We ALARA Results in Excellence Robinson

DUKE ENERGY® PROGRESS

ALARA Aspects of DSC Campaign at Robinson

2015 NORTH AMERICAN ISOE ALARA SYMPOSIUM - REGIONAL RPM MEETING

JANUARY 12-16, 2015

Steve Hall, Supv. Nuclear Station Sciences

ALARA Aspects of DSC at Robinson

- Some Firsts and Improved ALARA Methods
- Results – Doses per Task and Cask
- Lessons Learned
- Good Practices
- Future Improvements
- Questions

DUKE ENERGY® PROGRESS

ALARA Aspects of DSC at Robinson
- Some Firsts at Robinson -

- Use of NeverWet® to decrease **TIME**
- Moving shipping spacers to increase **DISTANCE**
- Use of moveable gamma & neutron **SHIELDING**
- **REMOTE ACCESS CONTROL** to HRA

Resulted in…

- **RECORD LOW COLLECTIVE DOSE** at Robinson

DUKE ENERGY® PROGRESS

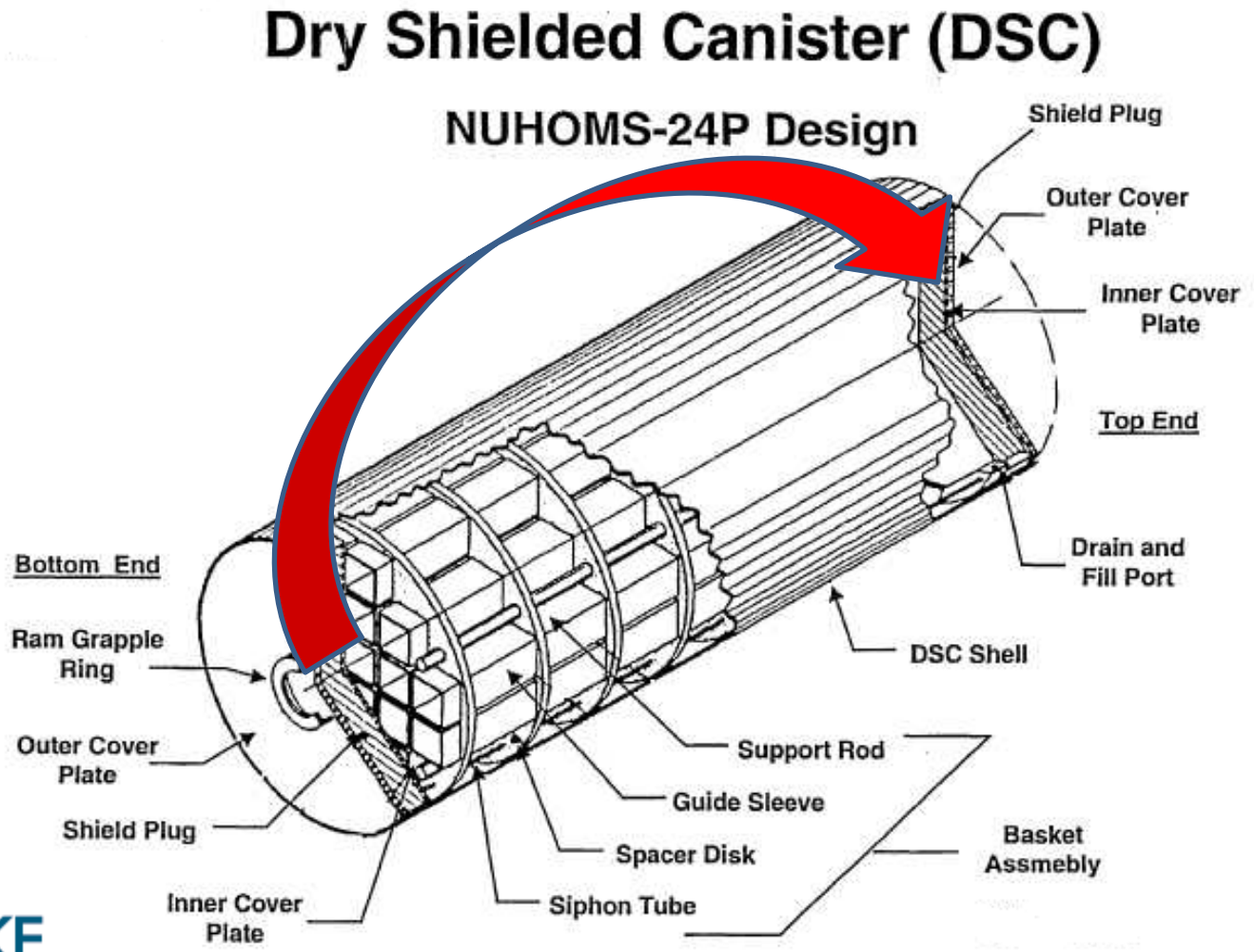
Testing and Approval for Use of NeverWet®

