DELAWARE RIVER BASIN COMMISSION
FLOOD ADVISORY COMMITTEE MINUTES

MARCH 10, 2004

The Flood Advisory Committee (FAC) meeting chaired by Alan Tamm began at 10:00 AM in the Commission office (DRBC) in West Trenton, NJ.

Review of the Draft Minutes from the December 10, 2003 Meeting

Mr. Fromuth said that he received an e-mail from John Talley of the Delaware State Geological Survey with a correction and some clarification on page 3 under Member Reports on Progress Towards Implementation Flood Warning Recommendations. There was a discussion last time about additional gages added and telemetry out of Delaware. In the copy in the handouts, there is bold italicized typing which covers the wording in the e-mail that John sent. The wording includes the specifics of the streams and the gages that are affected and where the telemetry is being added. These are good additions as part of the program in Delaware to improve their emergency planning systems. One of the recommendations in the original report that the Flood Advisory Committee had prepared was to improve telemetry in Delaware. It is suggested that John's wording be included in the minutes. The minutes were adopted with Mr. Talley's addition.

Discussion of Member Funding Issues

Mr. Tamm stated that DRBC has been very supportive of the state's efforts in mitigating and reducing flood losses. This Flood Advisory Committee was established a number of years ago, and it is very valuable

Mr. Fromuth said that the Committee has been meeting for about three years, and it is a vehicle for coordination. The real work in flood loss reduction is being done by the members of the Committee, and over the years it has been unusual for the DRBC to be able to provide information for all the activities in flood loss reduction in the Basin. This has helped DRBC get a better handle on work that is being done, and hopefully it has allowed for some communication among the organizations doing the work. There have been some tangible products. The Commission is having budget problems, and an e-mail was sent about six weeks ago mentioning this and talking about potential funding shortages. The Commissioners approved a normal budget, and also a cutback budget, and that cutback budget is on the website. It lists flood loss reduction as one of the programs that could potentially be eliminated. After the e-mail was sent out, some positive responses were received as far as potential alternate, temporary funding. The hope is that the Commission gets the budget back, and if that happens, this meeting and the coordination work that goes into the quarterly meetings can continue. The people who have responded (PA Emergency Management, NJ Office of Emergency Management and the City of New York) have all responded in a way that if the funding is lost from our normal budget to support the Committee, they are interested in helping to support it. Mariana Mossler of the New Jersey Office of Emergency Management has secured a grant for the DRBC for $10,000 to improve DRBC's website further on the flood loss reduction section, and make it more of a tool for education and outreach. Alan Tamm is interested in supporting this Committee through PEMA if necessary. The City of New York is generally interested in flood loss reduction coordination that can be followed with some work downstream of Pepacton Reservoir where there was some flooding. Mr. Klosowski had prepared some GIS overlays showing the floodplain and structures that would be potentially damaged. That work is going to continue because it has been requested by an Assemblyman, Clifford Crouch, to develop a permanent land for Pepacton for being a void in the reservoir when there is snowpack. Every effort will be made to continue the Committee, but what really makes the Committee work is the work that can be done in between the meetings. The

meetings are a chance for inputs from everyone, but the DRBC has not been doing a very good job supporting that over the last few years. Even with the funding that was received, they really need a person, at least half time, who is technically oriented and able to pull together information in GIS format.

Mr. Tamm had a question for Mr. Fromuth that revolved around the federal share of the funding. He said that this is a line item appropriation, and he wanted to know what it would take for members of this Committee to help facilitate restoration of the funding. Mr. Fromuth said he could send everyone the outline of the people that have been contacted and you can pick out who you feel from your organization standpoint would be the most key. They have concentrated on Arlen Spector's office. They have gotten commitments from these people to request funding, and that is money that is not in the President's budget. It is probable that there are people who should be contacted and are not on these lists. Mr. Tamm asked if that is a public document. Mr. Fromuth said that they sent a memo out to the Commissioners. The request that Senator Spector made has been for $1 million for both the SRBC and the DRBC. It has been taken forward as a recommendation.

Mr. Tamm said that the efforts of the DRBC have popped up continuously in efforts to get local hazard mitigation plans prepared. Yesterday he was up on Monroe County and came across their Brodhead Creek watershed plan that was in part funded by efforts of the DRBC. This adopted document really sums up the efforts of the DRBC flood protection looking at the interrelationships and coordinations between very different and diverse scientific aspects and ecological aspects. The statement of findings that each one of the municipalities that participated in this watershed plan signed off on reads, "Inadequate management accelerated runoff of stormwater resulting from development through watershed increases flood flows and velocities of lack of proper whiteline conservation throughout a watershed contributes to accelerated erosion and sedimentation. Overtaxes the current capacity of streams and storm sewers, greatly increases the cost of public facilities, carry and control stormwater, undermines floodplain management and flood control efforts in downstream communities, reduces ground water recharge, impacts surface and ground water quality, and threatens public health and safety." It goes on to say, "A comprehensive program of stormwater management, non-point source of pollution, wetland conservation including reasonable regulation of activities causing accelerated erosion and sediment loss is fundamental to the public health and safety and welfare and the protection of the people of the municipality and all the people with common welfare resources and environment." It shows that the efforts that we do individually and collectively have a bearing on flood control as well as many of the other programs that we consider dear to us and are a constitutional right in the Commonwealth of Pennsylvania. So, we strongly support the Flood Advisory Committee and the DRBC.

