# 11th MEETING OF THE DMCC

U.S. Department of Energy

METEOROLOGICAL COORDINATING COUNCIL

**Long Beach Convention Center**
**Long Beach, CA**
**February 12, 2003**

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## 0.0 EXECUTIVE SUMMARY

The Department of Energy (DOE) Meteorological Coordinating Council (DMCC), the Council, convened a Meeting at the Long Beach Convention Center, Long Beach, CA on February 12, 2003. This meeting was held in conjunction with the Annual Meeting of the American Meteorological Society (AMS). This was the eleventh ($11^{th}$) meeting of the Council since its inception in December 1994. A total of 19 individuals, from the public and private sectors, attended and participated in the meeting.

The overarching purpose of the meeting was to provide a forum for DMCC members and DMCC associates to review its accomplishments, products, and projects, and to discuss its mission and implementation. There were several other objectives that were accomplished during the meeting:

- DOE site meteorological program managers were provided an opportunity to discuss their programs and obtain feedback from the DMCC membership;

- Several technical presentations on relevant operational and research topics were provided to the DMCC membership to enhance their program execution;

- The future of the ANSI/ANS-3.11 Working Group was discussed and a path forward was established relative to the reaffirmation or revision of ANSI/ANS-3.11 (2000) prior to its suspense date of February 18, 2005;

- DOE Headquarter (HQ) elements (i.e., EH-412) associated with the atmospheric sciences provided updates on their programs to the DMCC membership; and,

- A DMCC Roundtable was convened to discuss where DMCC should be focusing its energies from FY03 through FY08.

There were also discussions on the FY02 accomplishments and FY03 planning of both the DMCC and the DOE Meteorological Topical Committee (MTC). The latter group is associated with DOE/EH-53, the DOE office that administers the Technical Standards Program (TSP). The MTC is closely associated with the DMCC and is chartered with the Technical Standards Program Office (TSPO).

The Office of the Federal Coordinator for Meteorological Programs and Supporting Research (OFCM) reported on its work associated with evaluating transport and dispersion models and its applications to weapons of mass destruction.

At the end of the meeting, a brief roundtable discussion for DOE meteorological program managers and supporters was convened that identified issues and sought appropriate remedies.

The early planning for the 12th DMCC Meeting was briefly discussed. This meeting may be held in Seattle, WA in conjunction with the Annual Meeting of the AMS on January 15, 2004. The ANSI/ANS-3.11 Working Group will also reconvene at this meeting.

The 13th DMCC Meeting will be held in Las Vegas, NV, nearby NNSA/NSO to celebrate the 10th anniversary of the Council.

## 1.0 OVERVIEW

The DOE Meteorological Coordinating Council (DMCC) convened at the Long Beach Convention Center in Long Beach, CA on February 12, 2003. This was the eleventh ($11^{th}$) meeting that the DMCC has sponsored since its inception in December 1994. The meeting was called to order by the DMCC Chairman, Dr. Darryl Randerson, who is also the Director, National Oceanic and Atmospheric Administration (NOAA) Air Resources Laboratory (ARL)/Special Operations & Research Division (SORD). This meeting was held to present new DMCC initiatives to its membership and associates, to share the many FY02 DMCC accomplishments, and to provide discussions on recent advancements in the atmospheric sciences to the DMCC membership.

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- Several technical presentations on relevant topics were provided to the DMCC membership to enhance their program execution;

- The future of the ANSI/ANS-3.11 Working Group was discussed and a path forward was established relative to the reaffirmation or revision of ANSI/ANS-3.11 (2000) prior to its suspense date of February 18, 2005;

- DOE Headquarter (HQ) elements (i.e., EH-412) associated with the atmospheric sciences provided updates on their programs to the DMCC membership; and,

- A DMCC Roundtable was convened to discuss where DMCC should be focusing its energies from FY03 through FY08.

The agenda of this meeting is documented in Appendix A. The 19 individuals that attended the meeting and their respective affiliations are listed on the following page.