DUKE ENERGY® PROGRESS

DUKE ENERGY® PROGRESS

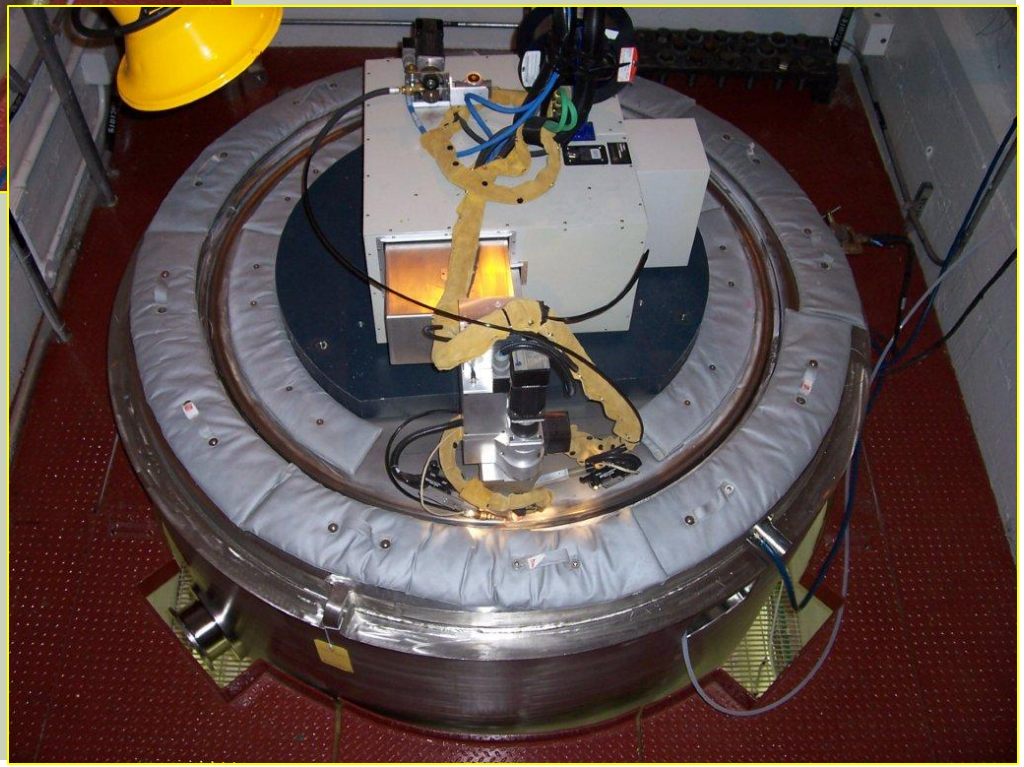
Use of NeverWet® Reduced Decon Time Saving an Estimated 30 mREM/cask

