2,6 toluene diisocyanate, ethylene oxide, toluene, hydrazine, hydrogen chloride, hydrogen fluoride, fluorine, chlorine and uranium hexafluoride

- Proposed AEGLs (43), inclusive of acetone, benzene, carbon disulfide, methyl ethyl ketone, xylenes, sulfur dioxide, nitric oxide, nitrogen dioxide, nitric acid, and ammonia

- Draft/Holding (15), inclusive of sulfur trioxide, sulfuric acid and oleum

Tobin mentioned that the EPA Toxic Substance Control Act (TSCA) inventory update rule does not cover inorganic chemicals and that unisolated intermediates are not in the production information.

With respect to whether interim AEGLs can be used as part of the SCAPA hierarchy for TEEL development, Tobin affirmed that it is reasonably safe to use the interim values since it is not likely that they would change.

Tobin concluded his talk with a new initiative that intends to utilize universal pharmokinetic and information from chemical classes (e.g., alcohols, aldehydes) to streamline the future AEGL development process. This technique allows the reduction of 473 chemicals on the two AEGL priority lists to 66 chemical categories of common pharmokinetic/pharmodynamic effects. Should this approach pass technical muster, it could provide significant cost savings for future AEGL development.

Tobin's presentation is located in Appendix F of this report.

Al Feldt indicated that all DOE/NNSA sites should provide him with chemicals that he can submit to EPA for AEGL consideration (see Appendix G). These should be received on or before May 31, 2004.

ACTION 04-46: DOE/NNSA emergency managers to provide priority chemicals to Al Feldt to submit to EPA AEGL program.

2.4 DOE Meteorological Coordinating Council Update (Darryl Randerson)

Darryl Randerson presented the status of the DMCC program. He indicated that the DMCC was chartered at DOE/Nevada Operations in 1994, and still operates with limited programmatic funding. The DMCC has provided added value to the DOE meteorological community and will support DOE meteorological programs to the extent possible within its funding constraints.

Randerson related the accomplishments of the DMCC over the past two years, which included:

- A meteorological program assist visit and data certification at the Waste Isolation Pilot Plant (WIPP)

- A meteorological program assist visit at the SNL-Albuquerque

- Coordination of the national standard on meteorological data monitoring programs, ANSI/ANS-3.11-2000, and the subsequent DOE and NNSA site adoption of this technical standard as a Voluntary Consensus Standard (VCS)

- Involvement in the development of working for three new ANSI/ANS standards, ANS 2-15, ANS 2-16, and ANS-21

- Review of the American Society for Testing and Materials (ASTM) draft SODAR standard.

Randerson mentioned that the DMCC held its last meeting in Long Beach, California in February 2003 in conjunction with the annual American Meteorological Society (AMS) meeting, and it will be holding its annual meeting in Washington, D.C. on Thursday, November 18, 2004, in conjunction with the winter American Nuclear Society (ANS) meeting. A report will be prepared of that meeting and will be available on the SCAPA Web page, as many of the previous DMCC reports are now located on the SCAPA Web page.

The DMCC produced Appendix D: DOE Operational and Research Programs for the Office of the Federal Coordinator of Meteorology (OFCM) FY05 Federal Plan for Meteorological Services and Supporting Research, in support of OS-53. This year, the operational and research programs were separated out from one another. This publication included information on the operational and research meteorological programs for 15 DOE/NNSA Sites and the DOE/NNSA national laboratories.

The DMCC is also supporting EH-412 in its update of Chapter 4 to DOE EH-0173T for consistency with ANS/ANSI-3.11 (2000) and EPA-454/99-R-005. Since ANS/ANSI-3.11 is undergoing a revision within its five-year sunset period, the work on DOE EH-412 intends to incorporate any changes from that revision. DMCC also has supported EH-412 by performing a peer review of a National Emission Standard for Hazardous Air Pollutants (NESHAP) particulates technical document.

Randerson also mentioned that the Pantex site has expressed interest in a meteorological program assist visit to follow up the DMCC assist visit of April 1997.

DMCC has enjoyed a long and productive relationship with the OFCM and Supporting Research, with members actively participating in several Joint Action Groups (JAGs) and was involved in the production of the 1999 document on consequence assessment models.

Randerson shared that DMCC plans to continue to interface closely with the SCAPA Consequence Assessment Modeling Working Group, in particular, and with the SCAPA program in general. A new project, which will ultimately lead to the revision and update of Atmospheric Sciences and Power Production–1984, has just been initiated through NA-41.

Randerson's presentation can be located in Appendix H of this report.

2.5 Emergency Response Planning Guide Update (Doan Hansen)

Doan Hansen showed a video presentation that discussed the progress of the American Industrial Hygienist Association (AIHA) in its development of ERPG values as toxic endpoints. All ERPGs are determined by a peer-review, weight-of-evidence approach through a comprehensive program involving the work of individuals from the private and public sectors.

The ERPG committee meets four times per year to review pending documents in its process of developing and issuing ERPGs. In addition to EPRG values, the committee develops supporting data documents, reference documents, and discussions for the new and updated ERPGs. Nine new ERPGs were developed in the past year, bringing the total number of ERPGs to 112. In addition, there are 19 chemicals at the ballot stage and 18 chemicals in the review cycle, for a total of 149 chemicals that will, at some time in the future, have ERPGs. All chemicals with ERPGs have a five-year sunset and must be reaffirmed or changed should new toxicological data merit such a change.

The ERPG committee of the AIHA also annually issues its red notebook and ERPG-WEEL Handbook which are both updated with the most recent ERPG values. The ERPG handbook also contains a basic introduction to emergency response and explains general concepts on hazard evaluation and dispersion models. The handbook contains the ERPG values for the chemicals but does not include the supporting documentation. These documents can be purchased directly from the AIHA on its Web page at www.aiha.org.

A recent success story involved the joint development of ERPGs for three uranium compounds by the DOE and the U.S. Army at virtually no cost, through the sharing of information.

