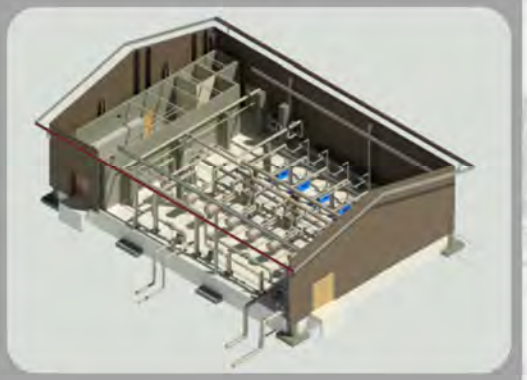
UPDATES TO DOD FUELING SYSTEM STANDARD DESIGNS AND AN INTRODUCTION TO BIM INTEGRATION

Prepared for:
NPMA
PETRO 2018

Eric Bausch, P.E.
POL-MCX
Omaha District
US Army Corps of Engineers



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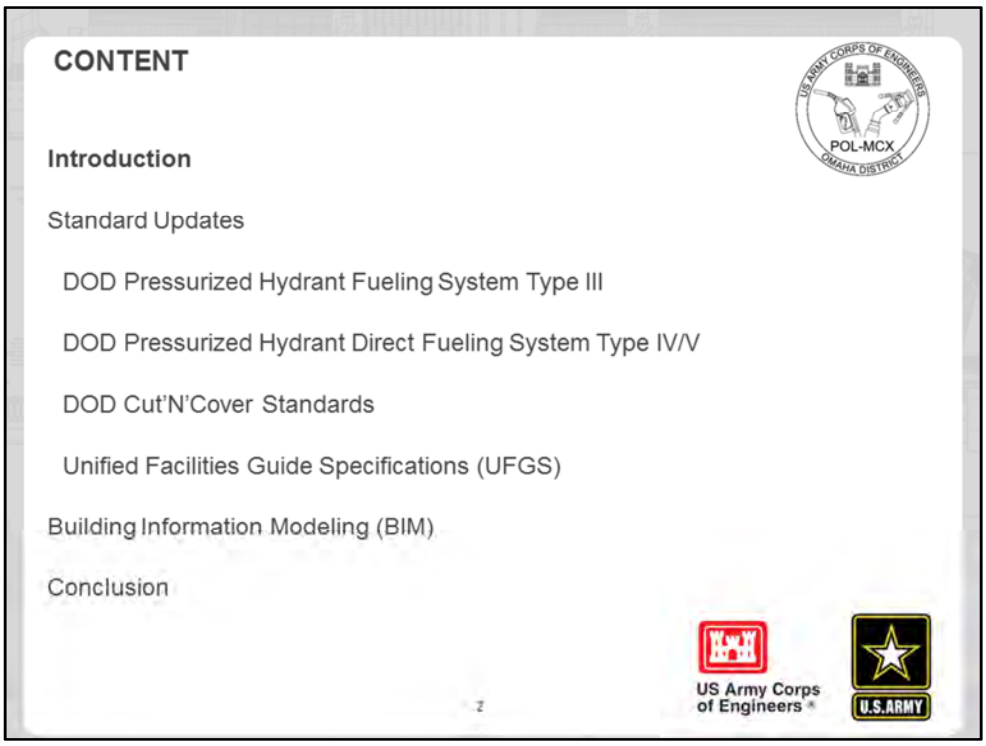
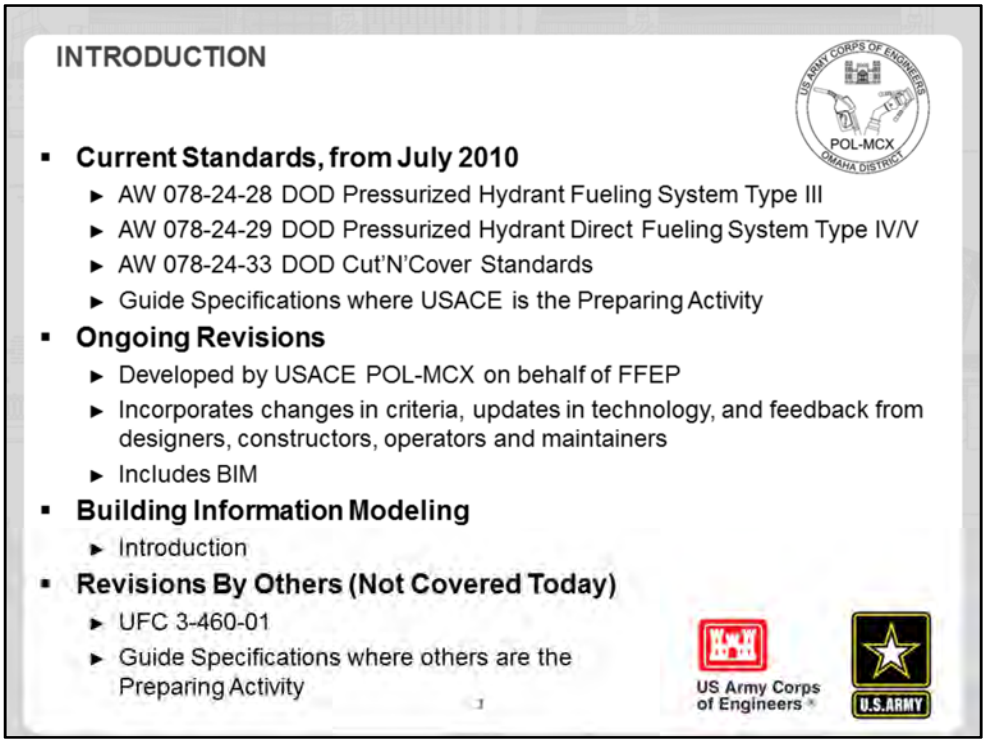


Today I am going to highlight some of the bigger changes that are occurring under the current round of updates to the fueling system standard designs and guide specifications. I'd like to start off by thanking you for coming, and if you have any questions, please feel free to chime in.



On behalf of the DoD Fuels facility engineering Panel, the POL-MCX is updating the standards and the related guide specifications that have USACE authority. There are other organizations that are performing concurrent updates to UFC 3-460-01 and the guide specifications where other agencies are the preparing activity, but I cannot cover those today.

I am also going to provide a very brief introduction to Building Information Modeling, which is being developed as part of the standard updates.

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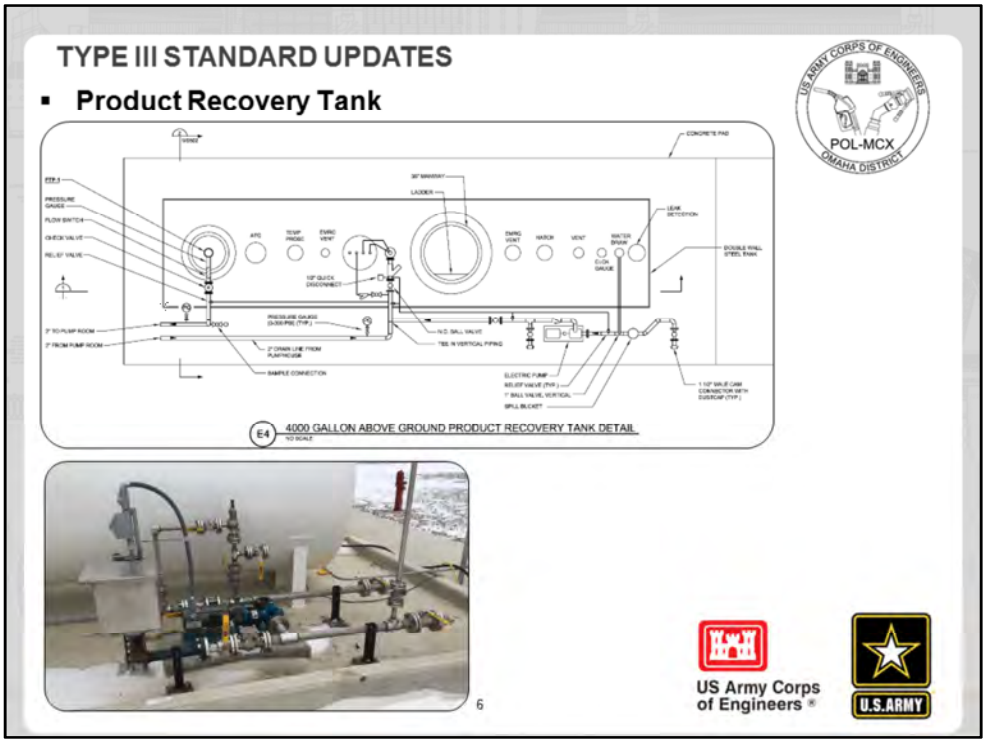
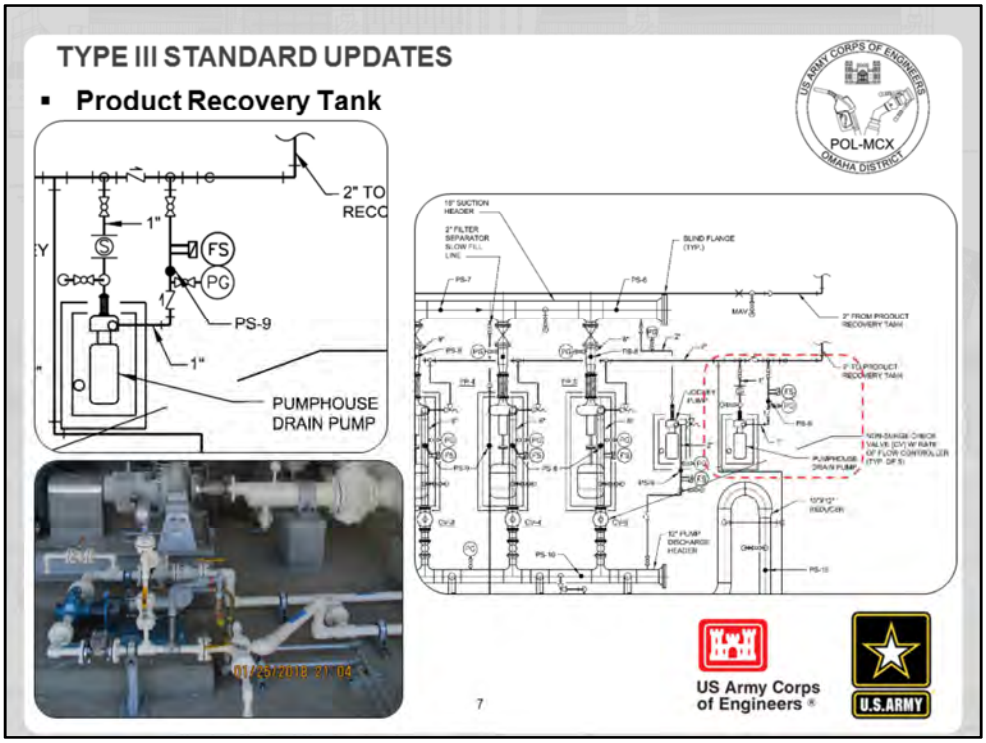
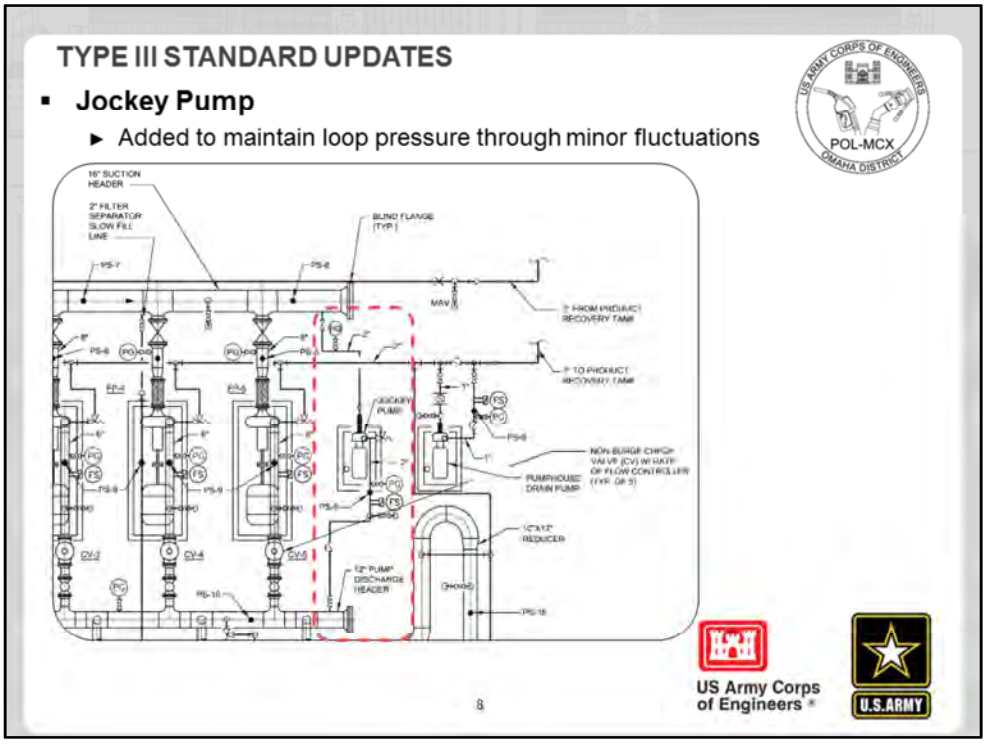
The first item to discuss for the type 3 standard is including options for either underground or aboveground product recovery tanks. The design for the aboveground product recovery tank was added in response to changes in EPA regulations in 40 CFR 280 and 281, and the desire in some areas to move away from underground storage tanks in response to those regulations and other factors.



