

# **NRC / NEI / UTILITY MTG 6/11/14**

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## **4" & 6" RD/CH Drain Piping Inspection at the Palo Verde Nuclear Generating Station**

### **Utilizing Quest's HYDRA™ Intelligent Pigging Technology**

**- Dan Wittas -**



# WHY IN-LINE INSPECTION?

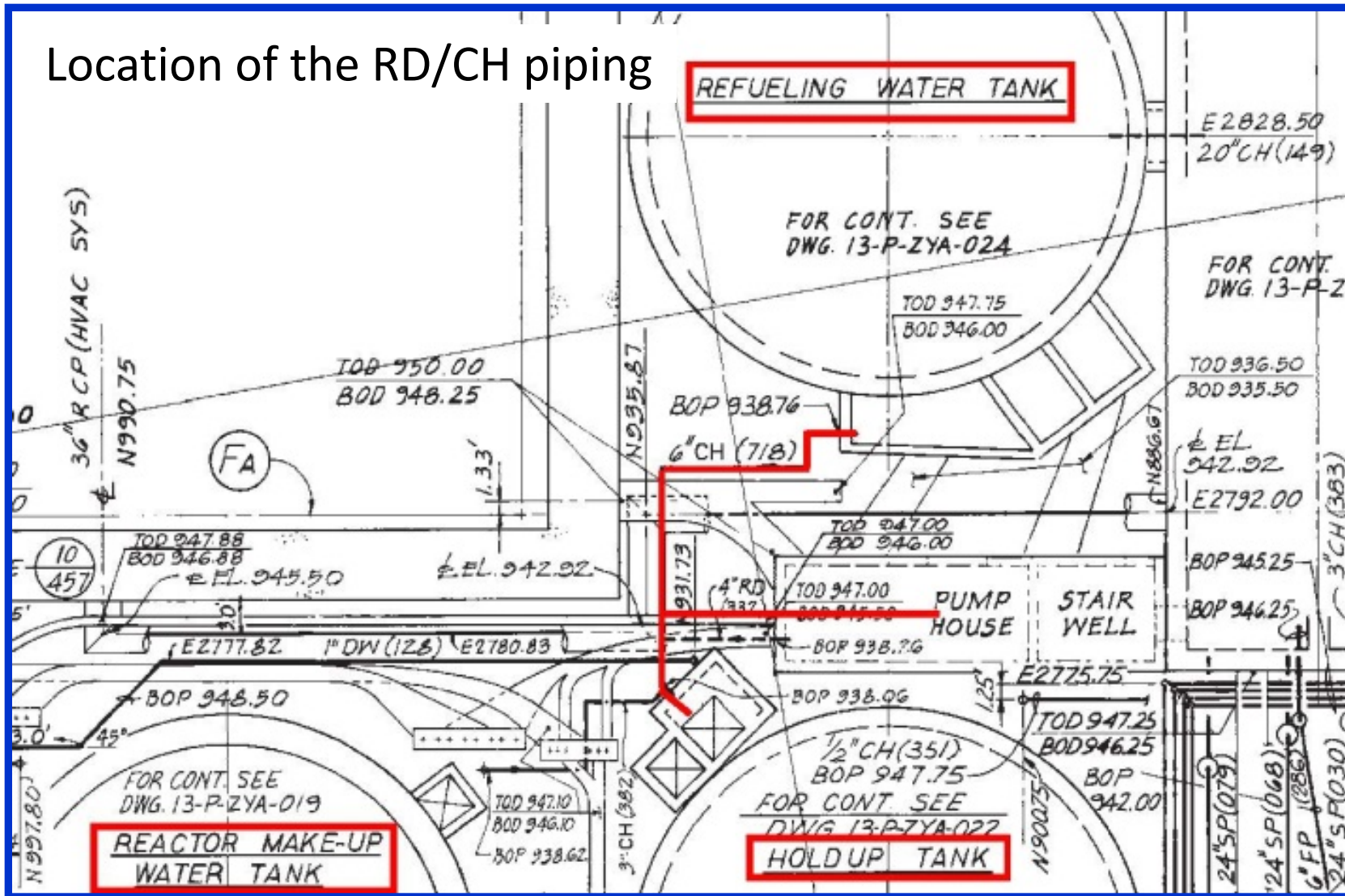
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- Consequence of a leak on these drain lines
- Location of the piping
  - Between 3 large tanks
  - Under other utilities
- Relatively accessible for deployment and retrieval inside the lines



