

Modeling Human Resource Development for New Nuclear Power Programs

**International Conference on Human Resource Development
for Introducing and Expanding Nuclear Power Programs**

Abu Dhabi, United Arab Emirates

March 14 to 18, 2010

Sara Scott, Kris Kern, Dmitry Keselman, Crystal Dale

Los Alamos National Laboratory

Presented by Tom Mazour, IAEA



WORKFORCE PLANNING

- Definition: the systematic identification and analysis of what an organization/nation is going to need in terms of the size, type, and quality of workforce to achieve its objectives.
- Identifies the steps that should be taken to get the right number of the right people in the right place at the right time.

Workforce Planning for New NP Programmes

- IAEA Members States have continually requested assistance on developing the range of competencies needed to implement a nuclear power plant programme
- Hence, the IAEA is producing “Workforce Planning for new Nuclear Power programmes”; submitted for publication

Introduction

- A tool for examining human resources for nuclear power programs has been developed for multiple applications
 - Single country program development
 - Existing program decision support
 - Examining global trends
- Next steps
 - Work with specific countries to evaluate their HR needs
 - Further develop the application for the global outlook
 - Support the IDWG by integrating with other country assessment tools
 - Continue development with integrated resource coupling (fuel cycles, industrial capacity, etc)
- We continue to refine the model and are interested in additional capabilities and applications

Scope

- For new programs, the model reflects three phases of program development, as described in “Workforce Planning for New Nuclear Power Programmes”
- The model includes staffing for
 - NEPIO (Nuclear Energy Program Implementing Organization)
 - Construction
 - Regulatory
 - Operations
- The model includes educational pipelines for
 - Professional (Engineers)
 - Technicians
 - Skilled labor
- Not currently included are staffing for fuel services and plant decommissioning

DEMONSTRATION SLIDES

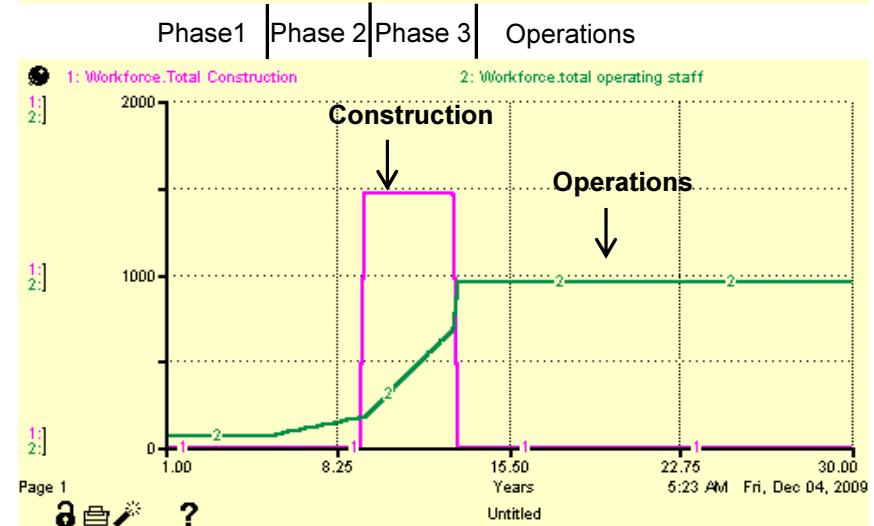
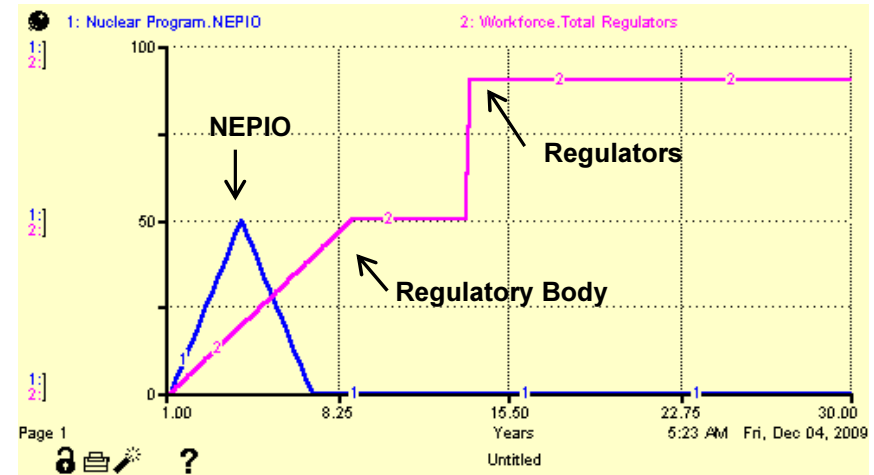
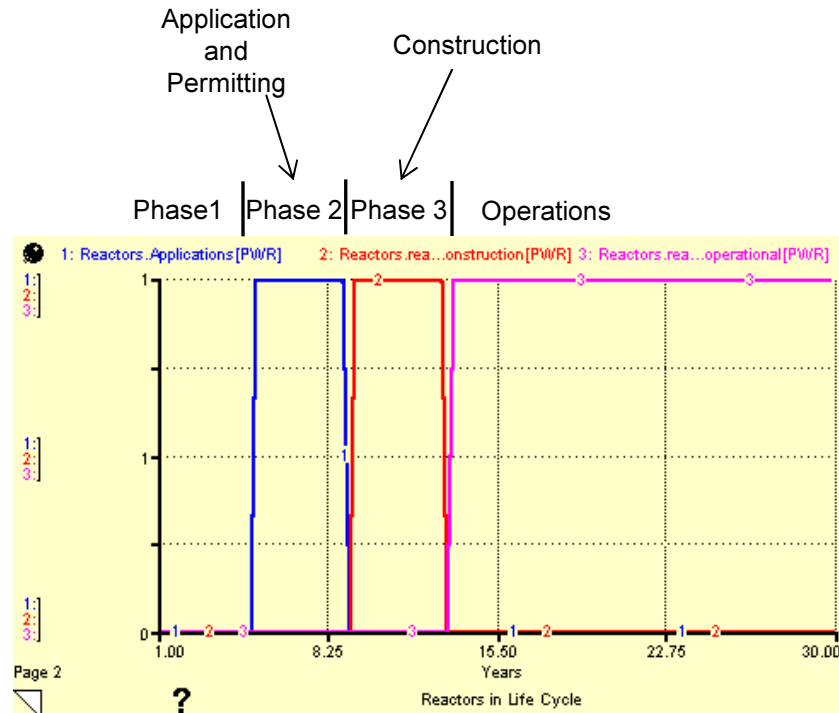
The following are images showing some results from the model