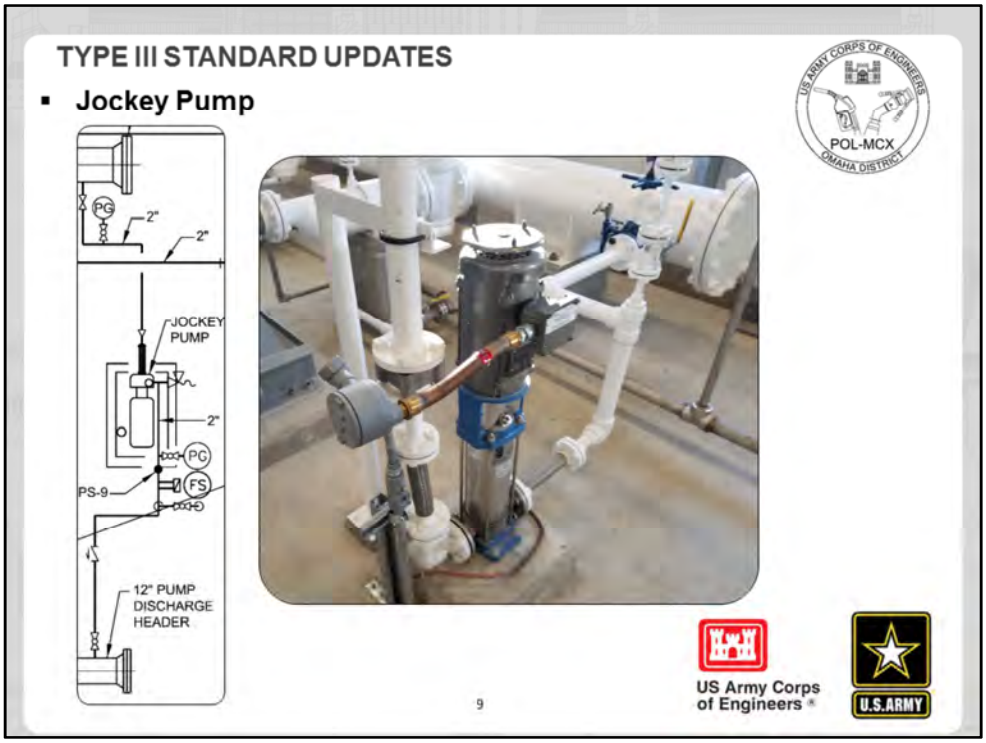
The aboveground product recovery tank is a UL-2085 rated tank, on a curbed concrete pad. The aboveground option includes all of the provisions provided by the underground PRT, including a small pump and spill bucket for emptying bowsers and other accumulations of fuel.



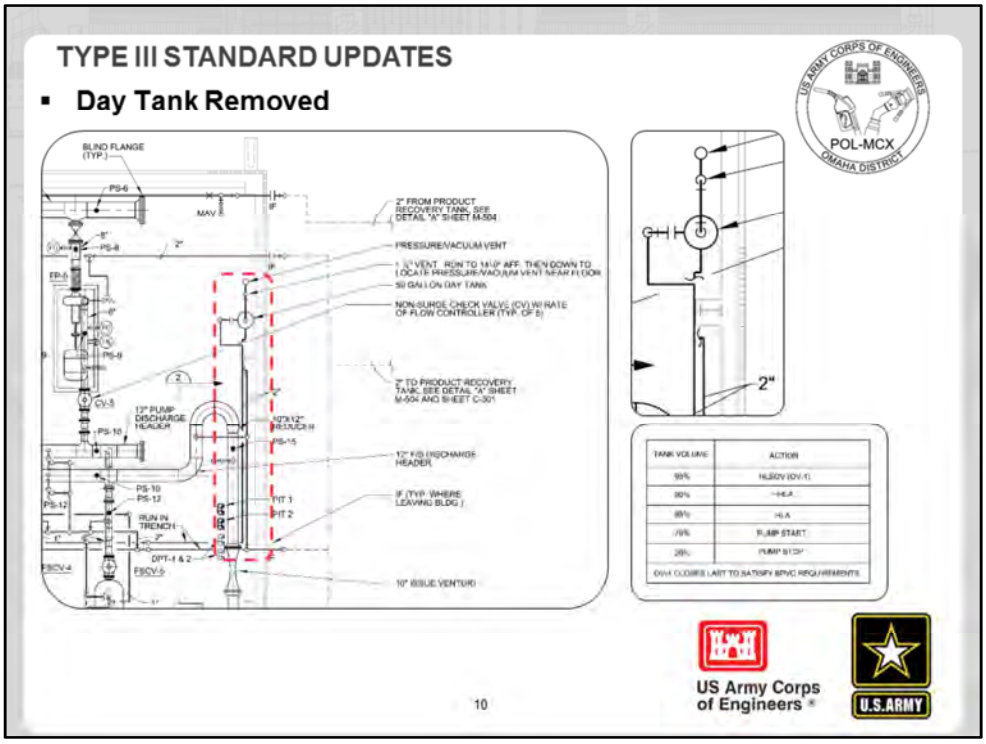
Since gravity draining to the Product recovery tank is no longer possible with the above ground tank, a small positive displacement pump is provided within the pumphouse. The pump includes manual on/off controls for draining piping and vessels as needed for maintenance. A bypass with a check valve is provided around the pump, to allow any pressure buildup within the drain piping to discharge directly to the PRT, such as from thermal relief valves.



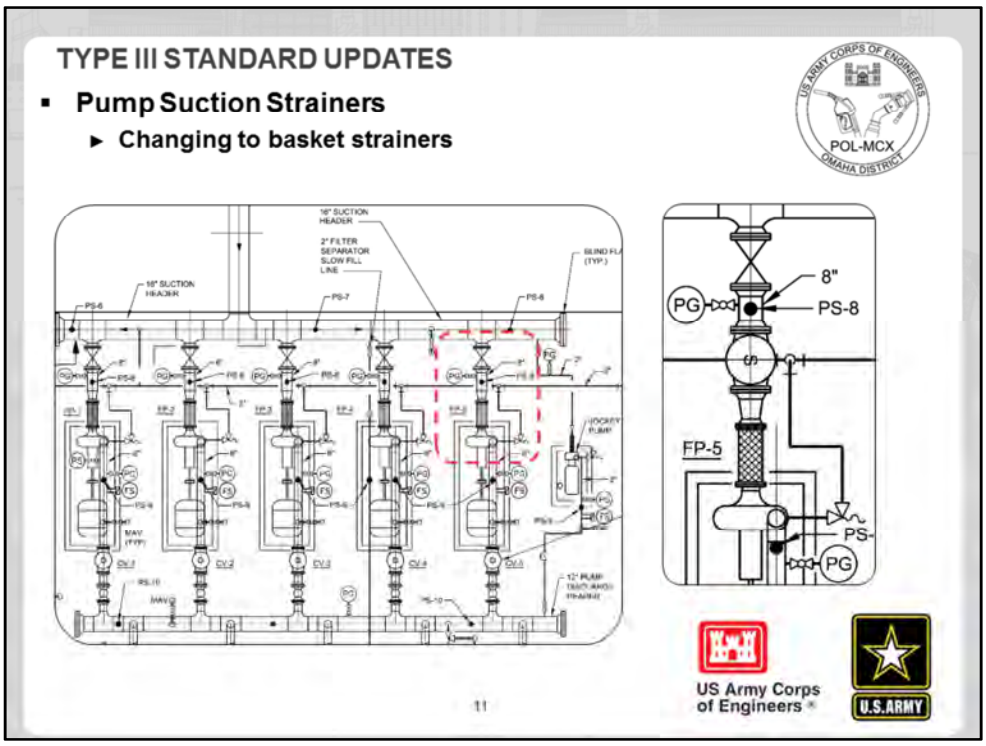
Another addition within the pumphouse, is a jockey pump to maintain pressures in the hydrant loop through minor fluctuations, such as from temperature changes, in order to prevent unnecessary cycling of the large fuel pumps.



