

>> MR. DOYLE: ... Jim Garster. Jim, are you on line? Oh, you're here. I thought you were on line. In person, even better. You're way cuter in person than on line.

>> JIM GARSTER (USACE): A couple of slides if you can bring them up.

Just give you my background, I call myself a surveying engineer so that you won't find me in any federal register but I went to the University of Maine so that's what we call ourselves there. So I've also been working on for the last four years or, so trying to get the Corp of Engineers on the right datums and getting them to understand what datums are has been the biggest challenge and getting to learn how to spell datums. A lot project managers and engineers, they think datums are something that are a bother and we just rather, we need a big construction project and those are more important. So, it's been sort of an educational issue.

And just by the way, everybody hopefully knows that NGVD 29 is not equal to mean sea level, never has, never will be and only within a few miles of those tidal stations. So that is one big thing we discovered and, well, not discovered but made me realize that a lot people had that misconception. And one of the things we found from our IPET study, looking at what happened during Katrina.

Over the last several years, I've been working on trying to educate the CORPS and I'm putting in a little plug here for the work we've been doing with NOAA. Working closely with NGS, Office of Coast Survey, and CO-OPS, assisting and developing guidance and have An engineer manual on vertical datums coming out the end of this year. And also in doing workshops and training, going around the different districts and education and providing these workshops on datums we're looking at trying to develop a certification program for what we called district datum coordinators within our districts that will oversee any issues related to datums within the CORPS and tools for connection to do the national spatial reference, OPUS-DB we're really relying on and VDATUM is the other thing we are pushing for, and also going through and updating so all of our projects are tied to the NSRS.

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So these are some of our requirements that we are doing and it says underneath that "resume slide slow" -- thank you has relate all of our projects and we have a policy in place, we put in place in March of last year, and it says that all of our projects shall be tied to NSRS whether tidale gauge or NGS benchmark whether passive or by the use of establishing OPUS DB. You see our nominal accuracy requirements, and we say nominal because it's not hard and fast; if somebody ties to the NSRS and gets .26, sorry I'm using feet instead of metrics, we like to use feet. We have a history issue there and so, you see our nominal accuracy because we don't want somebody saying, sorry, it does not meet that .25 and therefore, we are going to throw it out, it's not related to the NSRS, and these are accuracies related to the NSRS, and these are related to the rest of the world because we deal mainly with our local project areas and the relativeness of the project and the water level surface within that area and how it relates to the geodetic.

We are also requiring all our projects have duel elevations. That is a scary thing but we want to eliminate the problem that we ran into down in Katrina where people assumed that geodetic datum was equal to a water level surface, and we are trying to eliminate that issue. Therefore we have to have the water level surface relationship and the

geodetic and then, maybe eventually with this new magical datum that is supposed to do everything, maybe we can go to one, I don't know we will see and also tidal benchmarks very for the benchmarks tide as well for coastal and shore protection projects are very important.

We need to have published values in NSRS control and in this here, this conversion tool, transformations, current and past. We don't want to see changes just for the sake of changing. We don't want to see every year coming out with a new value new elevation on benchmarks or even on the CORS network that we are tied to because we then have to go back in time. If we have a project spanning the life of 10, 20, 30, 40, 50 years, we need to go back and be able to monitor that and that is extremely important to have those transformations in place. I think somebody brought that up earlier. The last presentation about BLM talking about the issue of transformation tools in place when the datum is in place, not some time afterward when we have to go around and figure out how they get put in place. The use of OPUS DB is essential, we are relying heavily on that, and, we are relying on the existing bench marks that are in place as long as they are checked and are verified marks that we are trying to do this at fairly minimal cost. And so by using OPUS DB is cost effective or using existing benchmarks if they are still valid, there is no reason to throw them away. But OPUS Projects will really help us. That needs to continue because that will help us with these large levy projects where we have to have multiple primary project controls that we are calling so they are tied to the NSRS and make sure all of our projects are tied to each other. So having that NSRS control really provides us consistency throughout our projects and that's really very much desired for us. We built a private control database. And this is going to allow to us to manage our local project control but relying on those connections in NGS so we are using NGS as the feed for that control. So we have -- every project has a primary control point which is tied into the NSRS and are related to that is our local control. So if for some reason, something changes in the NSRS control, we know we have that relationship to our local control and therefore, the project manager has to make a decision, not an automatic transformation. It alerts them to say something is going on here. You need to go out and resurvey, do a check and Dru was mentioning yesterday that going out and having those checks. And it's also important with this whole thing too, and I think Dru mentioned yesterday that the idea of having those uncertainty values associated that. That is extremely important for doing our risk assessments and the thing on the bottom here, this is very important because I think NGS likes to put out procedures and specifications that says if you follow these, you will you get it but we know with Blue Booking, as Dave always say, like is a sharp stick in the eye. So, we don't want to end up with sharp sticks in the eye procedures we want performance-based standards for our contractors to follow and check those and verify those.

