

CISN ADVISORY AND STEERING COMMITTEES MEETING
October 19, 2004
OES Headquarters, Sacramento, CA
Minutes of the Meeting

Present

Advisory Committee members: Ron Alsop, Greg Beroza, Jeff Lusk, Stu Nishenko, Chris Poland, Maury Power, Dan Shapiro, Ron Tognazzini, Loren Turner, Dan Dyce

Steering Committee members: Rich Eisner, Bill Ellsworth, Lind Gee, Doug Given, Egill Hauksson, David Oppenheimer, Mike Reichle, Barbara Romanowicz, Woody Savage, Tony Shakal

Guests: Henry Renteria, Jim Goltz, Moh Huang, Marcia McLaren

Welcome

Mike Reichle opened the meeting, and introduced Rich Eisner, who introduced Henry Renteria, Director of OES. Renteria expressed his appreciation for his long association with Rich Eisner and for Rich's many contributions to seismic safety, emergency planning and response. He also expressed his thanks to the Advisory Committee, and particularly noted his encouragement for reaching out for more partnerships with the private sector. He views CISN as an important project for OES, and stated his intent to continue CISN support. In the next few weeks, OES will be hiring a new Chief of Administration, who will be handling budget and personnel matters. Renteria said the Governor is very interested in earthquakes, and First Lady Maria Schriver will be the official spokesperson for disaster preparedness. She will be launching a year-long campaign shortly to address all hazards and preparedness for the state. Finally, he lauded CISN Display as a major new and valued tool for use in OES.

Reichle noted the need for input and advice from the Advisory Committee. The presentations during the rest of the morning and into the afternoon will summarize the activities and progress of CISN, and will conclude in the early afternoon with CISN's proposal for the next three years for OES and ANSS funding. The Advisory Board will have time in the afternoon for discussion and deliberations.

CISN: Progress Report for Last Four Years—Lind Gee, UC Berkeley

Gee briefly summarized the major advances in seismic networks in California since the Northridge earthquake in 1994. She reviewed the progress in the past four years by: 1.) addressing the improvements in stations and telecommunications infrastructure, 2.) progress in software standardization and calibration, 3.) developments in key products such as ShakeMap and CISN Display, and 4.) the complex organization of partnerships and people who have done the work. She reviewed the planned and actual accomplishments since 2002, noting that the

least progress has been made in statewide network integration, primarily due to the decline in funding below what had been planned. A copy of her presentation will be provided through the [CISN web](#) page.

Discussion: Lind explained that “integrated data access” means that users of the data have direct, “one-stop-shopping” access to the data they want. More progress in this has been made in providing engineering data than in seismological data. Ron Alsop from San Luis Obispo County OES commented on the usefulness of the CISN web site as a source of integrated information for many following the Parkfield earthquake. Chris Poland reminded the group that the design professionals should be included in the membership of the CISN user community. In response to a question by Maury Power, Lind Gee clarified that the currently 30 dual-feed instruments (exchanged between northern and southern California) consist of 30 broadband and strong-motion sites, and five strong-motion-only instrument sites. The plan is to expand this to a total of 60 sites.

CISN: San Simeon and Parkfield Experience—David Oppenheimer, USGS Menlo Park

Oppenheimer addressed the question, for the San Simeon and Parkfield earthquakes, “What we did well, and what could have been done better?” He emphasized that CISN network operations are well-practiced in handling magnitude 3 earthquakes, but can be challenged by M6 and larger events, which happen far less often and for which duty seismologists are not used to the high stress situations that can arise. Oppenheimer summarized the M6.5 San Simeon earthquake, which occurred during the holiday season, with people on vacation, and in a region of sparse station coverage where older analog instruments were used. He reviewed the timeline for development of earthquake location, magnitude, ShakeMap, and HAZUS products. While these products were delayed in some cases, the overall performance was pretty good. The experience of the earthquake has already served to improve many of them. The smaller M6 Parkfield earthquake was expected, although “overdue,” and was densely instrumented, though the strong-motion instruments were non-telemetered film recorders. Oppenheimer reviewed a number of addressable technical “glitches,” challenging human issues, and instrumentation limitations in coverage and data quality that continue to affect product reliability and utility. A copy of his presentation will be provided through the [CISN web](#) page.