## LIST OF ATTENDEES

| Individual | Affiliation |
|---|---|
| Rob Addis | Westinghouse Savannah River Company (WSRC) - SRS |
| Chuck Bach | Tennessee Valley Authority (TVA) |
| Bob Banta | NOAA ETL |
| Bob Baxter | B & S Systems |
| Tom Bellinger | Illinois Department of Nuclear Safety (IDNS) |
| Brent Bowen | Lawrence Livermore National Laboratory (LLNL) |
| Kirk Clawson | NOAA ARL/FRD |
| Ted Cress | Pacific Northwest National Laboratory (PNNL) |
| Gina Deola | Sandia National Laboratory (SNL) |
| Jim Ellis | Lawrence Livermore National Laboratory (LLNL) |
| Frank Estis | Office of Federal Coordinator for Meteorology (OFCM) |
| Paul Fransioli | Bechtel SAIC Company, LLC |
| Cliff Glantz | Pacific Northwest National Laboratory (PNNL) |
| Stan Marsh | Southern California Edison (SCE) |
| Carl Mazzola | Shaw Environmental & Infrastructure (Shaw E & I) |
| Harold Peterson | DOE/EH-412 |
| Darryl Randerson | NOAA ARL/SORD |
| Jim Sanders | NOAA ARL/SORD |
| Walter Schalk | NOAA ARL/SORD |

## 2.0 OPENING EVENTS AND DISCUSSIONS

Dr. Darryl Randerson, Chairman of the DMCC, welcomed the DMCC members and associates to Long Beach, California, and convened the eleventh ($11^{th}$) DMCC Meeting. Darryl briefly described the mission and the objectives of the DMCC, and presented a brief history of the many accomplishments of the Council over its eight-year history.

Each of the attendees introduced themselves and identified their affiliation and their function within the DMCC.

## 3.0 TECHNICAL REPORTS: ADVANCES IN REMOTE SENSING

### 3.1 Recent Remote Sensing Instruments (Bob Banta)

Bob Banta discussed what do we need concerning needs for remote sensing and how do we know that. He elaborated on reasons that required the development and implementation of new instrumentation. These included the need to refine our knowledge of the vertical structure of the atmosphere, the need to better understand horizontal transport, and the need to solve various air quality sampling issues.

Bob spent some time on defining the role of NWP models and improved measurements, discussing what is needed and how to assign priorities. The Nashville, TN study remote sensing study was further discussed. Of note was the difficulties encountered in hourly profiler data due to interferences from migratory birds. The low-level jet was a key player in the research study and daytime drift in the low-level jet was not handled well by the models.

One of the key lessons learned from the Nashville, Rocky Flats, and VTMX profiler studies is that nocturnal layering is an important problem. This layering causes a decoupling of the winds aloft from the winds near the surface layer. Moreover, issues associated with the stable boundary layer have shown a propensity for a strong time dependence.

Bob provided a listing of SODAR, LIDAR, RADAR and other remote sensing techniques, as well as atmospheric acoustics (e.g., tomography, infrasound) and discussed the merits of each of these remote sensing systems.

See Appendix B for further information on Bob's presentation.

### 3.2 INEEL Tracer Detection Methodology (Kirk Clawson)

Kirk Clawson reported on tracer technology work being performed at ARL Field Research Division (FRD) through the use of Ion Mobility Spectroscopy (IMS) remote instrumentation. ARL FRD is teaming with Montana State, New Mexico State and Washington State universities on this project.

The technology is capable of detecting illicit drugs, chemical warfare agents, explosives, and a series of environmental parameters. Once they can become small and compact, up to 50 can be deployed to support tracer experiments. Kirk further discussed the advantages of the IMS technology versus a sulfur hexafluoride continuous analyzer. This system was also used with a Po-210 source and it worked well.

In summary, the IMS technique shows great promise, but still needs more development. Major problems included detection limit and interfering compounds. Kirk credited Roger Carter and Shane Beard with the work that was performed.

Kirk's discussion is presented in Appendix C.

## 3.3 ARM Remote Sensing Instrumentation (Ted Cress)

Ted Cress reported on the status of the ARM remote sensing instrumentation. He noted that such instrumentation could be used to compute radiation fluxes from the cloud field. However, the need to represent the full 3-dimensional state of the atmosphere has not yet been achieved. Two basic questions are answered by the ARM Program:

1. If we can specify a cloud field, can we compute radiation fluxes?; and,

2. If we can specify the large-scale atmospheric fields, can we predict the cloud field properties?

Ted discussed the instrumentation at the North Slope Alaska Region, Southern Great Plains Region, and Tropical Pacific Region. These three locations are instrumented with 35 GHz radar, micropulse lidar, broad-band and narrow-band radiometers, microwave radiometers, meteorological sensors, and a sonde system. One of the issues with this instrumentation that needs to be overcome is the fact that solar noise limits the resolution of the system during the daylight hours.