Christine Bethke said that the Corps of Engineers have asked all federal agencies to write them a letter showing their support. The Corps is going to gather all of those and give them to Carol Collier, and she can then give those to the Senators. If anyone would like to send a letter to the Corps, they will forward those on as well. Her contact information is:

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Member Reports on Progress Toward Implementation of Flood Warning Recommendations

There is a bound document in the handouts. Over the last few months, Mr. Klosowski has put together a set of about twelve basin maps that are GIS-based and include inventories of stream gages as up-to-date as possible, as well as analysis of the FEMA flood loss claims database by watershed. Behind each one of the maps is a step-wise list of the data sources that he consulted and steps he took to put them together as a reference. There is a set that involves the categorization of watersheds based on claims and dollars in losses per square mile, and there is a set that shows repeat claims and losses per square mile. There is also a map related to the status of DFIRMS which are additional flood insurance rate maps that are gradually being produced for the basin. That map delineates whether the community or county has one of these and what type it is. Some of these maps are prepared with GIS databases where the GIS itself is a filing system along with the maps. There is also a map that shows the availability of the Q3 data. This data is basically a scanned image of the manual drawn flood map as completed over the last 20-25 years. As more and more of the DFIRM products are produced and at a higher level of accuracy, those overlays will be better. There are explanations on the Internet of how accurate the Q3 data is. It is basically a screening tool. Mr. Klosowski's work is the beginning of trying to tie data together for the Delaware Basin. The topographic mapping produced as part of the DFIRM work can form a basis for the flood stage forecast mapping sought in the AHPS program by the Weather Service. Mr. Zagone mentioned that the flood stage forecast maps produced for the Middle Delaware River in the early 1990s might be useful to the Weather Service.

Mr. Tamm made the comment that the product the Corps produced for the Wyoming River flood, Wyoming Valley Levee Raising Project, is extraordinary. It is for a 110-mile reach of the main stem of the Susquehanna, and it is an excellent product. It is something that has to be continued to be worked on, and development of this product for other areas of the state would be very useful. Because of funding limitations, they had to take a representative sample, but this is an emergency manager's dream. Pennsylvania is going to propose this as a hazard mitigation project opportunity to be done throughout the populated reaches of both the Delaware and Susquehanna and the Ohio River Basin. Another comment is that there are a lot of changes going on in PEMA and emergency management as well. Looking at the increased utilization of GIS in prediction, response and recovery, one of the elements that is being currently looked at on a statewide basis is the acquisition of a three-meter digital elevation model. Some examples are being seen of high-resolution satellite images where you can tell whether a man crossing a street has hair or not. PEMA is currently in the process of trying to find out whether better, more accurate elevation information would be available such that they could plug it into either the Corps of Engineers' modeling efforts or into the FEMA HAZUS program. PEMA is also looking at how to pull the National Weather Service data into their GIS so that after an event, they can clearly identify those areas that have been overwhelmed with stormwater management, based on historical records. This way they share with local emergency management coordinators where they should expect to have damage and damage reports. PEMA also intends to use this as a fundamental part of the recovery operation where they take the cumulative precipitation and photolay on a map that has the hazard mitigation project opportunities. Those projects look at what communities want to do, and they are able to go out and start the implementation of those hazard mitigation opportunities as soon as possible after a severe weather event.

George McKillop made a point for the record that it is very disturbing to hear that Rob Klosowski is leaving the DRBC. The Committee has seen his technical skills with a flourish in the activity that he has done. This is somewhat distressing and disturbing that his skills are going to leave. The Q3 data that he has compiled is what the National Weather Service is trying to do across the entire United States or at least in the eastern region. That is to put the focus on trying to figure out exactly where all this data is available as a starting point to get more of this flood inundation mapping going. These flood inundation projects are slow to start; they are piecemeal here and there. His thinking is that one possible way to influence some people in the budgeting to get some money is if there was a successful flood inundation

project to showcase the Delaware River Basin. This cannot be done overnight. To showcase something like that and see the benefits of this kind of flood mitigation type project would go a long way. It is a big start just getting this Q3 data available and finding out where it is. Mr. Fromuth said the Q3 data with the overlay of the 100-year floodplain is available nationwide. A precise elevation database is what is really needed to get the floodstage forecast maps. If a flood forecast point were established in the Pennypack Watershed, it could go hand-in-hand with flood inundation mapping that the Center for Sustained Communities got significant funding to do, and they also got about $200,000 from FEMA. When that is done, it is going to be compatible in accuracy and detail. An ability to map flood stages every couple of feet is sought. There needs to be more discussion with the Weather Service about the specs needed for inundation mapping. Mr. McKillop said the budget cuts that were taken from the national AHPS program to support the Susquehanna funding that was lost does not help. It certainly is going to slow this whole process down.