# WHY IN-LINE INSPECTION?

Location of the RD/CH piping



# WHY IN-LINE INSPECTION?

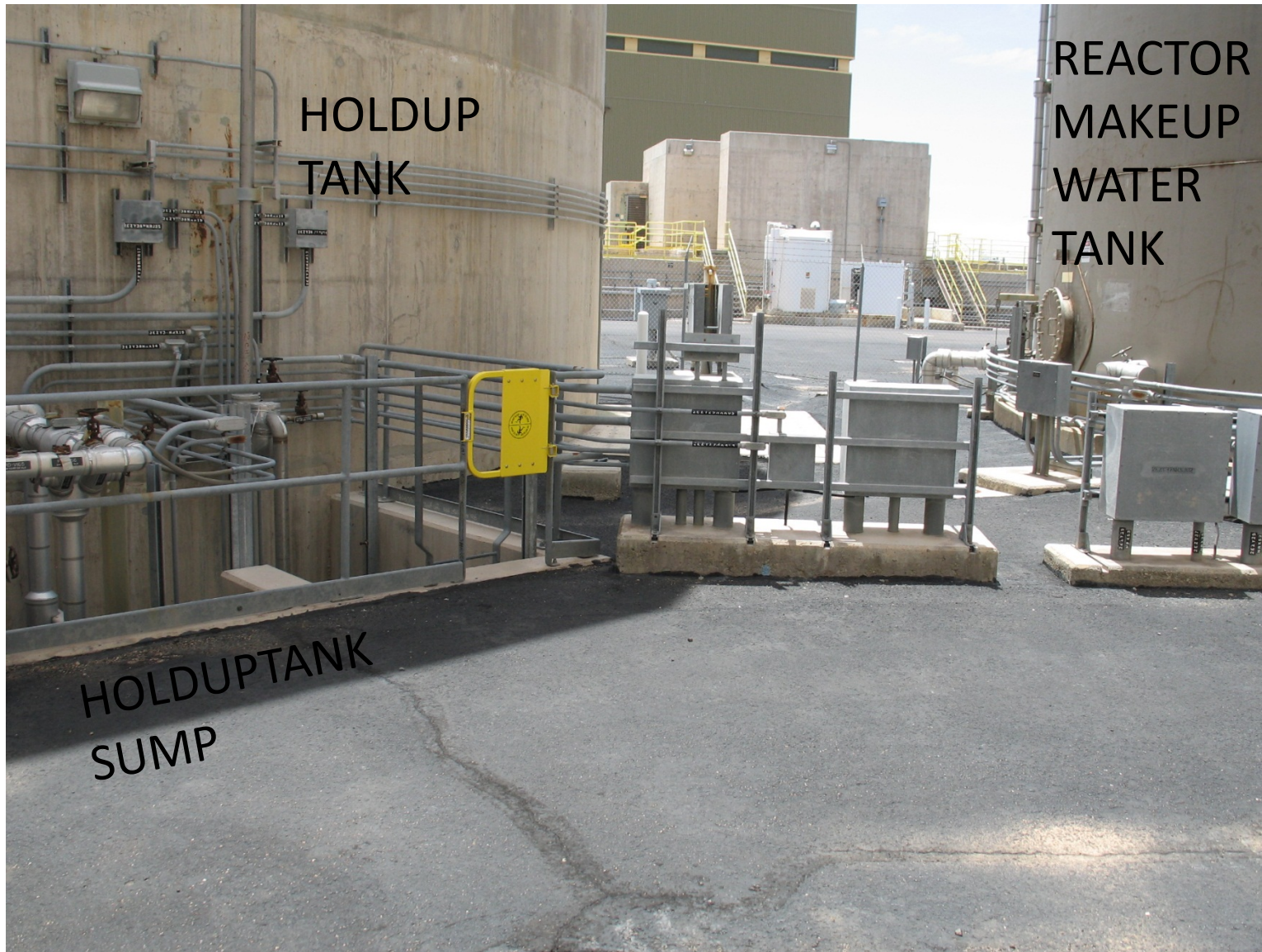


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# WHY IN-LINE INSPECTION?