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So continuing challenges: Areas of subsiding and uplift. Are we going to still have vertical time dependant positioning in these areas? That is very important. We need to be able to monitor these particular areas and know what's going on. Implementing various standards establishing geodetic and water level references. Education, this is critical to making sure -- I forgot my thought there, making sure -- making sure that we all know what's going on and not just-- we know what's going on because it's the people that will be using this, the person with the watch who has 10 centimeter accuracy and

goes out and think they can start establishing elevations. That scares the heck out of me that everyone is going to think they are surveyors.

So that is really a big issue. Tidal areas, new datum related to tidal gauges. That's real important. and real time networks. These are being used and these need to be tied to NSRS and that is extremely important and how they are related to the NSRS and how they are used. Again, we have folks going out and using this information.

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Some visuals here, Showing you what we've been doing as far as guidance development from our IPET report and developing into our draft DM will be done this year. And the idea that we are trying to relate all of these various datums to a single system.

What that allows us to do is allows to do, it allows us – we don't work outside of the watershed within the CORPS. We are fairly local as far as our projects. Some water sheds are pretty big. But in most cases, we don't usually work outside of a watershed. So having consistent control out there is what we are looking for, consistent NSRS control. But outside of that, we don't really care if a dam breaks in Oregon. It's not going to have a effect on the Mississippi river flows, okay. If it does, we are all in big trouble. I just have an illustration, here. I think they are fun, to kind of show you how we are tying in our projects. So we have NSRS control and we have our primary project control where we don't distort what's going on at this dam. We have one control point that we have tied into the NSRS. All the rest are there. We maintain the accuracy – we might have millimeter accuracy on all the network control points - But where that red dot is maybe plus or minus a quarter of a foot and that is fine for us.

Next slide - That allows us to tie that into the network -- next -- and allow us to easily tie this in to this framework.

Next please. So then, we can relate other projects and that's really what we are trying to do and again, localized area trying to relate all these various things together and this is very important for us. So outside of this local area, you know, we're not that concerned. But inside this local area, we are very concerned what is going on.

Lastly, the big thing I think I mentioned, the idea that we don't want to see changes just because we can get it. We don't want to see changes every year. That is -- that would be a big issue if every year somebody goes out to a project and using control and it is now centimeter difference, people come to us ask us for going out and doing some data collection and they have no idea the accuracy they want and they say, we need centimeter or millimeter accuracy and no, that's not really what you want, that we need this.

So it is really finding out what overall requirements here, what we need to do to establish this network and not go beyond that because why go beyond that if what we have is going to meet our needs.

So thank you.

>>MR. DOYLE: I think many of us can certainly relate to the issue of people telling us I need the best I can get. Then when you tell them what it will cost they say, well, maybe I don't quite need that.

I would like to take this opportunity to thank Jim for the work that the Corps has been doing and really because of the impetus through the Corps that OPUS DB came along

as quickly as it did. So we owe them a lot of gratitude. And I also just to make a point, I don't think this was made yesterday, we talked about the process of blue booking submitting data into the reference frame and now, OPUSDB. I hope everybody at least appreciates or understands, and I have had the opportunity to work in many places around the world with geodetic offices like this, but we are the only country in the world in which anybody, anybody can submit data to be included in the national reference frame. You don't have to be a licensed land surveyor. You have to follow the guidelines, dot the I's and cross the T's to don't have to show us your junior geodesist's secret decoder ring to get in there. It is a unique system.