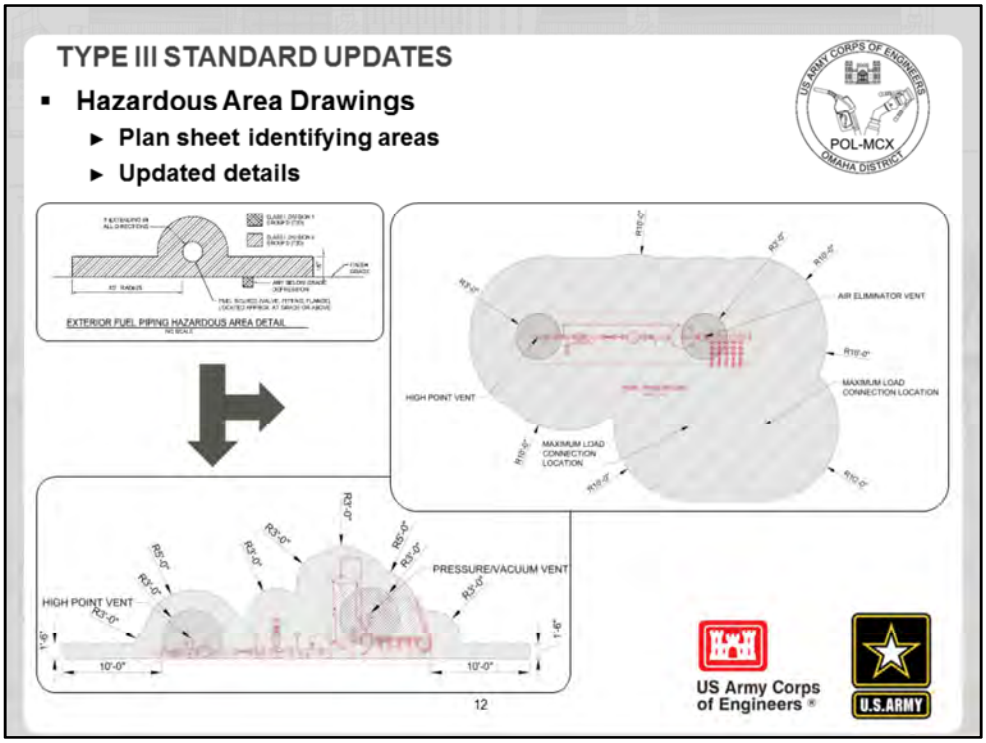
The jockey pump is a small 5 gpm pump controlled by the pump control panel in automatic mode. When the system pressure drops below 65 psi for more than 5 seconds, the jockey pump will be started and will run until the system is pressurized to 75 psi. If the system pressure drops further, such as during a refueling condition, the jockey pump will not start or will be shut down if it is already running. The jockey pump will also be utilized for tightness testing of the fueling loop piping, instead of the larger fueling pumps.



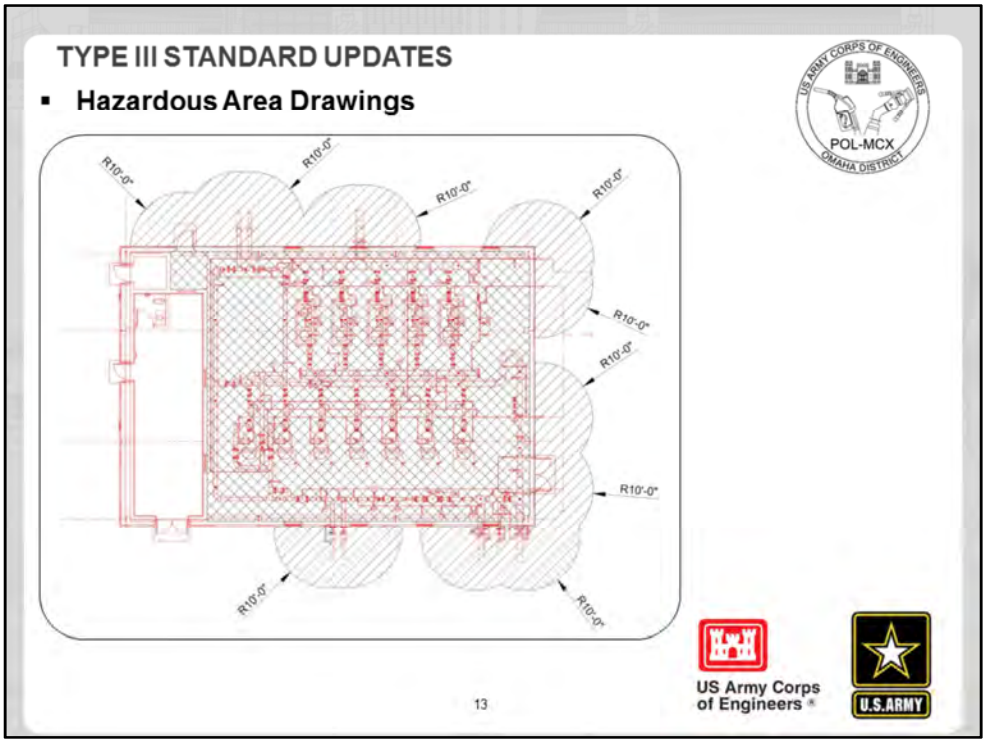
The 50 gallon day tank has been removed from the pressure relief system. The day tank was originally included to allow relief to this vessel without any valves to the discharge point. A determination has been made that the Boiler and Pressure Vessel Code does allow valves on the relief line, as long as measures are taken to ensure that relief occurs. The standard includes provisions to ensure relief, such as locking open manual valves and dictating specific operation of the high level shutoff valve on the product recovery tank. The level alarm system activates a non-critical alarm for high level at 85%, and a critical alarm for high high level at 90% which shuts down the fuel system prior to closing the high level shut off valve on the product recovery tank at 95%.



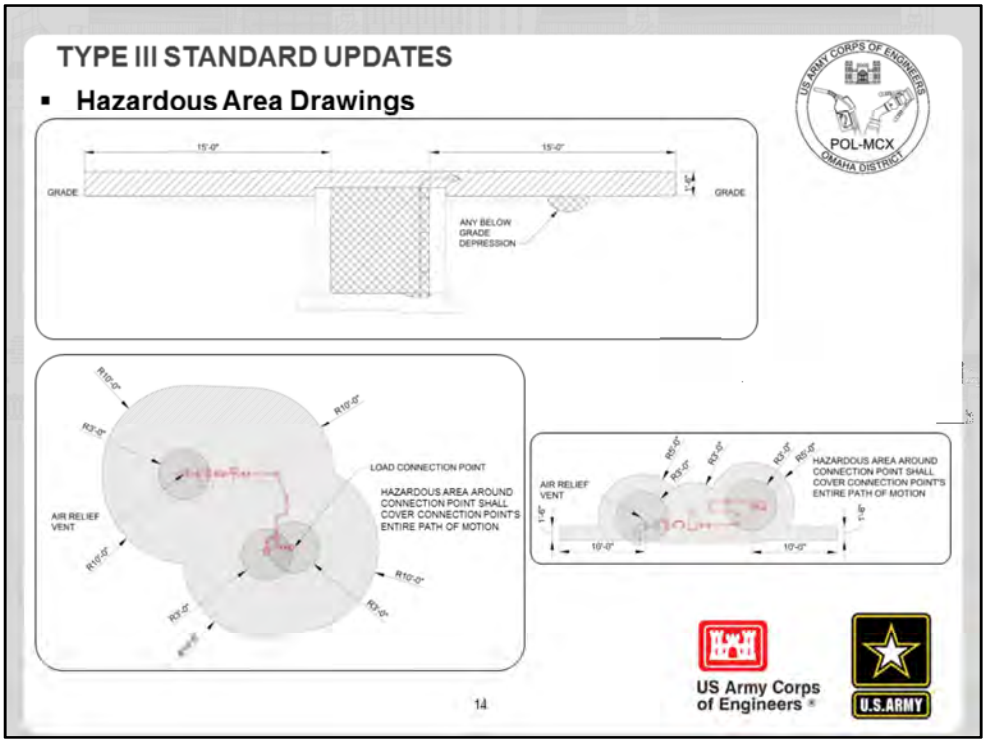
Under the current standard, the strainers upstream of each fueling pump are mesh cone strainers, installed within the piping connections just upstream of the pumps. The standard is being revised to provide basket strainers on each of the pump suction lines for easier maintenance.



