

Robert Pyke, Consulting Engineer

March 20, 2013

Deputy Secretary Jerry Meral
California Natural Resources Agency
1416 Ninth Street, Suite 1311
Sacramento, CA 95814

Re: The Recent Press Release on the BDCP

Dear Jerry,

Preface – I originally wrote the attachment in response to a request from legislative staff and subsequently wrote the letter itself last weekend for the reason that I explain in the first paragraph. I then decided to sit on it rather than sending it, but after watching some of your public meeting this afternoon it seems to me that you really need some help in separating the red herrings from the salmon and smelt. I honestly don't think the BDCP is going to work, because CM1 is not the solution to the plumbing problem, but if you want it to be given a fair hearing you have to stop emphasizing earthquakes and arkstorms and concentrate on whether you can produce a valid effects analysis that shows all listed species being lifted way out of jeopardy. Now read on ...

I have just written a couple of checks to renew my licenses to practice civil engineering and to use the title geotechnical engineer in the State of California, but I am not sure why I bother to do this when everyone and his dog make public statements that require expertise in these fields without being licensed to practice in them.

As an example, the press release “Brown Administration Releases Preliminary Bay Delta Conservation Plan”, dated March 14, 2013, contains the following sentence:

“A new water project diversion point on the Sacramento River near Sacramento and 35 miles of underground tunnels would secure water deliveries against catastrophe; at any time, a flood or earthquake could inundate the below-sealevel islands in the interior Delta and draw salt water toward the existing south Delta pumping plants, which would have to be shut down to avoid contamination.”

I have the following questions:

1. Who writes this stuff?

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2. Which registered professional engineers were the writers relying on for this opinion?
3. Have either you or the writers read the chapter on levees in the Economic Sustainability Plan of the Delta Protection Commission, a unit of the Natural Resources Agency, which was researched and written by registered professional engineers, and supersedes earlier studies such as the Delta Risk Management Strategy?
4. Doesn't your continued reliance on the earthquake bogey as a justification for the BDCP, suggest that the other reasons for pushing the BDCP must be pretty lame?
5. Doesn't your continued use of the earthquake bogey raise the question of whether your treatment of other technical issues is any more accurate than your erroneous fear mongering about earthquakes?
6. Are the State and Federal Water Contractors really picking up the tab for all this blather? Would not their funds be better spent on coming up with a real solution to California's water conveyance and storage problems

I am also attaching responses to statements that you made recently in a meeting with the Bay Conservation and Development Commission. I understand that in this case you were just winging it and were not purporting to offer professional engineering opinions but I think you might seek help before you repeat statements like this. As always, I'd be happy to talk.

Sincerely,

A handwritten signature in black ink that reads "Robert Pyke". The signature is written in a cursive, flowing style.

Robert Pyke Ph.D., G.E.

Response by Robert Pyke to Jerry Meral's comments made to the Bay Conservation and Development Commission in February. He made similar comments to the Delta Stewardship Council on February 21.

J.M. "Islands are backed up by peat levees made out of dirt and there is no engineering geology science that says that they can withstand any kind of earthquake event. We are long overdue for a major earthquake event. Most engineering geologists believe that liquefaction will destroy a great many of those levees and all at once." Pg 17