Hansen indicated that this video will be posted on the SCAPA Web site. Hansen's presentation is located in Appendix I.

2.6 Temporary Emergency Exposure Level Update (Doug Craig)

Doug Craig provided an update to the SCAPA TEEL development program.

Craig indicated that TEELs Revision 19, which was issued just prior to last year's SCAPA meeting, had concentration limits (i.e., TEELs) for 2,234 separate chemicals. The new Revision 19 TEELs were derived for SCAPA third priority list of chemicals provided by DOE/NNSA sites in 2003. In addition, Craig also derived TEELs for a few chemicals requested by other DOE facilities. A thorough Quality Assurance (QA) review of SCAPA chemicals was performed by Rocky Petrocchi.

TEELs Revision 20 addressed 285 new chemicals added to the existing list. In addition, the complete list was checked for duplicates and inconsistencies as the number of chemicals with TEELs has become so large that duplicity occasionally creeps in. Additionally, chemical abstract system registry numbers (CASRNs) from LANL and LLNL were added for many chemicals, and all added chemicals have been identified in Table 2 "Comments" column of the Revision 20 TEELs. This column provides information if special treatment was required. Craig emphasized that all identified errors have been corrected and the presently Revision 20 TEEL list, released last month, includes 2,519 chemicals. TEELs Revision 20 has been posted on the DOE/EH Chemical Safety Web site http://tis-hq.eh.doe.gov/web/chem_safety/ and soon will be posted on the new SCAPA Web page.

Craig briefly discussed the recent issue associated with TEEL values for silica, which appear to be too low (e.g., conservative toxic endpoint of human health response). Craig mentioned that these values may be too conservative for non-respirable particulates, but they could be reasonably accurate for respirable particulates that can reach the lungs and alveoli. He cautioned the users of the TEELs for silica that they should define respirable fraction (RF) in their hazards assessment work.

Craig has begun his initial work on TEELs Revision 21, which is addressing the SCAPA fourth list of chemicals that is requiring TEELs to be compiled. So far only a request for 17 new chemicals has been received from CH2M Hill, as no other DOE/NNSA sites responded to the call for new chemicals requiring TEELs. Due to the limited response, the solicitation of TEELs will be repeated.

ACTION 04-47: DOE/NNSA emergency managers to provide priority chemicals to Doug Craig to submit as part of the SCAPA fourth list of chemicals.

Planned changes for the development of the Revision 21 TEELs include:

- AEGLs, inclusive of interim AEGLs, will become the primary concentration limits ahead of ERPGs in the SCAPA hierarchy

- Interim 60-minute AEGLs will be used subject to confirmation as final values

- When TEEL-3 $\leq$ 1/f times the Lower Explosion Limit (LEL), f is to be determined

- A column giving the source of each of the TEELs will be added to Table 4.

Revision 21 TEELs that are derived from AEGL values will be italicized.

Mark Miller, who is responsible for the ALOHA code, asked about the impact of using AEGLs in atmospheric transport and dispersion codes. Since there are various AEGL exposure periods, there may be some issues in setting the level of concern.

Craig's presentation is located in Appendix J.

2.7 Health Code Number Update (Rocky Petrocchi)

Rocky Petrocchi presented the work that SCAPA was accomplishing with the Health Code Numbers (HCNs).

Petrocchi first discussed the status of chemicals that have had HCNs calculated, and the new chemicals which had HCNs developed during the past year. HCN development always trails TEEL revisions by one revision since the new TEELs are needed as input to develop the new HCNs. Petrocchi reported that the approximately 300 remaining HCNs associated with chemicals in TEELs Revision 19 have been developed with a QA check of this work by Doug Craig presently in progress. Once the QA effort is completed, there will be HCNs for 2,234 chemicals. Petrocchi indicated that the HCNs are not yet on the SCAPA or DOE/EH Web sites, but a placeholder on the new SCAPA Web site has been left for posting the HCNs. This posting should be accomplished within the next few months.

Petrocchi then briefed everyone on the HCN development plans for this upcoming year. Approximately 300 new chemicals will have HCNs developed, increasing the total to 2,519.

Petrocchi briefly discussed the automated "mixture method" Excel spreadsheet and the need to possibly revise approximately 800 previously developed chemicals with HCN 4.00.

Petrocchi next turned to a discussion on QA issues encountered in the HCN development effort. One area has to do with HCN selection priority. There is no problem if there are less than or equal to 10 HCNs for a chemical, but when there are greater than 10 HCNs (i.e., approximately 3% of the cases), a decision needs to be made to determine which to include and which to discard. Subjective techniques are presently used, but more objective criteria are needed. One solution already implemented involves increasing HCN columns from 5 to 10. This approach reduced the problem by an order of magnitude from approximately 100 (30%) to approximately 10 (3%) out of 300.

For the 3% of chemicals with more than 10 HCNs, objective criteria have been developed involving effect-based priority selection guidelines (in draft review with Doug Craig) with the following effect-based categories in decreasing priority order:

- Immediately life-threatening (e.g., asphyxiants, explosives)
- Significantly inhibiting to the ability to perform protective actions (e.g., severe/moderate eye and skin irritants)
- Life-essential organ effects using ranked causes of U.S. mortality for the year 2000 (e.g., heart, Central Nervous System, lung)
- Non-life-essential organ effects (e.g., anemia, reproductive system)
- Generic non-specific effects (e.g., chronic systemic toxin)
- Mild irritant effects (e.g., mild eye and skin irritation)
- Low-risk effects (e.g., nuisance particles, vapors, gases)

Petrocchi next discussed the HCN 4.00, “Acute Toxicity–Short-Term, High-Hazard Effects” problem with approximately 800 older chemicals in more detail. This present issue was primarily the result of the availability of less toxicology information in the past years. The “mixture method” purpose in these cases is defeated as there is a tendency to bin all exposures into HCN 4.00, which confuses the target-organ exposure binning. One solution to this problem is to revise the HCN development procedure with more selective criteria for HCN 4.00. This has already been implemented for several hundred newer chemicals. For approximately 800 older chemicals, he estimated that the new criteria will decrease the incidence of HCN 4.00 being assigned to chemicals from approximately 80% to approximately 25%, which is more in line with the mixture methodology. Accordingly, Petrocchi recommended the following action.