Mr. Tamm said PEMA currently has a hazard mitigation planning initiative at its insipient stages in Chester County. Chester County is also participating with FEMA on an application of the HAZUS program. It will be very beneficial to have an alternate opinion of the results of the HAZUS. This could be considered as a potential demonstration project. The USGS may also be involved in that with the Delaware Geological Survey. Bob Hainly said, yes they are. The Delaware office and his office are involved in adding real-time precipitation data to their two sites in Pennsylvania.

Joe Gavin said that he was not at the meeting in January, but he thought he remembered somebody saying that Chester County was working on a DEM. Mr. Tamm said that agency takes care of both flood protection as well as water supply, so they may have actually flown high resolution photography to get the very high resolution. Mr. Gavin said he could be wrong, but he thinks Chester County has been pretty progressive. Mr. Tamm suggested they get together after the meeting, perhaps through e-mail, and see what they can come up with to propose to Chester County to assist them.

Mr. Hainly gave an update on the USGS situation. As far as the funding issues, USGS received the allocation from the NSIP (National Streamflow Information Program) program about a month or so ago. It was slightly less than the levels for last year, which means that it will not go as far as it used to because of cost of living increases. It has not impacted any of the gages. That is the funding that they are contributing other than coordinating the stations. He asked Rob Reiser if he had the same situation in New Jersey. Mr. Reiser responded that there was a three percent drop, which was a combination of less funding from Congress and also more funding going to Reston for some work they are doing. As far as the progress towards the flood warning recommendations, the only thing they have to report is that they are talking with the City of Philadelphia water department. They were asked for some assistance with some water quality issues. As a result of that, it looks like they are going to restart some gages that used to be in the Carbon Creek basin. This will be over a period of two or three years. They will be restarting some gages there, and they will all be real-time gages. Mr. Reiser added that they have another gage on-line now with real-time data at the McDonald's branch of Wharton State Forest. It was just added a couple of weeks ago to the network. It was funded through the hydrologic benchmark program. They also have some temperature probes measuring air temperature at some sites just outside the basin in northern New Jersey that they are using for working advice record, and they are on the website.

Use of Alternative Technologies for Temporary Flood Control – Presentation by Bruce Knobloch, Aqua Levee Enterprises

Mr. Tamm introduced Bruce Knobloch from Aqua Levee Enterprises. Mr. Knobloch said he represents one company of many that are in the business of providing tools for temporary flood control. Mr. Fromuth received a copy of the notice for the National Conference to the Association of State Floodplain Managers, which will be in Biloxi, Mississippi this year. Aqua Levee has been a corporate member for

about the last three or four years. They attend and exhibit at the conference, and it is very beneficial for everyone that has any interest in flood control. There are a number of individual companies that provide other tools for the type of thing he is going to talk about. He was also looking at a publication put out by Pennsylvania that says, "…with the rate of technological advancement today, each of these technologies is becoming more sophisticated, more useful in effective mitigation. Weather alert radios can now be turned on from a remote warning site for specific locations and sound an emergency tone and instructions. Real-time stream gages that send measurements via satellite for better advance flash flood warning are currently being incorporated in the existing monitoring system. Reverse 911 systems allow emergency centers to reach specific at-risk locations in event of pending threat." Mr. Knobloch stated that he wanted everyone to take with them: 1) the awareness of current technologies that are available; 2) some of the initiatives that are occurring in other countries; 3) a summary of Corps of Engineer studies that have occurred; and 4) an outline of the various flood control products that are currently available and being used.

Flooding is one of the few natural disasters that you really have the opportunity to mitigate by technology. Gaging is one tool in technology that allows you to prevent it to mitigate the flooding. Now there are also better response and better barriers to prevent the flooding from occurring. There are multiple sources of flooding; precipitation, snowmelt, ice jams, hurricanes, wind surges, terrorism. Back when they were talking about the Iraqi war, there was one concern about terrorist attacks on the dams that would cause flooding downstream. That is a real threat, and something that has normally not been considered. When you look at the NFIP data for cost, it does not matter whether it is a federally declared disaster or not. We are not alone when it comes to flooding. Last month, New Zealand had some significant flooding occurring. This is something that has a lot of interest and a lot of concern all over the world. In the United Kingdom, they have gone through a study which is put out by their --- and environmental agency that looks at temporary and demountable flood protection. What they are looking at doing is evaluating different types of technologies, different types of products, and what works best in different applications. They now have also started to commence testing standards for products. The Army Corps has done some testing in Pittsburgh, and the Aqua Levee product has been tested in Pittsburgh. These are testing standards that can actually be used by the end users in selection of products. A report that the Army Corps put out in 1997 is referred to as the Virginia Tech Study. They were commissioned to do an evaluation of practices that were available back in 1997. They looked at what was available commercially, what other techniques gave them better boxes, and what the best opportunities were for temporary flood control. They also, now in fiscal year 2004, are looking at doing some product testing, and of course they are very interested in their product being tested. It is coming as a parallel effort by what the Army Corps is referring to as technologies and operational innovations for urban watershed networks. The Virginia Tech study looked at certain attributes believed to be beneficial in temporary flood control. Required footprint means that if you are going up three-feet in sandbags, it is a three-to-one ratio, so you are nine-feet wide with sandbag walls three-feet high. The cost is always a factor. What you are going to see with maximum retained water levels is that there is an interest in making sure that if the product is going to be used, it has to be done in a timely fashion; it has to be economical; and it has to work. As part of this effort, in 1997 there were no laboratory tests or ---- actual testing done on products. As a result of this test in 1997, there were four technologies that were top ranked. These included semi-permanent walls, the Jersey highway barrier, which they have identified as having high availability. They have also identified water-filled geo-membranes, and deep-cellular confinement systems, which have cells that are filled with soils or sand that create the barrier. Rather than being set in the ground for erosion control, they are used above ground as a temporary barrier. That technology is having success.