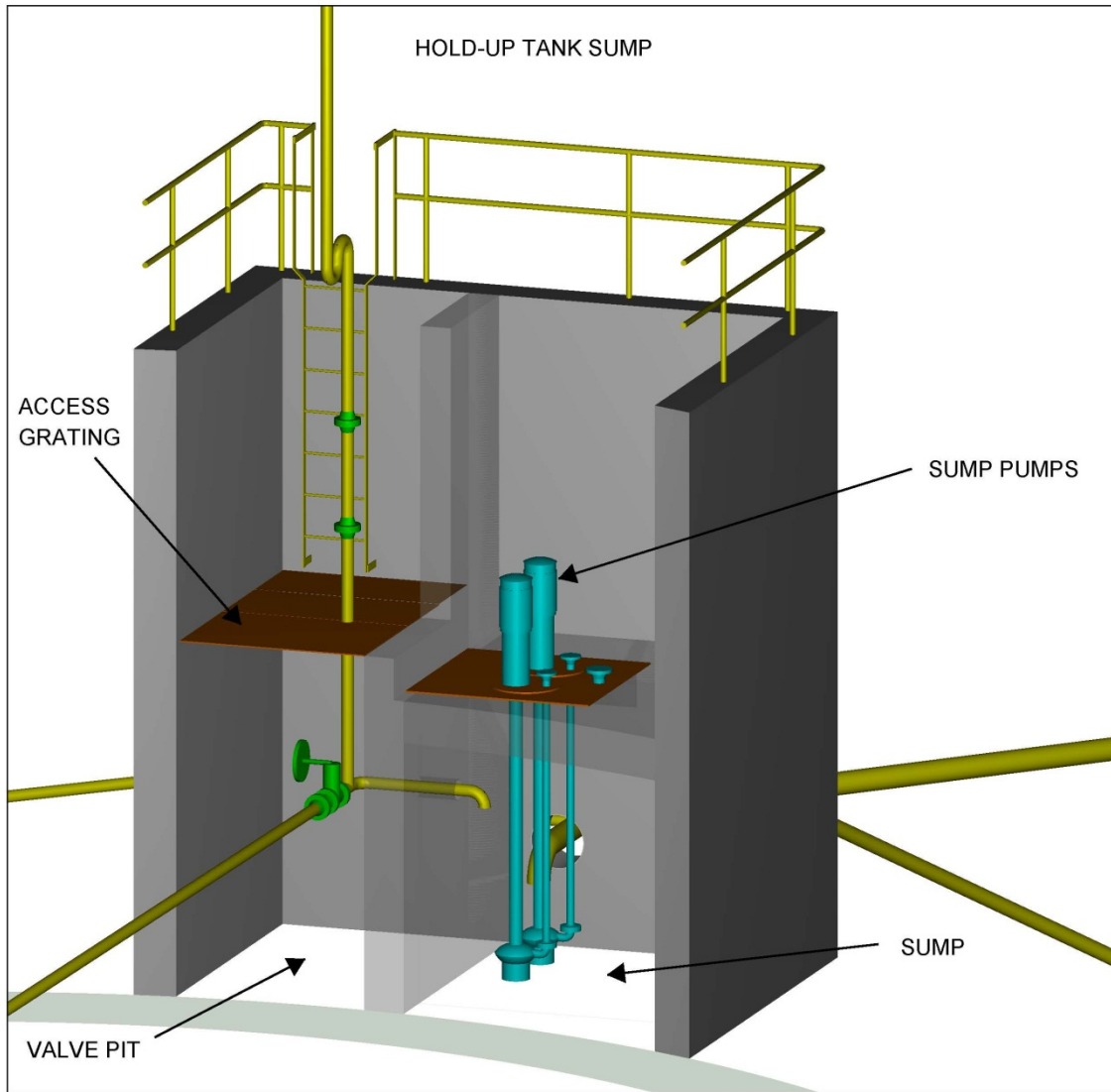


# WHY IN-LINE INSPECTION?



HOLDUPTANK SUMP

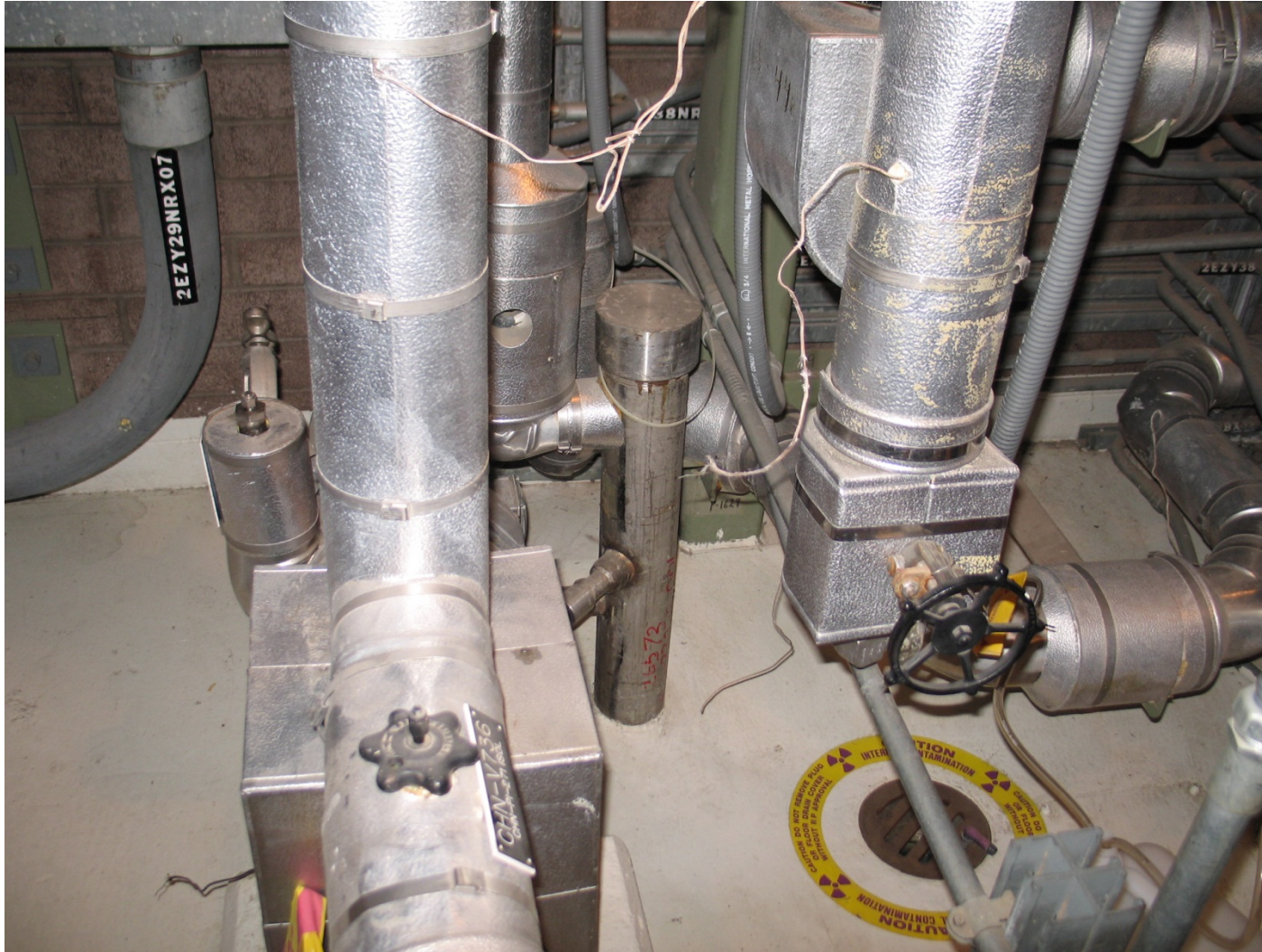
# WHY IN-LINE INSPECTION?



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# WHY IN-LINE INSPECTION?



RD LINES 4" THREADED CAP AND FLOOR DRAIN



# IN-LINE INSPECTION PLAN

- Build a team – BP Engr / Ops / Proj Mgr / ISI / RP / Work Planner
- Select vendor and technology
  - Site visits to 2 potential vendors
  - Consideration of NDE technology, FME, equipment decontamination
  - Quest's HYDRA™ Intelligent Pigging Ultrasonic Technology was selected



# IN-LINE INSPECTION PLAN

- Full scale mockup for deployment, retrieval and blind flaw detection capability
  - The inspection tool could be deployed and retrieved, thru 90s and a tee.
  - The Quest Hydra™ UT inspection tool detected 26 of 34 flaws. All 8 undetected flaws were below the published detection threshold. 10 flaws below the threshold were detected, including 2 - 1/8" diameter flaws.