Single Country Example – New Program

- The following viewgraphs are snapshots of results from the demonstration of the model
- The case illustrated is a new program to construct a 1000 MW PWR

What is the overall phasing of workforce development in relation to the program advancement?

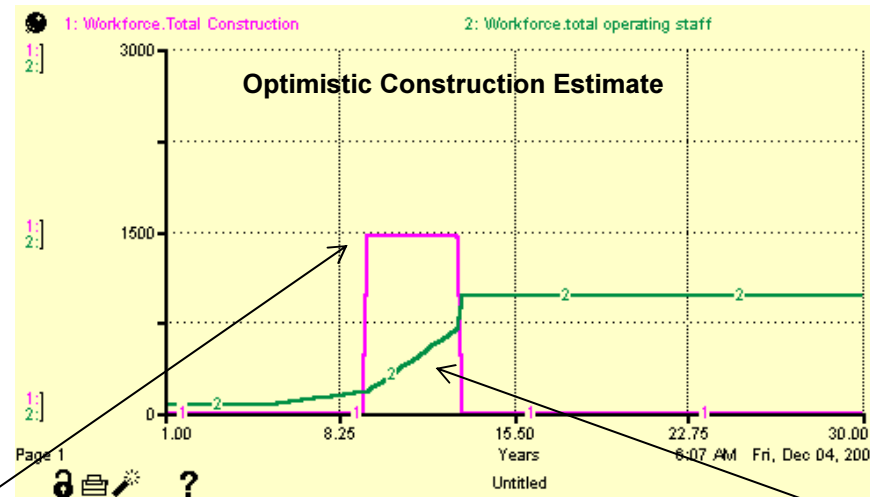
Program development



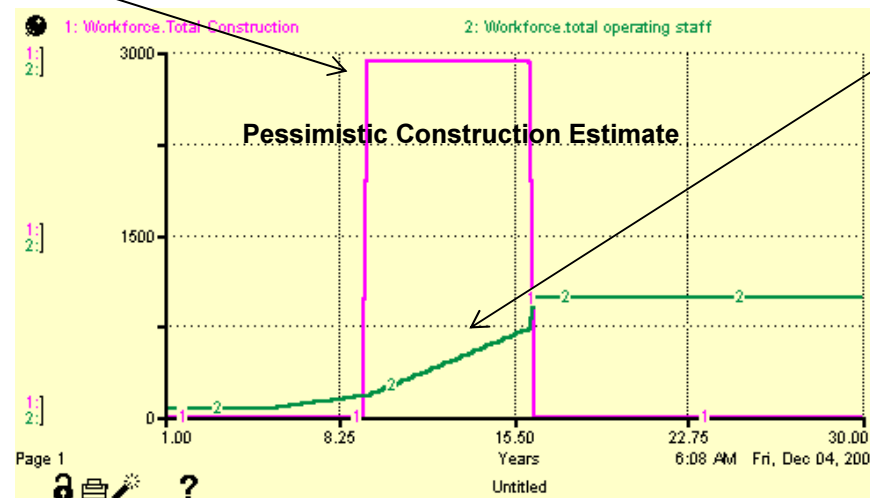
How large are the uncertainties in staffing requirements?

Effect of Data Variation - Construction

Estimates for the time to build a new plant vary from 4 to 7 years.



Peak on-site Construction labor estimates vary by a factor of 2.

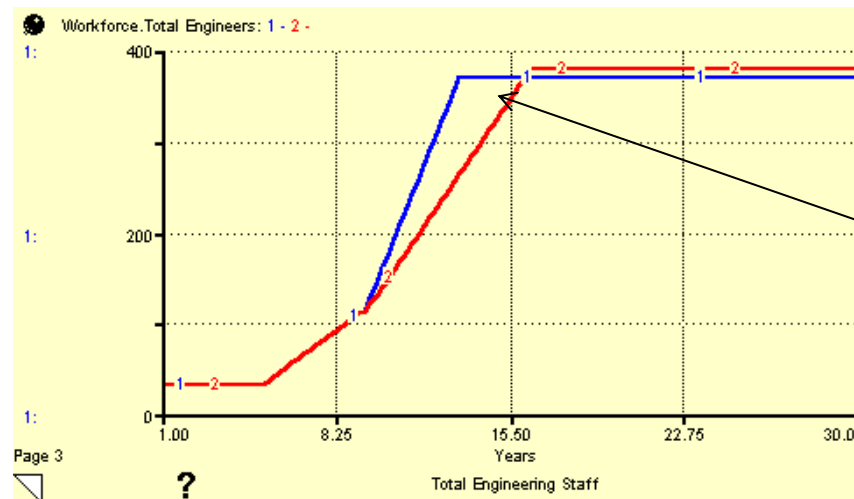


The rate at which operations personnel are hired is reduced for longer plant construction times

How large are the uncertainties in staffing requirements?

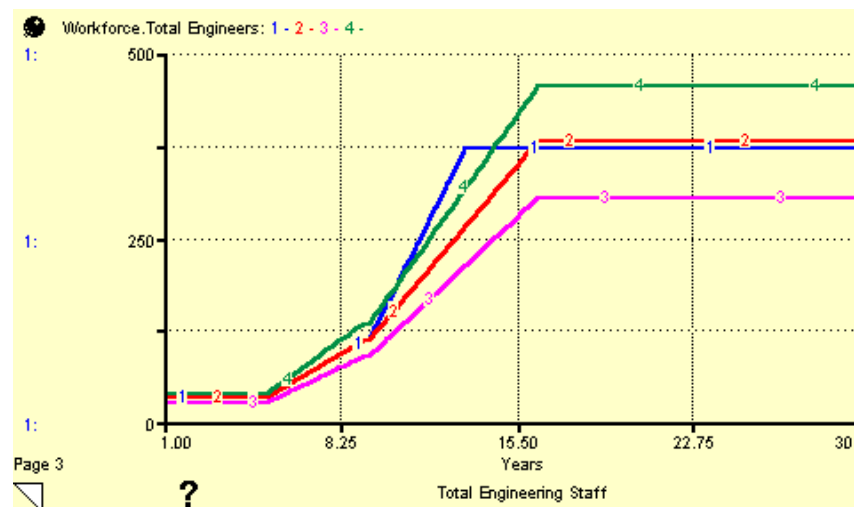
Effect of Data Variation - Operations

Timing of plant completion delays hiring of operations staff



Three year difference in plant construction time

Staffing size for operations can vary with plant size, type and operational approach