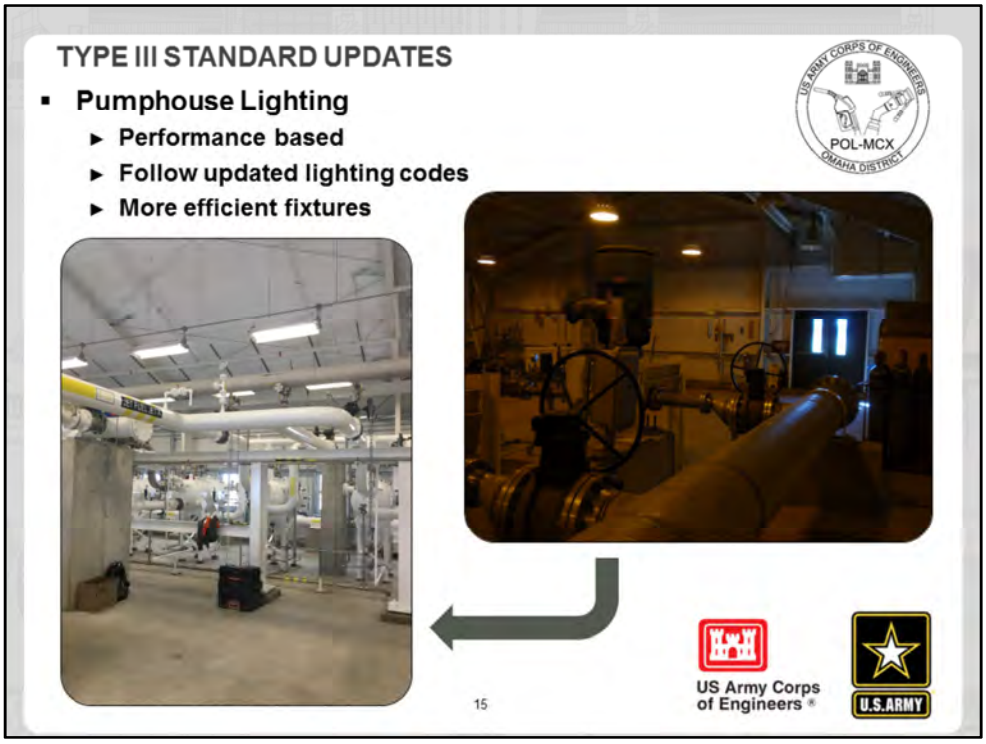
The next update is to include more specific hazardous area classification information. A hazardous area plan sheet is being added, in accordance with the requirements of UFC 3-460-01, which identifies where the hazardous areas occur on a typical project, which would be refined during design of each specific project. In addition, details are being improved for clarity and greater detail in application of hazardous area requirements. An example shown here is the upper detail from the current standard, meant to cover all piping and fillstands, offloads, and any other areas with valves, fittings and flanges. The updated standard will include details similar to the two lower plan and elevation details, which identify hazardous areas associated with a truck offload skid.



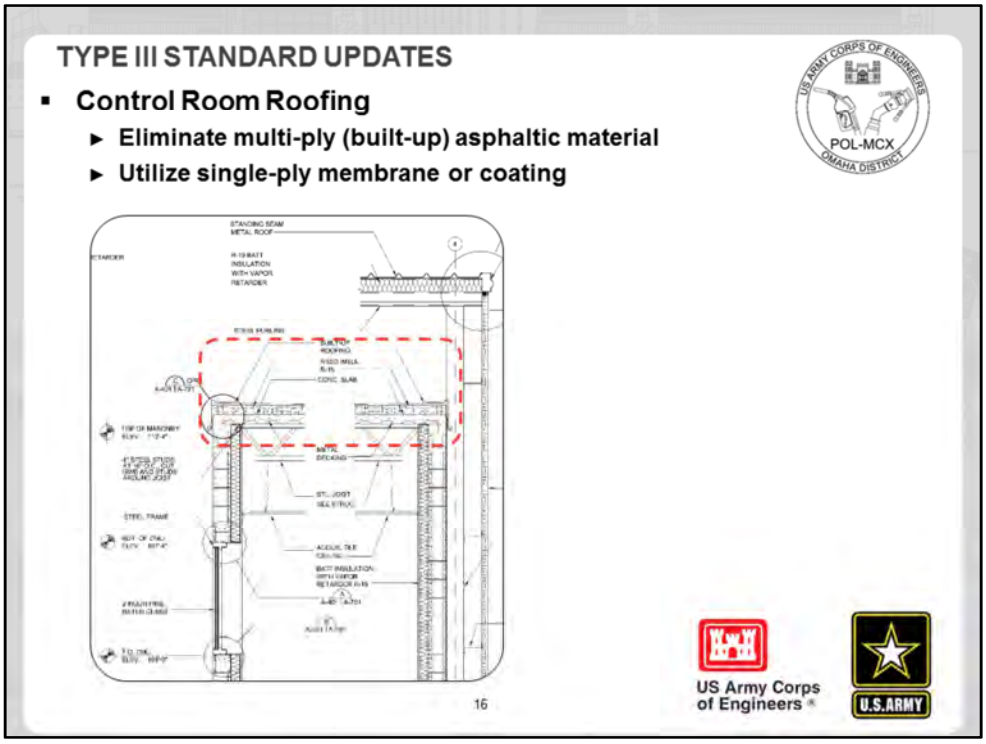
This is another example of an updated detail, showing the hazardous areas associated with an enclosed pumphouse.



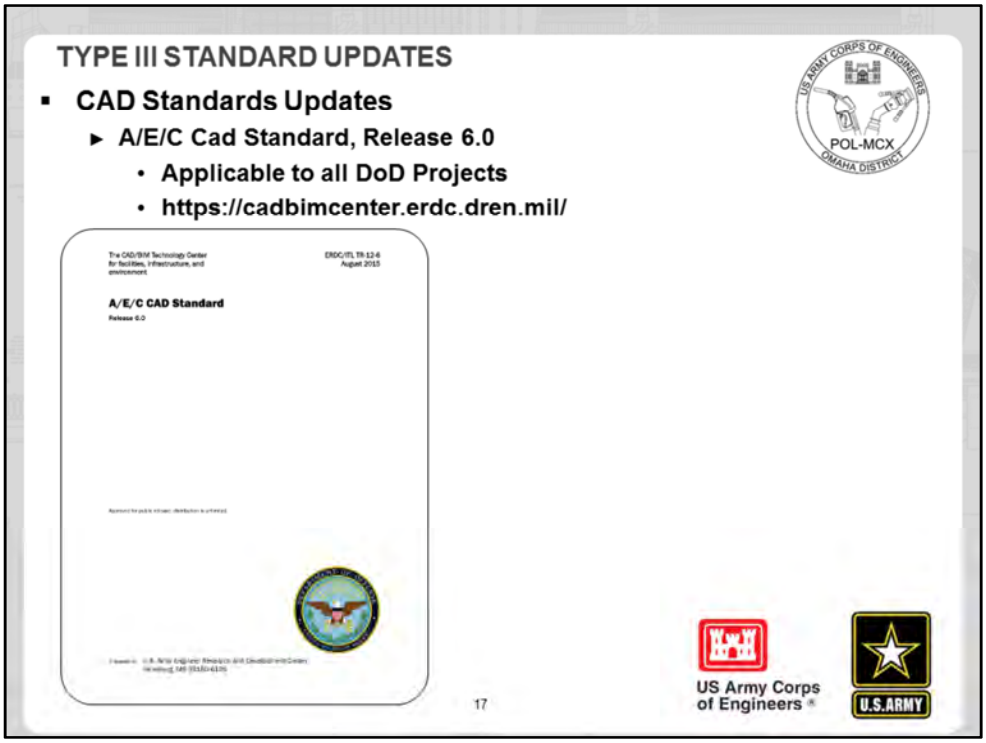
A few more updated details showing a remote containment basin section and fillstand plan and elevation details.



The type 3 standard pumphouse lighting design is being updated to be more performance based, to more easily allow subsequent project designs to incorporate updated lighting codes and enable designers to specify more efficient fixtures, such as florescent or LEDs, without deviating from the standard design.



The type 3 control room is located under the pump shelter canopy or within the pumphouse building when enclosed. The control room standard roofing material is being changed from a multi-ply asphaltic roofing material to a single ply membrane or coating material, which will allow much easier installation for contractors while still providing the control room protection from fuel spray or vapors.



While also incorporating these changes, the entire drawing package is being updated to the current A E C cad standards, release 6.0. The CAD standards dictate numerous areas of design files, such as the border, text size, file naming, symbology, and the organization of drawings within a design package. The current AEC CAD standards are available online at https cadbimcenter dot erdc dot dren dot mil