Ted discussed various instrumentation and its attributes. The millimeter cloud radar is still very costly (i.e., $750,000) and has insect and boundary noise issues. Micropulse LIDAR is used to determine cloud presence and cloud base. The atmospheric emitted radiance interferometer is an excellent, robust system that can be used in the near-field. The microwave radiometer is also robust and is used to determine water vapor path. The profiling microwave radiometer provides information on vertical temperature structure and vertical precipitable water vapor. Lastly, sky imagery provides information on sky dome radiance measurements.

The future of the ARM program was briefly described. There are plans to continue the current sites and add a mobile facility, to improve current instrumentation to perform at higher accuracies and to have improved durability. In addition, there is a desire to expand the data products and to link to related national and international programs.

Ted's detailed presentation is presented in Appendix D.

## 3.4 Interference Sources in Acoustic Remote Sensing (Bob Baxter)

Bob Baxter presented an interesting discussion on interference sources in acoustic remote sensing; especially in the 1-5 KHz range of the instrument.

Crickets are the main culprit and their presence makes it impractical to use it within this frequency range. Since there is a Doppler shift versus zenith angle in the 1-6

KHz range, thus leading to a trade off of signal attenuation versus noise sources. Noise attenuation can result in an incorrect zero Doppler shift.

Bob then elaborated on possible solutions to eliminate active noise, as well as passive noise, using acoustic shields and other techniques.

Bob also discussed the new SODAR siting criteria identified in EPA-2000.

Bob's presentation can be referenced in Appendix E of this report.

## 4.0 TECHNICAL REPORTS: RESEARCH TOPICS

### 4.1 Climate Reference Network (Darryl Randerson)

Darryl Randerson presented the U.S. Climate Reference Network (USCRN) for Ray Hosker who had a conflict with the meeting.

This project is intended to provide a long period of data at various locations in the United States that can be used for the development of an accurate climatology of the country. There will be at least one station in every one of the 50 states, with a total of 221 stations to be deployed annual through FY09.

The goals of the USCRN are to:

- Measure, record, and report, with the highest possible quality, thoroughly documented near-surface observations over the next 100 years;
- Provide timely data access for weather forecasting and climate monitoring; and,
- Preserve these observations for use in evaluating climate change across the United States.

The primary measurements will be air temperature and precipitation (rate, accumulation), with supporting measurements of wind speed, solar radiation, ground surface skin temperature, relative humidity, soil moisture, and soil temperature.

Darryl discussed the implementation plan for each of the stations. 13% of the stations are presently online. There will be generic site graphics and traceable calibrations. In parallel with deploying the instruments are various research tasks associated with the appropriate siting of the instrumentation.

Darryl concluded his discussion with an enumeration of the 10 climatic monitoring principles which include management of network change, parallel testing, full

documentation, data quality and continuity, integrated environmental assessment, historical significance, complementary data, climate requirements, continuity of purpose, and data access.

Darryl's discussion can be referenced in Appendix F of this report.

## 4.2 Current Research at PNNL (Cliff Glantz)

Cliff Glantz discussed the various ongoing projects at PNNL. Presently, PNNL's atmospheric research team has reached the 70-FTE level. The main capabilities at PNNL include fundamental sciences, environmental technology, and energy sciences.

With respect to the PNNL Atmospheric Sciences Department, there are three main capability areas in fundamental sciences. Areas of interest include atmospheric chemistry, boundary layer meteorology, global climate change, ARM, and particle sampling and analysis. The Environmental Technology Department focuses on applied research. Areas of interest include atmospheric dispersion modeling, multiple environmental media modeling, dispersion of pesticides and dust, and emergency response system development. The Energy Sciences Department focuses on applied research in indoor air quality and wind energy.

Cliff also discussed the instruments that are used at PNNL. These include 30 near-surface instrumented towers, 3 200-foot instrumented towers, 4 SODARs, nephelometer, aerosol light absorption, and multi-filter radiometer.

Cliff briefly discussed the DOE RAF G-1 field studies which included the new chem.-bio research chamber that will characterize "proliferation chemicals" (e.g., organophosphates) to support detection efforts, mix tailpipe emissions with atmospheric chemicals to understand the formation of persistent hazardous pollutants, and simulate formation of visibility-reducing aerosols.

