

Report of the Federal Work Group on Extreme Storm Events

The inaugural meeting of the Federal Work Group on Extreme Storm Events was held on September 4, 2008 at the U.S. Nuclear Regulatory Commission's (USNRC) Headquarters Building in Rockville, Maryland. Thomas Nicholson, USNRC appointed by Steve Blanchard, SOH Chair to serve as the Interim Chair. The representatives to the Work Group are: John England, Bureau of Reclamation; Eugene Stallings, National Hydrologic Warning Council; Douglas Clemetson, USACE; John Onderdonk, FERC; Nancy *Steinberger*, FEMA; Christopher Cook, USNRC; Robert Mason, USGS; John McClung, USDA/ARS; and Geoffrey Bonnin, NWS. The first agenda item was review of the SOH-approved Charter lead by John England, Bureau of Reclamation and the principal author of the Work Group Charter (see attached). He discussed the purpose, applicability, scope and activities of the newly approved work group. John mentioned that many of the items in the charter are highlighted in his abstract (see attached) for presentation at the American Geophysical Union's 2008 Fall Meeting on December 15, 2008.

The second agenda item focused on newly-funded research by the USNRC at the U.S. Department of Interior's Bureau of Reclamation with Dr. John England as the principal investigator. This Interagency Agreement research will assess extreme storm events occurring over the last 35 years to evaluate flood estimates for safety assessments of dams, nuclear power plants, and other high-hazard structures in the U.S. Due to staff shortages at Reclamation, the work will be limited at first to examining storms occurring in the Carolinas. This initial effort focuses on collecting and reviewing extreme storm event data in the Southeastern U.S. that have occurred since Tropical Storm Agnes (1972). John will work with Geoff Bonnin, NOAA/National Weather Service (NWS) to obtain hydrometeorological data from these large storms to update Probable Maximum Precipitation (PMP) estimates presented in the generalized hydrometeorological reports (HMRs). The ultimate scope is to examine all extreme storm data in the U.S., such as the January 1996 storm in Pennsylvania, June 2008 Iowa storms, and Hurricanes Andrew (1992), Floyd (1999), Isabel (2003), Katrina (2005), and to systematically assemble and analyze this data for use in regional extreme storm studies throughout the U.S. John plans to incorporate recent advances in storm maximization, transposition, envelopment, and depth-area duration procedures including radar precipitation data and stochastic storm techniques. Uncertainties and exceedance probability estimates of PMP will be explored. Potential effects of climate variability and change on the PMP will also be investigated.

A national database of extreme storm events related to flooding was discussed. Douglas Clemetson, U.S. Army Corps of Engineers's (USACE), Omaha, Nebraska Office mentioned that he was having a student start on compiling the extreme storm data that the USACE has in the Omaha office files. This work is to initiate the creation of database that can be shared between agencies and updated with additional storm information. The work consists of entering historic storm information into a database including the date of the storm, storm location, scanned images of isohyetal maps, bucket survey data, depth-area-duration relationships, temporal distribution, storm dew points, wind direction, elevation of the storm center, and radar images if available. The isohyetal maps will be digitized into a GIS format for use in future storm transposition studies. Initially, this database will contain about 250 historic extreme storms that have occurred in and around the Missouri River basin. It will also include the previously analyzed storms published in "Storm Rainfall in the United States" which contains extreme storms through 1973. Once the initial database is completed we can add additional storms that have occurred since 1973 for other regions of the US as funding and resources permit. All this

information can be placed on a web site for easy access by all agencies and the public, if desired by the work group. Doug hopes to submit a request for additional funding through the USACE dam safety program. If this is approved, he plans to assemble a team of hydrologists and meteorologists from around the Corps to assist with this effort. To further this work he requested that we facilitate a meeting with John England, Reclamation and Geoff Bonnin, NWS to see what data they can provide so we do not duplicate any effort.

The work group next discussed the National Academies of Science and Engineering's *Workshop on Research and Applications Needs in Flood Hydrology Science* being held on October 15, 2008 in Washington, DC (see attached agenda). Tom Nicholson, John England, Geoff Bonnin, Nancy Steinberger, and Robert Mason attended the workshop. The four fundamental questions addressed during the one-day workshop were:

- 1. What should be the underpinnings and motivating science and applications questions in a new science of hydrologic extremes?*
- 2. What can and should be the role of new observing methods, both in situ (including new sensor technologies) and remote sensing? How might approaches to the estimation of hydrologic extremes differ based on the richness of the historic observations?*
- 3. What should be the interface between the science of hydrologic extremes and applications issues, such as the need to replace standard methods, such as Bulletin 17B and other methods that are based on stationary statistical methods? And*
- 4. How can advances in techniques for the accurate analysis of ancient flood events aid estimation of future flood magnitudes and frequency, and understanding of the generative processes for extreme flood phenomena?*

The workshop presentations and discussion sessions focused on these questions. The presentations and subsequent discussions will be summarized to the SOH during the October 30, 2008 meeting by Tom Nicholson and the Work Group members that attended. In follow-up discussions with Dr. Eric Wood, Princeton University and NAS/Committee on Hydrologic Sciences, Tom Nicholson invited him and Will Logan, NAS workshop facilitator to discuss their workshop observations and recommendations to the Work Group members at the next meeting.

The next Work Group meeting will be in conjunction with the AGU 2008 Fall Meeting in San Francisco. John Onderdonk, FERC will host the work group meeting at their offices in downtown San Francisco on Tuesday, December 16, 2008 @ 2:00 PST. A tentative meeting agenda and teleconferencing access will be provided prior to the meeting. The principal meeting topics will be the NAS Workshop highlights, Reclamation's progress on their PMP research, and the extreme storm event database being developed by the USACE.

John England, Reclamation, volunteered to serve as Work Group Vice-Chair. No other candidates were identified and or nominated. John was elected Vice-Chair as per the Charter procedures. No one volunteered or was nominated to serve as Work Group Chair. Representatives were requested to reconsider and to elect a Chair at the next meeting. Tom Nicholson will remain as Interim Chair.