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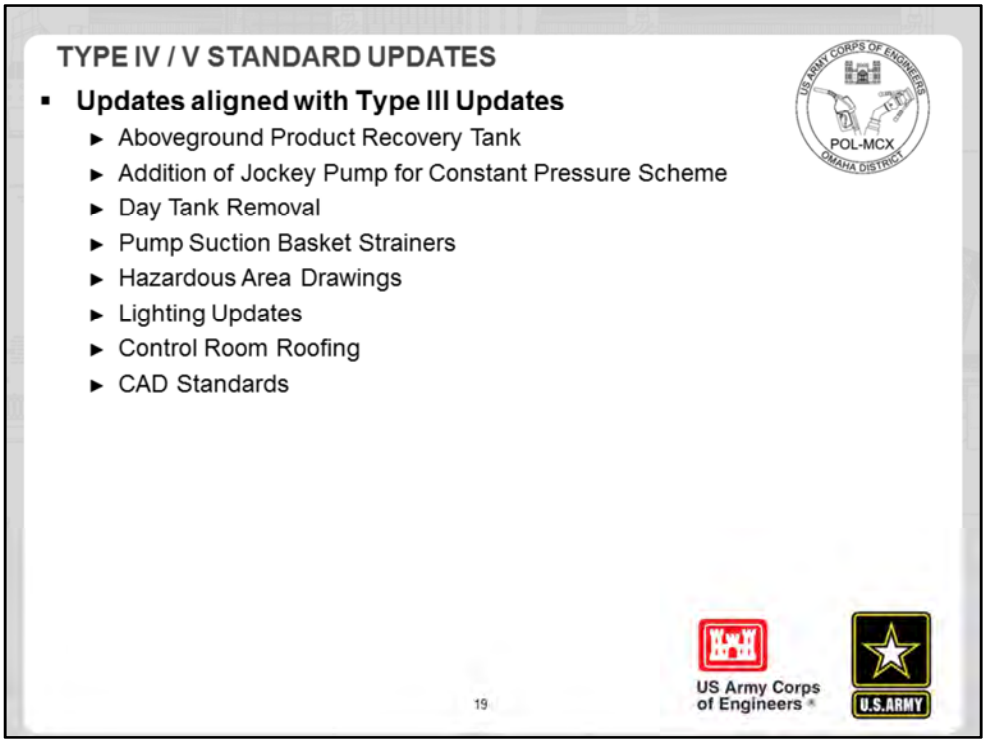
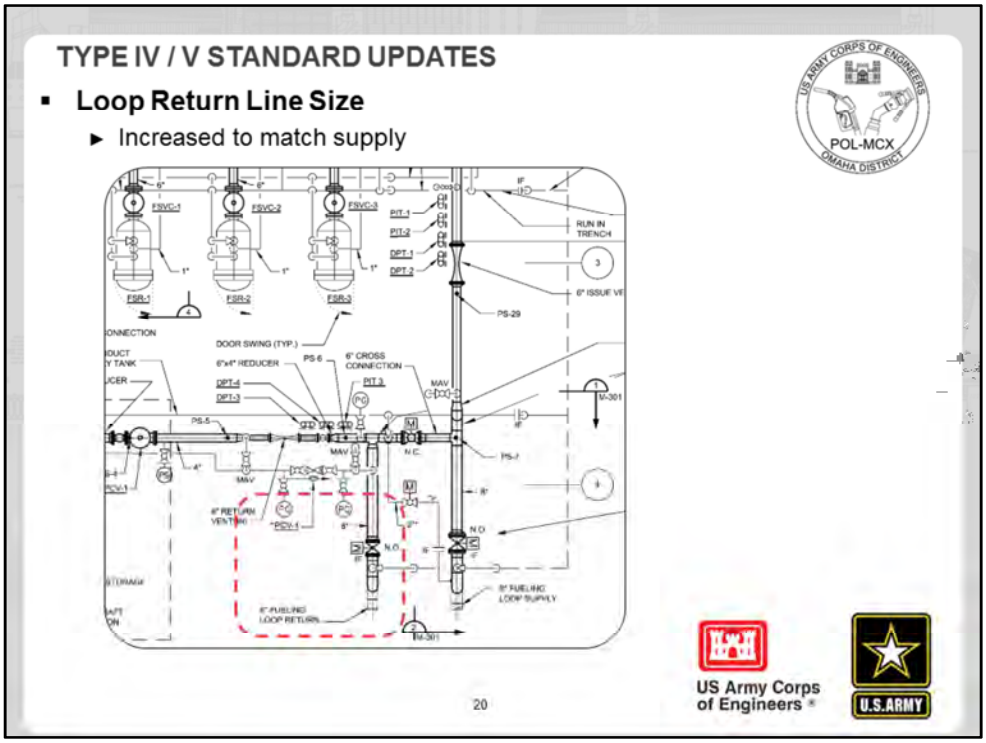
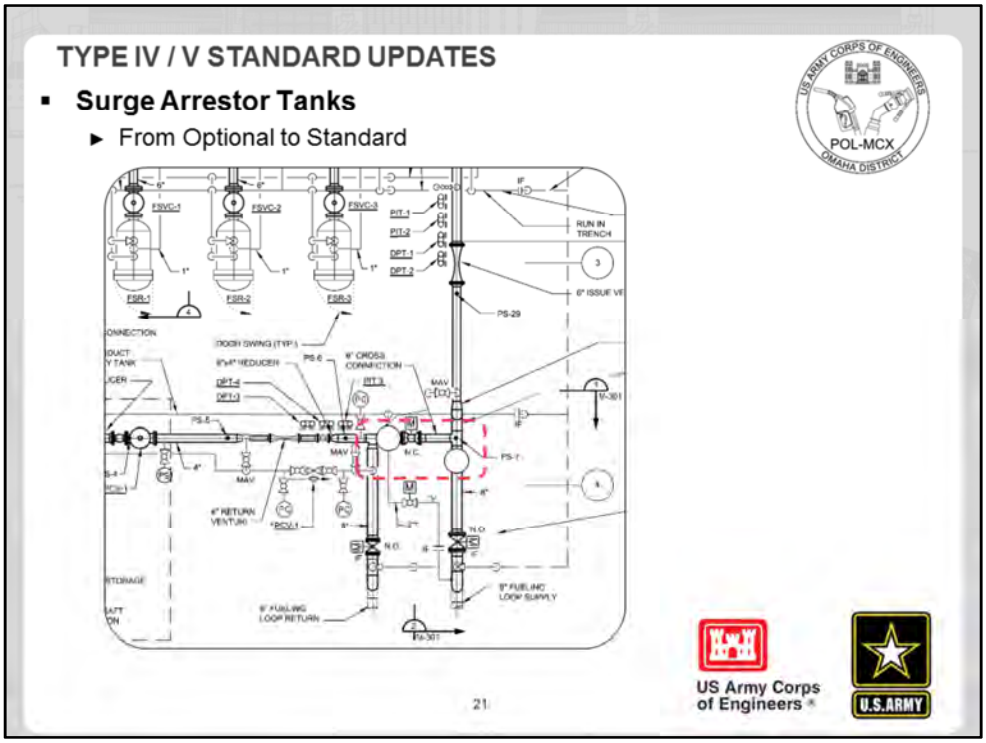


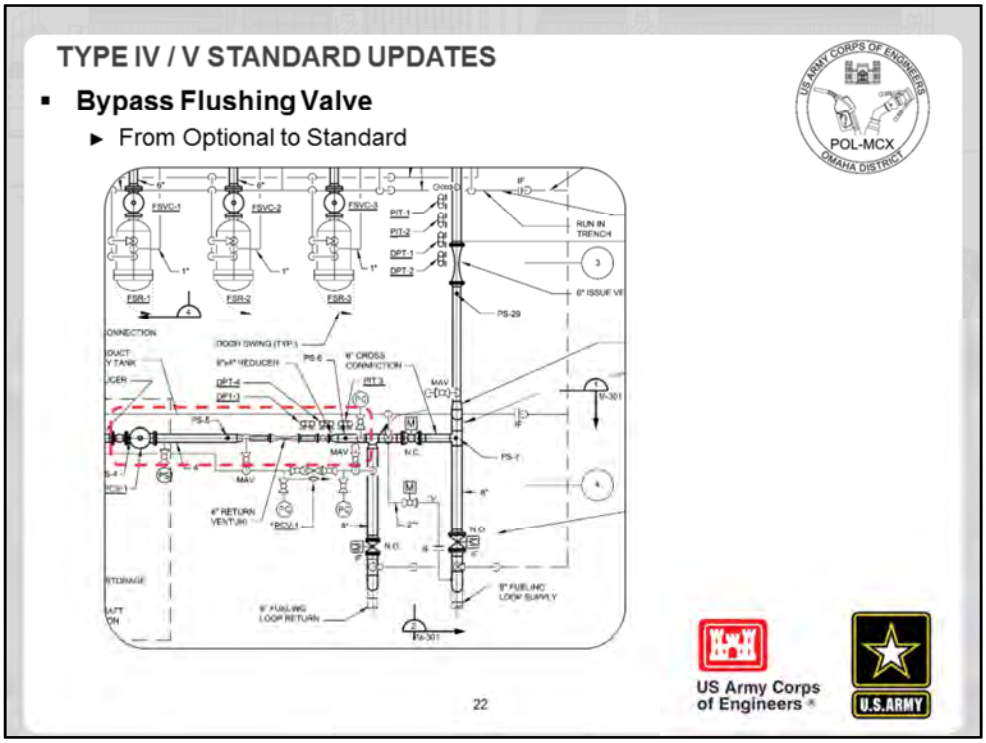
In general, the updates to the Type 3 standards are being incorporated into the Type 4 and 5 standards, including those items previously discussed.



The first change is increasing the loop return size to match the supply size, for better flow and to support pigging of the fueling loop piping.



Surge tanks were previously included only where required by a surge analysis, or where directed by the service's subject matter expert. The surge tanks are now part of the type 4 and 5 standard for all applications, to achieve more precise control of the fueling system.



The final major update to the type 4 and 5 standard is the inclusion of a full size bypass around the return venturi with a manual valve for flushing. The bypass was optional previously, but is being incorporated into the standard design for most systems.