Discussion: Marcia McLaren of PG&E pointed out that the smoothness of the ShakeMap for Parkfield made it hard to apply initially to nearby PG&E facilities; the decision was made not to deploy engineers for seismic inspections because of the low shaking levels reported. Notification of the availability of new versions of ShakeMap and explanations of why they are improved would be helpful to the emergency response effort. Oppenheimer said that the need for providing information about ShakeMap quality was well noted for San Simeon and Parkfield, but it is a complicated problem. Tony Shakal reviewed several ideas that are being considered to indicate quality of coverage. He also noted that the Parkfield earthquake has the highest remaining concentration of film strong-motion recorders in the State. Bill Ellsworth pointed out that ShakeMap is based on median ground-motion estimates, while some users may want to

have different post-event information that would be more useful for making decisions; more input from users is needed. For example, a ground-motion exceedance map could be made, giving the shaking that had only a 10% chance of being exceeded, instead of a 50% median. In response to a question about the aftershock processing backlog, Oppenheimer said that procedures for such processing need to be revised to reduce having analysts look at all the data. Chris Poland asked about Oppenheimer's use of the phrase "rapid and reliable"; how is "reliable" measured—speed, accuracy? Oppenheimer responded that this was in the context of earlier earthquakes such as the Loma Prieta and Northridge events, when important information was slow to come out or was inadequately provided to users. Poland urged that there be more discussion about what reliable means. He used the example of highly localized areas of intense shaking compared to areas a few blocks away. Poland indicated the exceedance idea that Ellsworth mentioned starts to get at what we can say. We know about some effects like site geology and ridgetop shaking; we know about these and should be able to address them.

Chris Poland also pointed out that the earthquakes he and other engineers worry about are the magnitude 7.8s. What is going to happen with such a very large event? Oppenheimer said that backup between northern and southern California is intended to address this to some extent. Poland responded that there is still the human response problem that needs attention, beyond old instruments and enhancing redundancy. Oppenheimer said that the human response matter is under active discussion in ANSS, to go beyond the "homegrown" regional networks and response procedures that are as good as the current resources allow. This is not the same as having people 7-by-24 who are used to responding and who know how to respond to earthquakes day in and day out. There is some thought of having a national response procedure to diminish the human factor of people who do earthquake response only occasionally. Poland noted that OES does not have an internal team of seismologists that is more used to the stress of emergencies; this may bear more consideration. Marcia McLaren encouraged CISON to do in-house earthquake exercises to help train on procedures for large earthquakes. Poland expressed his respect for research seismologists who are trying to be duty seismologists, but he thinks it is going beyond their training and culture to do what needs to be done. Maybe the time has come to look at putting earthquake-trained people inside the emergency response system to carry out that role. Rich Eisner noted the reduction of the earthquake program staff within OES. He suggested possibly having OES pagers at USGS, Caltech, and Berkeley to speed up contacts with key earthquake people; conference calls are too slow. He concurred with the point of looking at current internal procedures; CISON information is coming out within minutes, faster than people are prepared for. Bill Ellsworth said that the USGS recognizes the need for a 7-by-24 response center, but there is no money to do it currently. Something that this group should consider is that, if the USGS established a fully staffed real-time center located somewhere other than California, would Californians be comfortable with that? Such a center for responding to national and global events might be most sensibly located outside of the seismic areas. If a different model would seem to better serve California's needs, it would be useful for the USGS to hear about that. The Advisory Committee in particular would be able to provide good counsel.

Tony Shakal noted that structural engineers are trained to perform post-earthquake building inspections in a reliable, certified way. Could OES play a role to train outside personnel to be “earthquake-response certified,” thus leveraging the OES culture? Eisner noted that staffing and other resources in OES to do this are limited, but perhaps there could be some way for OES and the earthquake monitoring community to develop and conduct such training, for the benefit of both groups. Jeff Lusk pointed out the importance of having personal contacts and professional relationships, which makes the interactions fast and effective. If these contacts are reduced over time, this could be a real problem. Exercises and standardization of procedures can help. Eisner noted the large reduction in the size of the OES earthquake group from 35 ten years ago to two now. Ideally, the contacts would be institutionalized and systematic to compensate for such changes. Poland stated: “if larger organizations are required to support putting out reliable and useful information, then such staff increases need to be made known.” Stu Nishenko commented on the rising expectations created by success in San Simeon; is CISN the victim of its success. Additional reliability issues mentioned were telemetry and electric power. Poland asked if CISN was prepared to not put a product out until it is adequately reliable. Several expressed the desire to have rapid products with adequate qualifications provided. Poland emphasized that instructing users is needed, but the training must be just in time. Large numbers of people cannot be adequately trained prior to the event. Eisner raised again the question of what will happen in a large event, like a M7+ in the San Francisco Bay area. David Oppenheimer suggested rethinking what data we really need for getting a very detailed map of shaking using many more instruments than we currently are considering. Shakal emphasized the consideration of changing the “culture” of CISN to include training into the emergency response mode. Nishenko brought out the differences between research and operations in USGS. Ellsworth expressed hope that the NEHRP reauthorization, which would establish the requirement for developing a four-agency plan for working together constructively, will help bring focus and action on addressing this issue of balance between research and operations.