If you looked at each one of these methods individually, they are very proven. They are really an alternative to the temporary levee. The negative is that there is a high capital investment involved, but it is an alternative to a permanent levee. Mr. Knobloch showed some photographs from the Czech

Republic. A few years ago there was severe flooding in Prague, and there are three locations where those walls would be installed. Two of the three have been installed. A foundation must be in place prior to placement.

The Army Corps determined in the 1997 study that the Jersey barrier is simple and fast, and that it has a high availability in the urban areas. The Corps also identified that a modified barrier would be better. The question was that maybe it should be made of plastic. There are plastic Jersey barriers around, but the problem is that they must be filled with water. The difficulty with using this type of technology is that the barriers are not water tight, so plastic sheeting may be required in order to provide any kind of resistance to penetration. They require heavy equipment for installation, which may not be a good idea if you have saturated soils.

Water-filled units are light weight and easy to store. They are quick and easy for obtaining two to three feet of extra barrier height, and could be used as a temporary levee extension as well as other areas where you just need a limited height increase. They are adaptable to uneven ground because they are pliable. However, the 1997 study determined that there were concerns about anchorage and section joints. There is limited mixed height availability because once installed, height cannot be increased. Durability may also be a problem. The reason being is that it is just a vinyl tube. Technology-wise it is not much different than water tubes used to weigh down pool covers during wintertime.

There is one product, geo-cel, which is being looked at by the government and the Army Corps, and will probably be included in testing this year. Essentially, this particular design involves dividers much like the separators within a wine cart. Because of that, it takes very minimal storage; they fold flat. It could be used as a gate closure in some of the levee walls. The negatives are the need for heavy equipment. A front end loader is required. Another big issue is that it uses sand. In an urban area, the sand residue may cause problems with storm sewers.

The Aqua Levee Company was being conceived in 1997. The inventor was looking at the fact that something had to be done better, and unknown to him the Army Corps was doing the study independently. The Corps then looked at the product and made sure that all of those criteria that the Army Corps identified in their 1997 study were met. The goal is to have a product that is easy to use, reusable, and cost effective. The Aqua Levee is a water-filled unit, but unlike the standard round tube, it has a triangular shape with a hard shell on the outside. The advantage to that is that it protects the water tube from any punctures. It is simple and fast, and also good for low retained head. It uses water as the ballast, and when set up along a waterway, water is available. It is reusable with minimal storage needs and simple to use in an emergency situation, water from hydrants can be used as well. The product can be used to protect individual buildings, or it can be used as a levee extension or any other type of wall. Mr. Knobloch showed a video demonstration.

In a demonstration of the product in England, twelve units were set up in fifteen minutes, and twelve units are equal to 75 feet. The assembly was on a roadway crossing so that the water was just a couple of inches deep. They let the water rise to twelve inches and then released the water. The next thing they did was to take that same unit and reinstall it in the spot where it was taken out. This demonstrates how the units can actually be set in flowing water. This is a tool that can be used for temporary flood control, and it has been used in other ways. The units can withstand impacts from the side.

Aqua Levee units replace 120 sandbags. They can be deployed quickly without extensive training. Storage, transport and deployment can be handled from a single trailer. Due to its triangular shape, the Aqua Levee has a narrow footprint (2.5 feet). The hard exterior shell gives it high puncture resistance.

Warehouses presently contain approximately 1.5 miles worth of Aqua Levees. Mr. Knobloch encouraged support for the Army Corps in their studies and for the Army Corps to stockpile products. Once the Corps performs additional tests on the different products, Mr. Knobloch stated that they intend to setup a matrix that says under these type of flood conditions, these type of products are applicable.

Kathy Lear asked who primarily is purchasing Aqua Levees, townships or counties. Mr. Knobloch replied that this particular product is still a little pricey for the needs of individual homeowners. The product was purchased by a warehouse company in New York State, and the U.S. Fish & Wildlife Service bought the product also for some restoration work on an island in the Mississippi River. Aqua Levee would like to make some sales to municipalities. However, municipalities have a hard time with budgets.

Mr. Knobloch suggested the following to expand the use of Aqua Levees: 1) Promote it within your agency. 2) Influence the Army Corps in their encouragement to use the product. 3) Pursue grant funding. 4) Organize and commit to cooperatives and subscription services. The philosophy is that not everybody is going to be flooding at the same time. A long term goal is to set up regional distribution centers.

