**BEFORE THE PUBLIC SERVICE COMMISSION OF THE STATE OF MISSOURI**

SUMMARY OF MEETING

COMES NOW Union Electric Company d/b/a Ameren Missouri (Ameren Missouri or Company) and for its Summary of Meeting states as follows:

On October 23, 2014, at 11:30 a.m., a tour of the Callaway Energy Center was held.

Ameren Missouri Personnel Attending: President and CEO Michael Moehn, Vice President Nuclear Operations David Neterer, Sr. Director Operations Luke Graessle, Sr. Director Executive Projects Stephanie Banker, Strategic Communications Advisor Anne Roselius, Legislative Representative Rick Eastman and Manager Regulatory Affairs Gaye Suggett.

MPSC Personnel Attending: Chairman Robert Kenney, Commissioner Daniel Hall, Commissioner Scott Rupp, Goldie Tompkins, Amy Moore and Rachel Hassani, Katie Struemph, and Heather Arens.

Office of the Public Counsel Personnel Attending: Acting Public Counsel Dustin Allison.

Respectfully Submitted,

*/s/ Wendy K. Tatro*
**Wendy K. Tatro**, #60261
Director and Assistant General Counsel
1901 Chouteau Avenue, MC 1310
P.O. Box 66149
St. Louis, MO 63166-6149
(314) 554-3484 (phone)
(314) 554-4014 (facsimile)
amerenmoservice@ameren.com

**ATTORNEYS FOR UNION ELECTRIC COMPANY d/b/a AMEREN MISSOURI**

**CERTIFICATE OF SERVICE**

The undersigned certifies that a true and correct copy of the foregoing document was sent by electronic transmission, facsimile, U.S. Mail or e-mail to all parties of record in all of its contested cases pending before the Missouri Public Service Commission on this 28th day of October, 2014.

*/s/ Wendy K. Tatro*
Wendy K. Tatro

# *An Overview of Ameren Missouri's Callaway Energy Center and Nuclear Power*

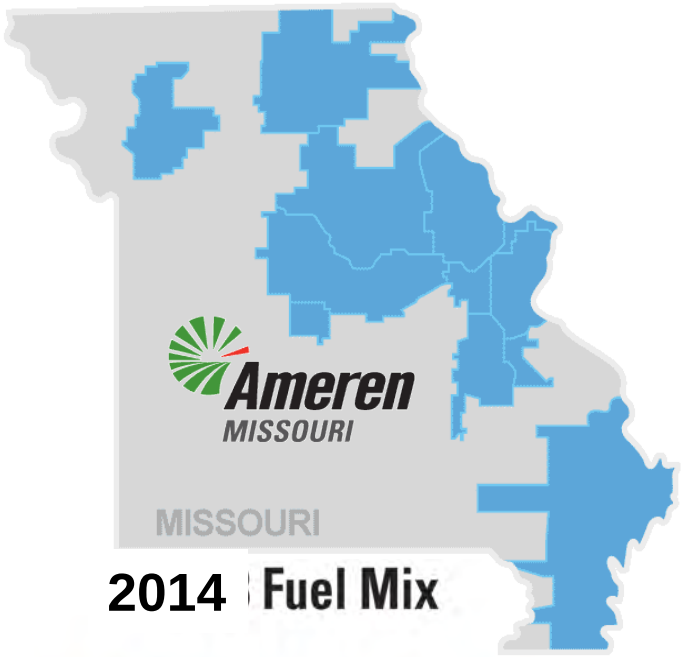
2014

Ameren MISSOURI

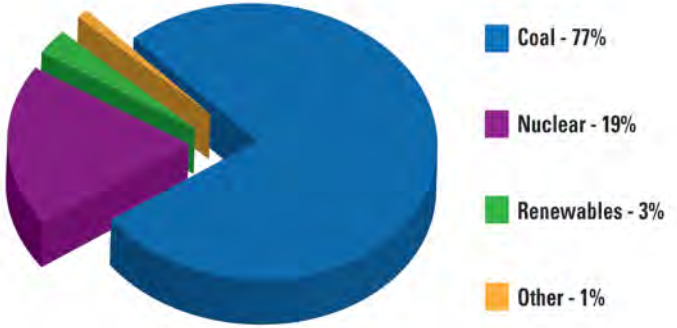
# Powering Missouri

## Integrated Electric & Gas Utility

- **77% of generation from coal in 2013**
- 1.2M electric customers (3M people)
- 127,000 natural gas customers
- 24,000 square miles of service territory
  - 2,900 miles of electric transmission lines
  - 33,000 miles of electric distribution lines
- 10,500MW of generation
- Serve more than 63 counties and more than 500 communities
- ~4000 employees