ACTION 04-48: Revise approximately 800 older HCN 4.00 chemicals. Until this is completed, temporarily treat HCN 4.00 results in mixture method as overly conservative.

Petrocchi's presentation is located in Appendix K.

2.8 Chemical Exposures Working Group Report (Doug Craig)

Doug Craig presented an update and progress report on the activities of the CEWG.

Craig indicated that most of the CEWG effort has been directed towards development and application of TEEL methodology, with 20 TEEL lists issued since 1992. Initially, the TEEL lists were included in the methodology for analysis of exposures to non-radioactive materials. The 1992 TEEL list included limits for about 80 chemicals, inclusive of all chemicals with ERPGs, all chemicals with CEGLs, EEGLs, SPEGLs, and 24 chemicals with DOE draft ERPGs (e.g., nitric acid). The initial derivation of limits used only existing concentration limits (e.g., PEL and TLV-TWA, STEL and C, LOC and IDLH).

Craig related that the TEEL lists were published in the AIHA Journal in 1995. In that publication, many of the chemicals lacked concentration limits. Therefore, acute toxicity parameters (e.g., TC_{LO}, TD_{LO}, LC_{50}, LC_{LO}, LD_{50}, and LDLO) were converted to Human Equivalent Concentrations (HECs), and default body weights (BWs), RRs, and Route Adjustment Factors (RAFs) were used. The HECs statistically compared with existing ERPG-2 and ERPG-3 values and yielded mean ratios for each toxicity and lethality parameter.

Craig shared that the present well-known acronym, TEEL, was adopted in 1997. In that year, additional concentration limits (i.e., RELs, MAKs, and WEELs) were added to the methodology. The basic methodology had toxicity-based TEELs added to the derivation methodology, with hierarchy-based TEELs to be used first. This expanded methodology was published in Journal of Applied Toxicology in 2000. Since that time, several SCAPA-approved changes have been made:

(1) Three RAFs decreased.

(2) TEEL-2 multiplied by 10 or 100 were based on Toxicity-TEELs to Hierarchy-TEELs ratios.

(3) PELs, TLVs, RELs, WEELs were adjusted by compound to element molecular weight (MW) ratios.

Craig closed his discussion with a few historical TEEL tidbits:

(1) The TEEL list has been posted on the DOE/EH Chemical Safety Web site (http://tis-hq.eh.doe.gov/web/chem_safety/) since Revision 15.

(2) TEELs Revision 15 (1999) had 1,170 chemicals.

(3) TEELs Revision 18 (2002) had 1,718 chemicals.

(4) TEELs Revision 20 (2004) has 2,519 chemicals.

Craig's presentation is located in Appendix L of this report.

2.9 Chemical Mixtures Working Group/HCN Report (Rocky Petrocchi)

Rocky Petrocchi presented an update and progress report on the activities of the SCAPA Chemical Mixtures Working Group, which included an update of the HCN project. His primary focus was on the proposed changes to the mixture method. The emphasis of this proposal is to add exposures for organ systems, not just individual target organs.

Petrocchi developed the rationale for this proposed change. It is based on the premise that organs in organ systems are interdependent on one another and the effects should be additive, not independent. Adoption of this change in methodology could yield more conservative results, dependent on chemicals and their HCN categories.

Petrocchi then reviewed the definition of the Hazard Index (HI), which is a prerequisite to understanding the organ system proposal. The HI is the exposure concentration divided by the exposure limit concentration. For HI values greater than unity, an overexposure exists indicating that mitigating actions should be taken. If any HI is greater than 0.5, this usually indicates that an action threshold is triggered.

Petrocchi then presented information on the current versus the proposed HCN categories and showed how the HIs might differ with each categorization system using a hypothetical chemical mixture.

A white paper was developed that documents the proposed changes. An Internet search for the medical and physiological basis to support the proposal was conducted. The Agency for Toxic Substances and Disease Registry's (ATSDR) Chemical Mixtures Program (CMP) was founded, and specifically, the CMP draft guide on mixture exposure assessment was consulted. This is a national guide that is based on EPA guidance and is similar to the SCAPA mixture method. However, there is one important difference—there is no HCN target-organ coding system. ATSDR leaves target organ assignment to the discretion of the investigator. As a result of the lack of target-organ assignment guidance in the ATSDR CMP system

and an unfruitful search on other Internet sites, no formal basis could be found to support the White Paper proposal.

Petrocchi then recommended that the current SCAPA method should be left as it is and that NA-41 may wish to support a more thorough search for a basis. Should a basis be found, the proposal could be reconsidered.

Petrocchi's presentation is located in Appendix M of this report.

2.10 Consequence Assessment Modeling Working Group Report (Cliff Glantz)

Cliff Glantz presented an update on the activities of the Consequence Assessment Modeling Working Group. The present membership includes: Cliff Glantz (PNNL), Carl Mazzola (Shaw Environmental), Larry Campbell (Hanford), Darryl Randerson (ARL/SORD), Gary Worley (Y-12), Chuck Hunter (SRNL), John Nasstrom (LLNL), Ron Baskett (LLNL), Denny Armstrong (LANL), Reed Hodgin (Alpha-TRAC), Wayne Davis (WSMS), Amber Martin (WSMS-Oak Ridge), Michele Baker (WSMS-Oak Ridge), David Seidel (LANL), Kevin O'Kula (WSMS), and Rob Addis (SRTC).

