EMP Good news from Dwight and Chris
Glenn Rhoades, B.Envd, MBA -- Director, Western United States, EMP Task Force on National and Homeland Security as a 501(c)(3)
From: Dwight L. Eckert [mailto:dwight.l.eckert@gmail.com]
Sent: Wednesday, April 12, 2017 11:23 PM
To: Dwight <dwight_eckert@hughes.net>; **Dwight L. <dwight.l.eckert@gmail.com>**; dwight.eckert@emptaskforce.us; dwight.l.eckert@lmco.com
Subject: FW: Mitsubishi in Memphis

Please see the information rich response from Chris below.
Thanks, Dwight L. Eckert **303-669-4545** Colorado State Coordinator for
The EMP Task Force on National and Homeland Security

From: Chris Sistrunk [mailto:chrissistrunk@gmail.com]
Sent: Wednesday, April 12, 2017 10:06 PM
To: Dwight L. Eckert <dwight.l.eckert@gmail.com>
Cc: Dwight <dwight_eckert@hughes.net>; dwight.eckert@emptaskforce.us; Eckert, Dwight. L. <dwight.l.eckert@lmco.com> **Subject:** Re: Mitsubishi in Memphis

Hi Dwight,
You are correct about the Mitsubishi facility as well as AEP being the only company to use 765kV. My previous company Entergy only goes up to 500kV.
There are four relatively new manufacturers of large power transformers in the USA:
Efacec in Rincon, Georgia since 2010
Hyundai in Montgomery, Alabama since 2011
SPX in Waukesha, Wisconsin (expansion in 2012)
and lastly Mitsubishi in Memphis, Tennessee since 2013

The design is also done by each power company in conjunction with the manufacturer...because each large power transformer (LPT) is custom built. (There are many things that go into the design such as available space in the substation, single phase tanks or three phase tanks, transportation methods and constraints to get to the substation, and many other factors.)

This document from DOE (updated in 2014) explains all about LPTs and includes information about the new manufacturers in the USA as well as recent efforts to protect the grid and make it more resilient.
https://www.energy.gov/sites/prod/files/2014/04/f15/LPTStudyUpdate-040914.pdf

Here's a good snippet from page 27: "In recognition of the importance of LPTs with regard to the reliability of the grid, there are various ongoing efforts to enhance the resilience of power transformers. Specifically, there is an increasing amount of activities to address the potential threats to LPTs, including the following:
· On March 7 2014, the Federal Energy Regulatory Commission (FERC) directed NERC to develop **mandatory physical security standards within 90 days** in the wake of attacks on transmission facilities in the United States in 2013. Owners and operators are

to first identify critical facilities, and then develop and implement plans to protect against physical attacks that may compromise the operability or recovery of such facilities.

98 NERC, under the direction of FERC, are developing reliability standards that are intended to mitigate the effects of GMDs on the reliable operation of the electric power system, including power transformers in a two-stage effort. The phase-one reliability standard will require applicable registered entities to develop and implement operating procedures that can mitigate the effects of GMD events.
99 Phase two efforts will require applicable registered entities to conduct initial and on-going assessments of the potential impact of benchmark GMD events on their respective system.
100 · A number of manufacturers are exploring the development and implementation of mitigation and hardening options, including the development of parts that are more resilient to potential threats, as well as protective devices. · EEI's Spare Transformer Equipment Program and NERC's Spare Equipment Database Program are designed to provide ways in which utilities may identify and share spare transformers across North America during an emergency.
101 As this information becomes available, this will help decision makers understand what additional programs or incentives may be needed to increase the number of available spares.
· The U.S. Department of Homeland Security's (DHS) Science and Technology Directorate, along with their partners, the Electric Power Research Institute, ABB, and CenterPoint Energy (CNP), and with the support of DOE and the DHS Office of Infrastructure Protection, have developed the Recovery Transformer (RecX), a prototype EHV transformer that would drastically reduce the recovery time associated with EHV transformers. The RecX is lighter (approximately 125 tons), smaller, and easier to transport and quicker to install than a traditional EHV transformer. The RecX has been operating in CNP's grid since March 2012, after a successful exercise that included the transportation, installation, assembly, commissioning and energization of the transformer in less than one week. The RecX is a 345:138kV, 200 MVA per phase transformer (equivalent to 600 MVA) and was designed to be an applicable replacement for more than 90 percent of transformers in this voltage class, which is the largest voltage class of EHV transformers."
I don't see who else you emailed this to, but please forward it to anyone who might find it useful. Best regards, Chris Sistrunk, PE (in Louisiana) , Electrical Engineer Mississippi InfraGard President

On Wed, Apr 12, 2017 at 10:39 PM, Dwight L. Eckert <dwight.l.eckert@gmail.com> wrote: Hi Everyone, I thought this might be interesting to you. We have been saying that there is no capability to build these large, high Voltage transformers in the U.S. That seems to have changed. The Memphis plant is the only U.S. plant that is building transformers rated above 500kV.
http://www.businesswire.com/news/home/20160511006646/en/Mitsubishi-Electric-Shipped-765kV-Power-Transformer-North

My research shows that AEP is the only company in the U.S. operating HVAC up to 765kV. Also 765kV is the highest Voltage transmission in the U.S. I don't know if 750MVA is the highest rating transformer in the 765kV range. I'll see if I can find out.

The Mitsubishi web site says that although the fabrication is in Memphis Tn., the design is accomplished in Japan. The plant was opened in 2013.
This is really good news. It would be better if there were more facilities building these HVAC devices. It is unfortunate that the design is still overseas.

Thanks, **Dwight L. Eckert 303-669-4545** Colorado State Coordinator for The EMP Task Force on National and Homeland Security