**2014 Fuel Mix**

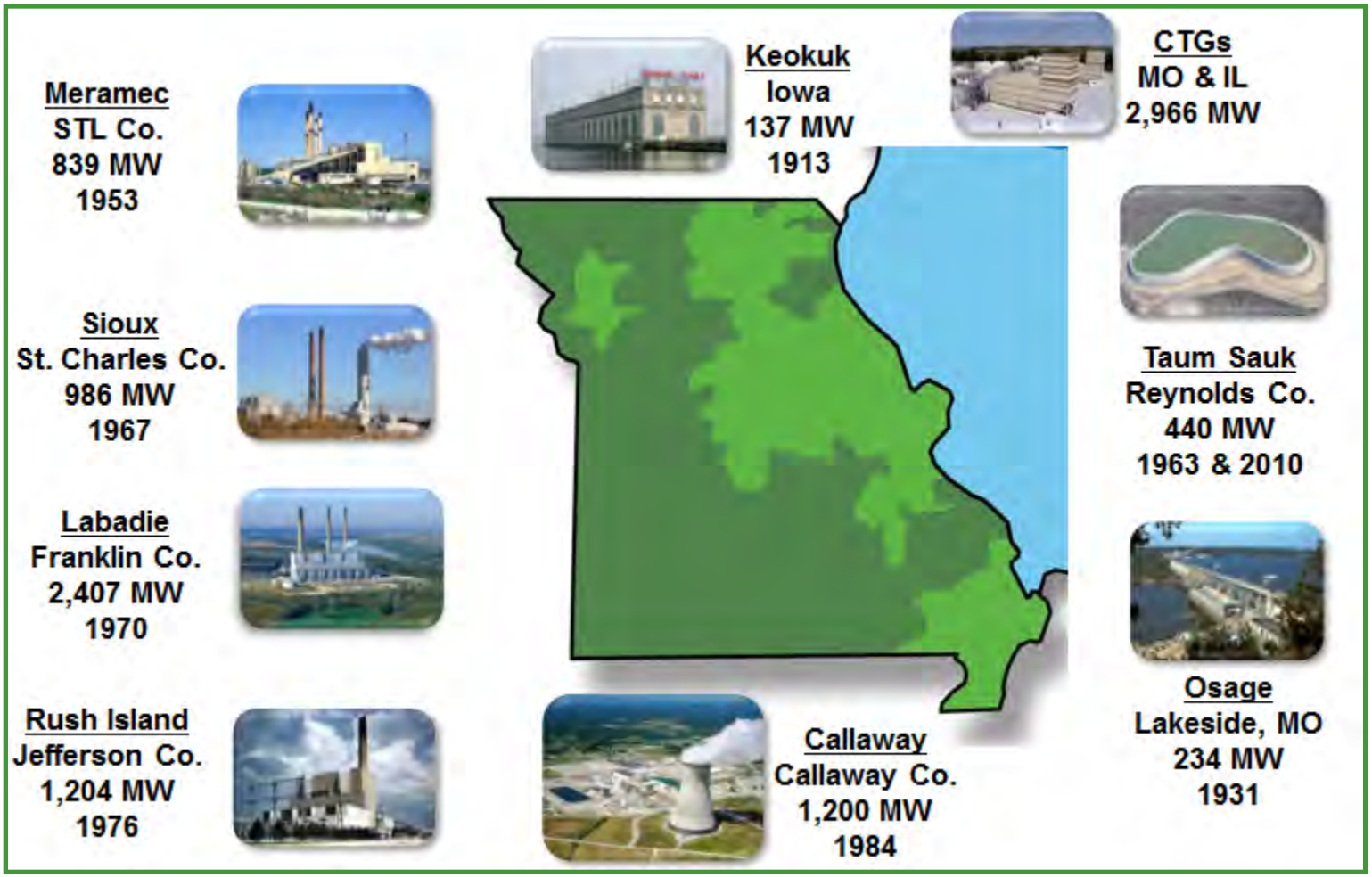



Other Generation sources include:
- Natural Gas
- Methane Gas



Ameren MISSOURI

# AMEREN MISSOURI GENERATION…OVER 10,000 MW




## Recent Additions

**Landfill Gas Energy**
**15 MW**

**Wind Energy**
**102 MW**

**Solar Energy**
**6 MW (12/14)**

Ameren Missouri has also implemented the largest Energy Efficiency Program in our state's history; investing more than $150 million. Customers are saving energy and reducing demand.