CISN: Outreach Plan—Jim Goltz, OES

Goltz briefly reviewed the CISN products and their dissemination, with particular emphasis on CISN Display and the ShakeMap-HAZUS interface. The plan to contact and inform users and potential users of the CISN products involves diverse media and an exhaustive list of activities. A copy of his presentation will be provided through the [CISN web](#) page.

Discussion: Chris Poland asked about feedback on the TV use of ShakeMap. Goltz reported that TV news tends to be wedded to the epicenter and expanding rings view, with only a few using TV ShakeMap. Rich Eisner pointed out that ShakeMap for TV needs to be dynamic and more colorful. Barbara Romanowicz asked why the earthquake community was targeted for early training in CISN Display. Goltz said that there was a heavy emphasis on emergency services first, and seismic network operators need the information early so they can pass information on to others. Any group that wants to use

CISN Display will not be denied access. Goltz wanted to have the training operate in a phased manner, but the priorities could also be changed. He also noted that ShakeCast has not been a CISN outreach priority up to this time. In response to the question of reliable delivery of CISN Display, Oppenheimer noted that NOAA is using satellite internet links for the tsunami application of CISN Display to obtain a highly reliable delivery. But Eisner pointed out that CISN Display is not invulnerable. He also illustrated the diverse information that can be obtained with through CISN Display. Doug Given noted that CISN Display is designed to let the user choose what information they want to receive.

Lunch - Advisory Committee meeting to select new Chair & Vice-Chair

Ron Tognazzini conducted a meeting of the Advisory Committee members during lunch. During that meeting Ron Tognazzini was elected as Chair, replacing Bruce Clark and Stu Nishenko was elected as the Vice-Chair of the Advisory Committee, replacing Ron Tognazzini. A general discussion followed the elections regarding the expectations and duties of Advisory Committee members within CISN. Several issues that were raised in the morning discussions were informally discussed between members of the Advisory Committee during lunch.

CISN: Structural Instrumentation and the Engineering Data Center— Tony Shakal, CGS

Tony Shakal focused his discussion on the instrumentation process used by the California Strong Motion Instrumentation Program in CGS. He noted that the process being developed for ANSS structural monitoring was described at the previous Advisory Committee meeting by Woody Savage, and is expected to share the same features. Shakal summarized the instrumentation carried out both for buildings and for dams and bridges (lifelines), and explained the SMIP data utilization funded projects and annual seminars as a means to encourage the timely use of the collected data to improve design codes and practices. He then discussed the data obtained from the recent Parkfield earthquake in detail, noting that the CGS and USGS strong-motion networks performed well. Improvements include upgrading to digital instruments, increased integration with the National Strong Motion Program and ANSS, and continued development of the CISN Engineering Data Center. At the close of his presentation, Shakal showed a movie of the 3-D motion of a building model as shaken by the Northridge earthquake, with discussion of the response of the structure.

Discussion: Stu Nishenko asked if the agreements with the building owners include access to damage information after an earthquake. Shakal indicated that the access to damage information is tenuous, since the permission to instrument building can be terminated at any time, so post-earthquake examination of a structure needs to be approached carefully. Bill Ellsworth noted the great value of records of the Parkfield earthquake to better understand the rupture process, and asked about the availability of the unprocessed records at this point. Shakal indicated that the one digital record that CGS collected is available now. His organization is less comfortable releasing the

unprocessed digitized film records, but he said he thought that the comfort level is adequate to release them. Ellsworth indicated that for this earthquake the data are particularly important because the event will be used as a reference event that people will be modeling for years. The future of the Parkfield instrumentation is uncertain, although some instrumentation will stay. Woody Savage provided an update on status of the ANSS structural monitoring program. Early this calendar year, a committee was formed, headed by Andrew Whittaker, to prepare the guideline for ANSS structural instrumentation. The guideline will be coming out soon for reviews by the ANSS National Steering Committee and ANSS Regional Advisory Committees and others within the regions. In California, there will likely be two meetings with CISN, one in northern California and one in southern California.