A final draft version of the working group's charter was prepared and issued earlier this year. The charter provides the following reasons for the working group:

- Promote the use of improved consequence assessment modeling techniques within the DOE complex
- Improve coordination between DOE sites and programs to promote, where appropriate, common method, tools, and standards for consequence assessment modeling
- Plan for future needs, requirements, and missions
- Promote innovation and technology transfer in consequence assessment modeling
- Advocate awareness of appropriate consequence assessment modeling capabilities and the benefits to DOE and its contractors of adopting appropriate methods

The Consequence Assessment Modeling Working Group has the capacity to provide the following to the SCAPA program:

- Information and leadership within DOE in the area of consequence assessment modeling
- The exchange of technical information among DOE sites
- Identification of areas requiring further research and development
- The development and dissemination of new consequence modeling tools
- Interface with other agencies, academic groups, and professional organizations working in the area of consequence assessment modeling
- Recommendations on new modeling approaches
- Technical support and assistance to the DOE community

Glantz also indicated that work has been started on populating a consequence assessment modeling toolbox and that he has worked on Web site requirements as a platform on which to place the toolbox. The purpose of the toolbox is to make models and information readily available, not to discourage the use of other models. Glantz mentioned that the toolbox may contain up to 60 models.

Criteria for the inclusion of models in the toolbox include the following attributes:

- Models are generic and can be used at any site (i.e., portability)
- Models are well documented and have extensive SQA documentation
- Models are relatively easy to learn and use
- Models are either free or fairly inexpensive

Glantz mentioned that the current focus of the working group is to improve and populate the Consequence Assessment Modeling Toolbox, to develop a UAG to focus on NARAC model usability issues, to develop recommendations for QA standards for consequence assessment models designed for emergency response applications, and to develop a training course for decision makers on the capabilities, limitations, and appropriate use of consequence assessment models.

Glantz next addressed the steps that the working group was taking in developing the toolbox. The goal is to go beyond the existing toolbox presently in the DOE

Central Registry, and to focus on both emergency response models and hazard assessment models. With respect to hazards assessment applications, there is a need to emphasize models that meet SQA criteria. However, for emergency response models, the group will put somewhat less emphasis on QA in deciding which models are in the toolbox.

Glantz then discussed the candidate models, which include:

(1) ALOHA
(2) GENII
(3) HOTSPOT
(4) EPICODE
(5) NARAC (i.e., ADAPT/LODI)
(6) APGEMS
(7) HPAC (SCIPUFF)
(8) CHARM
(9) CAPARS.

Glantz elaborated on some of the questions that were being addressed in this effort, including:

- What should we report about the models in their summary entry in the toolbox?

- What should be the source of our information on the models (e.g. OFCM's 1999 report)?

- Can we work with the OFCM to produce a survey of dispersion models?

- Would OFCM support our efforts to provide Web-based information on consequence assessment models?

Glantz then shifted his attention to the UAG, whose purpose is to work with NARAC to set up a forum for collecting and sharing usability issues and proposed improvements among all NARAC, NNSA, and DOE users. The UAG also intends to assist NARAC in prioritizing usability issues and gaining management support to address these issues and to monitor NARAC progress in addressing these issues. Glantz indicated that Gary Worley has volunteered to lead the UAG and will recruit representatives from each site to participate. The group will exchange comments and ideas within the next few weeks, will organize these comments, identify priorities, and develop a schedule for promptly moving this initiative forward. NARAC intends to launch a user newsletter.

Glantz then discussed the QA standards for consequence assessment models, leaning to restrictive standards rather than standards for safety and regulatory

applications. He indicated that Larry Campbell, Carl Mazzola, and Wayne Davis will be joined by others in researching and drafting appropriate QA standards for emergency response models, while external assistance will be sought from the DOE/EH Central Toolbox Registry.

Glantz mentioned that a need exists for decision makers to better understand what consequence assessment models can do and what they cannot do. Therefore, a training course is being proposed to address the existing knowledge gap. The working group will be surveying what information is available and whether information already developed by Reed Hodgin in his work at Rocky Flats Environmental Technology Site (RFETS, ORNL, and SNL can be used.

In the next few months, the working group will populate the toolbox, move forward with the UAG, and move forward on gathering information and developing QA standards for emergency response models. Due to such an aggressive mission, the working group intends to conduct monthly teleconferences to ensure continuity between annual SCAPA meetings.

Glantz's presentation is located in Appendix N of this report.

2.11 SCAPA Web Page (Cliff Glantz)

Cliff Glantz presented the recent work of restructuring the SCAPA Web page.

Glantz mentioned that the SCAPA Web page was developed in the mid-1990s and posted on the Brookhaven National Laboratory (BNL) Web page. Due to limited resources, this Web page soon became outdated and needed a new home. Discussions on the Web site design within the EMI SIG Web page developers were completed at the last EMI SIG/SCAPA meeting, and ORISE worked on the new site soon after last year’s meeting with a schedule to develop it on the new EMI SIG Web site in late-2003. Detailed Web site guidance was provided in December 2003 and a first draft of the Web site was available in February 2004. Review comments were prepared in early March 2004, and most of the comments were resolved in April 2004. The URL is http://www.orau.gov/emi/scapa.

One of the new features of the Web site is the new searchable TEEL database system that is being developed by Tony Pierpoint of ATL, Incorporated. It should be ready in late-May. There was some discussion as to whether material safety data sheets (MSDSs) should also be included in this database.

Glantz provided some general observations of the new Web site, and six of seven key observations have been addressed to some extent. The most significant problem involved the SCAPA navigation menu. However, this is in the process of being addressed. Nearly all of the 21 specific recommendations have been adequately addressed.

Glantz reviewed several proposed changes to the Web site. He indicated that the old SCAPA Web site will soon begin transferring users to the new Web site, the old BNL Web site will be retired, and that some functionality is still being implemented by the ORISE Web designers.

Glantz's Web page presentation is located in Appendix O of this report.

2.12 EMI SIG Hazards assessment Working Group (Debbie Johnson)

Debbie Johnson reviewed the work of the EMI SIG Hazards assessment Working Group which is closely aligned with some of the SCAPA missions.

2.13 Elements of a Bioterrorism Emergency Response Program (John Wade)

John Wade provided an excellent strategic view of the bioterrorism emergency response program work that is being conducted by Battelle Columbus.

