

Presentation to Water-Related Topics Overview Committee

North Dakota Legislative Assembly 2011-2012 Interim

July 12, 2011

Chairman Fischer and Committee Members,

Thank you for the opportunity to appear today and give a progress report on the 2011 Missouri River flooding in the city of Bismarck. Since I see from your agenda that Burleigh County Commission Chairman Brian Bitner will follow me, let me give you some background. Bismarck and Burleigh County operate together in a joint emergency operations center for large-scale events like floods. Each entity has an emergency manager. We feel the joint center helps us to eliminate confusion in emergency response and provides a more timely response to situations. We also coordinate with Mandan and Morton County who also operate a joint emergency center.

The Bismarck-Burleigh flood is really two quite distinct events. While the rural areas of the county had significant residential exposure to the river in rural subdivisions, the city's exposure was to a relatively few units, all of which were built recently to a higher floodplain elevation. While rural lots of two to five acres are the norm, city lots generally occupy less than a third acre. This concentration of development makes dikes an effective flood control mechanism within the city. Bismarck had advance notice of the impending flood as the reservoir acted as a partial buffer. We had some time to build dikes in this community that prior to 2009 had never seen a large area flood. I am sorry that Minot and other mouse River communities could not have had this time benefit.

The major problem Bismarck had in fighting this flood was logistical. Virtually every day the flood forecast increased in level. This is not to point the finger of fault at anyone. Spring, 2011 produced a much cooler and wetter than average condition throughout the drainage basin. Billings got more rain in a week than they get in a season. The mountain snowpack was 140 percent of normal and not melting. The Yellowstone River appears today to be more a white-water rapids than the familiar old, lethargic river. The

effect of these constant prediction changes in river stage was a flood response plan drawn on Monday that was of no value by Wednesday. This also meant that early decisions on flood protective works had to be flexible for later changes and that a maximum stage had to be incorporated into all plans. Some of these constraints may have made the flood management decisions reached in the early days of this fight look a bit unusual. While we are all keenly aware of the rising river and the areas of the community that are endangered by this flood, the historical perspective of this event must not be lost.

On the afternoon of Friday May 20, 2011 the city was advised by the Corps of Engineers that the level of the Missouri River in Bismarck was going to be escalated to a higher stage due to much higher than expected inflows into the Garrison Reservoir. It was expected at that time that the stage at the Bismarck gauge might reach 14 feet. While that was an alarmingly high stage, it is still two feet below flood stage. Flood stage was reached previously with the 2009 ice jam flood event. During that event no city properties were inundated.

Since that May 20, 2011 discussion much wetter than normal (record) weather has befallen the already heavily saturated Missouri River drainage basin that feeds the Garrison Reservoir. That precipitation and the abnormally heavy snowpack in the mountains of Montana and Wyoming have combined to push the anticipated river stage in Bismarck to 20.6 feet. The change from 14 feet to 20.6 feet came in incremental messages from the Corps of Engineers over about a week's time. This has forced the city to recalibrate its flood response on almost a daily basis. This is not a criticism of the Corps of Engineers who have tried mightily to stay on top of the changing conditions within the drainage basin.

The first priority of any city is to protect as many of its residents as possible within the available time and resources and to ensure that flood control facilities are built in time and to a high degree of reliability. Response must begin with the planning available in the first days of an event and it must be flexible for changing circumstances. The

Riverwood Drive dike was the first flood control structure considered for this event. It was built to handle a 17 foot event (a foot above flood stage) when the 14 foot event was forecast. It has been enlarged and strengthened to withstand the present projected 20.6 foot crest. When it was built the river was within a foot of the dike in several locations. There is no other location on Fox Island or Southport or anywhere west of Washington Street that could provide the solid footing and reliability of this dike location. It is the right place for the primary protection levee.

As the river stages increased over time the decision was made to build other dikes to deal not only with the direct flood flow from the west but also with the backwater effect of Lake Oahe and flooding from the south. A clay dike was constructed in the area west of the Dakota Zoo and Sertoma Park, along the stormwater ditch and around the wastewater treatment plant. As groundwater concerns for the homes adjacent to the Riverwood golf course surfaced and a dike to stop the northward migration of flood waters from Lake Oahe was being constructed, a private engineering consortium assisted homeowners with a sand bag dike that would help them cope with the storm water issues associated with the water being retained on the golf course. The golf course was pumped once the dike was completed. At present all dikes are holding. Some seepage is occurring along with high ground water exfiltration. These are all expected to occur.

There was a private effort to construct a dike around the private residential area of Southport as well. Although begun when the river had reached an advanced stage, the effort was supported by city and state resources after the majority of the work to upgrade the Riverwood Drive levy was completed. In addition, there were truckloads of filled sandbags transported to the neighborhood for public use. This dike was constructed in an area initially considered for the main dike but rejected due to the sand base on which it would be supported and the inadequate width available for normal levee construction. Another concern with this location for a primary dike was the effect of the river current on the area over an extended event. Since much of Southport rests on river sand soils protected by rip rap, it would not be a prudent decision to place a

primary dike protecting all of south Bismarck on land subject to erosion if the rip rap barrier is breached, undercut or overtopped.

Bismarck's major concerns with this flood are not the height of stage so much as the duration of the exposure and the effects of the river currents over time. Most floods come and go in a few weeks. The standard crest is a day or two and then levels fall slowly. This event is expected to last for 60 or more days and the "crest" we are currently experiencing has remained almost unchanged just above 19 feet for several weeks. Just as the Missouri River mainstem reservoirs provided a buffer at the beginning of this flood, they will cause the event to be extended. We know very little about the efficiency or effectiveness of clay dikes over a prolonged period of exposure. In this respect, the 2011 flood event is a pioneering effort.

The second concern is with ground water and its largely invisible assault on basements and building supports. We are working with the State Water Commission to monitor this effect of the flood but it will be with us for quite some time.

There is also an effect on the psyche of the community. Most people can stand an extreme or a change in routine for a short period of time but there is a sense of hopelessness that creeps into events that continue for extended periods. The "normal" we are look to recover is out of our grasp. Stagnant water, odor and mosquitoes tend to become issues that would be overlooked in a short duration event. Depression is also a concern.

We pray for the strength and wisdom to effectively deal with this event and we are thankful for the almost boundless assistance we have been given. The assistance of the Governor and our state congressional delegation has been invaluable in dealing with this emergency. The Army Corps of Engineers, North Dakota National Guard and the State Water Commission have shared their wisdom and expertise with us on an almost daily basis since the event first took shape. Many other federal and state resources are

here and available to us as we go forward fighting this battle. Assistance has also been provided from many cities in this state, most notably the city of Fargo.

We deeply appreciate the interest and concern of this committee and the North Dakota Legislative Assembly. Your attentiveness to this problem and your efforts to assist not only our community, but all who are undergoing this challenge is greatly appreciated.