CISN: Next Three-year Proposal to OES and ANSS—Egill Hauksson, Caltech

Egill Hauksson introduced the planning process for the period July 2005 to June 2008, to correspond with the next three-year contract period with OES. Rich Eisner encouraged using a five-year planning horizon to allow good continuity of planning and funding. This means that the current Strategic Plan should be revised to project forward for five years, then a three-year proposal should be prepared for work to start in July 2005. This should be done early next year. The state budget is uncertain going into next year, due to the large budget shortfall. Hauksson suggested that the Advisory Committee consider writing a letter that contains an evaluation of the CISN project, including how they think it is doing and what they recommend in terms of its moving forward. Hauksson reviewed the history of OES funding, both general funds as well as special funds from FEMA. Hauksson described the presentation to follow as a series of seven initiatives with a discussion question for each for the Advisory Committee. His presentation will be provided through the [CISN web](#) page.

1. Continue to operate the statewide earthquake monitoring and ShakeMap generation facilities.

Does the CISN Advisory Committee believe that the current routine CISN operations are serving the statewide needs of California?

Discussion: Ron Tognazzini noted problems with the speed of data, in particular ShakeMap (for San Simeon); the lifetime of information for emergency responders is short. The production of ShakeMap does not rely on film recorders, but it is possible for data to be delayed by communication line problems. Shakal explained there is a pocket of film recorders at Parkfield. Poland emphasized the need to replace film recorders with digital recorders with communications. Tognazzini noted the conflict between technology improvement (replacing film recorders and short-period stations) and installing new stations and other extensions.

2. Improve ShakeMap coverage and earthquake monitoring in selected regions of California.

What priorities does the Advisory Committee place on specific geographic areas?

Discussion: Hauksson described the statewide station distribution, and explained the criteria used to deploy stations, including filling holes in the network, adding stations along segments of the San Andreas Fault. Maury Power asked about instrumentation in NW California. David Oppenheimer noted the tension between the ANSS focus on urban areas as opposed to other priorities like the subduction zone. Chris Poland noted the visibility and popularity of ShakeMap, and asked what size city really benefits from having ShakeMap? Should the focus be on covering cities and covering them better? Eisner noted that the issue is the density of population, measured by census tracts and Zip codes. The CISN goal is one per Zip code, and is about 60% fulfilled now, but there are moderate-sized cities missing. Bill Ellsworth expressed disappointment in having only one record of engineering interest for the Denali Fault earthquake. He emphasized the engineering importance of close-in recordings of strong earthquakes. There needs to be a balance with urban monitoring. Ron Alsop noted the good marketing that comes from a focus on the San Andreas Fault, which most people view as the “big one.” Ellsworth noted that in Japan (about the same area as California), the network that makes the ShakeMap has 3400 intensity meters (six times what we have now). Alsop also noted that rural areas can benefit from ShakeMap for directing emergency response, just as urban areas can. Tognazzini noted the need for a dense ShakeMap array to get good HAZUS loss estimates for FEMA. There are important later applications of ShakeMap for housing needs, casualty numbers, and debris volumes. There is a science case and an emergency response case. Ellsworth noted the difference between possible inexpensive instruments just for ShakeMap and better instruments that fill the engineering and science needs. Oppenheimer also noted there are critical long-term issues, like attenuation in different regions, not only emergency response. Poland noted that changes in attenuation relationships eventually lead to changes in the building code. The next code change is due in 2012. Where should funding go in the next three years that it could make a short-term difference? Several individuals discussed the amount of money needed (about \$10M for the whole state), which comes from a variety of sources. The Advisory Committee serves both OES and ANSS, so they can direct comments on priorities to each. Regarding questions of instrument cost, Hauksson noted that the overall cost of the network is dominated by people, not the equipment.

3. Upgrade and enhance infrastructure at CISN centers to improve acquisition and processing capabilities, reliability, and security.

What recommendations does the Advisory Committee have for CISN to improve robustness and the survival of CISN in a major earthquake?

Discussion: Hauksson noted that a small fraction of the stations causes most of the problems. There are also expensive problems with meeting new security requirements.