Wade began his presentation by asking 12 fundamental questions associated with emergency response to bioterrorism attacks:

- What are the bioagents of concern for DOE sites?
- How might these bioagents be released?
- What quantities would need to be released to have adverse impacts?
- How would a bioterrorism event typically be detected?
- What would be Centers for Disease Control and Prevention Control (CDC) role in this and how would they interface with DOE?
- Do technologies exist to detect bioagents before medical symptoms appear?
- How would the source location of the bioterrorism attack be determined?
- How should we model the atmospheric transport and dispersion of bioagents?
- How far downwind do bioagents need to be "tracked" before their concentrations drop to such low levels that they are no longer harmful?

- What can DOE emergency preparedness and response personnel do once a bioterrorism event is suspected of having impacted or originated at their site?

- What sort of bioterrorism emergency response plans exist at non-DOE sites and what plans should DOE sites formulate to address this concern?

- What protective actions can be made to deter a bioterrorism event before it happens?

Wade emphasized that a biological agent “attack” involves the intentional exposure of numerous individuals to either bacteria (e.g., anthrax) or viruses (e.g., ebola) or toxins, primarily by the inhalation of aerosolized particles, which are colorless, odorless and tasteless; or secondarily by ingestion in food or water often without their awareness of the exposure at the time. Adding complexity to this problem is that the people who are exposed do not show any immediate signs or symptoms and can move hundreds of miles before symptoms are detected, effectively limiting quarantine countermeasures. He likened a biotechnology accident to a tool set without an instruction manual. To determine how it occurred is essentially not relevant once the event has already taken place.

Wade indicated that each category of agent—bacteria, viruses or toxins—presents an individual diagnostic treatment and/or detection challenge. Early detection is vital if there is going to be an effective emergency response. In addition, theoretically, inhalation of only one agent-containing particle may be sufficient to cause disease. Therefore, a question can be asked: Is the United States health care industry prepared to respond?

Wade provided some discussion on bacteria, viruses, and toxins. The microorganisms have a large range of sizes and inflict different modes of action in the body. Effects from exposure to these microorganisms range from incapacitation to lethality. In most cases, infection cannot be detected in an early manner as hours to days usually pass before noticeable symptoms will appear. The diseases inflicted on people by these microorganisms are transmissible person-to-person or may be limited exclusively to initial exposure. There is also a large range of lethal or incapacitating doses depending on the particular agent (e.g., 1 particle to 10,000). To give some perspective, John mentioned that the hypothetical infective dose of anthrax spores would fit on the dot at the end of this sentence. One significant weakness is that very little is known regarding the transmissibility of disease, which is a vital piece of information for an effective emergency response.

In addition to the terrorist use of naturally occurring microorganisms or weaponizing naturally occurring microorganisms, there is a new threat, termed the biotechnology

problem, resulting from genetically engineered microbes (GEMs). These include, but are not limited to:

- Antibiotic resistant agents (bacteria)
- Disguised pathogens and chimeras
- Non-pathogens turned into pathogens
- Agents with enhanced infectivity
- Agents with enhanced stability in the environment

Other considerations involve the changing of the route of infectivity and, for toxins, the increasing of the production yield. Even the hypothetical well-intentioned molecular biologist, if not using proper protocols, can develop a strain of microorganisms that could prove very troublesome.

Wade then changed his emphasis on what he termed the seven phases of a biological attack. These include the following elements:

1. Immunization or Pre-Treatment
2. Biodetection/purpose
3. Biodetection capabilities
4. Biodetection
5. Individual and Collective Protection
6. Post-exposure diagnosis and treatment
7. Decontamination

Wade provided the following diagram that identified the technologies that are available for a domestic scenario today and for the near future. These show significant holes that need to be filled:

• Vaccines	+/-	+	+?
• Detectors	+/-	+	++
• Diagnostics	-	+	++
• Individual protection	-	-	-
• Collective protection	+/-	+/-	+/-
• Therapeutics	+	++	+++
• Decontamination	-	+/-	+
• Training	++	+++	++?
• Knowledge	+	+++	++?
• Experience	++	+++	++?

Wade then focused on the major strategic issues associated with bioterrorism emergency response. He mentioned that without early detection or early warning, the first indication of a bioterrorism event will be an unexpected increase of patients with generic, flu-like symptoms (e.g., fever, malaise).

Early diagnosis makes the emergency response easier by two orders of magnitude. Depending upon the agent used, exposed individuals may rapidly spread the event, either passively on their persons or communicably with the people they are around. For many agents, current medical treatment after the onset of symptoms will be essentially ineffective. Decision-making will be paralyzed by lack of good data and the time it takes to determine that there has been an event. Once it is determined that a bioterrorism event has taken place, there is a whole host of issues that need to be addressed relative to response. Wade provided the following listing of these strategic issues:

- The United States Public Health Infrastructure, which is essential to success (e.g., National Institute of Health [NIH]/National Institute of Allergy and Infectious Diseases (NIAID), needs to be repaired.

- The existing medical treatment infrastructure, inclusive of managed care, may not be ready.

- The medical versus psychological triage paradox is an issue (e.g., how to sort the “walking wounded” from the “worried well”).

- Since health care delivery is already a full time job, solutions for the health care provider must be relevant to day-to-day activities.

- Policy and will to use Investigational New Drug (IND) products needs to be addressed inclusive of passing BioShield Legislation.

- Indemnification of the health care industry and the delivery mechanism needs to be addressed.

- Organization and accountabilities for quarantine policy, procedures, authority, and practice need to be developed.

- The cost-benefit equation of mass casualty planning and exercises versus managed care needs to be established.

Thus, rapid diagnosis is the key to emergency response. Another area that needs additional research is consequence assessment modeling which does not address the dispersal of biological material very well.

Wade concluded his presentation by posing a set of 12 hypothetical questions to DOE relative to its development of bioterrorism emergency response program.

- What are the bioagents of concern for DOE sites?

