SYSTEMS SCENARIOS & INTEGRATION WORKING GROUP

PROGRESS REPORT

D. J. Hill
Argonne National Laboratory

ATW Steering Committee Videoconference

April 21, 1999

SCENARIOS

- Scenarios provide performance goals for ATW System
  - ‘No New Orders’ is base scenario (as reviewed by MIT 1/98)

- Not meant to predict the demise of the nuclear enterprise or to imply that ATW has maximum value under that scenario
  - Provide a clean basis for comparison

- Alternative scenarios will differ in deployment strategy rather than R&D requirements
  - Small differences in timing of first unit

SYSTEMS INTEGRATION

- Ensure that technical working groups have an integrated view of schedules
  - Basis for R&D needs definition
  - Schedule(s) are aggressive (success-driven)

- Define key questions
  - e.g., Goals for STF
    - How ambitious should they be?
    - What are the effects on R&D?

STF OBJECTIVES

- Test bed for DEMO and ATW conditions

- Concept verification
  - feasibility of coupling between accelerator and target
  - controlability
  - beam delivery

- Address key technical issues (next viewgraphs)

- Flexible (multi-use?) facility

TECHNICAL ISSUES

- LBE technology
  - reliance on Russian experience
  - chemistry, spallation products, material compatibility

- Accelerator reliability
  - new performance requirement for an accelerator

- Window design
  - materials issues

INSTITUTIONAL ISSUES

- SSIWG is also addressing institutional issues.

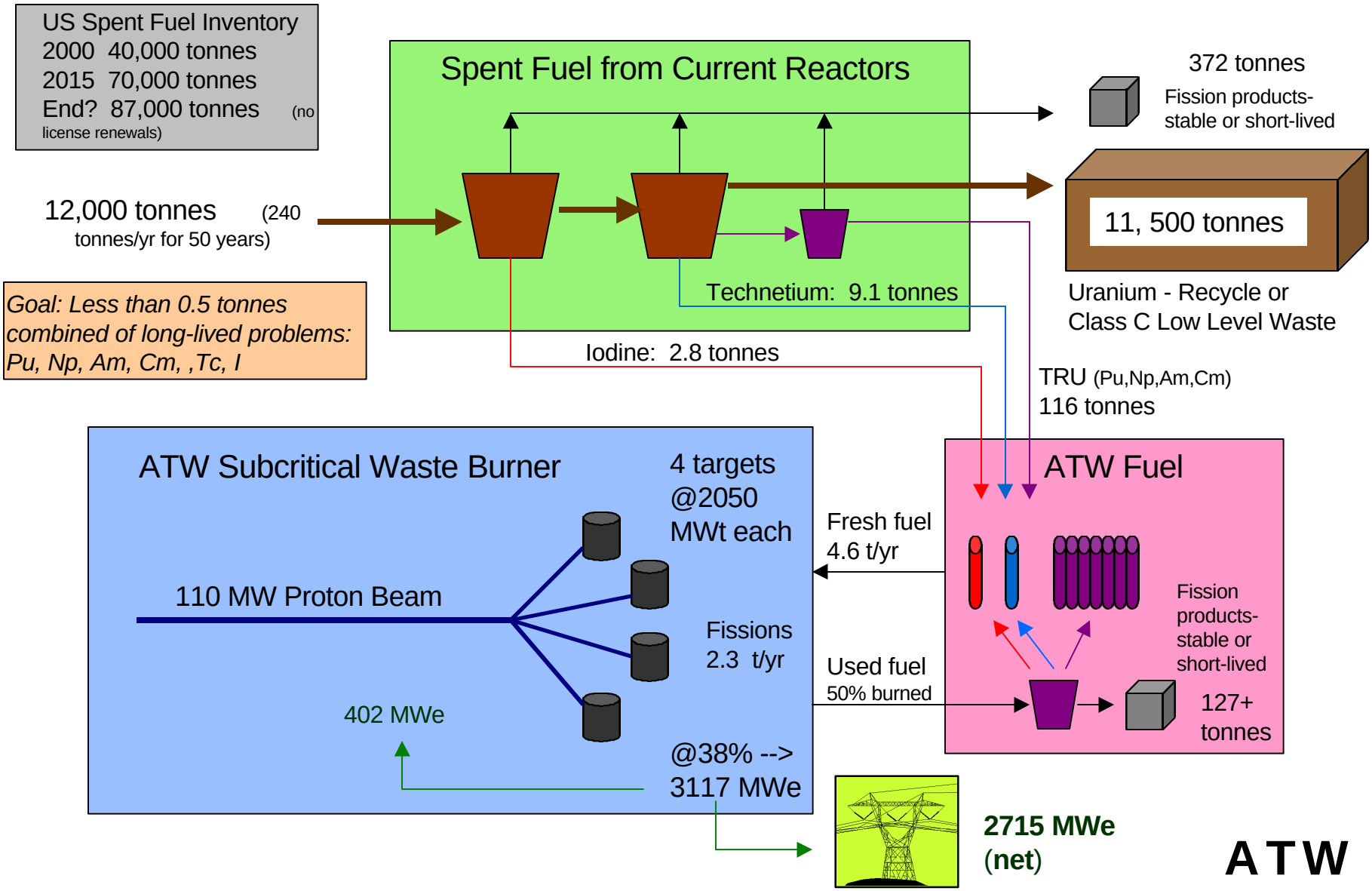
  – licenseability, siting, etc.
  – ownership and the effect on electricity markets
  – system and organizational requirements
  – public acceptance
  – proliferation resistance