4. Upgrade and enhance existing CISN software systems to improve data processing and information delivery.

What is the relative merit of standardization of products as compared to other CISN efforts such as improving robustness?

Discussion: Hauksson stated, there is a tradeoff between improving hardware and software versus adding stations.

5. Verification of impact analysis with a moment tensor and synthetic ShakeMap will be calculated at the CISN Southern California Management Center.

How important is independent verification of ShakeMap?

Discussion: Hauksson discussed the application of a newly developed tool to compute wave propagation of a well-determined moment tensor for the source through the detailed velocity model (400 m resolution) of southern California. The result is a synthetic ShakeMap. The results can also be used to prepare a movie of the wavefield. The bandwidth of the wavefield is up to about 0.4 Hz. Funding is requested to purchase an array of about 100 computers. He suggests that this idea might be suitable for a special funding source.

6. Implement system for the simultaneous estimation of earthquake location and the seismic moment tensor at the CISN Northern California Management Center.

How important is independent verification of locations, M_w , and moment tensors?

Discussion: Hauksson this idea involves using more data than just P picks to improve rapid locations and moment tensors. This can be useful for offshore events. This can be done in 5 to 10 minutes after the earthquake. He suggests that this idea might be suitable for a special funding source.

7. Outreach, communications, and technology transfer (seven tasks)
 - a. Conduct workshops on the use of tools such as ShakeMap and CISN Display.
 - b. Develop and distribute training materials for use of earthquake information
 - c. Maintain websites with up-to-date earthquake information
 - d. Continue enhancement of CISN Display
 - e. Continue enhancement of the CISN transport layer software
 - f. Provide scenario ShakeMaps for training

g. Develop the CISN Warning Map

What are the relevant priorities of the outreach items? Are there other outreach items that we missed?

Discussion: Hauksson briefly reviewed each of these seven elements. He particularly described the seventh item as an immediate visual display of an earthquake in progress. It could replace an existing analog display in OES and might be useful in emergency centers and for the media, and would be a new CISN product. Hauksson then summarized the goals of the next three year proposal to OES and ANSS as follows:

Summary

- Improved ShakeMap and earthquake monitoring coverage
- Statewide real-time reporting
- Statewide seamless archives
- Backup procedures implemented
- New directions/innovations for earthquake monitoring
- Outreach to emergency responders, engineers, others

The baseline funding to be requested from OES is \$2.3M, but there are other possible sources of funding that comes through OES such as Emergency Management Program grants and the Hazard Mitigation Program grants.

Advisory Committees Discussions

Tognazzini led the discussions on the questions presented by Hauksson. Members of the Advisory Committee were advised by Rich Eisner that consideration should be based on both a five year strategic perspective as well as a three year contract with OES for funding. Hauksson requested that the Advisory Committee develop a letter to the Director of OES in support of CISN funding. The members of the Advisory Committee agreed and Tognazzini was assigned to develop a draft. Ron: Several noted that the letter should also go to Dave Applegate at USGS.

The questions as presented by Hauksson were discussed with the first four together for operations, followed by the next two regarding future directions and the last in terms of outreach priorities.

1. Does the CISN Advisory Committee believe that the current routine CISN operations are serving the statewide needs of California?

The Advisory Committee considers the current routine CISN operations as critical to meet the needs of the emergency responders, engineers and research scientists to save lives, mitigate against earthquake damages to the built environment and advance the

research necessary to understand earthquakes in California. The continued production and improvements of routine products such as earthquake hypocenters, magnitudes, moment tensors, strong motion records and ShakeMaps were considered basic to seismic safety in California and of highest priority for CISN. Chris Poland added that research scientists need to be trained to be OES responders, or OES responders need to be trained to be duty seismologists.

2. What priorities does the Advisory Committee place on specific geographic areas?

The Advisory Committee discussed numerous ways to decide between geographic areas, including population density, geologic structure, earthquake hazard potential and vulnerability of the built environment. All of these parameters should be used, rather than the selection of any particularly under-served area over another. It was suggested that the use of 2 sigma error bars or 2% probability of exceedance mapped data might be considered to express the uncertainty in geographic areas that are under served with high speed and ShakeMap quality stations. Within the first four questions, expansion was considered of lesser priority than maintaining routine CISN operations in the first question or the technology renewal of the next two questions.

3. What recommendations does the Advisory Committee have for CISN to improve robustness and the survival of CISN in a major earthquake?