Moving Shipping Spacers to Top of Fuel Saved an Estimated 40 mREM/cask

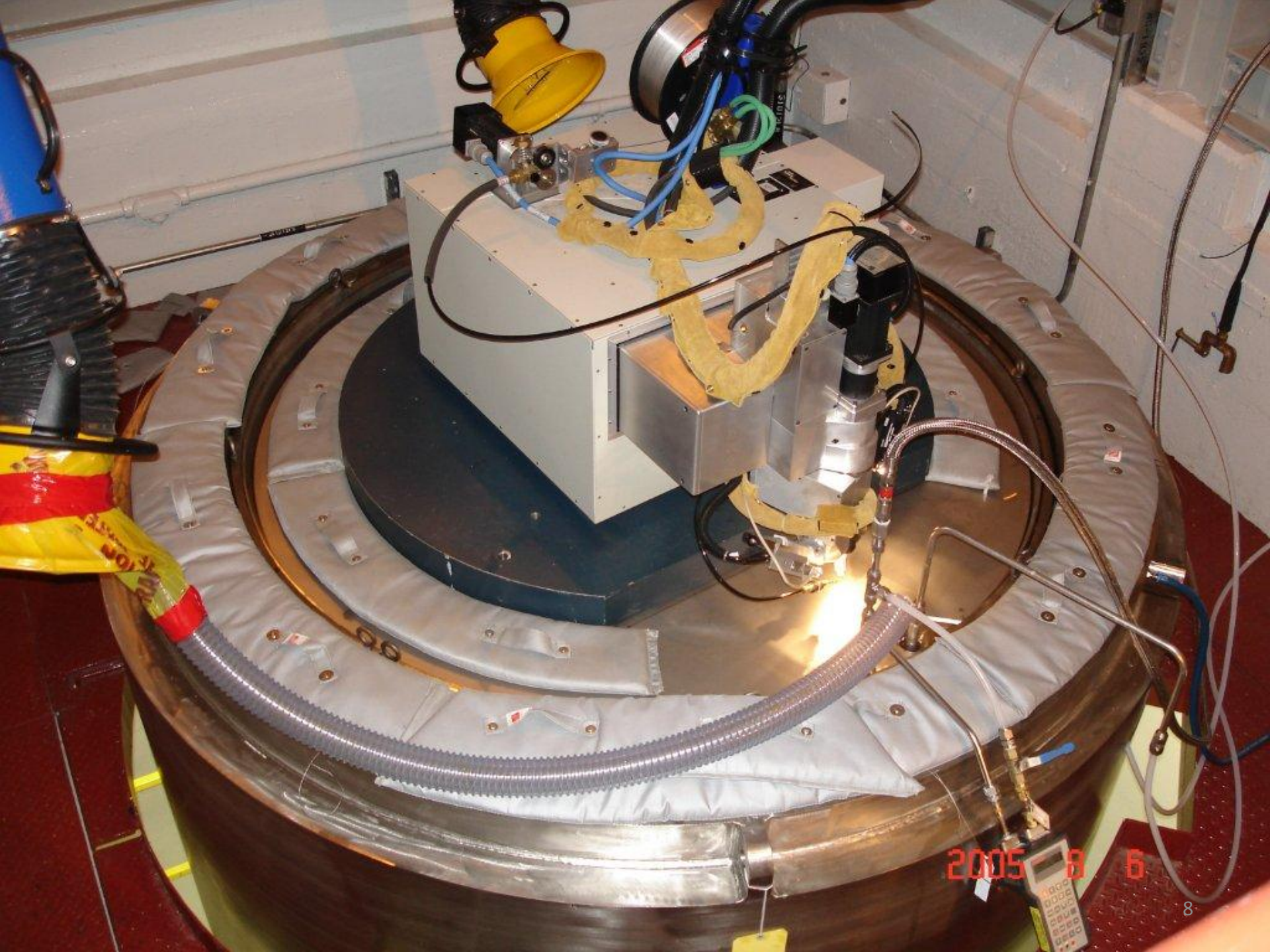


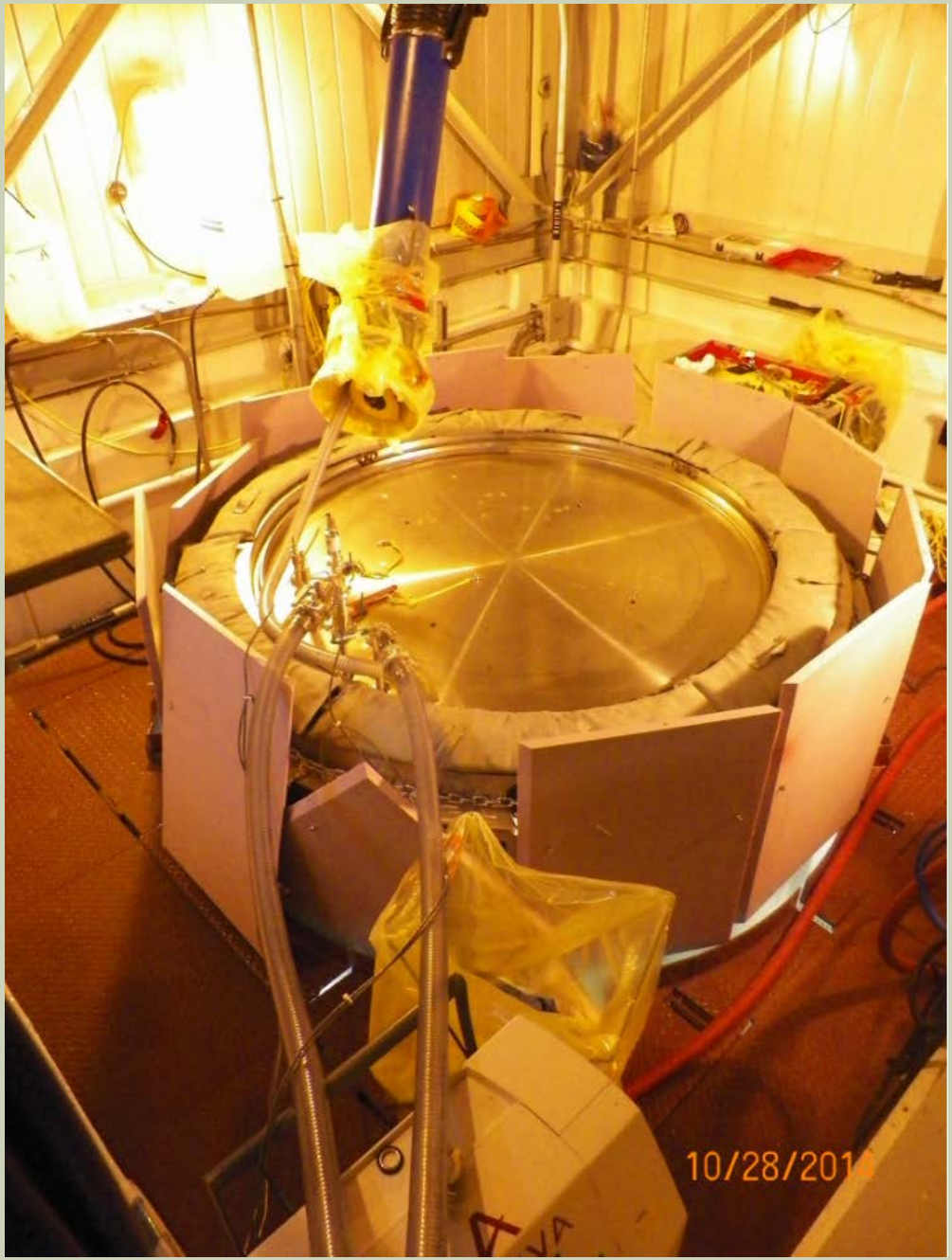
DUKE ENERGY® PROGRESS

Moveable Lead Shielding to Reduce Gamma Exposure



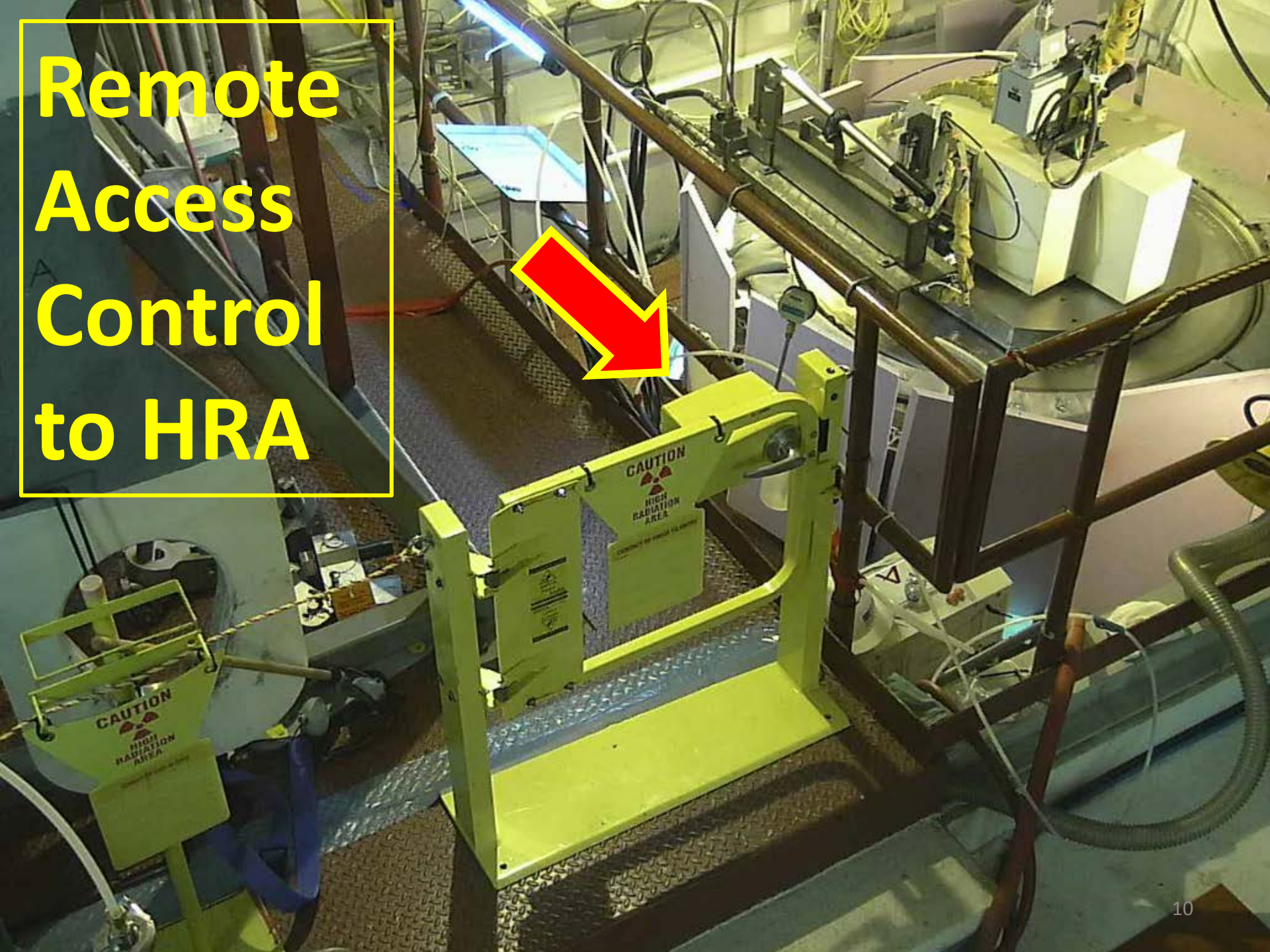
DUKE ENERGY®
PROGRESS

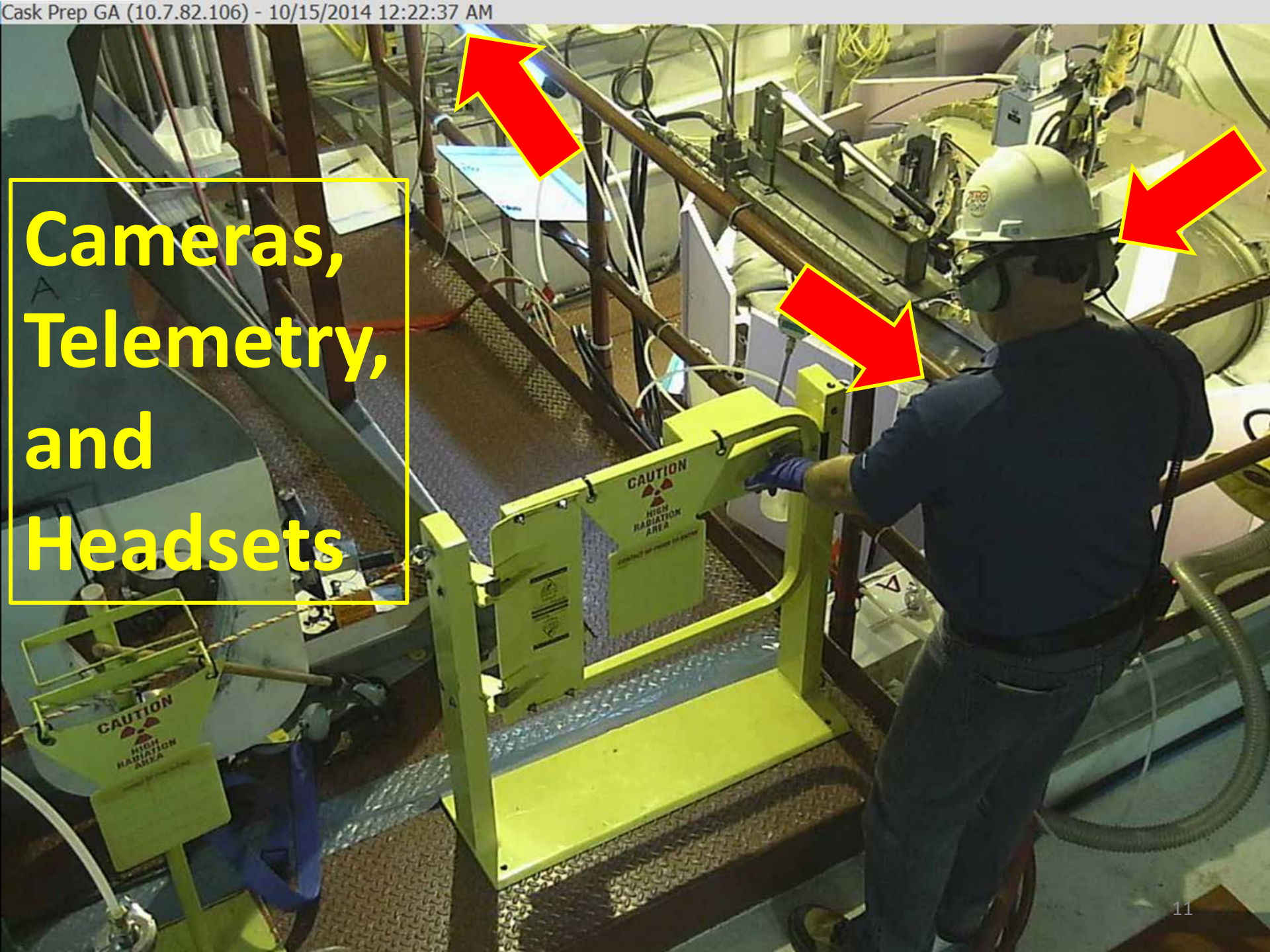

2005 8 6



Borated Poly Shielding to Reduce Neutron Exposure

DUKE ENERGY® PROGRESS


Remote Access Control to HRA
