Overview

- Unified Facility Criteria (UFC)
- Standard Designs
- Pipeline Pressure Testing Guidelines
- Specifications

- Questions
DoD Fuels Facilities Documents

- Unified Facility Criteria (UFCs)
  - 3-460-01 Design: Petroleum Fuels Facilities
  - 3-460-03 O&M: Maintenance of Petroleum Systems*

- Standard Designs
  - ASTs (Vertical)
  - Type III, IV, V Pressurized Hydrant Systems
  - Cut and Cover Tanks
  - USAFE/ NATO Standard *
  - Military Service Stations *
  - Rotary Wing Hydrant Systems *
  - Fuel Laboratory *

*Under Development
DoD Fuels Facilities Documents

- Pipeline Pressure Testing Guidelines
  - Will be incorporated into UFC 3-460-03

- Unified Facilities Guide Specifications (UFGS)
  - Most in the 33 nn nn series
  - Associated with Standard Designs
  - Available on WBDG site

- Coating Systems
DoD Fuels Facilities Documents

- Unified Facility Criteria (UFCs)
  - Authoritative, mandatory unless waived by Service HQ

- Standard Designs
  - Starting Point For Design, Edited For Site Adapt
    - Engineering design is still needed
  - Identifies preferences and design choices
    - Includes designer notes
    - Lists which UFGS to be used
  - Major deviations require Service HQ approval

- Unified Facilities Guide Specifications (UFGS)
  - Edited for the job
  - Designer choices in brackets
UFC 3-460-01 Design: Petroleum Fuels Facilities

- Guidance for all new design and construction
- Guidance for Major Rehabilitation
- 340 pages

Chapters:
1. Introduction
2. General Design Information
3. Bulk Fuel Storage Facilities
4. Aircraft Fueling Facilities
5. Marine Receiving And Dispensing Facilities
6. Interterminal and Installation Pipelines
7. Ground Products Fueling Facilities
8. Atmospheric Storage Tanks
UFC 3-460-01 (cont)

9 Piping Systems
10 Alternate POL Facilities
11 Support Facilities
12 Major Rehabilitation
13 Fueling Facility Temporary Deactivation
14 Fueling Facility Closure

APPENDICES
A References
B Manual Surge Calculations For Simple Piping Systems
C Charter Of DoD Fuels Facility Engineering Panel
D Glossary
E Plates
UFC 3-460-03: Maintenance of Fuel Facilities

- Currently Under Development
- Will Replace The Current UFC 3-460-03F
- Will Replace The Current MO-230
- Will Be Tri-service

- Anticipate Publishing in December 2015
UFC 3-460-03 (cont.)

- Will Follow The Outline Of UFC 3-460-01
  - For example – Chapter 3 will cover the maintenance requirements for bulk storage facilities.
- Will Provide Additional/Consistent Guidance For Cleaning & Inspecting Fuel Storage Tanks
- Will Provide Pipeline Pressure Testing Guidance (Following The Pipeline Integrity Management System Procedures)
UFC 3-460-03 (cont.)

- Will Provide Appendix With List Of Equipment & Maintenance Schedule
- Will Include Facility Plates Detailing Equipment
- Will Include List Of Inspection Items In Addition To API 653 & STI SP001 lists.
Pipeline Pressure Testing Guidelines

- Finalized in December 2013
- Approved By FFEP - June 2014
- Will Be Incorporated Into UFC 3-460-03?
- Provides Guidelines For Pressure & Frequency For Integrity Testing
- Not To Be Used For New Construction
- Not Published But Available If Requested
AST Standard Design

- Vertical Steel Tanks in JP-5 or JP-8/F-24 Service
  - Can be used for other products
- For >5K, <100K BBL Vertical ASTs
- Fixed Roof, Floating Pan
  - Considerations given for tanks w/o pans

- For New Construction, But Can Be Used For Renovations
- Elevated And Non-elevated Foundations
  - Areas with/without high water tables
- Requires Design In Accordance With API 650
- For CONUS And OCONUS
History & Current Status

- Original Design in mid 80’s

- Update in Feb 1993
  - Shop drawing detailed
  - Only included Tank, not site layout

- Last Update Published in 2012
  - Rely more on API 650, prescribe government preferences

- Current Update 2015
  - Includes piping/dike details

- Will Post to USACOE Std Dsn website
AST Standard Design

- Useable volumes clarified

- High/low level control & shutoff logic

- Roof structure, compression ring
  - Single column for diameters $126\;\text{ft} > D > 91\;\text{ft}$
  - No columns for diameters $< 91\;\text{ft}$

- Three UFGS Specifications

- UFC 3-460-01 was updated to resolve conflicts.
Pressurized Hydrant Fueling System (Type III)

- AW 078-24-28
- Published In July 2010
- It is comprised of two operating storage tanks, a pump house, a hydrant loop, and hydrants at each parking position.
- Any Number Of Aircraft Parked Along The Fueling Loop Can Receive Fuel Simultaneously Up To The Flow Capacity Of The System.
- Aircraft Can Be Defueled While Others Are Refueling.
Type III Hydrant Fueling System
Pressurized Hydrant Direct Fueling System (Type IV & V)

- AW 078-24-29
- Published July 2010
- Used To Fuel Aircraft With Engines Or Support Equipment Running.
- Installed Where The Mission Dictates A Continuing Need For Rapid Turnaround Without Shutting Engines Down And Are Located To Permit Quick Return To The Runway.
- Type V Systems Are For In-shelter Fueling.
Type IV Hydrant Fueling System
Type V Hydrant Fueling System
Aircraft Fueling System with Underground Vertical Storage Tanks (Cut and Cover)

