Nuclear Power and the Environment

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September 11, 2017
Agenda

• Exelon as a company
• Nuclear Power Basics
• Nuclear Fuel and Reactor Core
• Nuclear Industry
• Nuclear Power & the Environment
• Dry Cask Storage
• Career/Internship Opportunities
Exelon by the numbers

#1 COMPETITIVE ENERGY PROVIDER IN THE U.S.

1.1 MILLION CONSTELLATION CUSTOMERS

$72.2 BILLION IN ASSETS

ALMOST 35,000 MEGAWATTS OF OWNED POWER GENERATION

47 STATES WHERE EXELON OPERATES

6.6 MILLION UTILITY CUSTOMERS

23 Nuclear Reactors

100% Corporate Equality Index
Nuclear Physics & Electricity Generation
Nuclear Fission
Nuclear Chain Reaction
Generating Electricity - Fossil Fuel

Steam produced

Heat

Steam →

Turbine

Generator

Electricity
Generating Electricity - Nuclear

Steam produced

Heat

Steam →

Turbine

Generator

Electricity
Generating Electricity
Nuclear Fuel & Reactor Core
Reactor Core
Nuclear Fuel
Energy Equivalents

1 Uranium fuel pellet

3 barrels of oil, 126 gals

17,000 ft³ of natural gas

1 ton of coal, 2000 lbs

1 cord of wood, 5000 lbs
Nuclear Industry
(Illinois, USA & World)
Nuclear Power in Illinois
Illinois Electricity Generation

- Coal: 7000 GWh
- Nuclear: 8000 GWh
- Natural Gas: 500 GWh
- Other Renewables: 700 GWh

Source of Electricity
United State Nuclear Plants
United States Electricity Generation

Source: U.S. Energy Information Administration
Nuclear Power Around the World

- United States ~ 20%
- Canada ~ 10%
- United Kingdom ~ 25%
- Sweden ~ 50%
- France ~ 80%
Nuclear Power and The Environment
What’s coming out of those cooling towers?
Those aren’t smoke stacks...

- Nuclear generated electricity avoided 613 million metric tons of carbon dioxide in 2011 in the U.S. This is nearly as much as is released from 118 million cars, which is nearly all U.S. passenger cars!
- Nuclear energy accounted for about 64% of the U.S. emission-free electricity generation in 2013.
Emission-Free Sources of Electricity - 2013

Nuclear 63.3%

Hydroelectric 21.2%

Solar, Wind & Geothermal 15.4%

Source: U.S. Energy Information Administration
Other Sources of Clean Energy

Land Needed by Wind or Solar Energy to Match Annual Nuclear Energy Production*

Wind Turbines

Solar Cells

Area equal to West Virginia

Area equal to New Jersey
Radioactive Waste

• **Spent Fuel Pool**
  – Provide for the storage and cooling of the spent fuel, spent control rods, and other irradiated core internals
  – Hold ~4000 fuel assemblies
  – Designed to provide shielding to personnel, withstand seismic loadings, and prevent missiles, generated by high winds, from damaging the fuel

• **Dry Cask Storage**
  – Fuel pool storage capacity will be exceeded
  – Viable near-term solution to free up storage space in the fuel pools
Dry Cask Storage
Dry Cask Fuel Storage

ISFSI – Independent Spent Fuel Storage Installation

Design Basis:

- **Tornado**: 260 mph
- **Tornado missiles**: up to 4,000 pounds at horizontal speed of 126 mph
- **Flooding**: submerged in 50 feet of water due to flood or tsunami
- **Site temperature**: -40°F to +133°F
- **Snow**: >100 pounds per cubic foot
- **Seismic**: 0.37 g
- **Fire**
- **Tip-over**
Dry Cask Storage
Dry Cask Storage
Dry Cask Storage
Nuclear Careers & Internship Opportunities
Myth:

I have to be a nuclear engineer to work in the nuclear industry.
Truth:

There is a wide variety of careers in nuclear power!

• Engineers
  – Nuclear, Electrical, Industrial, Chemical, Mechanical, Materials, Civil/Structural

• Professionals
  – Health Physicists, Radiation Protection Technicians, Chemists, Information Technology, Finance, Legal, Business Management, Security, and Training

• Skilled Workers
  – Electricians, Welders, Pipe Fitters, Machinists, Carpenters, Heavy Equipment Operators
Exelon’s Enterprise-Wide Intern Program

Program tracks include Engineering, Finance, IT, Retail, Corporate, and MBA.

Many of our interns complete multiple internships at Exelon and go on to receive offers for full-time positions with the company upon graduation.

The internship is a 10 week, paid program.

The 2018 program will run from June 4 - August 10.
What to expect as an Exelon Intern

**Academic Learning:** Interns will work on value-add projects that will allow them to apply knowledge learned in the classroom to the workplace. At the end of the summer, they will present their projects to a panel of business leaders and their peers.

**Skill Development:** Exelon internships mirror full-time positions, and will allow interns to develop decision-making and critical thinking skills, increased confidence and self-esteem. Continuous feedback is integrated into the program, through initial Goal Setting, Mid-Term Evaluations, and End of Summer Evaluations.

**Career Development:** Opportunities to meet and interact with Exelon employees helps interns gain knowledge of the qualifications and duties of specific positions so students can explore their interest in the field.

**Peer Networking:** Organized intern program events provide an opportunity for interns to get to know each other in a more casual environment. Typical events include a plant/site tour, community service outing, and intern picnic.
2018 Summer Internships

We are seeking students who meet the following criteria:

- Currently enrolled in Bachelor’s or Master’s program
- Minimum GPA: Cumulative 2.8/Major 3.0
- A track record of outstanding academic performance
- Eagerness to contribute in a team-oriented environment
- Ability to work creatively and analytically in a problem-solving environment
- Excellent leadership, communication (written and verbal) and interpersonal skills

Engineering Majors Include:
- Mechanical Engineering
- Electrical Engineering
- Nuclear Engineering

Non-Engineering Majors Include:
- Business
- Computer Engineering
- Computer Science
- Cyber Security
- Economics
- Finance/Accounting
- Information Systems
- Marketing
- Mathematics
- Statistics
- Supply Chain
Questions

Visit Exelon at ECS Career Fair
September 12th – 12 – 6pm
@ the ARC

www.exeloncorp.com/careers

Download our App – Exelon LINK

Energize YOUR Potential