CAUTION
HIGH RADIATION AREA
CAUTION
HIGH RADIATION AREA


Cask Prep GA (10.7.82.106) - 10/15/2014 12:22:37 AM
Cameras, Telemetry, and Headsets
CAUTION
HIGH RADIATION AREA
CAUTION
HIGH RADIATION AREA

Remotely Operated HRA Swing Gate

Remote HRA Swing Gate.mp4

Task #	Work Order Description	HSM-23	HSM-25	HSM-24	HSM-26
1	Prepare And Place Cask In SFP	0	0	0	0
2	Load Fuel into DSC	0	1	0	0
3	Survey and Decon of Cask	40	57	26	43
4	Install Shield Plug, Attach Yoke, Drain and Transfer Out of Pool into CPA	15	5	3	5
5	Receive Cask in CPA, Remove Lid Retention System, Remove Annulus Seal, Install Shielding, Install Shield Bell, and Begin Drain of Canister	11	5	11	11
6	Complete Canister Draining, Prep and Weld Inner Cover Plate	12	3	6	5
7	QC Inner Cover, Port Welds, & Outer Cover	7	3	4	7
8	Drain, Vacuum Dry, Helium fill, and Leak Check	8	5	7	7
9	Weld Vent and Siphon Ports	2	1	4	0
10	Install/Prep/Weld outer cover	7	3	2	5
11	Remove Annulus Shielding, Install Cask Lid and Bolts, Remove Shield Bell, Drain Annulus, Place Cask on Trailer Cask, Install Forced Air System	21	26	19	12
12	Remove/Install HSM Door, Transport TC to ISFSI, Align Cask and Insert DSC, Return TC to Crane Bay	77	59	93	64
13	Activities to Support Inserting Seismic Restraint	5	11	2	2
Totals		205	179	177	161
DSC kW		25.4	26.0	26.7	26.7