- How might these bioagents be released?
- What quantities would need to be released to have adverse impacts?
- How would a bioterrorism event typically be detected?
- What would be CDC role in this and how would they interface with DOE?
- Do technologies exist to detect bioagents before medical symptoms appear?
- How would the source location of the bioterrorism attack be determined?
- How should we model the atmospheric transport and dispersion of bioagents?
- How far downwind do bioagents need to be tracked before their concentrations drop to such low levels that they are no longer harmful?
- What can DOE emergency preparedness and response personnel do once a bioterrorism event is suspected of having impacted, or originated at their site?
- What sort of bioterrorism emergency response plans exist at non-DOE sites and what plans should DOE sites formulate to address this concern?
- What protective actions can be performed to deter a bioterrorism event before it happens?

Wade also provided a set of suggested Internet reading:

- Federal Response Plan and Terrorism Incident Annex
  http://www.fema.gov/rrr/frp/
  http://www.rand.org/publications/MR/MR1251/MR1251.AppG.pdf
- Dark Winter Exercise
  http://www.homelandsecurity.org/darkwinter/index.cfm
- TOPOFF Exercise
  http://www.state.gov/s/ct/rls/fs/2002/12129.htm
- National Institute of Allergy and Infectious Diseases (NIAID)
  http://www.niaid.nih.gov/biodefense/

Wade's presentation is located in Appendix P of this report.

2.14 NARAC Update (John Nasstrom)

John Nasstrom presented some of the more recent developments and activities of the NARAC program and its goals for the coming year.

Nasstrom discussed the NARAC Central Modeling System (CMS) and its access to expanded meteorological data sources (e.g., mesonets, DOE meteorological networks, DoD meteorological networks). Weather data has been likened as the "life-blood" of NARAC. In addition, there have been several enhancements to NARAC iClient and NARAC Web software tools. Presently, there are 275 DOE NARAC Web users.

Nasstrom mentioned that NARAC is also developing new guidebooks and training materials to support its ever-growing user group. It has developed guide books for determining model inputs and model defaults, and a step-by-step guide to NARAC iClient options. NARAC is also developing joint guidance material on how to use NARAC and Computer-Aided Management of Emergency Operation (CAMEO)/ALOHA systems during an incident, and fast-running local dispersion modeling tools for deployed use.

Nasstrom shared that among the recent projects at NARAC, it is involved in the integration of NARAC and EPA/NOAA CAMEO/ALOHA chemical hazard databases and plume modeling tools. In addition, NARAC is integrating databases to improve affected population estimates using operational databases, 2000 Census district blocks and global landscan, with resolution to approximately 1 kilometer.

Nasstrom turned his attention to new capabilities, which included the following:

- Manual customization of population for event-specific applications (e.g., day-night population density)
- Day and night population variation databases for 30 United States cities
- High-resolution weather radar data and NARAC/LODI precipitation scavenging model to simulate wet deposition hot spots
- Research on outdoor-indoor infiltration models with Lawrence Berkeley National Laboratory (LBNL)
- An advanced new-generation nuclear fallout model

Nasstrom indicated that LLNL is collaborating with multiple agencies on urban experiments to test and develop urban flow and dispersion models. It has recently

received funding from the DHS. In addition to this collaborative effort, LLNL is involved in the following initiatives:

- Standardization and integration with the EPA/National Oceanic and Atmospheric Administration (NOAA) CAMEO/ALOHA toxic chemical models and with NOAA Hazardous Material Response and Assessment Division (HMRAD)

- Studies associated with exterior to interior building air exchange with LBNL

- Determination of radiological, chemical and biological source characteristics and release mechanisms with SNL

- Development of an integrated system for field measurement database, modeling tools, dose assessment and Geographical Information System (GIS) for DOE Nuclear Incident Response Teams (NIRT) with SNL and the Remote Sensing Laboratory (RSL)

- Establishment of a RASCAL-NARAC interface with the Nuclear Regulatory Commission (NRC)

- Development of acute dose, casualty/fatality estimates and prompt (e.g., blast, thermal, radiation) effects with SNL

- Development of new dose-response relationships and toxic load models for chembio material with U.S. Army Edgewood Chemical Biological Center (ECBC)

- Incorporating building effects in operational dispersion models with the United Kingdom (UK) Defense Science and Technology Laboratory (DSTL)

Nasstrom's presentation is located in Appendix Q of this report.

2.15 Recent Modifications to the ALOHA Chemical Transport and Dispersion Code (Mark Miller)

Mark Miller presented and demonstrated the new version (i.e., Version 5.3) of the ALOHA model. ALOHA was developed in the mid-1980s for emergency responders. The unfortunate driver for its development can be traced back to the tragedy at Bhopal, India in 1984. The passage of the Emergency Preparedness Community Right-to-Know Act (EPCRA) in 1986 also enhanced the reasons for the development and maintenance of this code.

Miller also distributed compact discs (CDs) of ALOHA Installer of Version 5.3.

Miller discussed several new features of the ALOHA code including a more comprehensive treatment of an evaporating puddle (e.g., universal puddle model) and a multiple footprint output that been added to this atmospheric transport and dispersion model code.

Miller demonstrated ALOHA 5.3. Included in the demonstration was the hardwiring of AEGLs and ERPGs; the use of red, orange, and yellow colors for footprint delineation; and an indicator to show when ground temperature may exceed puddle temperature. In FY05, NOAA Hazmat plans to add capabilities to address the impacts of fires, detonations and deflagrations.

2.16 DNFSB 2002-1 and Status of the Central Toolbox Registry

Chip Lagdon, Director, Office of Quality Assurance Programs, presented the status of the Central Toolbox Registry, which was organized to address the January 2000 DNFSB Technical Report Number 25 issues. Its mission is to:

- Develop a SQA survey and interpret the results
- Develop candidate software for safe harbor model toolbox
- Develop code guidance documents and gap analysis
- Augment SQA in DOE directives
- Develop a central registry, maintenance and advisory organizations for codes

Lagdon then discussed the responsibilities of the Central Toolbox Registry, which include the following elements:

- Provide recommendations for permanent storage of software
- Coordinate with the NRC on code assessments
- Implement QA Action Plan from DOE/EH

The Central Toolbox Registry is sponsoring an effort to evaluate codes against requirements and then will determine deficiencies (i.e., "gap" analysis) and advise on remedial actions that need to be taken.