The Advisory Committee strongly recommends that CISN upgrading and enhancing the infrastructure at CISN centers to improve robustness and redundancy of assets and staff needed to provide CISN products. This includes additional operational training for research scientists that might be called up during a major earthquake as on duty seismologists to quickly and reliably evaluate and distribute information that is needed for the distribution of CISN products. It also includes technology renewal for computers and networks that improve data acquisition and processing capabilities in today's extremely security conscience cyber environment. As a significant part of the CISN information use and distribution system, the Advisory Committee feels that OES needs to make modifications to their network to allow completion of the CISN communications backbone ring. The Advisory Committee considered improvements in robustness and redundancy for CISN as a high priority, just slightly less than the next question.

4. What is the relative merit of standardization of products as compared to other CISN efforts such as improving robustness?

The Advisory Committee considers standardization of products through software enhancements, where practical, as very important to reliability and speed of data processing and information delivery. Many members of the Advisory Committee were unaware that earthquake data could be processed differently in one CISN center, compared to the same data being processed in another CISN center. It was suggested that standardization could allow the sharing of staffing resources between CISN centers, making standardization of products an enhancement for both reliability and speed. The Advisory Committee considers standardization, wherever practical, as an extremely high

priority, second only to maintaining routine CISN operations in the first question, but only slightly higher than improvements in robustness and redundancy considered in the third question.

5. How important is independent verification of ShakeMap?

The Advisory Committee considered the use of software that runs on a large computer cluster, taking advantage of finer meshed three-dimensional surface models combined with finite sources as an independent evaluation rather than verification of current ShakeMap products. This proposed synthetic ShakeMap could be calculated within 30 to 50 minutes of occurrence of a large earthquake, at the CISN Southern California Management Center, which currently uses software and a three-dimensional model of the surface under the Southern California Metropolitan area that were developed in a previous NSF grant. Similar three-dimensional models have not been developed for other areas in the State. Chris Poland suggested that Community Internet Intensity (Did you feel it?) Maps could be used to provide an independent evaluation of ShakeMap. The Advisory Committee felt that it was important to be looking forward to improve the products distributed by CISN, however, between this proposal and the next question regarding future directions for CISN; it was felt that this question was less promising than the next for the future of CISN. Bill Ellsworth made the very important point that this project works toward the ability to predict time histories, which are of increasing significance in earthquake engineering.

6. How important is independent verification of locations, M_w , and moment tensors?

The Advisory Committee considered the use of continuous monitoring of the seismic wave field, which differs from current methods that depend on phase picks for earthquake detection. This continuous monitoring method would be used to enhance the evaluation of routine products such as earthquake locations, magnitudes and moment tensors. In particular, this method would significantly improve the ability to locate earthquakes at the edges of CISN, such as offshore where stations are only located on land, often at significant distances from the hypocenter. The Advisory Committee felt that this question was more important than the previous one regarding future directions for CISN, but much less important than the first four questions under consideration. This proposal should be considered if special funding does become available.

7. What are the relevant priorities of the outreach items? Are there other outreach items that we missed?

The Advisory Committee considered the seven outreach activities and rated them based on an academic grading system. Each question was asked, discussed in part and voted on by the members of the Advisory Committee. Their ranking in highest priority order as represented by the grades indicated below, were taken as a rough average of each vote.

Priority Grade	Item No.	Outreach and communications and technology transfer items
A	c.	Maintain websites with up-to-date earthquake information
B ⁺	d.	Continue enhancement of CISN Display
B	f.	Provide scenario ShakeMaps for training
B ⁻	a.	Conduct workshops on the use of tools such as ShakeMap and CISN Display
C ⁺	g.	Develop the CISN Warning Map
C	b.	Develop and distribute training materials for use of earthquake information

Outreach item d. Continued enhancement of CISN transport layer software, was not prioritized in the above table because the Advisory Committee felt that it should be considered a part of question 4, regarding upgrades and enhancements to existing CISN software systems to improve data processing and information delivery. The Advisory Committee considers this item, which is already under development, to be elevated to extremely high in priority as a part of question 4 which is second only in priority to maintaining routine CISN operations in the first question.

An additional outreach item that was discussed by the Advisory Committee, suggests that CISN consider using a direct feed approach to the media. This approach could be similar to the way NOAA is currently collecting information from school sites around the country and directly feeding that data after processing into local broadcast stations.