PREVIOUS DFS CAMPAIGN

	HSM-17	HSM-18	HSM-19	HSM-20	HSM-21	HSM-22
Totals	288	218	247	275	209	195
DSC kW	24.7	25.7	28.7	29.3	31.6	34

DUKE ENERGY PROGRESS

Lessons Learned

- Crowd control during transport and insertion of first cask
- Sheared bolt on transport skid during loading of 3rd cask (additional 20 mREM)
- Pump down of DSCs (delay and additional 4 mREM)
- Transfer trailer parked too close to crane concrete support base – 4 mREM spent in realignment
- Rigging box at ISFSI in 5 mREM/h field relocated
- HRA boundary should not be set up to far in advance of downending

DUKE ENERGY® PROGRESS

Lessons Learned

- Do not place cask top cover on trailer until DSC is inside HSM. Dose received installing lid next to DSC.
- Lead shielding on ISFSI pad needs to be set up prior to TC entry
- Put borated poly shielding up as soon as bell is installed for dose savings (see Future Improvements)
- Decon cask before cask is drained
- Skid pad for lifting spacers and items to and from SFP and CPA

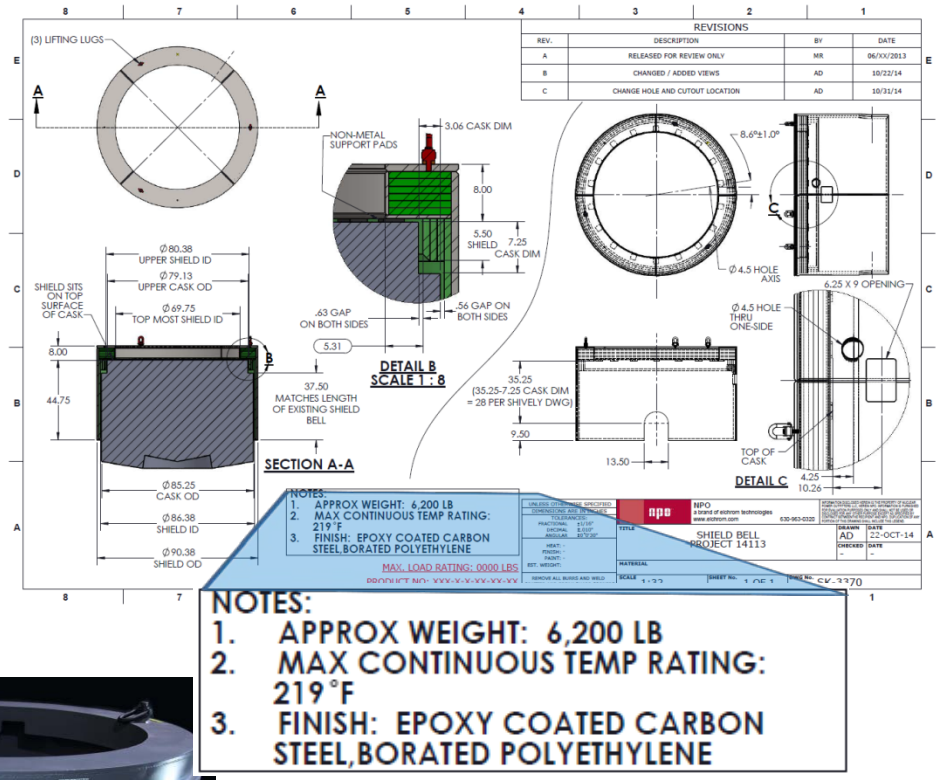
DUKE ENERGY® PROGRESS

Good Practices

- No PCEs
- Spacers placed on top of assemblies (vs. bottom) increased distance from source term to workers saving approximately 40 mREM/cask
- First-time use of NeverWet® on cask, decreased decon time saving approximately 30 mREM/cask
- In-progress reviews performed after each cask was loaded in HSM and post-job at the conclusion of the campaign
- **Experienced** DFS crew to perform work

Future Improvements

- Shield Bell – neutron and gamma
- Guide pins for ISFSI HSM Doors for quicker alignment
- Sprinkler system in cask prep area to facilitate decon
- Mobile low dose waiting area sign with green flashing light
- ED marquee for upper CPA and ISFSI pad
- Trailer mounted shielding
- Modify wings and flaps in upper cask area and second level to allow easy passage for cask trunnions



Questions

DUKE ENERGY® PROGRESS