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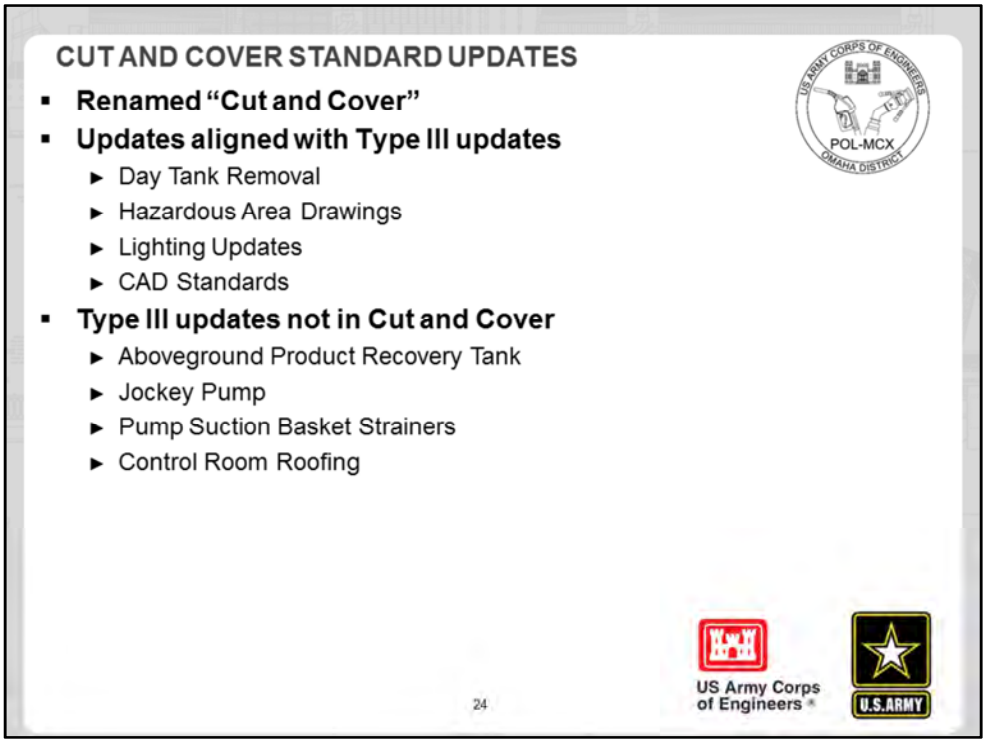
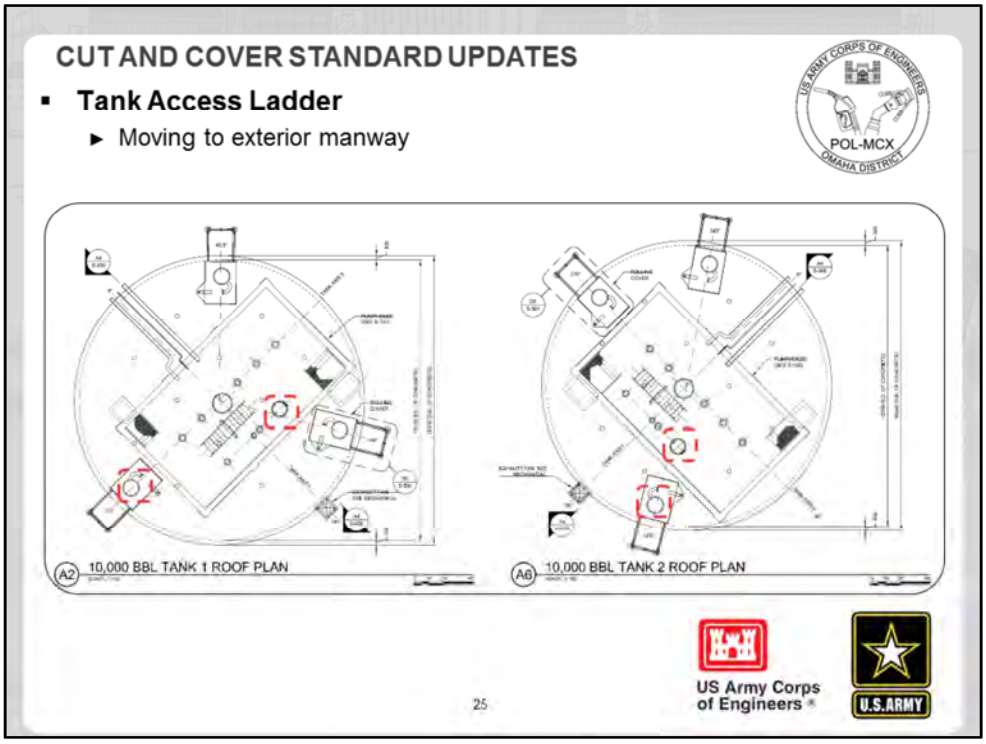
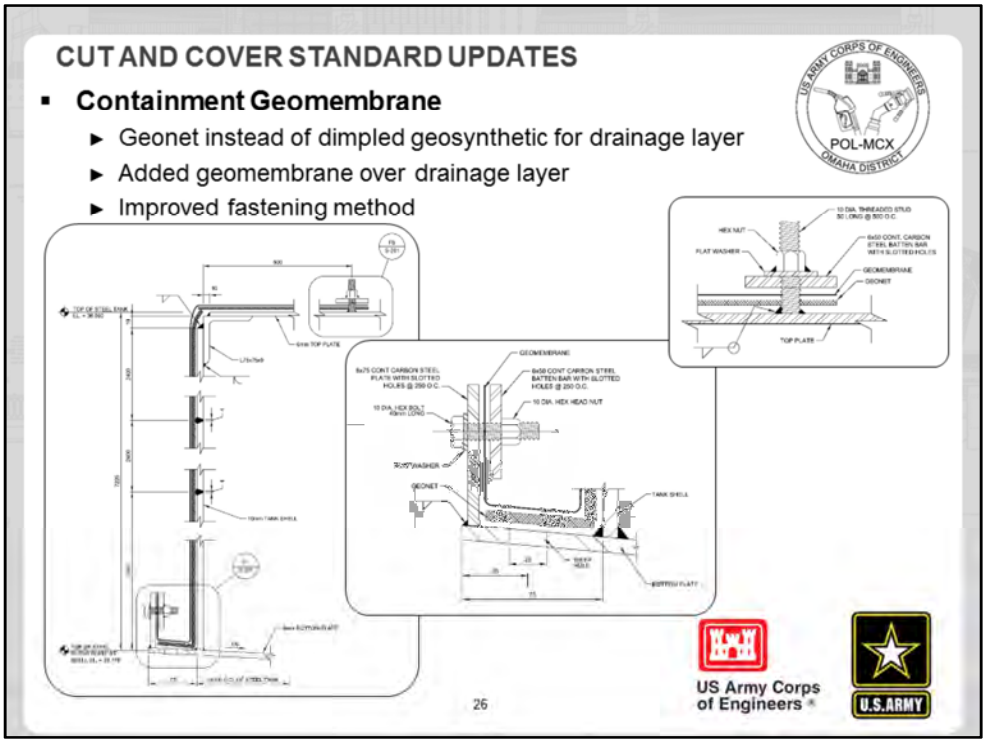


The first change you will notice, is this standard is being renamed Cut and cover.

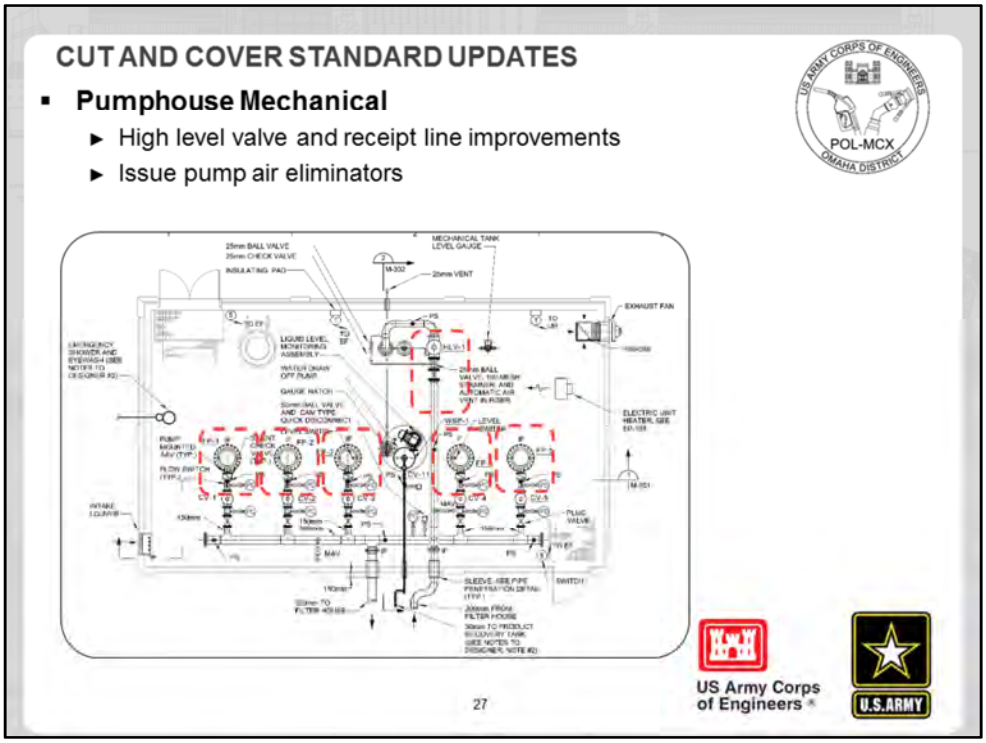
From there, some of the updates to the Type 3 standards are being incorporated into the Cut and cover standard, however not all of the items previously discussed are included. Specifically excluded are the aboveground product recovery tank, jockey pump, pump suction basket strainers, and control room roofing.



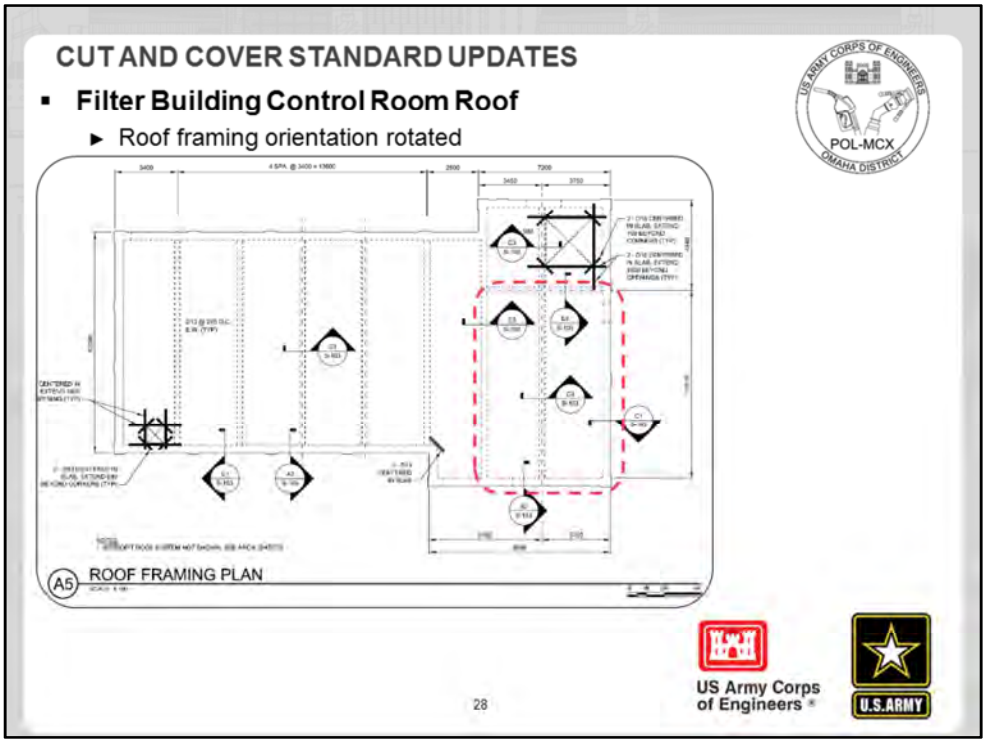
The tank access ladder was previously within the manway located in the pumphouse; the ladder is being moved to one of the exterior manways for each tank.



The other change on the cut and cover tank deals with the secondary containment between the steel tank shell and outer concrete layer. The dimpled geosynthetic drainage layer has been replaced with a geonet for easier constructability. A geomembrane has been added over the drainage layer, to prevent any liquid from seeping out of the drainage layer at seams. In addition, the geomembrane and drainage layer attachment details used at the bottom and top of the tank have been updated to be more secure and utilize easier construction methods.



Within the pumphouse, the receipt high level valve is being updated with a quick-opening feature and differential pilots, as well as adding an automatic air eliminator, inlet strainer, isolation valve, check valve, and pressure gauge on the tank fill line upstream of the HLV. Air eliminators are also being added on each of the issue pumps.



Within the filter building, the control room roof framing orientation has been rotated 90 degrees to parallel the filter room roof framing and better accommodate hvac equipment.