- As laboratory employees SSIWG cannot make recommendations only describe problems.

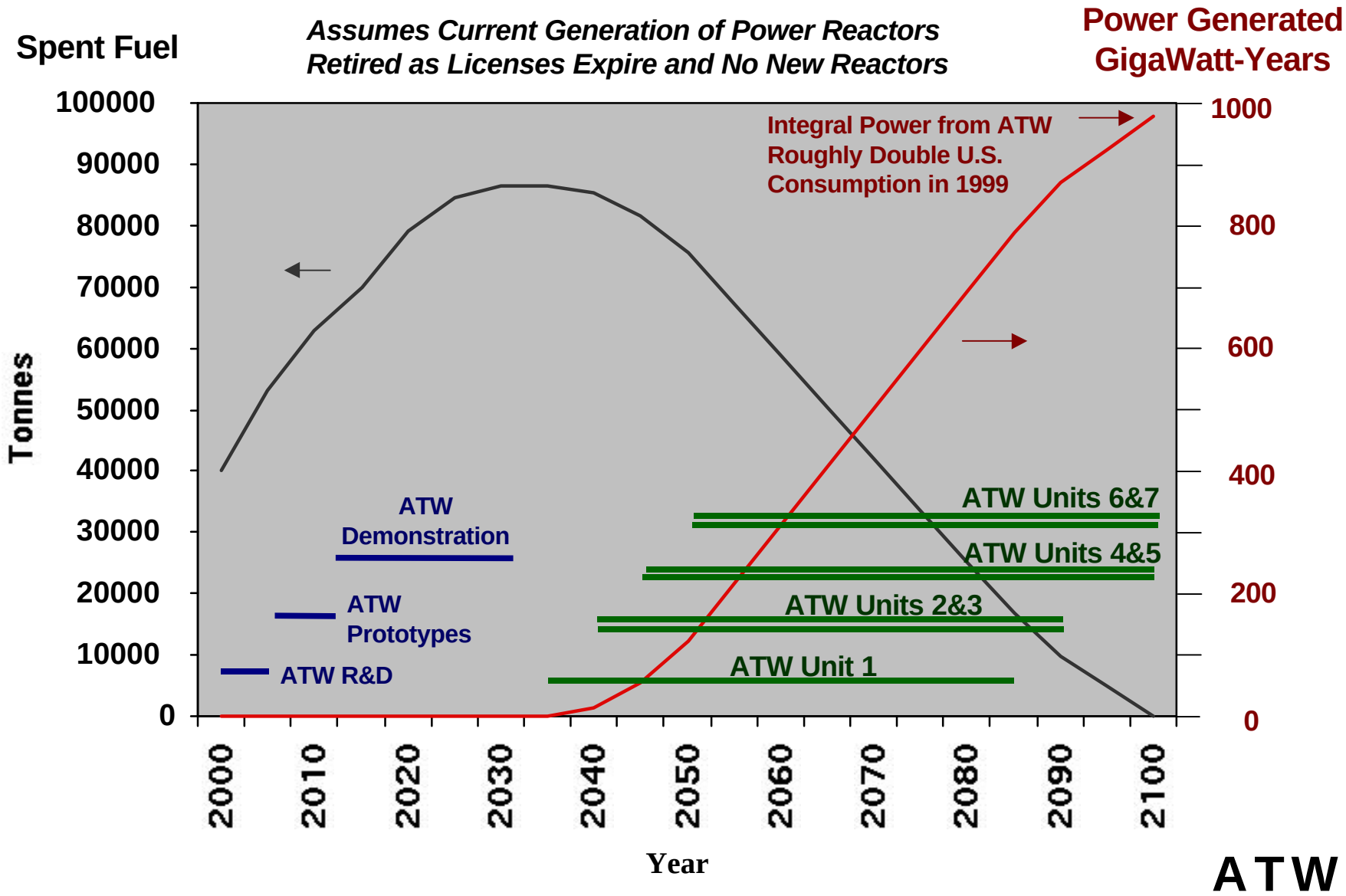
DOCUMENT OUTLINE
(Surrogate for Work Plan)