Ameren MISSOURI

# NUCLEAR ENERGY 101

## and AMEREN MISSOURI'S CALLAWAY ENERGY CENTER

# QUESTION:

## How many nuclear plants are operating in the United States?

A) 17

B) 39

C) 100

D) 565



Ameren MISSOURI

# QUESTION:

**Nuclear power provides what percentage of electricity in the United States?**

A) 5 percent

B) 20 percent

C) 46 percent

D) 63 percent



Ameren MISSOURI

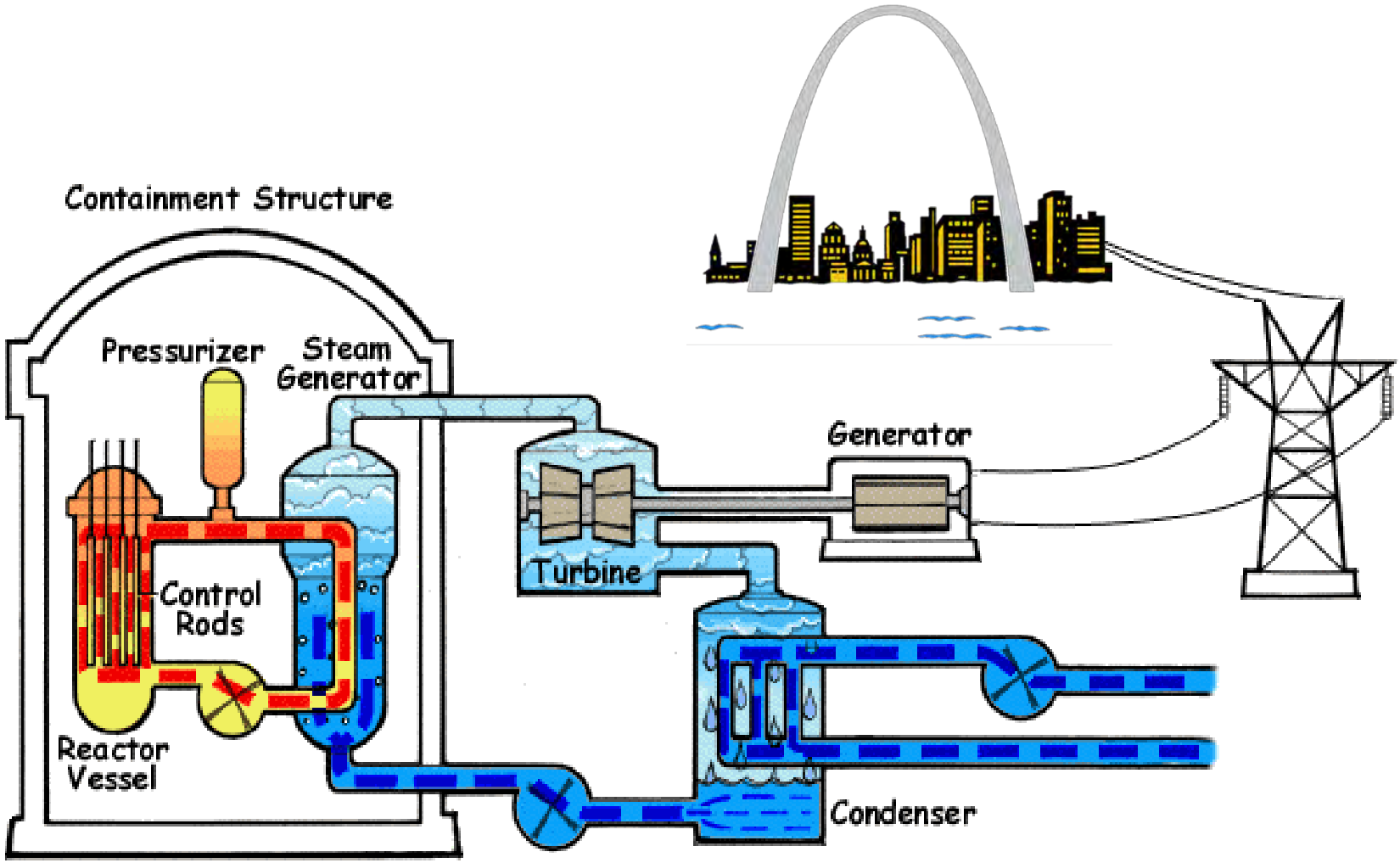
# UNITED STATES

- Largest producer of nuclear energy in the world
- Nuclear energy provides 20% of U.S. electricity
- A 1,200 megawatt reactor like Callaway powers 700,000 average households each year
- Oldest operating plant is located in Oyster Creek, N.J. (1969)