R.P. Almost totally incorrect. Islands are not backed up by levees, they are fronted by levees. To say that levees are made out of dirt is not incorrect. But dirt can be good or bad. Including peat as dirt, because it is very organic soil, most levees in the lowland portion of the Delta are composed mostly of peat and sit on a peat foundation. See Chapter 5 of the Economic Sustainability Plan (ESP) of the Delta Protection Commission for more details and explanations. Peat turns out to be a very good material from the point-of-view of withstanding earthquake loadings, although it is very compressible under static loadings. See my remarks to the last DSC meeting <http://www.youtube.com/watch?v=Ff0-fJ0W8P4> and Chapter 5 plus Appendix E of the ESP <http://forecast.pacific.edu/desp.html> . In the upland Delta the levees are composed more of sands and silts and sit on sandy foundations. These levees might be more exposed to liquefaction but they are even further away from the known earthquake faults. The threat of liquefaction in particular is discussed in Appendix E of the ESP. Peats do not liquefy. You can have peats, which settle, or you can have liquefaction, but you can't have both. It is a moot point whether or not we are overdue for a major earthquake – event is redundant. Not on the San Andreas, which last ruptured in 1906 but has an estimated return period of 200 to 300 years – the Hayward fault, which is the closest known "major" fault to the Delta, although it is 45 km from the western tip of Sherman Island, last ruptured in 1868 and is thought to have a return period in the order of 150 years, so that it could go off any day although the "official" USGS estimate butts the probability of Hayward fault earthquake at something like 30 percent in 30 years, so that the annual probability of such an event is low but is increasing. There are closer sources such as the Marsh Creek – Greenville fault and the Mount Diablo Thrust that the USGS is now studying and touting as potential threats and these and other unknown faults in the Delta pose some risk but are unlikely to produce anything like the magnitude 7 event that might reasonably be expected on the Hayward fault. Their probability of occurrence is uncertain. Most engineering geologists, like Jeff Mount, should be gagged and /or put in the stocks and pilloried because of the disservice they have done to responsible science and engineering. Jeff, by the way, is a very good fluvial geomorphologist and expert on river restoration, but he should stick to what he knows. The behavior of levees under earthquake and other loadings is a question of geotechnical and earthquake engineering and I have only ever met one or two engineering geologists who could discuss these subjects intelligently

J.M. "An atmospheric river event of that type would overwhelm every flood defense in the Central Valley. The Delta would cease to exist. These events re-occur about 150 to 200 years. We are near due for an event like this." Pg17

R.P. See my remarks to the DSC (op cit) where he made a similar comment. In brief, superstorms, which might occur every 200-300 years pose the greatest threat to towns like Sacramento in the Central Valley, that, at best, have 200-year flood protection. Delta levees can easily be improved to provide 500-year flood protection, as recommended in the ESP.

J.M. "There is a strong geological opinion that says that we really should be looking at more like seven meters of sea level rise. Any significant rise in sea level would overwhelm all of the Delta levees. The cost of trying to maintain these dirt levees against this type of sea level rise would be so many billions of dollars. Given the very low economic value of the islands, the state, the federal government and the landowners will not invest those billions of dollars. So, it's highly likely that the Delta as a land form will not look anything like it does within the lifetime of many people who live in the Bay area today." Pg 17

R.P. The popular opinions about dramatic sea level rise come predominantly from atmospheric and climate scientists, like James Hansen of Columbia University, not from geologists, although they rely in part on data from ice-cores and such which is related to geology. But every real quaternary geologist that I know, including Roy Shlemon, who endows the chair that Jeff Mount used to sit in at UC Davis, scoffs at the more extreme predictions of (man-made) climate change and sea level rise. That is because they know the history of sea level for at least the last 500,000 years and they know that you can't base predictions on short windows. In the Bay Area sea level was 20 feet higher than present about 105,000 years ago but then it dropped some 300 feet in the last of the five ice ages that we have seen so far. The present high stand of sea level, while not as high as the last peak, has in fact lasted longer than any of the previous high stands, so maybe the next precipitous drop is only a couple of thousand years away. I don't normally talk about this because you get lumped together with crazy senators (Federal of course) and rather I just say that further sea level rise is possible and we should be prepared to deal with it. But, as Gregg Gartrell of the Contra Costa Water District likes to point out, by the time we get to the State's official target for planning purposes of 55 inches of sea level rise by the year 2100, Miami will be an island protected by levees and who knows what will have happened around the margins of the Bay. But the key thing here is that Delta levees are relatively easy to raise. Again see my remarks to the DSC. The recommendations contained in the ESP include designing Delta levees for floods, earthquakes and sea-level rise with a return period of 500 years – a recommendation that the DSC has so far refused to adopt - because it would solve too many problems, I think, and they have some deathly fear of doing that. Again, as Greg Gartrell likes to point out, we should be prepared to deal with sea level rise, but to spend a lot of money in advance of further observations is the way to create a stranded investment. I think the solution that we came up with in the ESP, to build fat levees now, which serve multiple ends, and then raise them only as necessary, is the smart way to proceed.