- AW 078-24-33
- Published in July 2010
- Cut and Cover storage tanks are steel-lined reinforced concrete with leak monitoring capability.
- They are not used within CONUS except when tanks are required to be constructed within the explosive cordon area.
- They are to be used in OCONUS Pacific in high threat areas or when tanks are required to be constructed within the explosive cordon area or clear zone.
Cut and Cover Tank
Cut and Cover Tank Farm
USAFE/NATO Standard Design

- Similar to the Type III system
- Includes Cut & Cover Tanks
- Incorporates European Codes (UL vs CENELEC (ATEX))
- Updates Standard Specifications (STS)
- Digitizes 1987 version
- Anticipate Publishing in Dec 2015
Military Service Stations

- **Phase I (completed)**
  - Conduct an industry wide review of best practices
  - Review, list and summarize all related DoD and government requirements

- **Phase II (completed)**
  - Conduct life cycle cost (LCC) analysis
  - Develop a decision matrix

- **Phase III**
  - System layout (65% design) drawings and specifications for recommended tank configurations including alternate options

- **Phase IV**
  - System layout (FINAL design) drawings and specifications for recommended tank configurations including alternate options
Military Service Stations
Rotary Wing Hydrant System

- Small Type III system
- Primarily for Rotary Wings
- Remote Locations

- Planning Phase
Fuel Laboratory

- Initiative Based On Recent Work At POL Labs In New Cumberland, Wainwright And Cabana.

- Design Goals:
  - Conceptual level of design for application across all Services
  - Provide consistent interpretation of relevant codes and criteria
  - Controlling factors of Fuels laboratories
    - Volume (storage, throughput)
    - Product (handling and disposal requirements)
    - Functionality (type of tests performed)

- UFC Format

- Completion - TBD
Fuel Laboratory
Current Coating Systems

****NEW*** SECTION 09 97 13.15 LOW VOC POLYSULFIDE INTERIOR COATING OF WELDED STEEL PETROLEUM FUEL TANKS

- Modified epoxy novolac polysulfide coating
- The first and finish coat materials are identical except that the coats shall be in contrasting colors to allow identification
- Note that the qualification testing requires immersion testing for six months
- Published February 2015

SECTION 09 97 13.27 EXTERIOR COATING OF STEEL STRUCTURES

- 2 - Epoxy coats 350 g/l 2.8 lbs/gal max. VOC
- 1 - Polyurethane Topcoat 350 g/l 2.8 lbs/gal max. VOC
Coating Systems (cont.)

- **PLANNED COATING SYSTEM**
  - **EXTERIOR COATING:**
    - 1 - zinc rich coating
    - 1 - inorganic topcoat

- **Coating Specification that will be CANCELLED ASAP:**
  - **SECTION 09 97 13.17 THREE COAT EPOXY INTERIOR COATING OF WELDED STEEL PETROLEUM FUEL TANKS**
    - 3 - Epoxy Coats 350 g/l 2.8 lbs/gal max. VOC

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<td>UFGS 01 33 23.33 Aviation Fuel System Submittal Requirements</td>
<td>Feb-2010</td>
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<td>UFGS 32 13 15.20 Concrete Pavement for Containment Dikes</td>
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<td>UFGS 33 52 43 Aviation Fuel Distribution (Non-Hydrant)</td>
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<td>UFGS 33 08 55 Commissioning of Fuel Facility Systems</td>
<td>Jul-2007</td>
<td>UFGS 33 52 90.00 20 Welding for POL Service Piping</td>
<td>Feb-2010</td>
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<td>UFGS 33 09 53 Aviation Fuel Pump Control and Annunciation System</td>
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<td>UFGS 33 56 10 Factory-Fabricated Fuel Storage Tanks</td>
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<td>UFGS 33 09 54 Aviation Fuel Pump Control and Annunciation System (Type [IV][V])</td>
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<td>UFGS 33 09 55 Aviation Fuel Pump Control and Annunciation System (Cut-N-Cover Tanks)</td>
<td>Feb-2010</td>
<td>UFGS 33 56 13.15 Undertank Interstitial Space</td>
<td>May-2012</td>
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<td>UFGS 33 52 10 Service Piping, Fuel Systems</td>
<td>Apr-2008</td>
<td>UFGS 33 56 63 Fuel Impermeable Liner System</td>
<td>Apr-2006</td>
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<td>UFGS 33 52 43.11 Aviation Fuel Mechanical Equipment</td>
<td>Feb-2010</td>
<td>UFGS 33 57 00 Bulk Fuel Receiving / Dispensing Equipment</td>
<td>Aug-2011</td>
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<td>UFGS 33 52 43.12 Aviation Fuel Pantograph</td>
<td>Feb-2010</td>
<td>UFGS 33 58 00 Leak Detection for Fueling Systems</td>
<td>Apr-2008</td>
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<td>UFGS 33 52 43.13 Aviation Fuel Piping</td>
<td>Feb-2010</td>
<td>UFGS 33 59 00 Tightness of Existing Underground Fuel Systems</td>
<td>Apr-2007</td>
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<td>UFGS 33 52 43.14 Aviation Fuel Control Valves</td>
<td>Feb-2010</td>
<td>UFGS 33 65 00 Cleaning Petroleum Storage Tanks</td>
<td>Aug-2011</td>
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<td>Feb-2010</td>
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DoD Fuel Facilities Specifications

- FFEP is planning to Revisit Specifications that are older than 5 years old in FY16.
Criteria Libraries

- UFCs and Specifications (UFGSs) available at: The Whole Building Design Guide
  http://www.wbdg.org

- Standard Designs available at:
  http://www.hnd.usace.army.mil/stddgn/
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7/12/2017