The Nuclear Power Institute Programs for Human Resource Development for the Nuclear Industry

IAEA Conference on Human Resource Development

Vienna, Austria

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Broader Needs for the Nuclear Workforce
The “Other than Nuclear” Challenge

Technologists/Technicians
2-year Associate Degree Backgrounds

Mechanical Engineers
Electrical Engineers
Chemical Engineers
Engineering Technology
Nuclear Engineers
Operations, Non-licensed Operators

Mechanical Systems Instrumentation & Control
Rad Protection
Maintenance
Engineering Physics
Engineering Technology
Operations, Non-licensed Operators

The “U.S. Model” for the workforce at a nuclear power plant

Engineers
4-year Degrees
Other Engineering Disciplines

Nuclear Engineering Degree

The “Other than Nuclear” Challenge

Timing of Workforce Employment Before Plant Operation

Years Prior to Initial Plant Operation

- 2 Year Degree
- 4 Year Degree
Largest department of nuclear engineering in the U.S., with 302 undergraduates and 143 grad students

Only university in the country with two nuclear reactors

Exceptional facilities

Distinguished faculty

Robust, well funded research program

Recognized on national and international levels

Website: nuclear.tamu.edu
Nuclear Power Institute

• NPI is a partnership of
  – industry,
  – universities,
  – two-year technical and community colleges,
  – high/secondary schools and junior highs,
  – students and teachers,
  – communities,
  – stakeholders,
  – elected leaders,
  – state, federal, and international agencies

• The NPI focus is on preparing the workforce for the nuclear industry and building public understanding and acceptance of nuclear energy
Engineers

Diplome-Certificate Program
A Unique and Innovative Approach

Partner Universities

- Mech Engr
- Elec Engr
- Chem Engr
- Civil Engr
- Engr Physics
- Engr Technology

NPI Nuclear Power Diplome-Certificate

- Fundamentals
- Systems-BWR/PWR
- Operations
- Human Performance

Outcome
Graduates with Academic Backgrounds, Credentials and Hiring Advantages for Jobs at Nuclear Power Plants

Approach: Distance delivery of courses based on industry input and needs.
Engage undergraduate engineering students in \textit{interdisciplinary} & \textit{multilevel team} projects sponsored by government / industry to:

- Problems defined by industry partners
- Visit to nuclear power plants
- Work with industry mentors
- Enhance the engineering education of students through real world experiences
- A new educational approach through “externships”
• **Partner** with 2-year community or technical colleges

• Graduates receive and Associates degree in
  - *Electrical and Electronic Systems*
  - *Digital Instrumentation and Control*
  - *Radiation Protection*
  - *Non-licensed operations*

• Curriculum includes courses in *mathematics, science and engineering systems*

• **Strong preparation** to enter into training programs at nuclear power plants

• National Uniform Curriculum Project-in 39 community colleges in the U.S.
Outreach Programs

Nuclear Power Institute

Teacher Programs

Student Programs

Communities and Leaders
NPI Programs for Teachers

Progression of Programs

International Teacher Exchange

Counselors Making Occupational Readiness Exciting (C-MORE)

Science on Saturday (SOS)

Enrichment Experiences in Engineering (E³)

Teacher Summit

Teacher Workshops

Conference for the Advancement of Science Teaching (CAST)
Enhance lab skills & techniques

Develop curriculum and experiments for the classroom

Practical experience at the nuclear power plant.

Teachers Enrichment Experiences in Engineering

Experiences with the latest in engineering research
POWER SET

• Powerful Opportunities for Women Eager and Ready for Science Engineering and Technology

• High school/secondary school girls selected to apply for membership
• Educational tools and support to pursue STEM studies and careers

Students

Power GRID

• Girls Responding to Industry Demands

• Extension of POWER SET
• Focus on junior high school girls
• Encourage their participation in math and science through high school
**WIT**

- *Workforce Industry Training*
  - Mentoring by industry professionals
  - Site visits to local industry partners
  - Professional development activities
  - Educational visits to universities and community colleges
  - Community service events
  - Scholarship opportunities

**BRT**

- *Boys Resourcing Technology*
  - Extension of WIT
  - Focus on elementary and junior high boys
  - Engage in academic activities
  - Stay focused on STEM path
SOS
Science on Saturday
For students and the community

- Demonstrations and experiments geared to junior high and high school students and to families

- Organized and presented by POWER SET and WIT members

- SOS aims to stimulate scientific inquiry and promotes student interest

- Third event held April 5, 2014 at Wharton High School

- Anticipated 300 participants, over 400 took part
International Collaborations

• Many formats: workshops, meetings and training courses
• Duration: one week to one month
• Number of participants: 5-45
• Multi-disciplinary groups
• Sponsorship by IAEA or national groups
• Include nuclear power plant visits, reactor laboratories, “Disaster City” exercises, meet elected leaders, see outreach activities
• Countries: Argentina, Bangladesh, Brazil, Bulgaria, Chile, China, Czech Republic, France, Indonesia, Japan, Jordan, Kenya, Malaysia, Mongolia, Nigeria, Russia, Thailand, Turkey, UK and Uruguay
“Roadmap to Operational Experience”
Opportunity for work experience in an operating nuclear power plant

Masters Nuc Engr

Associates NPP Technology

2 ½ year program
1. NPI is a full-scope, end-to-end, integrated approach to human resource development. Participation of government and government agencies, and elected officials and decision makers is vital. These key individuals and organizations encourage the effort, and provide support, a voice and advocacy for NPI and its programs.

2. Critical role of vocational training. The majority of the workforce does not involve only B.S. level engineers, but are graduates from two-year programs that are developed in collaboration with industry that prepare them for careers as technologists and technicians at a nuclear power plant.
3. In education and training, education is only part of the story. **Collaboration with industry results in:**
   - curricula, material, inputs and programs,
   - opportunities for students to benefit from industry mentors and get onsite experience, and
   - work on real-world, industry defined problems.

4. **Outreach** is instrumental in:
   - engaging with the next generation both for support of nuclear power and in building the workforce, and
   - generating vital contacts with the community to foster public understanding and acceptance of nuclear energy.
A Key Outcome

One of our Main Goals!