The registry sent out a SQA survey and determined that there was significant variability in local SQA implementation, a lack of consistent DOE oversight of

programs, insufficient contractor self-assessment, and that few safety analysis codes have complete verification & validation processes in place with supporting documentation. In addition, well-defined training programs are not widely available. The registry is sponsoring six high use codes that are recommended candidates for a safe harbor toolbox. These are: MACCS2, CFAST, ALOHA, EPICODE, MELCOR, and GENII.

Lagdon presented a summary of the Central Registry resources which included the following components:

- Design code surveys
- Multiple-use design software
- Software assessment schedules
- SQA knowledge portal
- Incorporation of functions of Central Registry and SQA list server
- Repository for SQA knowledge
- Toolbox code information, reports and standards, training courses and procedures
- Collaboration space for the SQA community
- SQA Subject Matter Expert (SME) locator
- SQA discussion forum

Larry Campbell inquired whether nuclear QA applied to consequence assessment models. Lagdon responded that it did apply when a nuclear release was in progress. In addition, this level of QA also applies to protective actions. Lagdon also added that the registry has determined that there are a limited number of Federal programs that are SQA qualified.

Lagdon mentioned that DOE/EH is involved in the development of new QA directives. These include QA Order 414.1B which contains SQA responsibilities and clarifies safety system software scope. This order is nearing issuance, as it is awaiting secretarial office concurrences. The suspect/counterfeit items prevention guide (i.e., G 414.1-3) draft will be ready for February release, and the QA Guide 414.1-2A revision has been initiated with target release date of May 2004. DOE O 414.1C is on REVCOM and is expected to be issued in September

2004. There is also consideration being given to extending DOE N 411.1 until DOE O 414.1C is issued.

Lagdon indicated that the Central Toolbox Registry has developed a SQA knowledge portal and is in consultation with SMEs. Safety analysis code guidance and gap analysis reports are expected by April 2004, and once they are received, a path forward will be developed. It is anticipated that the SQA directives will be issued by the end of 2004. Some near-term activities which have been scheduled are:

- Participating in NNSA and EM SQA site assessments;
- Partnering with NNSA and EM to complete site assessments;
- NNSA and EM updating of FRA documents;
- Hosting SQA training in May 2004;
- Partnering with NNSA and EM in monitoring of cross-cutting SQA issues.

Lagdon then turned his discussion to the gap analyses that have been performed for ALOHA, EPICODE, CFAST, MELCOR, GENII and MACCS2. Some of the results of the MACCS2 gap analysis were shared. Two of 10 code developer SQA areas were determined to be satisfactory, with recommended improvement in eight other areas.

The key areas of improvement include the following activities:

- Update the model description and finalize the University of New Mexico verification document

- Add prototypical problems and error diagnostics to the documentation

- Enhance user feedback and technical information exchange

- Release Version 1.13 in mid-2004

- Fix multiple plume segment and emergency preparedness models

- Add new version and guidance report to address DNFSB Technical Report 25 issues

- Enhance fire plume phenomenology, code errors, end user QA problem (i.e., dose conversion factors) and documentation quality

Lagdon's presentation is located in Appendix R of this report.

3.0 WRAP-UP AND REVIEW OF ACTION ITEMS/NEXT SCAPA MEETING

Carl Mazzola thanked everyone for their attendance and all of the input they provided and indicated that the next SCAPA meeting will be conducted in conjunction with the next TRADE EMI SIG meeting, since SCAPA is now a subcommittee of EMI SIG-TRADE. The meeting will be located in New Orleans, Louisiana. Each of the three action items that resulted from the meeting was reviewed and assigned and are presented in Table 3-1.

AI No.	Description/Discussion	Assigned to
04-46	DOE/NNSA emergency managers to provide priority chemicals to Al Feldt to submit to EPA AEGL program.	**Al Feldt**
04-47	DOE/NNSA emergency managers to provide priority chemicals to Doug Craig to submit as part of the SCAPA fourth list of chemicals.	**Doug Craig**
04-48	Revise approximately 800 older HCN 4.00 chemicals. Until this is completed, temporarily treat HCN 4.00 results in mixture method as overly conservative.	**Rocky Petrocchi**

Table 3-1: Action Items opened up in the May 2004 SCAPA Meeting

The following table presents the listing of the 29 SCAPA open action items, as of May 6, 2004.

AI No.	Description	Discussion
00-04	Develop MetView/APGEMS hyperlink to SCAPA Web page	SCAPA Web page almost ready. ESRI license needed for APGEMS, but an information link can be accomplished. DUSTRAN does not have limitation.
01-07	SCAPA support to the Emergency Response Committee	Memorandum being prepared for SCAPA membership. To be sent out prior to the May 6, 2004 SCAPA Meeting.
01-10	Review new EPA PAG draft after it is issued	New EPA PAG draft has not yet been issued for review.
02-07	Identify technical subject matter experts to address consequence thresholds of bioagents	Doan Hansen has suggested that biosafety levels would be ideal criteria for categorizing and binning consequences. The Centers for Disease Control (CDC) uses biosafety levels in their interim rule.
03-04	HCN Methodology	A draft “HCN Priority Selection Criteria”

	needs to be revised to add HCN selection criteria	paper for HCN development has been written and is currently in peer review discussion.
03-05	Recruit toxicologists and microbiologists to serve on SCAPA working groups	This action item will be discussed at an upcoming SCAPA planning meeting.
03-08	Acquire NARAC technical basis documents to support future DOE/NNSA consequence assessment modeling efforts	John Nasstrom of LLNL was contacted on January 7, 2004 and provided a list of NARAC papers a few weeks later. Need to decide if this list is complete and then forward to SCAPA membership through Web page entry.
04-01	SCAPA charter needs to be revised	Tom Tuccinardi has been assigned the task to prepare a first draft. Glantz will provide assistance. Dr. Feldt and Carl will review the draft product. This activity should be wrapped up before the May meeting.
04-02	SCAPA program needs volunteer support	NA-41 was been supplied a draft of the letter in January 2004.
04-04	TEELs Revision 21	Work on TEELs Revision 21 will begin, now that TEELs Revision 20 has been completed.
04-05	Applicability of HCNs	NA-41 to evaluate whether there is a need in the DOE/NNSA community for HCNs.

