Commissioner Merritt August 24, 2016 Report to SLFPA-W

Title Slide: Today the Commissioner from Baton Rouge would like to say something from the heart in connection with the ongoing flooding there.

Slide 2: Everybody knows I came to this Board, in 2007, from Baton Rouge where Jayne and I lived very happily with Michelle, our Black Labrador retriever and Gaia our Cockapoo in a Southside oak hickory bottom where we were safely (or so we thought) more than 7 feet above the modern flood plain with a base flood elevation of 24 feet above sea level or 1 foot above the elevation we guess the safe house upstairs linoleum floor to be.

Slide 3: This is what the view from the linoleum looked like last night. I say we guess about the elevation of the safe house linoleum floor because we won't know for sure the elevation of anything in our jurisdiction, including how much to raise a levee, or when to close a gate, nor how much costly material we will need, until we partner with NOAA and insist their state of the art, storm hardened, weather and tidal gauge station be outfitted for us with a continuously operating elevation reference station.

Slide 4: This is what a Gulf Coast Network of best practice earth science data stations looks like and we shouldn't be afraid to be easily satisfied by the best for our taxpayers.

Slide 5: For those of you pondering the difficulty in which Baton Rouge, my old homestead included, finds itself, consider this. Everybody's helping now, even the President is in town. I got my licks in and did my helping on a pretty day ten years ago when as a Baton Rouge small business owner and homeowner I was outraged by the scientifically trashy, error filled FEMA flood prone area maps of my south Baton Rouge neighborhood.

Slide 6: I was outraged because I know what the water of a savage flash flood did to my dusty prairie home 33 years before.

Slide 7: Oklahoma has a semi-arid climate and half the annual rainfall you get here. As the Oklahoma State climatologist reports:

"Precipitation
The dominant feature of the spatial distribution of rainfall across Oklahoma is a sharp decrease in rainfall from east to west (Figure 4). Although precipitation is

quite variable on a year-to-year basis (Figure 5), average annual precipitation ranges from about 17 inches in the far western panhandle to about 56 inches in the far southeast…"

I remember Chimney Rock was located near Freedom, Oklahoma and had been a land mark used by pioneers traveling on the Santa Fe Trail. On Tuesday, March 13, 1973 a local rancher discovered it had fallen since last seen the previous Saturday. Its fall may have coincided with the passage of a storm.

"The state climatologist goes on to report: ….Excessive rainfall occurs at times. Amounts of 10 inches or more during 24 hours, while rare, have been recorded. The greatest official rainfall in a 24-hour period is 15.68 inches at Enid on October 11, 1973."

From Oklahoma Climatological Survey at
http://climate.ok.gov/index.php/site/page/climate_of_Oklahoma

Slide 8: I am determined our taxpayers get the best flood protection service because of the polite and very public quarrels in Norman since 1975, over how to plan development in Central Oklahoma to prevent flooding.

Slide 9: I am fired up because of a geological field trip to Thompson Canyon, traveling this road before a particularly savage flash flood in 1976, and again within a year after when the road was repaired. I knew, in 2006 as I studied those bad FEMA maps of Baton Rouge, how important the threat of stalled thunder storms delivering a cloudburst was going to be to Baton Rouge. That's why I wrote a technical letter, a geologist's letter to Governor Blanco outlining the many technical deficiencies, errors and omissions in what was then passing for a FEMA flood prone area map of my South Baton Rouge neighborhood.

Slide 10: My1973 geology field trip also included the Black Hills of South Dakota where we saw what erosion can do. I already knew what raining a five gallon bucket full can do to the south 80 acres of our dusty family farm in the Cherokee Strip. After traveling the country studying geology, it was at Mount Rushmore I began to realize unless a person lives atop Mount Rushmore on the top of George Washington's head, water draining from somewhere else is going to come see just about everybody else in the country when there's a sudden, relentless, downpour of rain.

Slide 11: I got a rapid response in 2006 when I made the Governor of Louisiana my pen pal. One of the Governor's staff members telephoned me at my Baton Rouge office right away. We talked it over and the state official suggested I be put in touch with the team examining the drafts of the new FEMA flood map series then being completed but not yet released. I helped and although the new maps seemed to be better, our Louisiana stakeholders need to realize, as I came to, those maps are of no practical scientific value for flood protection. They only exist for the narrow, hollow purpose of assisting the sale of flood insurance policies to people who wish to buy them and they are not of the same scientific quality as the studies I am recommending this board undertake.

Slide 12: Important, state of the art studies like engaging Dynamic Measurement LLC for an inexpensive computer study and map of any geohazard undermining levees on the West Bank. Only they can provide a proprietary analysis of Natural Sourced Electro-Magnetic (NESM) data. Lightning strike data, recorded by meteorologists for more than15 years, proves lightning really does strike again and again in the same place and for good, geological and electrical circuit reasons! This illustration is from my presentation to the open meeting of the SLFPA-E Operations Committee on July 10 2014.