John Kane asked how Aqua Levee would be used for stream crossings of about six feet in depth. Mr. Knobloch replied that six feet is too much depth for the Aqua Levee product.

Mr. McKillop asked if the product has been used in any other coastal communities. Mr. Knobloch said no it has not. The company is in the process right now of trying to make people aware of this and other technologies.

Mr. Tamm thanked Mr. Knobloch for providing some education. In Pennsylvania, there are many communities in critical facilities that just cannot be moved, and this product or one of the other products may be applicable for them to utilize. Mr. Zagone made the comment that philosophically he understands what they are doing, but the downstream and upstream flood retention must be considered. It might well be a good idea to be prepared for that kind of thought process with some modeling or some way of getting what the upstream and downstream effects are going to be if you have a certain situation in a particular stream, especially with our current society, people recognize that they may have been flooded because of something that happened upstream. Mr. Knobloch said he appreciates that and again, the Aqua Levee product must be used properly to avoid adverse impacts upstream or downstream.

Jeff Mahood asked what kind of equipment is needed to fill the product. Mr. Knobloch said that they have a little horsepower pump with two-inch hoses that they use to siphon water right out of the river. It is 150 gallons so one unit is filled in a minute with that kind of pump. Mr. Mahood asked how close you need to be to the water. Mr. Knobloch said that you can extend the hoses. In terms of how far away from the river bank, because this product fills up so quickly, you can start putting it up as the water comes closer to where you want your barrier. Mr. McKillop asked if those units were connected. Mr. Knobloch said that they are not connected and that the water pressure internally seals against itself. Some of the ends of the water bladder extend beyond the hard shell to allow angularity contour changes, which is necessary in rural areas. A seam shield can be made that fits over and covers that otherwise exposed portion of water bed. A question of the stability of the units was raised. Mr. Knobloch said the units do not have to be anchored because of the water head of about two feet. The maximum stacked height is two units, which provide protection for about 40 inches of water.

Mr. Fromuth said that downstream of Pepacton Reservoir there was a problem this year with high spill rates causing flooding. He asked what kind of lead time would be needed if there were a requirement for a thousand feet of Levee on each side of the stream. Mr. Knobloch responded that a thousand feet is roughly .2 miles and if they were putting at a rate of about 75 feet in 15 minutes, it is not very long if you had the ability to have the units locally available. The rapid response trailer was mentioned before. There

are 350 units in one trailer along with a pump and anchors if necessary. The Aqua Levee product could be stored by the highway or fire departments, who could also install them.

Commonwealth of Pennsylvania Hazard Mitigation Plan

Mr. Tamm said that hazard mitigation has been a fundamental premise of the development of our society. It is believed as is manifested in the laws, regulations and in the establishment of the Commonwealth of Pennsylvania and its predecessor, hazard mitigation is the fundamental premise of our society. If you look back at the actions that William Penn took and his experiences back in 1668. He suffered with the rest of the population the bubonic plague of 1668 and 1669. He suffered from the great disastrous London fire. When he was given his opportunity to create his utopian society here in Pennsylvania, he realized that these hazards affected his population. As is found in the scholarly research, he elected to design his principal city, Philadelphia, to have wider streets to act as fire breaks, and he also told his people that each building lot could only be built on 25 percent, because he at that time thought that the vapors transmitted the bubonic plague and he wanted to give the vapors a chance to dissipate. Throughout history, a relationship and management of the hazards has been maintained whether they be social, societal, natural or technological. The basis of state government is a result of our efforts as a society, individually and collectively to manage risks and to mitigate those risks that take precedence. With that history, the regulations that came down in the disaster mitigation act of 2000 are approached with knowledge that a process has been embarked upon that is not new. The act which appears in 44CFR206 requires a plan to avoid disasters. What actually makes up the plan or the determination of what hazards are faced? The determination of the vulnerability, and the determination of what could be done to eliminate the hazard or reduce the impact of the hazard and then setting priorities to accomplish the desires and goals in the state, and then adopting the plan as a far-ranging vision. No problem was seen with implementing the 322 requirements or hazard mitigation plan. In fact, it was prepared and submitted to FEMA and had received approval on many of the previous Section 409 plans. The hazards that are faced in Pennsylvania include flooding, ground hazardous waste, environmental, transportation, pandemic agricultural problems. Pennsylvania has worked to make the state legislation appropriate for the management of the projects, and through many diverse programs within the state, mitigated the hazards and made this a safe state. They have the Department of Environmental Protection, the Department of Conservation and Natural Resources, and a whole host of other agencies. Collectively, they plan and take actions to manage risks. They are also asked to quantify their vulnerabilities. They look at their historical experience with floods. They developed, based on the accessibility of geographic information, various models and have utilized the HAZUS model that FEMA released. They have utilized some other GIS modeling and have recently learned of the initiative of the U.S. Army Corps of Engineers associated with the Wyoming, PA levee raising project, which has provided quantitative damage quantification. Aerial photos acquired during this process serve as the base layer. The maps and flood inundation areas clearly identify the areas that are at risk. There are many structures that are potentially floodable during a certain stage of the river. The community on the other side of the river has put in a levee, and as a result, they are not susceptible to the same flooding. The Corps of Engineers did not have money to do everything, so they selected a representative sample of properties. They had no information on commercial structures, so what they used in their estimate was two structures out of 26 that had total damage of $27,947. The Corps of Engineers and FEMA have been discussing the estimation method.