AI No.	Description	Discussion
04-09	Central Toolbox Registry-CAM WG integration	A meeting with the DOE/EH Central Toolbox Registry took place on 1/7/04 and meeting minutes were issued. Chip Lagdon, Registry manager spoke at 5/6/04 SCAPA Meeting. The CAM WG toolbox effort will be further integrated with the registry. Cliff Glantz is developing toolbox candidate criteria which will be available shortly. First toolbox models to be presented at the May 2004 EMI SIG/SCAPA meetings. Carl Mazzola is keeping current on the parallel toolbox effort being undertaken by EFCOG under the Safety Assessment Working Group.
04-12	Establish a new bioagent working group	No activity.
04-14	Bioagent source terms	No activity.
04-22	TEEL methodology paper	Current efforts are underway to develop the paper with no timetable yet established.
04-23	HCNs for Revision 20 TEELs	Doug Craig prepared and sent to Rocky Petrocchi, the file of chemicals that are new to Revision 20. Petrocchi plans to start HCN development after the May 2004 EMI SIG/SCAPA meetings.
04-32	AEGL integration into SCAPA hierarchy	Initial determination is to use one-hour AEGLs and input values into SCAPA hierarchy as the highest selection. Further discussion is needed.
04-36	Improve SCAPA Web page navigation	Activity is ongoing.
04-37	Remedy SCAPA list server attachment limitation	Activity is ongoing.

04-39	Firm up the list of consequence assessment issues that the CAM WG would address	A list of issues beyond the toolbox and NARAC user group has been drafted.
04-40	Expand TEEL database system beyond chemicals for which TEEL values have been developed to include any chemical in use by DOE.	SCAPA Web hits would provide an interest indicator.
04-41	Consider adjusting TEEL-3 values which exceed LEL values.	Doug Craig to review the affected TEELs, while Po-Yung Lu to provide chemical LEL list.
04-42	Call additional contacts to obtain chemical names and CAS numbers for chemical priority list.	Tom Tuccinardi is leading the effort to obtain additional chemicals for TEEL development.
04-43	Find IUPac names for chemicals suggested by LLNL for TEEL database standardization.	Rocky Petrocchi is following up with Ike Eichhorn or LLNL. LLNL suggestions contact found and contact information given to Doug Craig for any needed follow-up.
04-44	Develop HCN methodology technical paper.	Doug Craig and Rocky Petrocchi developed an estimate and draft scope of work to prepare the HCN paper and forwarded it to Tom Tuccinardi.
04-45	Place TEELs and HCNs on the SCAPA Web site.	TEEL database will be maintained on SCAPA Web page with a hyperlink to the EH chemical safety Web page. Chemical mixture methodology including all developed HCNs will be added to the Web page.
04-46	DOE/NNSA emergency managers to provide priority chemicals to Al Feldt to submit to EPA AEGL program.	Activity is ongoing.
04-47	DOE/NNSA emergency managers to provide priority chemicals to Doug Craig to submit as part of the SCAPA fourth list of chemicals.	Activity is ongoing.
04-48	Revise approximately 800 older HCN 4.00 chemicals. Until this is completed, temporarily treat HCN 4.00 results in mixture	Activity is ongoing.

	method as overly conservative.	

Table 3-2: Updated SCAPA Action Items after the May 2004 SCAPA Meeting

4.0 APPENDICES

Since a proceeding of the meeting presentations was not developed prior to the meeting, this section will document the presentations and other relevant documentation that was presented at this meeting. The following is a listing of these presentations.

Appendix	Description
A	Agenda and Meeting Logistics
B	Welcome and Introductions
C	Las Vegas Meeting Report
D	SCAPA Action Items
E	EPA IRIS Program
F	Acute Exposure Guideline Limits Update
G	AEGL Chemical Priority List
H	DMCC Update
I	ERPG Update
J	TEELs Update
K	HCN Update
L	Chemical Exposures Working Group Report
M	HCN Organ Systems
N	Consequence Assessment Working Group Report
O	SCAPA Web Page
P	Bioterrorism
Q	NARAC Update
R	DNFSB 2002-1 SQA and Central Toolbox Registry

A zip file of these presentations has been prepared and is being sent with an electronic copy of this report. This file can be unzipped and the contents downloaded into the following appendix pages to create a complete paper copy of this report.

APPENDIX A

Agenda and Meeting Logistics

(SCAPA Handout 1)

APPENDIX B

Welcome and Introductions

(SCAPA Handout 2 – Welcome)

APPENDIX C

Las Vegas Meeting Report

(SCAPA Handout 3)

APPENDIX D

SCAPA Action Items

(SCAPA Handout 4)

APPENDIX E

EPA IRIS Program

(SCAPA Handout 5)

APPENDIX F

Acute Exposure Guideline Limits Update

(SCAPA Handout 6)

APPENDIX G

AEGL Chemical Priority List

(SCAPA Handout 7)

APPENDIX H

DMCC Update

(SCAPA Handout 8)

APPENDIX I

ERPG Update

(SCAPA Handout 9)

APPENDIX J

TEELs Update

APPENDIX K

HCN Update

APPENDIX L

Chemical Exposures Working Group Report

APPENDIX M

HCN Organ Systems

APPENDIX N

Consequence Assessment Working Group Report

APPENDIX O

SCAPA Web Page

APPENDIX P

Bioterrorism

APPENDIX Q

NARAC Update

APPENDIX R

DNFSB 2002-1 SQA and Central Toolbox Registry