Slide 13: Between onshore and swamp DM LLC surveys there is a day and night difference! Electrical characteristics of the levee right of way determine where lightning strikes. This creates an opportunity to measure and map subtle, hard to see, local faults or seepage affecting levee design and survivability.

Slide 14: We need additional seismic analysis by Dr. Lorenzo's team of any anomalies found by DM LLC to pinpoint unhealthy levee sections to see how deep, wide and long any structurally weak areas are before we put more weight on those weak foundations without reconsidering the designs that: (1) assumed everything was ok and (2) we could pile up dirt to lift levees indefinitely with no weight limit leading to failure. The best due diligence we could do as a Board is to tie together the computer study and the seismic study by using both to inform the third step we must take, subcontracting the Louisiana Geological Survey to map our jurisdiction in detail.

Slide 15: I appreciate Governor Blanco taking my 2006 concerns about the Baton Rouge Flood maps so seriously. I knew this day would come because I had been saying for years anyone can have a cloudburst and unless you live on top of George Washington's head at Mount Rushmore, water is coming to see you.

Slide 16: I recall the 1973 Enid Flood occurred as almost 16 inches of rain fell in four hours. Turkey Creek went wild killing at least 6 people including a Vance Air Force Base Sergeant who drowned before he could run out of his living room.

The elevation above sea level in Enid is 1,240 feet so all the water in Turkey Creek quickly drained away.

Slide 17: The flash floods were even more energetic as the flood water plunged away from Estes Park, Colorado, through Big Thompson Canyon in 1976 with ferocious violence. I drove this highway in a 1972 Volkswagen Super Beetle on a geology field trip in the Summer of 1973 before this damage was done and again less than four years later after this damage had been repaired.

Slide 18: Canoe Bend Lake, near my former house in Baton Rouge, is normally about 17 feet above sea level and isn't going to drain quickly because there is not much difference in elevation over the distance to the Gulf to provide the energy to move the rain water to the sea.

I have been asked: "can what happened in Baton Rouge happen here?". **Yes and worse, here's why:** Not only does rainwater hang around here longer, because there's not much elevation to move it out, but in a low country along any coast there's no handy place to store a lot of rapidly delivered water from everywhere else. With the ring of levees protecting our community from external water threats like the surge of water due to an approaching tropical storm, we do not have the pumping capacity to keep pace inside the ring with a cloudburst.

Slide 19: In four days, most of it in one day (11.24 inches on August 12, 2016), Baton Rouge got over 19 inches of rain. A storm like that here, inside the hurricane levees on the New Orleans West Bank, would make an above ground swimming pool out of our jurisdiction.

Slide 20: There are two profound geological problems this Board must address with seismic and electrical levee foundation strength tests and the proposed geological study. One concern is weak foundation soils beneath the levees have sometimes made it impossible to build to planned project heights. Not having a CORS elevation datum, from a satellite in space, withholds from the Commissioner's decision making process any meaningful idea of how high to build levees and how much material to use to maintain these projects or even how to strengthen weak foundations apt to fail.

http://www.ngs.noaa.gov/PUBS_LIB/NGSRealTimeUserGuidelines.v1.1.pdf

CORS: Using up to date technology will "…obtain consistent, accurate three-dimensional positions…(of high accuracy and relative to a stationary base station)…with expected relative accuracies in each coordinate component on the order of a centimeter" (a centimeter is about 4/10 of an inch).

Slide 21: The other concern is the size and duration of a rainfall we can handle. My impression is pumps in the New Orleans area can handle about an inch of rain in the first hour and half an inch per hour thereafter until about five or five and a half inches per day are received. The rain that swamped my old Baton Rouge house was on the scale of the 1973 Enid cloudburst that saturated the ground within two minutes or so making the rest of the storm "runoff" that could not soak in.

Here on the West Bank levees are designed with safety berms, some on uncompacted foundations, to brace up the levees so, as they become engorged with water and weight, they won't slump down. The additional threat of a sudden downpour of rain is the weight of the accumulated rain that cannot drain out of the ring nor be pumped out quickly. The Corps has guessed wrong about how much weight the levee foundations can take and not even considered how much of an additional threat the weight of water waiting to be pumped out will be.

Slide 22: Even on much harder geological formations, like the Cretaceous shales and limestones I described in a book I coauthored, construction projects and impounded water have triggered failures.

A dam in the panhandle of Texas once was unable to hold back a flood when the lake behind the dam was released because the land couldn't take the weight (and pressure of the lake water) and failed as the dam stood until destroyed by the rushing flood occurring beside it when the land anchoring the sides of the dam gave way.

A skyscraper under construction in North Texas was never completed and its partially excavated sub-basement filled back in when the ground beneath other buildings on the downtown city block became unstable as the clay below the adjacent buildings began to flow plastically toward and in response to the opened pit.