The Code of Federal Regulations requires project identification, and each structure is a potential project. The state has asked the communities to identify projects for inclusion in the state hazard mitigation plan as hazard mitigation project opportunities. The local hazard mitigation plans should contain these projects, and each should be prioritized. PEMA is currently working through an interagency team to determine exactly how that prioritization is going to occur. There will be room in the plan for locally prioritized state suggested projects. Funding for mitigation projects is limited and flexibility should be

built into the plans. PEMA would like to include in this plan the Corps of Engineers' protocol for flood damage assessment on a statewide basis. The protocol is more or less consistent with HAZUS and the intent of HAZUS, and this is a good process to go by. The state also needs to prioritize local projects because there is a lot of concern for the state, but has used the existing programs and agencies within state government to accomplish this aspect of the plan. The plan was prepared with the assistance of the DRBC Flood Advisory Committee. The section that the Committee commented on was included in the Commonwealth's plan that was prepared for the Emergency Management Accreditation submission, December 31st. The Emergency Management Accreditation Program (EMAP) – FEMA realized that there was discrepancy between the advocacy of Emergency Management from the past and gave PEMA money to develop some standards very similar to the NISO standard. Homeland Security requires accreditation to receive money for emergency management, so it is very critical for the Commonwealth to achieve EMAP compliance. PEMA rushed forward utilizing the existing public outreach programs through sister agencies to prepare this plan, which they believe is EMAP and 322 compliant.

The plan being shown today has been under review by FEMA for the past four months. Sometimes their determinations of adequacy are more stringent than EMAP, and sometimes they are less stringent than EMAP. The hazard mitigation plan is part of the Emergency Operations Plan of the Commonwealth of Pennsylvania and it appears as Appendix 6 of Annex W. Mr. Tamm showed the illustration from the lithograph of the Johnstown flood which was a landmark event in Pennsylvania with over 2,200 people dying and substantial damage to the community. The Johnstown flood was one of the key factors in the development of disaster assistance with the American Red Cross. The illustration shows the hazard, the impact of the hazard, the debris that is generated, fires, flood waters, heroic rescues from citizens, and it embodies the basic understanding of hazards and response in Pennsylvania. He also showed some examples of the plan document. The plan document is internally linked so every document that is referred to, with the exceptions of those documents that are too voluminous to reference specifically, is present on this disk. The laws and interpretations, the summary of the laws and regulations, and the case law that is provided by the Pennsylvania Bar Institute are not included. The planning process is documented and includes geologically related hazards, natural hazards, man-induced, and ecological hazards even though that was an option for 322 compliance. The Emergency Management Accreditation process required that they addressed all of those hazards with the same level of detail as appeared in their Emergency Operations Plan. Many of the discussions on geologic hazards (flooding, drought) come from their websites collectively, and from government websites and government published documents. The state climatologist wrote new material for lightning hazard characterization and weather hazard characterization. As a result of that, the plan meets the 322 criteria for hazard identification. PEMA has included some repetitive loss property information that the National Wildlife Foundation prepared a number of years ago.

The entire mitigation plan was developed by an interagency team that was a subcommittee of the interagency land use committee. Ultimately, what the team came up with was a listing of mitigation measures for all hazards. In the absence of any approved local hazard mitigation plan, the team substituted the list of mitigation measures that were not funded but left over from previous disasters that included a wide range of stormwater issues, flooding issues, landslide issues, even some proposed earthquake issues. They were asked to prioritize on a statewide basis their assistance to local communities. There is some discussion as to the valuation of the human life. In Pennsylvania this is a very difficult philosophical issue, because after 911 they have seen a utilization of the concept that life can be valued from the basis of their annual salary. This makes somebody living in a penthouse on top of a 30-story building in Philadelphia that is earning $500,000 to $1 million per year much more valuable than a life in rural Wyoming County. From the state perspective, that is a difficult pill to swallow, because they hope to value human life equally. Comment is sought on all and any parts of this plan.

PEMA believes that through collective efforts, they have met the requirements of the 322 for the standard plan. FEMA is supplying some preliminary reviews of this, and their suggestions are being incorporated.

Mr. Fromuth asked how the plan is available. Mr. Tamm replied that currently it is only available through the cd distributed to the Flood Committee. This document is the official EMAP submission. They have not been granted compliance with the EMAP as of this time. They feel that they meet those requirements and they are currently in the process of putting the hazard mitigation plan on the Pennsylvania's DCED's electronic land use library. This is a draft and public comment is being solicited. Mr. Tamm asked reviewers to look at it from your agency's perspective, and look at it from your personal perspective. This plan has been developed through coordinated efforts of citizens and state agencies. It has been shared with a number of counties and the elected officials of those counties that range from the far west to the eastern most counties in Pennsylvania. It has been shared with over 20 state agencies. It has been shared with all of the emergency preparedness liaison officers in the Commonwealth, and they are looking at it from their agency's perspective. Mr. Fromuth asked if this was PEMA coordinated. Mr. Tamm responded that PEMA coordinated it, because under state law they are the coordinating agency.