Cliff also discussed the Nighttime Aerosol/Oxidant Plume Experiment (NAOPEX), which involves an evaluation of nighttime chemistry in stable atmospheres. PNNL and other research groups released tetroons equipped with ozonesonde, radiosonde, and GPS unit to "watch" the $O_3$ evolve. The study tracked tetroons over the ocean at night for up to 6 – 8 hours.

The details of Cliff's discussion are presented in Appendix G.

## 5.0 UPDATE ON RECENT DMCC PROJECTS AND RELATED ACTIVITIES

### 5.1 Recent and Future DMCC Program Initiatives (Darryl Randerson)

Darryl Randerson presented the status of the DMCC Program.

Darryl noted that DMCC was Chartered at DOE/NV Dec. 2, 1994 and although operating with little programmatic funding, DMCC has provided added value to the DOE meteorological community and will continue to support DOE meteorological programs to the extent possible within funding constraints.

Darryl reviewed some of the DMCC programs, which include the sponsorship of technical forums and business meetings, the performance of Assist Visits, the maintenance of a DMCC web page, and the provision of technical advice and assistance. In FY02, the DMCC assisted the Waste Isolation Pilot Plant (WIPP) with an Assist Visit and advice on data certification.

DMCC also provided oversight to the Meteorology Topical Committee (MTC). It assisted the DOE Technical Standards Program Office (TSPO) with its annual DOE TSL-1/TSL-4 updates and with the adoption of ANS-3.11 as a Voluntary Consensus Standard (VCS). DMCC assisted ASTM with the review of a draft SODAR standard.

DMCC issued a report on its January 2002 Annual Meeting in Orlando, FL, and developed Appendix D: DOE Operational and Research Programs for the OFCM FY03 Federal Plan for Meteorological Services and Supporting Research.

Darryl reviewed the DMCC FY 03 activities which include this annual meeting, the reconvening of ANSI/ANS-3.11 Working Group, additional Assist Visits to WIPP and SNL in the Fall 2002, the maintenance of DMCC Web Page, and the development of the OFCM FY04 Federal Plan for Meteorological Services and Supporting Research.

Additionally, DMCC has updated the meteorological element of EH-0173T (i.e., Chapter 4) for consistency with ANS/ANSI-3.11 and has a proposal into the Office of Science to revise the Atmospheric Science and Power Production technical document.

Appendix H documents Darryl's presentation.

### 5.2 OFCM Report: Selection & Evaluation of T & D Models (Frank Estis)

Frank Estis reported on the recent work performed by the SEATD Joint Action Group (JAG) and its report on the use of atmospheric dispersion models for evaluating transport and dispersion of weapons of mass destruction. One of the conclusions of the report is that no single code was capable of addressing all of the scenarios. It also noted that there are 29 separate Federal codes that are used on a 24-7 basis.

Frank elaborated on the scenarios that were developed to test the candidate models, the response times of the models, the model processes, and the 24-7 reach-back capabilities. He enumerated the various SEATD recommendations and indicated that a follow-up workshop is being scheduled.

Frank's presentation can be referenced in Appendix I.

### 5.3 DOE EH-412 Project: DOE/EH-0173T Chapter 4 Update (Hal Peterson)

Hal Peterson discussed the work that was being performed by the DMCC in updating Chapter 4 of the 1991 DOE/EH-0173 to include ANSI/ANS-3.11 (2000) and EPA-2000. In addition to Chapter 4, the Chapter 4 section of the summary was also updated and provides an excellent checklist for a DOE site to perform a self-assessment.

Hal indicated that the revision is ready for DOE concurrence review. Once this review is completed, DOE/EH-0173T will be republished with the updated summary and updated Chapter 4 information.

Hal's presentation is presented as Appendix J.

## 6.0 ANSI/ANS-3.11 (2000) WORKING GROUP MEETING

### 6.1 ANS-3.11 Self-Assessment (Rob Addis)

Rob Addis discussed a self-assessment performed at the Savannah River Site (SRS) to determine whether ANSI/ANS-2000 objectives were being met. The results of the self-assessment led to changes in the relative humidity and temperature difference accuracies, calibration procedures, and the SRS Environmental Monitoring Plan. Rob has also used the self-assessment methodology to perform an assessment at Oak Ridge, TN.