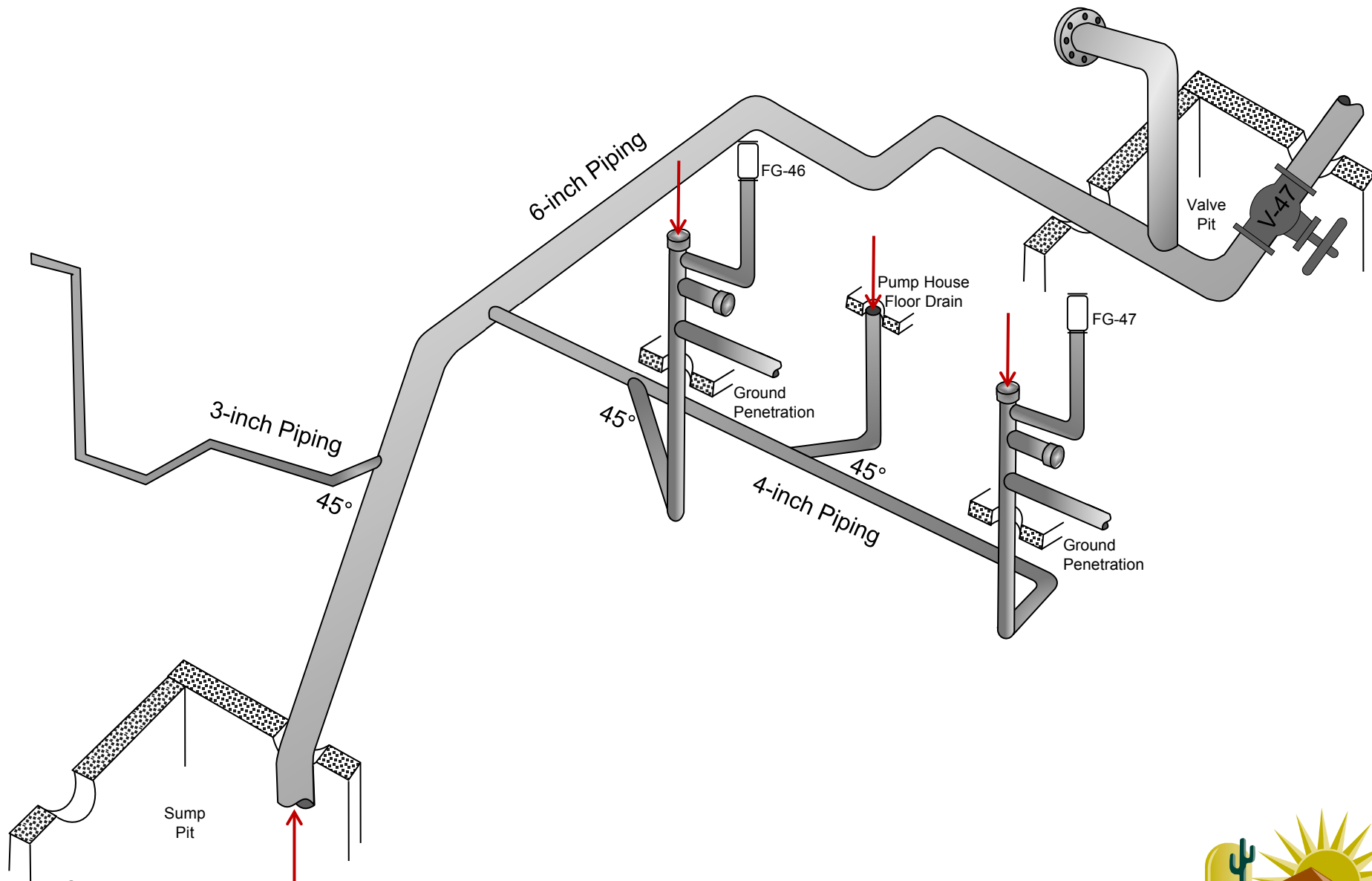


# IN-LINE INSPECTION PLAN

- Contingencies / Lessons Learned –
  - Design engineering T-min acceptance criteria
  - Sump pumps need to be removed for access
  - 2 Launchers
  - Backup water pump & inspection pig
  - Pre-req for hot water flush to dilute boric acid
  - Leak test ILL piping and use catch basins



# IN-LINE INSPECTION PLAN



# IN-LINE INSPECTION PLAN



FULL SCALE MOCK-UP W/ 32 FLAWS PRIOR TO BURIAL

# IN-LINE INSPECTION PLAN

- Work and inspection instructions, with
  - Initial conditions, such as, remove sump pumps, remove 90° elbow in sump, disconnect tank overflow pipes, cap HUT pump skid and floor drains
  - Connection of ILI equip, pump, launcher, pipe and valves
  - Operate the ILI, evaluate the results and restore systems