**100 reactors in 31 states**

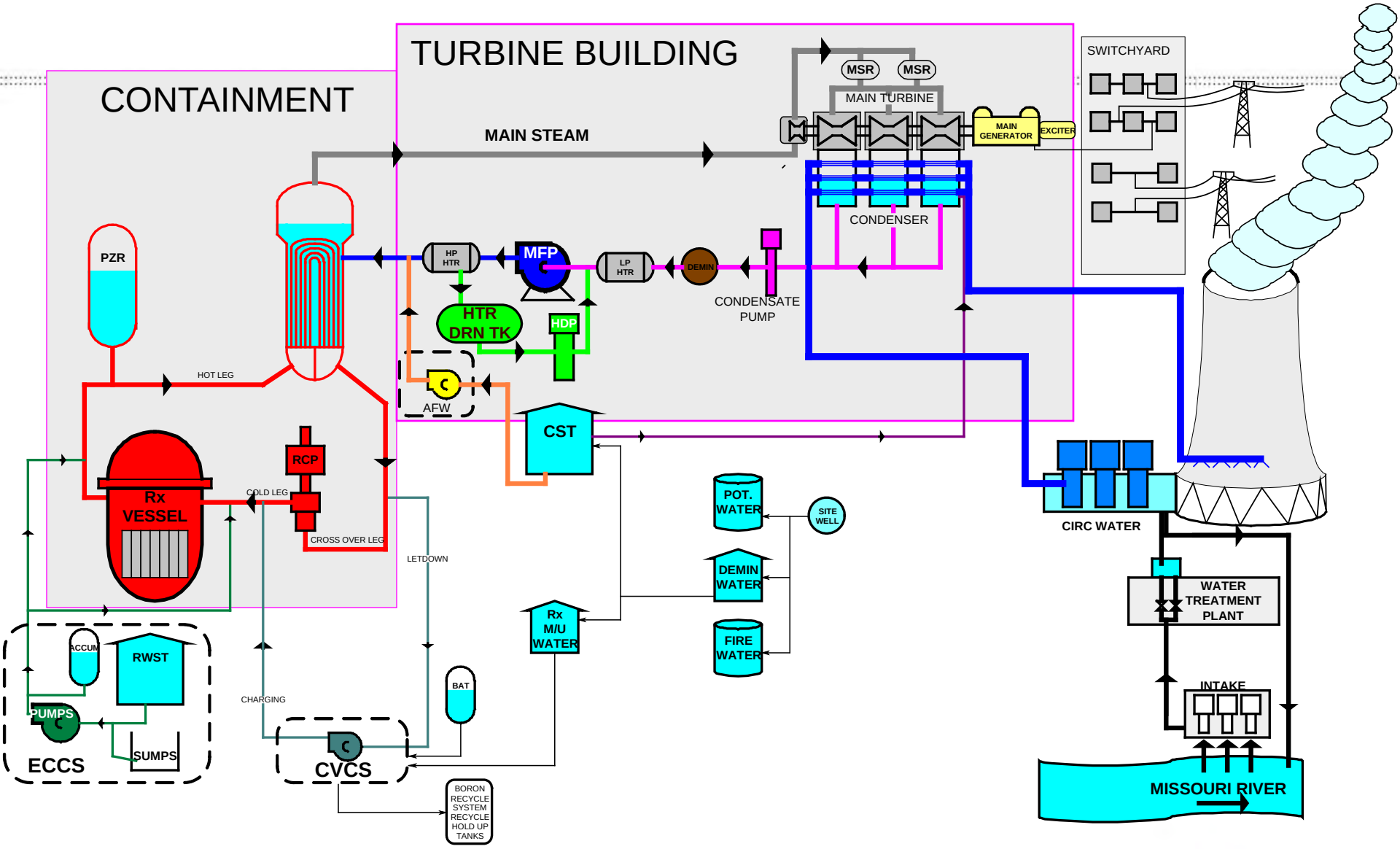
Ameren MISSOURI

# HOW DOES NUCLEAR ENERGY WORK?






Ameren MISSOURI




## CALLAWAY SIMPLIFIED SYSTEMS DIAGRAM



Ameren MISSOURI

# CALLAWAY ENERGY CENTER – REFUEL 20

- Refueling and maintenance outage in-progress

- Outage Workforce
  - 800+ Ameren Missouri Callaway employees
  - An additional 1100+ supplemental workers