Report on DRBC Staff Activities

Mr. Fromuth said he was going to go over the set of handouts. This is a short report on the work that Rob Klosowski has done over the last few months. In the back of your package, there is a list of references (Item F1), which was put together by Judith Strong, the DRBC librarian. There was an interest in looking over the DRBC's library publications related to flooding and historic accounts of floods. This is being put together as a list of references in the DRBC library. The intent is to put this on the website as a guide for those interested in flood problems in the basin. The list does not include flood insurance studies; that is available on the web through FEMA. The referenced studies are particular to the basin states.

The next item (F2) for which Mr. Klosowski put together a link on our website, has to do with the Disaster Mitigation Act of 2000. On the front of the Association of State Floodplain Managers' February News and Views publication is a short article on the consequences of not complying with the Disaster Mitigation Act and what funding will and will not be available. The key item in remaining eligible for disaster mitigation funds is to have a state hazard mitigation plan. The communities of the states that have those plans have increased eligibility. If the state does not have a plan by the end of November of this year, the communities will not be eligible for hazard mitigation grants. This essentially links to that article. Ms. Lear said that she has seen the article, and before anyone reads it and gets scared, New Jersey has a state hazard mitigation plan. The article gives the impression that there is not one in New Jersey. It has been under revision since the past summer, and it has recently been submitted to FEMA for review. It will be formally submitted for its first draft by March 31st and NJOEM is expecting to get comments back from FEMA by the middle of May. NJOEM is going to submit it a second time if needed by the beginning of September. NJOEM has been advised that they may end up requiring a revision, because apparently a lot of plans do not pass FEMA's scrutiny the first time around. NJOEM will have a plan that will be approved by November. NJOEM will work with the standard plan and enhance it for the future. Ms. Lear said that New York's plan was submitted and it was not approved. It is not uncommon for plans to be rejected the first time they are submitted, so some criticism is expected. Mr. Zagone said that Delaware's plan is in process, and is getting reviewed as it goes along. He fully expects Delaware's plan to be in and approved by the deadline.

Mr. Fromuth noted that handout F3 is a report by Mr. Klosowski on a meeting he attended at the Center for Sustainable Communities at Temple in February. This item is a write up of what went on at that meeting with a list of attendees and contact information. Also, there is a color map that shows the adopted Digital Flood Insurance Rate Map (DFIRM) for Region 3 which includes Pennsylvania and

Delaware. This compliments the map that was referred to in the package that was bound, which is Mr. Klosowski's analysis based information FEMA sent him on the status of DFIRM mapping.

Item F4 gives a relative comparison between the National Map and DFIRMs programs. The National Map is a program that the USGS is working on to develop a system of layers to enable a user to compile GIS information and analysis or maps to suit their purposes. Some of the information that is going to be combined with that is flood information. The DFIRMs are not available on line at this point as any kind of layer mapping system. What FEMA has available right now is orthophotography and Q3 data. Over time, as the DFIRMs are developed, the potential is going to be there to put those on line. Mr. Klosowski added that the National Map is a work in progress. Mr. Hainly said that Pennsylvania State geologists are developing stronger data to have Pennsylvania included in the National Map program. Mr. Fromuth said that there is another program in Delaware called Data Mill. Mr. Tamm said that in Pennsylvania they have the Pennsylvania Spatial Data Repository which is more or less the same.

Mr. Fromuth said that Item F5 is a letter from New York City DEP to Assemblyman Clifford Crouch acknowledging the meeting that took place on January 15th to discuss the problem of flooding downstream of Pepacton Reservoir. A group of citizens downstream of the reservoir have asked that the City work to try to minimize the spill rate by maintaining a void in the reservoir. The argument has been that when the level is high, there is very little risk to the water supply in the reservoir. What the City agreed to do is to look into a program for when the potential for maintaining an adequate water supply is high, and looking into the possibility of creating a void in the reservoir through increased releases to maintain some space. Because the reservoirs were not designed for flood control, the flood loss reduction potential is not high. The citizens have acknowledged that, but they are asking the City to do everything they can do to help reduce the chances of flooding. The people located downstream of the dam would be in the floodplain if the dam was not there, and they would be flooded worse. A petition was signed by about 400 citizens, and the Assemblyman has requested that a permanent plan be put in place. The City has said that they will cooperate in setting up a committee to look into a permanent plan.