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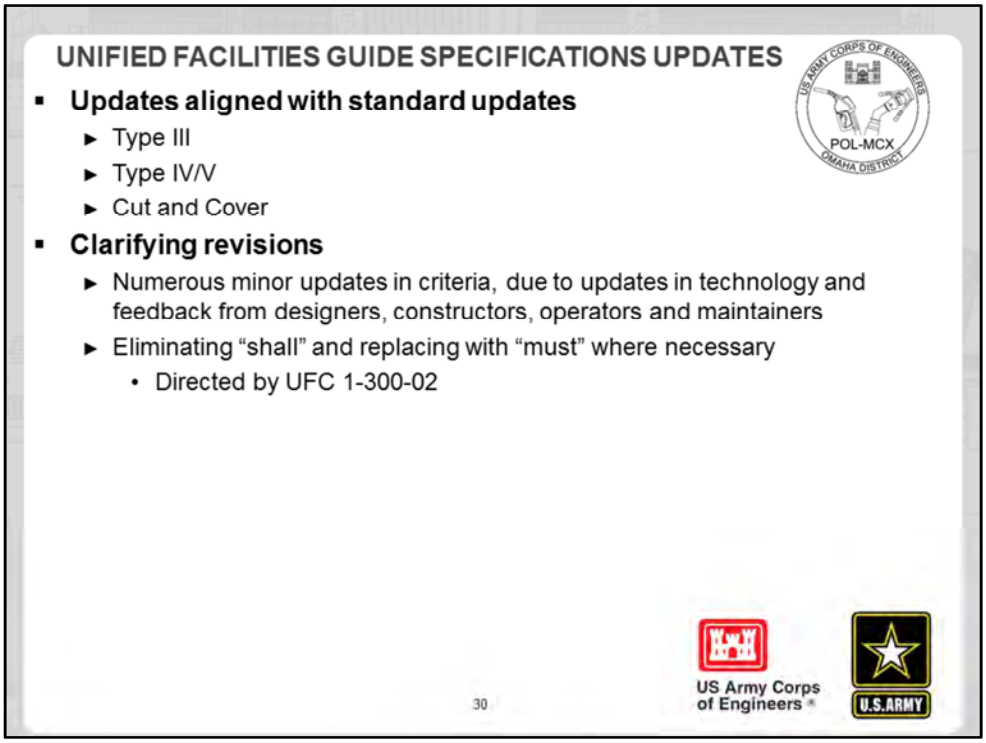
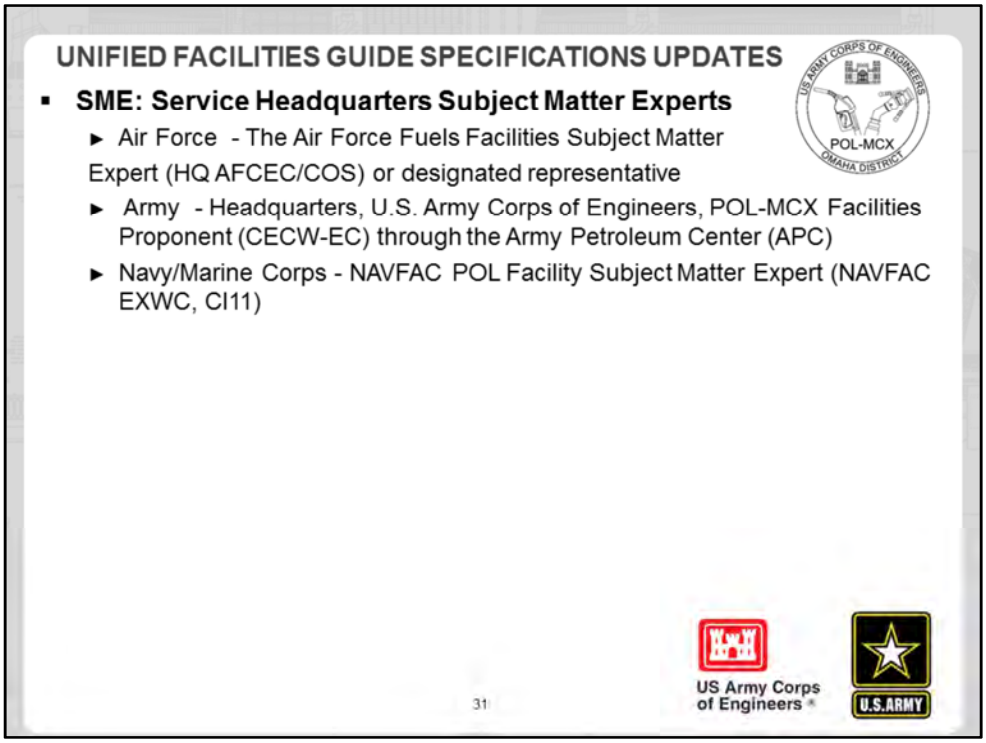


The biggest changes to the guide specifications are related to simply incorporating the revisions that are being made to the standard design drawings.
In addition, there are extensive minor revisions due to technology updates and feedback from project and system stakeholders.
Another minor change that occurs throughout all of the specs, use of the word shall is being eliminated.



The other change that I wanted to specifically mention is that the updated specifications each include the identification of the subject matter experts that are to be contacted for guidance regarding specific applications and possible deviations from the standard designs.

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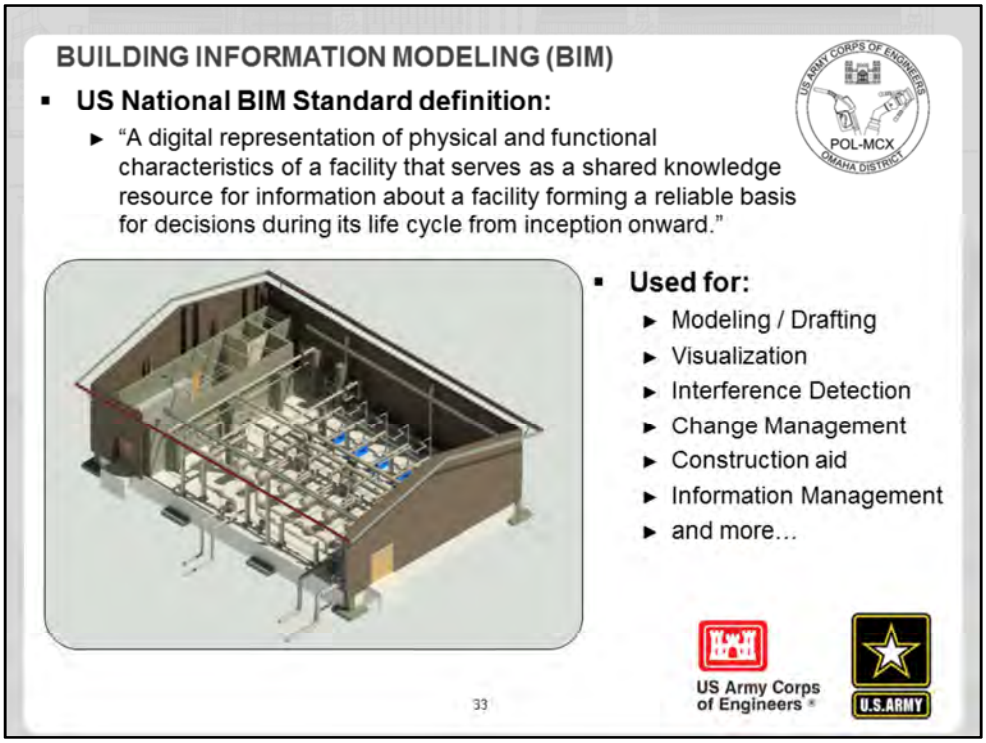
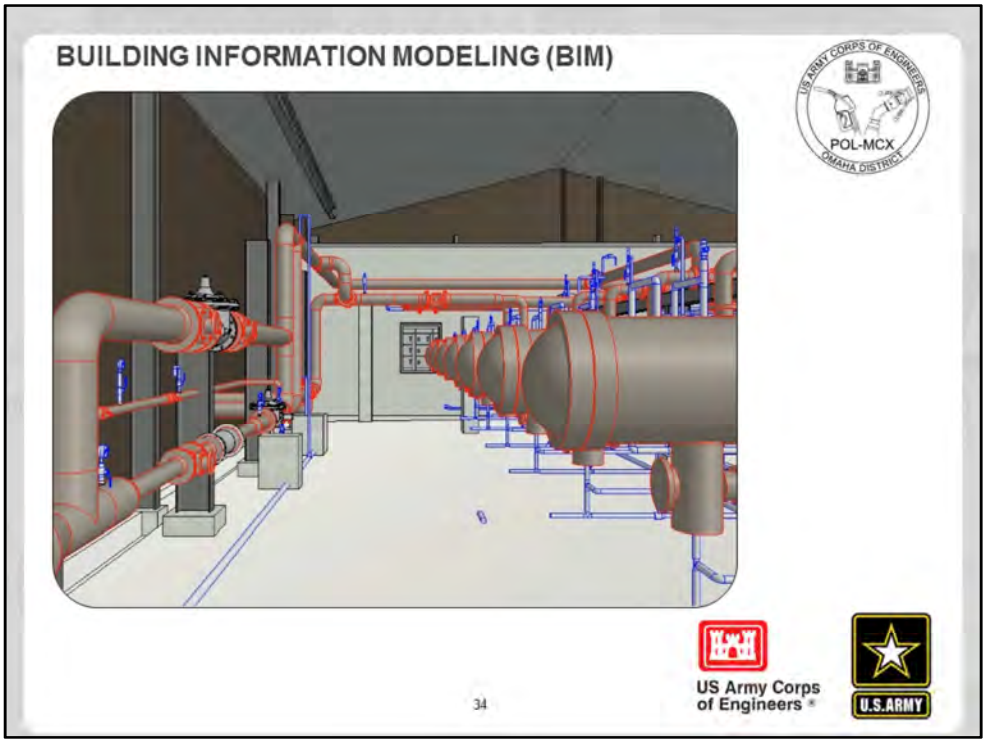


BIM is a digital representation of a facility, that can become a database of information about that facility.

A building is designed by developing the model, allowing visualization and enhancing interference detection. When any changes are needed, it simplifies the process, by automatically reflecting those changes in sections, elevations, and details.

The model is passed on to the construction contractor, who can utilize the model for ordering materials, phasing or sequencing of construction, determining methods of construction, or fabrication of materials. The model is then populated with information about the construction of the building and materials and equipment used.

During the life of a facility, the model can then be referenced for O&M data, warranties, and more. It becomes a valuable resource when repairs or alterations are required.