- Major projects
  - Integrated Leak Rate Test
  - Replace Reactor Vessel Head Closure
  - Replace Main Generator Core Monitor
  - Replace Intake Strainers
  - Fukushima (FLEX) Modifications



Ameren MISSOURI

# REACTOR VESSEL HEAD CLOSURE REPLACEMENT

**Weights and Dimensions**

- Replacement reactor vessel head weighs 288,170 pounds
- Assembled, the reactor vessel head stands 42 feet 9 inches
- The diameter of the reactor head vessel is 17 feet

**Installation**

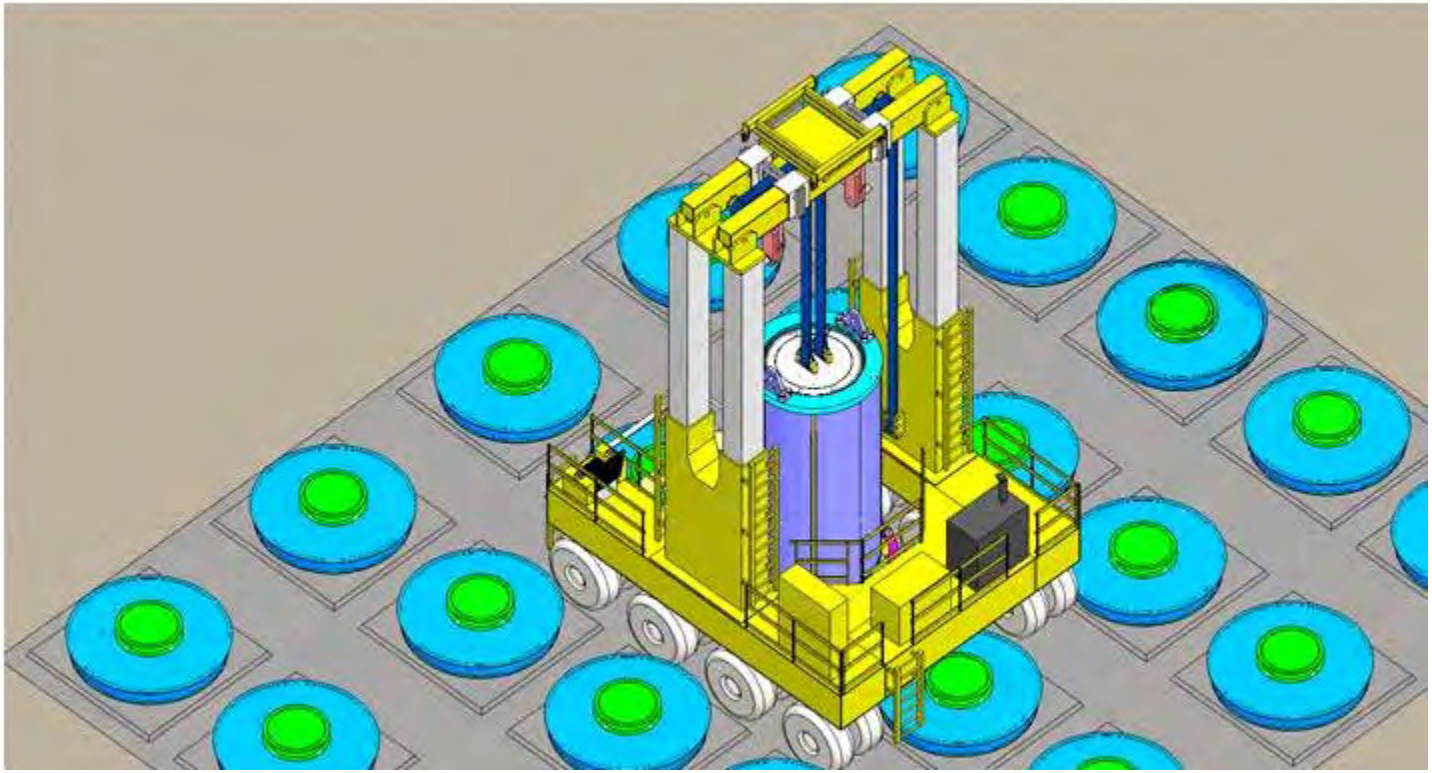
- In-Progress



Ameren MISSOURI

# DRY CASK STORAGE

- Callaway has started a major project to be the first US plant to install underground dry cask storage. The first used fuel will be transferred in late 2015.