Slide 23: Many caves have been found when entrances were created overnight as rains loaded ponds with so much water the ground beneath the pond collapsed under the weight of the water. For example, this month I visited Blue Springs Caverns near Bedford, Indiana where the current entrance was formed overnight in 1940 as a severe storm passed filling the pond till the load bearing capacity of the land was exceeded. When the country side cracked, the farm pond drained into what is now the current cave entrance where you can descend past the rubble and mud of the underground flood into the cavern.

Slide 24: A local example, of a troubled public works project that began before it was discovered the foundation was too weak to complete it, is Fort Proctor.

Like the Washington Monument begun seven years earlier in 1848, both projects were halted by the onset of the War and both had serious, unrecognized foundation problems due to weak coastal sediments at the building sites.

Slide 25: The world's best known example of a troubled public works construction project on weak coastal foundation soils is the Washington Monument. During construction it was discovered its foundation would not be able to carry its weight and extensive and elaborate redesigns were made to the foundation. Later, in the 1930's Congress almost brought the monument down again with a landscaping project. A USGS geologist stopped the project just in time with a geological study that proved a proposed flower bed near the monument would have started weak clay soils beneath to flow under the monuments weight just as the Texas (Cretaceous) clays were beginning to flow as digging a new basement was undermining the skyscrapers next door.

Slide 26: Looking back on the last nine years and after trying so hard and so long to get qualified engineering talent to run the agency on a daily basis I think we now have to take an unflinching look at the Commissioner's public policy leadership and say our Commissioner's public policy leadership has come a cropper when I have been calling for a high water inspection vehicle (like a four wheel drive Jeep with a high clearance kit, 12000 pound front or back hitch mount winch, fixed spot lights and a snorkel kit) since at least January, 2013, and we don't have a properly outfitted vehicle ready for high water yet that SLFPA-W could have driven back to Baton Rouge ten days ago.

Slide 27: Leadership will be coming a cropper in future because I have showed you elevation maps, precinct by precinct, showing how 2/3 of SLFPA-W's

Jefferson Parish jurisdiction is below sea level (some precincts by an average of four feet below sea level) and Commissioners don't have a completed geological study recommended by me and approved by LSU for the SLFPA-W Board's immediate approval and funding since February, 2012. Such a study would include elevation (LIDAR) data and be an invaluable digital base map for your use as an interior drainage basin flood fighting tool. Baton Rouge has been using these methods and maps since 1991.

Yellow ten foot contour
Green five foot contour
Blue sea level.

ELEVATION ISSUES—WE NEED CORS: Having good quality, best practice, NOAA systems and data will link us to the benefits of all the NOAA research partners using the same equipment.

Slide 28: Baton Rouge officials are early adopters of geology and geophysics "know how" explaining why they have already mapped how far under water my old house is. The Advocate Newspaper web site reports the city-parish's geographic information systems department has been mapping the extent of flood inundation for the past few days. They stressed that their numbers are still preliminary but said they are based on calls for search and rescue, calls for sewer service, information from floodplain maps, public input and more. The blue pointer with the white dot shows the location of my old house, on a Holocene Terrace, several feet above the modern flood plain of a tributary of Dawson Creek.

Slide 29: Public Policy Leadership by the SLFPA-W panel comes a cropper every month for years now when our Commissioners pass motions to pay the bills but don't pass a resolution or vote or speak out against bad or same old same old construction project deals that don't use debris screening heavy equipment during levee repairs or lifts;

Slide 30: or encourage CPRA (the official non-federal sponsor) to do as other countries in the world have done for years, ever since Hurricanes Katrina and Rita, and use common geophysical techniques to find unhealthy levee reaches.

What SLFPA-W did accomplish 6 years ago is a geophysics success story and is a tool in our tool box ready to use to find unhealthy levee sections. This work was done on the SLFPA-W "V" levee as a thesis for a master's degree by local (Harvey) resident Mr. Jason Hicks. He studied a SLFPA-W seismic survey of an

unhealthy levee reach upstream of the pump station and presented his findings at this 2010 poster session during AAPG's convention in New Orleans.

Slide 31: Commissioners, we should boldly use a fraction of the resources we have saved to invest in flood protection by not waiting to play a defensive flood fight game but to go on the offense every blue sky day by investing in the best weather station technology, investing in geophysics and geology studies, like the one shown above, to understand how much more weight our rights of way can take from levee lifts and undrained water, without failing.

Slide 32: With geology and geophysics studies we can locate any geo-hazards that might undermine a levee. When we have the equipment we need to do high water inspections or require debris screening loaders when removing or replacing clay while lifting levees, then we will also have the public's confidence because we will be meeting the expectations set when this reform board was founded. Experts really will make a difference and improve upon what is passing now for best practice.

There's no time to lose. I am worried about two stray storm remnants meeting, and possibly combining, on our coast next week. Let's get cracking.

end