BUILDING INFORMATION MODELING (BIM)
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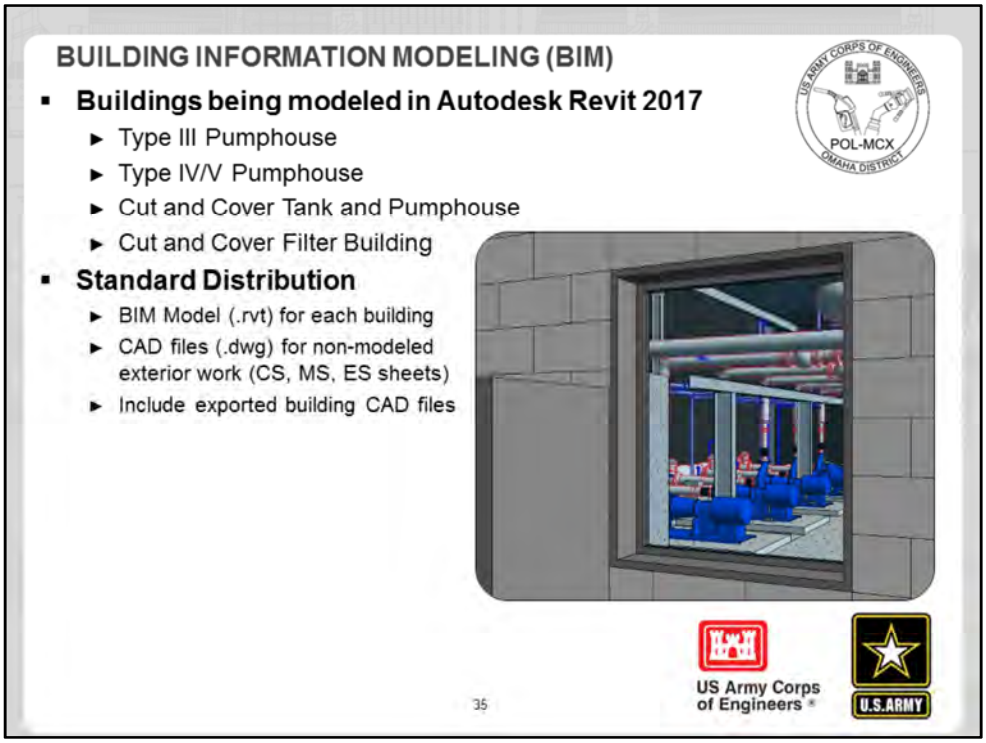
VIDEO



The buildings associated with the standards are all being modeled in Revit 2017. This includes the pumphouse in the type 3, 4, and 5 standards, and the cut and cover tank, pumphouse, and filter building in the cut and cover standard. Upon distribution of the updated standard designs, the building models will be included, along with CAD files for the exterior work that isn't part of the BIM model. To support those without the need for BIM or the software necessary, standard building CAD files will be exported from the model and included in standard distribution.

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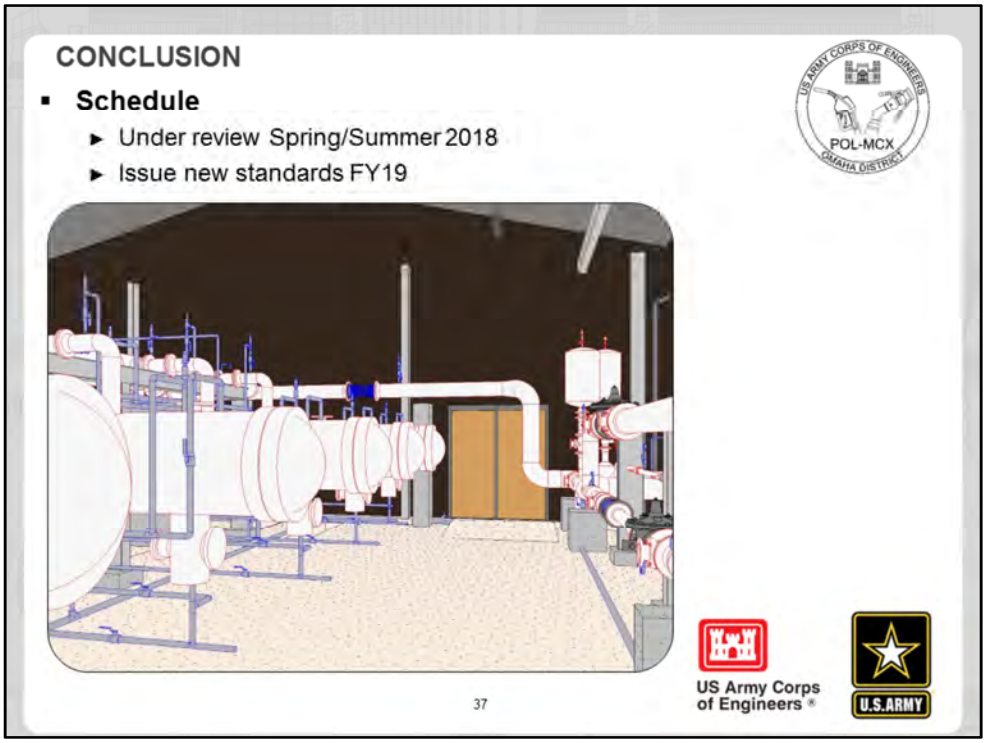
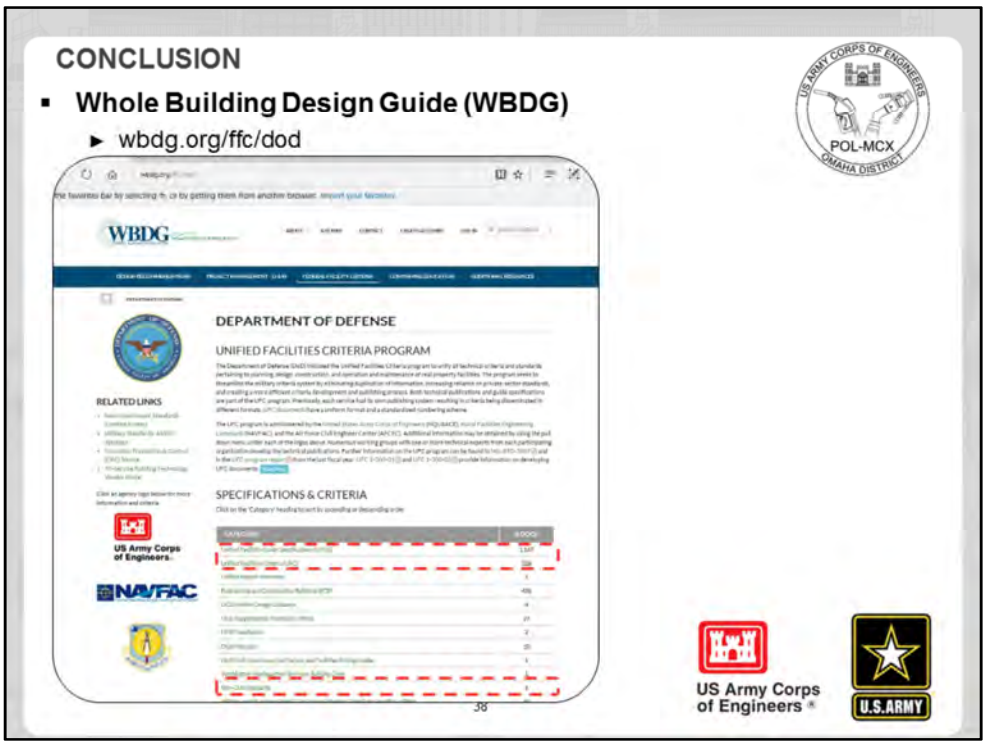
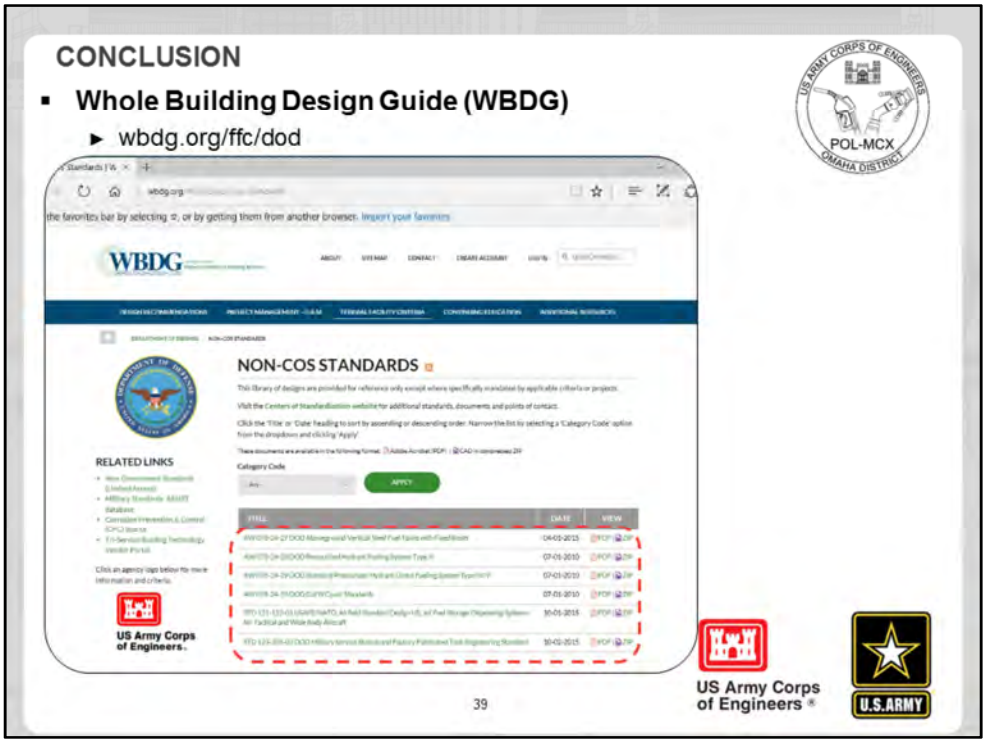


The standard updates are currently in progress, and will be distributed for review late spring and early this summer. Following review and incorporation of comments, it is expected that the updated standards will be released in FY19 following approval.



Active standards are available on the whole building design guide at wbdg dot org backslash f f c backslash d o d. At that address you can find dod criteria, or click on the agency links on the left to browse service specific criteria. All active guide specifications and UFCs are available under those categories, as well as archives of previous versions. If you select the Non-COS Standards link identified at the bottom, you'll find the fueling system standard designs.



The active standard designs are provided in pdf format, as well as a zip file that includes the CAD files. The BIM model file will be included with each standard once the updated standards are released.

One thing you may notice, is that there is not criteria change request link for these standards, as there is for UFCs and UFGS's. Until such time that function is added, please provide any recommended improvements to us, or to the FFEP, through your service representatives.

QUESTIONS

Eric Bausch, P.E.
POL-MCX
Omaha District Corps of Engineers
eric.l.bausch@usace.army.mil
402-995-2198

http://www.nwo.usace.army.mil/About/Centers-of-Expertise/Fuel-Systems/

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