Rob also provided an update on the construction of a new 1200-foot tower at SRS. It is higher than the earlier tower and is instrumented at the 100-foot, 200-foot, and 1000-foot levels.

Rob completed his presentation by discussing the work on the ENSEMBLE project which is a web-based tool to do model comparisons. He showed the exercises performed to date and explain the premise behind ensemble modeling.

Rob's discussion can be referenced in Appendix K.

### 6.2 Implementation/Lessons Learned Report (Utility) (Chuck Bach)

Chuck Bach discussed the effect of ANSI/ANS-3.11 on the TVA meteorological programs. The bottom line was that there were no costly changes resulting from the new requirements. TVA made monitoring changes to its temperature measurements.

The self-assessment generated a Problem Evaluation Report (PER) involving 30 things to look at. Its implementation was managed through the TVA configuration management system.

Chuck's discussion can be found in Appendix L of this report.

### 6.3 ANSI/ANS-3.11 (2000) Recap

Stan Marsh presented the work that went into the development and publication of ANSI/ANS-3.11. This work began in June 1996 and concluded in February 2000.

Stan indicated that the nuclear power plant utility meteorologists have been reticent in implementing the new ANSI/ANS-3.11 (2000) due to the risks of committing their facilities to additional expenditures. Costs are being closely monitored by each utility and any increase in licensing commitment will not be looked on favorably. However, it was noted that most of the utilities were following the principles contained in the new standard.

Appendix M documents Stan's presentation.

### 6.4 ANSI/ANS-3.11 Working Group: Reaffirmation (Carl Mazzola)

Carl Mazzola led a discussion on the future of the ANSI/ANS-3.11 Working Group. It appeared that there was a consensus for continuing the Working Group to ensure that the standard would either be revised or reaffirmed before its projected February 16, 2005 sunset. A schedule and work assignments were developed. These were issued as meeting minutes under separate cover.

Many who were present that were already on the Working Group, agreed to serve in the same capacity. In addition, several new members, including some who were present at the meeting, were elected to the working group.

## 7.0 DMCC ROUNDTABLE

Darryl Randerson led the DMCC Roundtable discussion. The following points were made during the roundtable discussion:

- DMCC meetings were generally useful for the DOE attendees;
- There was a desire for another combined DMCC-SCAPA-NUMUG combined series of meetings. The earliest this can be accomplished is in the Spring 2005;
- The next meeting should focus on atmospheric sciences and energy applications, as well as homeland security;
- The next meeting should have several presentations by DOE field elements;
- DMCC should provide quarterly updates on its projects by e-mail;
- For the third year in a row, the next meeting should be held in conjunction with the AMS Annual Meeting. However, the selection of the meeting date should attempt to avoid any conflicts with the AMS Meeting.

## 8.0 2004 DMCC MEETING

Darryl Randerson presented his thoughts on the early planning for the next DMCC meeting that is to be held in conjunction with the Annual Meeting of the AMS in Seattle, WA. This will be a one-day meeting tentatively scheduled for January 15, 2004. It will be coordinated with a meeting of the ANSI/ANS-3.11 Working Group that will examine the early changes needed to the new national standard on meteorological data.

Early planning for the 10th Anniversary DMCC Meeting will be in November 2004, in Las Vegas, NV.

## 9.0 APPENDICES

Since a Proceeding of the meeting presentations was not developed prior to the meeting, this section is reserved to document the presentations and other relevant documentation that were made at this meeting. The following presents a listing of these presentations.

| Appendix | Description |
|---|---|
| A | Agenda |
| B | Recent Remote Sensing Instruments (unavailable) |
| C | INEEL Tracer Detection Methodology |
| D | ARM Remote Sensing Instrumentation |
| E | Interference Sources in Acoustic Remote Sensing |
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# Appendix A

## Agenda

# Appendix B

## Recent Remote Sensing Instruments (unavailable)

# Appendix C

# INEEL Tracer Detection Methodology

# Appendix D

# ARM Remote Sensing Instrumentation

# Appendix E

## Interference Sources in Acoustic Remote Sensing

# Appendix F

## Climate Reference Network

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# PNNL Projects

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## Accomplishments and Activities, 2002

# Appendix I

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## DOE EH-412 Project

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## ANS-3.11 Self Assessment

# Appendix L

# Implementation of ANSI/ANS-3.11

# Appendix M

## ANS-3.11 History