Ameren MISSOURI

# SAFETY BRIEF

- Our top priority – Safety
  - **Nuclear** – our employees see to that every day – security is highly trained and well armed
  - **Radiological** – special ALARA brief
  - **Industrial** - This is an industrial environment
    - Hazards
      - Icy/wet surfaces
      - Trip hazards such as floor grating and concrete curbs
      - Hot pipes
      - High noise
      - Don’t touch or bump any plant equipment
    - Personal Protective Equipment will be issued
      - Hard hats
      - Safety glasses
      - Earplugs



Ameren MISSOURI

# SECURITY BRIEF

- No cell phones – leave them here
- No cameras – we will take pictures for you
- Stay with your assigned escort at all times – within eye sight. If you become separated from your escort, immediately contact Security or the nearest plant employee.
- Ensure your Visitor Badge is displayed in plain view at all times.



Ameren MISSOURI

# RADIATION IS A NATURAL PART OF OUR ENVIRONMENT

- Americans receive radiation exposure of about 620 millirem (mrem) annually from all sources
- Fifty percent comes from naturally occurring radiation from the Earth, in the air and water, from outer space, and in our own bodies
- The other 50% (310 mrem) comes from man-made sources, such as medical and dental X-Rays and certain consumer products
- Example Exposure Rates:
  - Chest X-Ray = 10 mrem
  - CAT Scan = 1,000 mrem or more
  - Round-trip flight from New York to LA = 2 – 5 mrem
  - Public exposure from nuclear plants/year = 0.4 mrem
  - Nuclear plant worker avg. annual dose = 160 mrem
  - Callaway worker avg. annual dose = 30 mrem



Ameren MISSOURI

# ALARA BRIEF

- You assume risks every day (going to your office). By touring this site you will encounter industrial risks, security risks, as well as radiological risks.
- People have been exposed to natural radiation since the beginning of time. Radiation, simply defined, is energy emitted through space and matter. This energy is expressed in a unit known as “REM” (Roentgen Equivalent Man). REM is a measure of how the energy or radiation affects the human body.
- Since radiation exposure at Callaway site is so low we actually measure in millirem or 1/1000 of a REM. The average person receives 620 mrem/year from natural and manufactured sources.
- The risks associated with occupational doses are very small and considered acceptable when compared to that of other occupational health risks.
- Since the scientific community lacks consensus on how much radiation exposure is acceptable and it is impossible to control your exposure to naturally occurring sources, we strive to limit exposure to manufactured sources of radiation.



Ameren MISSOURI

# ALARA BRIEF

- In the nuclear industry we limit exposures by using a practice known as ALARA “As Low As Reasonably Achievable.” It’s a very simple concept of Time, Distance and Shielding.
- All areas of your tour today have been surveyed to be less than 5 mrem/hour.  As a visitor, you are limited to < 50 mrem.
- Under Article 10, Part 20 of the Code of Federal Regulations, we are required to inform women of their right to formally declare a pregnancy. The exposure limit is 500 mrem for the entire term of the pregnancy.
- We also ask that you let us know about any medical treatments; in particular, those involving nuclear medicine. The medical isotopes can show up days, or weeks, later. Our monitors are very sensitive but cannot detect radiation origin so they will detect any radiation given off by your body.



Ameren MISSOURI

# ALARA BRIEF

- Your exposure will be monitored today using an electronic dosimeter which will provide a readout of your dose and dose rates.
- Stay with your escort and follow their instructions especially in the RCA. It is best not to touch or lean on anything if not required for safety purposes.
- Escorted individuals are not allowed in contaminated or high radiation areas.
- We will have personnel assist you along the way into and out of the area.
- No eating, drinking, chewing, or smoking in the RCA. No Gum.
- In case of a dosimeter alarm, or a plant emergency alarm, your escort will assist you in exiting the area.

- Questions?



Ameren MISSOURI


FOCUSED ENERGY. *For Life.*