- Depth of treatment constrained by time available
- Initial work (writing) focused on the following:
  - Section 1 Introduction
  - 2 Why transmute?
  - 3 Scenarios
  - 4 Technical Reference
  - 5 Alternative Technologies (includes international collaboration)
  - X Institutional issues
- Later efforts will focus upon the following:
  - Section 6 Systems Integration (bulk of work done here)
  - 7 R&D Costs
  - 8 Benefits

ATW Plant Sized to Process 12,000 tonnes of Spent Fuel



ATW Can Safely Convert Spent Nuclear Fuel Waste Legacy to Electric Power by the End of the 21st Century

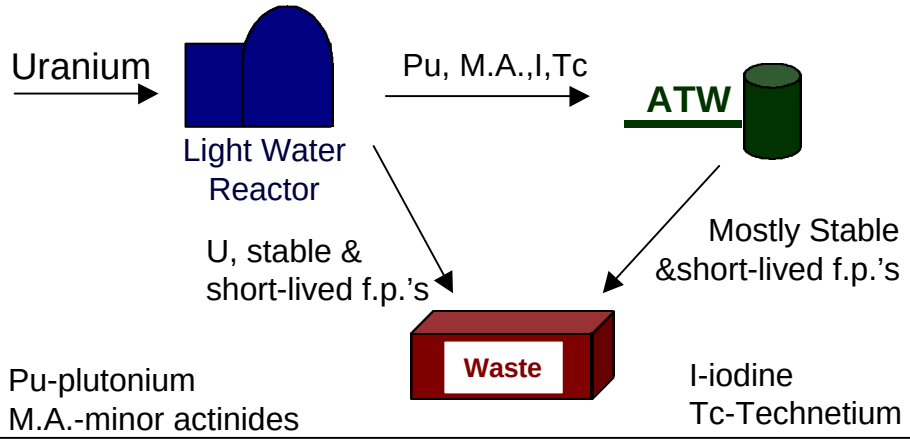


ATW

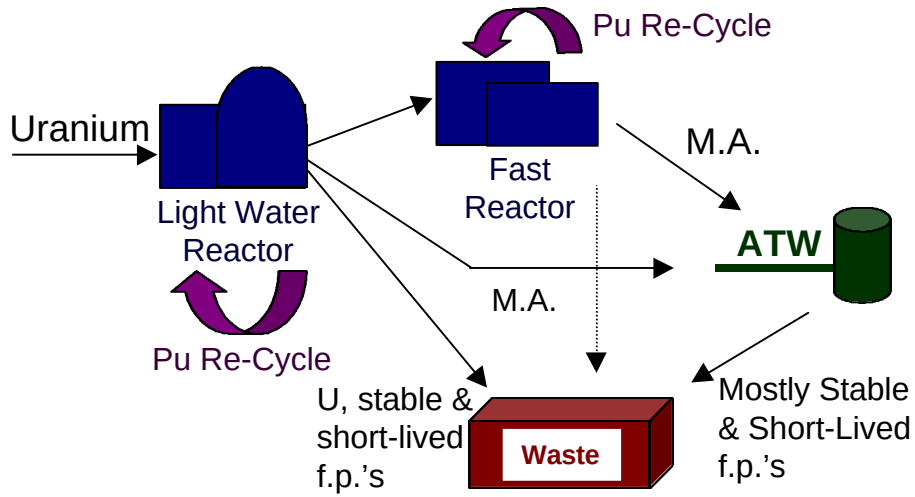
Nuclear Infrastructure & Policies Impact ATW Implementations:

Vary by Nation and Probably by Time *(Impacts ATW Fuel)*

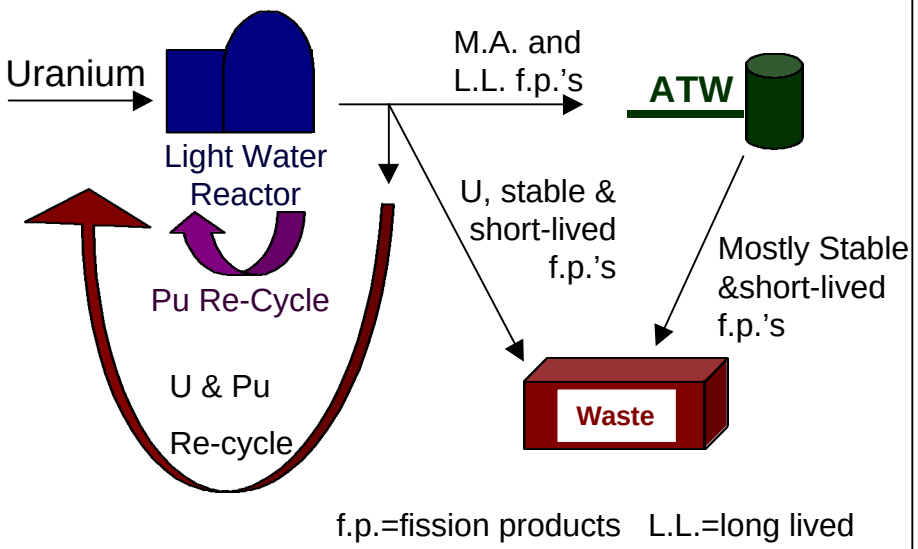
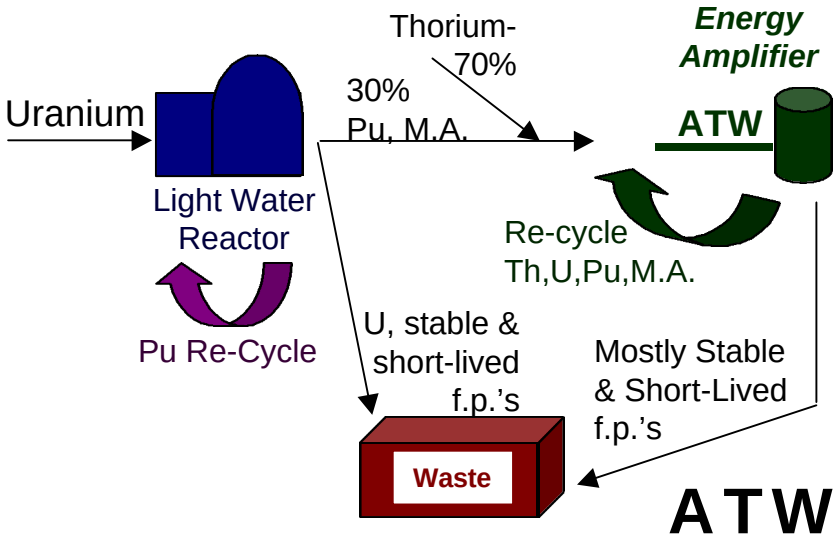
United States: Once-Through Fuel Cycle



France: Multi-Component Concept



Japan: Double Strata Fuel Cycle



CERN (Spain, Italy,..): Minimal Scheme