UCLA Effort on FNT

*   Effort is focused on <u>the most critical issues</u>

*   This effort is required under practically any strategy

-    Modelling of most important phenomena

-    Predictive Capability

-    Small experiments to verify basic concepts and most important phenomena

-    Prerequisite to establishing feasibility, and understanding how to go about demonstrating economic, safety and environmental potential of fusion

-    Effort is of direct, critical relevance to fusion and to ITER

Primary Areas of Emphasis

1. Neutronics and Shielding

    Experiments, Instrumentation and Analysis

    For any Blanket Breeding or Non-Breeding:
    - Radioactivity
    - Nuclear Heating
    - Streaming/Shielding from Large Ducts
    - Tritium Breeding/Line Source

2. Tritium Modelling
    - PFC
    - Beryllium
    - Single Crystal Li_2O
    - Analysis of BEATRIX
    - Analysis/Collaboration with CEA France

3. Thermal Control and Thermomechanics
    - Analysis
    - Small Experiments

4. In-Pile Experiments
    - Design and Analysis

5. Out-of-Pile Experiments
    - Define Requirements
    - Develop Test Plan for Testing Scaling, Sequence

6. Liquid Metal Free Surface (Divertor)

7. DEMO Blanket Concepts and How to Get There

Neutronics and Shielding

A. Remarkable (Historic) Achievements During the Past
    2 Years (Critical for any Breeding or Non-Breeding
    Blanket and Shield)

    1. Use of Point Source as Line Source

    2. Measurements of Integral Radioactivity and Decay
       Heat

         • First Time in History
         • Results Show Clearly that Serious
           Experimental/Analysis Effort: 1) Saves
           money, and 2) Necessary for Fusion to
           Establish Credibility

    3. Integral Measurements of Nuclear Heating

         - First Time in History
         - Results Show More Serious
           Experiment/Analysis Effort is Needed

B. Conclusions from Tritium Breeding Experiments

C. Planning of Shielding Experiments

APPLICATION (CONTINUED)

ITER
(First wall, (shield))

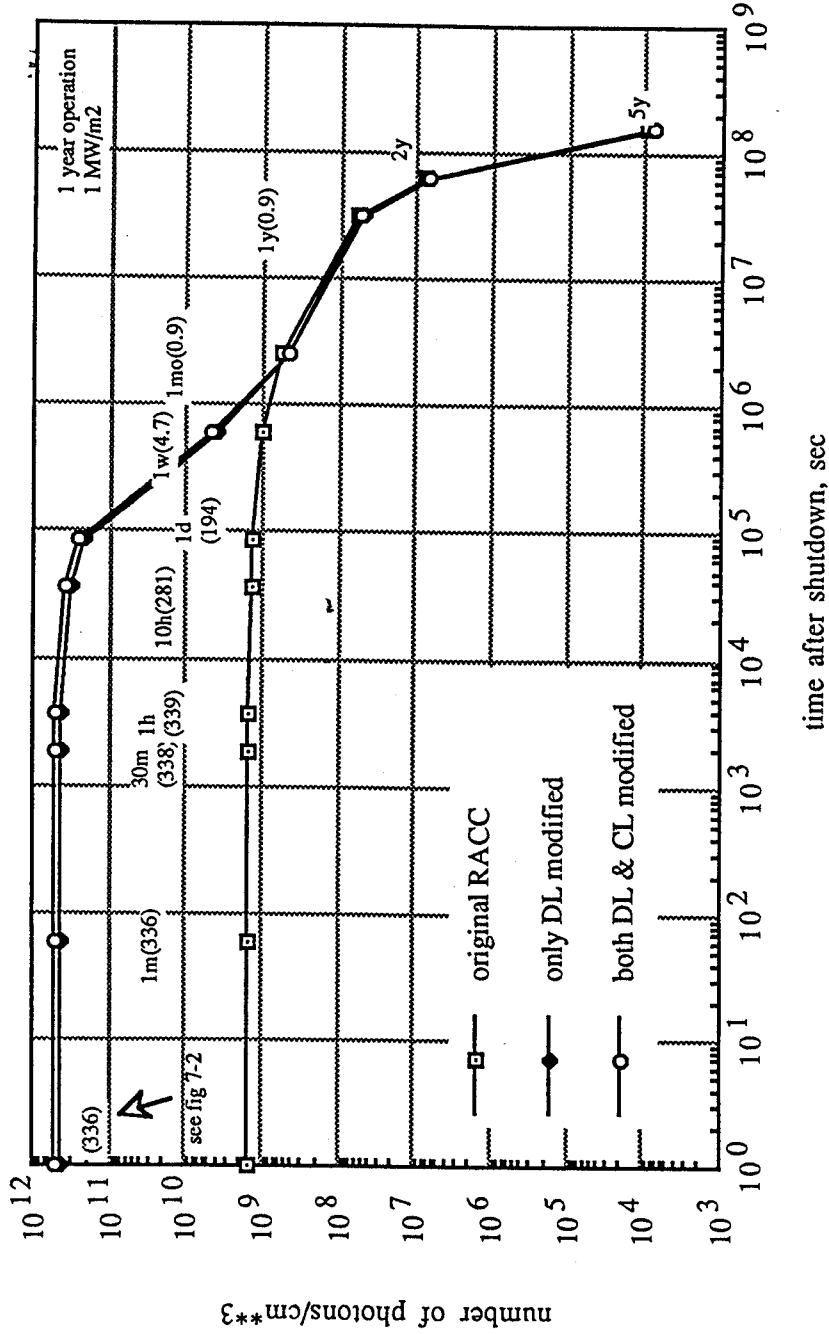- RESULT FOR TUNGSTEN ZONE

Fig. 7-3 Specific photon yield (photons/cc) in tungsten zone
as a function of after shutdown time by using 3 different data libraries in RACC