The DRBC staff will participate in this committee. The maps handed out represent some of the work that Mr. Koslowski did. The second map shows Pepacton Dam with the 100-year flood outline overlaid on an orthophoto. The first map in the sequence is a blown up version of the same thing. Outlined in red are the houses that are subject to the 100-year flood. This year the City released over 10 bg from the reservoir during a temporary spill reduction program. Right now the snow melt has increased the storage in the reservoir quite a bit, but they were down about 20 bg from the sill at Pepacton at one point. The last item is a copy of an article by John Talley from the Delaware Geological Survey concerning the flooding that occurred in September from the remains of Tropical Storm Henri. About ten inches of rain fell on new Castle County and southern Chester County in about six hours. There was record flooding in the Red Clay Creek watershed. Mr. Talley documented this very well and the work Delaware is doing to increase the number of gages is consistent with the Committee's flood warning recommendations.

Mr. Klosowski gave a summary of his activities. His most recent efforts included documenting the data sources, and developing new map inventories. He also began a map of New Jersey Office of Emergency Management mitigation projects. He noted that the Pennypack remapping project will utilize two-foot contour data, x-ray data and land use data from the Delaware Valley Regional Planning Commission. The two-foot contour data will be generated from aerial photography. They did mention that there is a little bit of a problem in the Bucks County portion of the study in the sense that they are lacking tax parcel information. They can still do the flood mapping and the data on top of the orthophotography, but they are limited in their ability to do benefit/cost analysis in terms of identifying what property is at risk and what mitigation steps might be taken. Regarding Bucks and Montgomery County DFIRM conversion, most of the discussion related to some of the problems they have been having. The flood plain mapping data, in many cases, overlay poorly with the ortho imagery. The problem is that the accuracy of the

resolution they need is not available, and they do not have the budget to acquire it by other means. Lidar was discussed as a possibility, but that can be expensive. The Pennypack study team has been in contact with a vendor concerning Interferometric Synthetic Aperture Radar, which is another means of acquiring topographic data that would be cheaper and less data intensive, but they are not sure yet whether it is going to give them the accuracy and the resolution they need. At the meeting, Jeff Featherstone mentioned that he has been approached by other watersheds that are interested in doing studies similar to the Pennypack. They have not proceeded beyond initial discussions with any of them, but he said he could do that if FEMA was interested. FEMA would like to have county level entities coordinate the updating and web-based delivery of maps as a municipal problem occurs. They mentioned Chester County as a good example, but they would like to see other counties doing it. They talked about Pennsylvania spatial data access being a good repository for data, but it is probably not too practical for updating that data and the development that occurs at the municipal level.

Mr. Klosowski also did work on editing the flood related components of the basin plan. He also reviewed the Monroe County conservation district stormwater management ordinance. An unusual feature of the plan was the use of a consumptive use tracking report for all regulated activities. That included a stormwater component which was calculated as the difference between required infiltration and proposed infiltration. Based on hydrologic modeling, the county would establish what they wanted the infiltration to be. If proposed infiltration exceeded required infiltration, the negative net stormwater could be calculated and that would show up as consumptive use. A community vulnerability assessment tool was acquired from NOAA. It is similar in concept to the FEMA state and local mitigation planning document and also to the HAZUS program in that it has components for identifying and analyzing hazards for forming analyses of critical facilities and societal, economical and environmental impacts, and also for identifying and analyzing mitigation opportunities. Mr. Klosowski has reviewed it to determine whether there are any ideas that could be incorporated on the DRBC flood hazard website. He believes the NOAA method does a good job of discussing what some of the issues are, where data can be obtained to help you analyze those issues, how to come up with existing measures from census data that could be used to characterize your area study so that you could assess the risks. DRBC's AHPS web page was also updated.

Next Meeting

The next meeting of the Flood Advisory Committee was originally scheduled for Thursday, June 10, 2004 at 10:00 a.m. It has subsequently been moved to Thursday, July 1, 2004 at 10:00 a.m.

FLOOD ADVISORY COMMITTEE
ATTENDANCE

March 10, 2004

NAME	AGENCY
BETHKE, Christine	U.S. Army Corps of Engineers (USACE) – Philadelphia
FROMUTH, Rick	DRBC
GAVIN, Joseph	USACE – Philadelphia
GILMAN, Clark	New Jersey Department of Environmental Protection (DEP)
HAINLY, Bob	U.S. Geological Survey (USGS) – Pennsylvania
KANE, John F.	New York City DEP
KLOSOWSKI, Robert	DRBC
LEAR, Kathy	New Jersey Office of Emergency Management (OEM)
MAHOOD, Jeff	U.S. Department of Agriculture (USDA) - Natural Resources Conservation Service (NRCS)
MATTE, Albert	National Weather Service (NWS)
McKILLOP, George	NWS – Eastern Region Headquarters
MOSSLER, Mariana	New Jersey OEM
NICKELSBERG, Walt	NWS
PETREWSKI, Gary	PPL
REISER, Robert	USGS
REUBER, Michael	National Park Service – Upper Delaware
RODGERS, Ted	NWS – Middle Atlantic River Forecast Center
STEIGERWALD, Scott	Pennsylvania DEP
TAMM, Alan	Pennsylvania Emergency Management Agency
WESTFALL, Greg	USDA – NRCS
ZAGONE, Joseph N.	U.S. Department of Homeland Security – Federal Emergency Management Agency Region III