Large operations staff size

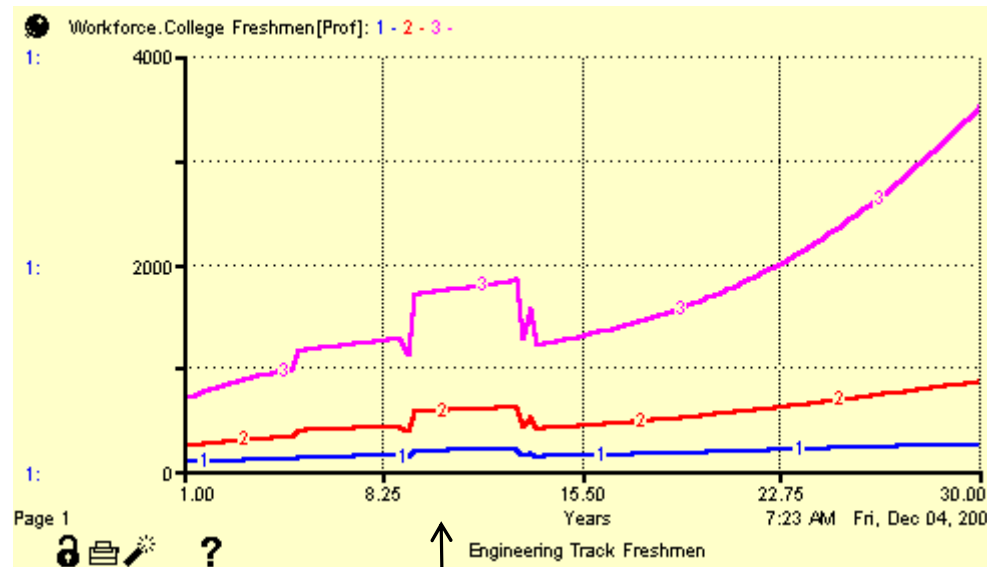
Small operations staff size

Educational Needs

What are the educational needs to support the program?

How do related industries (ie Nuclear Medicine) factor?

What does it mean to have competition in the workforce?



Surge in demand corresponding to hiring for plant operations

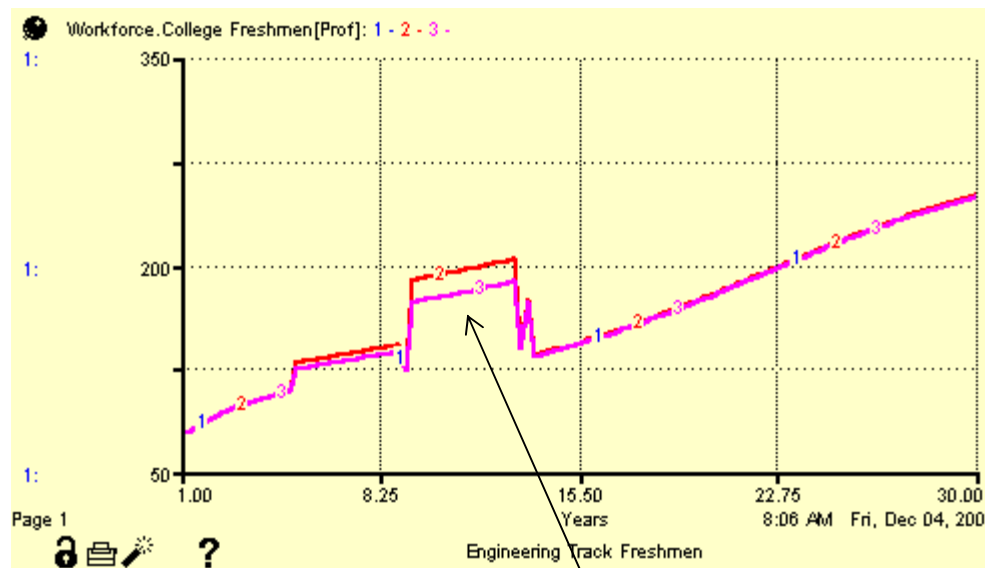
Base entrant level to maintain competition in the workforce

Base entrant level to support nuclear power and related industries

Base entrant level to maintain nuclear power workforce

Outsourcing

How does outsourcing approach affect workforce development?



Educational demand reduced by foreign outsourcing

Human Resource Modeling Path Forward

- We are examining ways of making this tool available for use by tailoring it to specific country resources and plans
- We propose a modelers forum within the IDWG in which representatives collaborate to produce country specific models
- Through “roll-up” of individual country results a global picture of local and supplier HR needs would be available.