

Key Issues and Planned Task for FY99

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- **Flibe:**

- **Key issues:**

- To assess the reasons and issues of using flibe as the coolant and breeding material for fusion

- **Work plan and schedule for 99:**

- Flibe chemical state definition
 - Tritium breeding
 - MHD effects on heat transfer
 - Structural material selection
 - Tritium control
 - Be issues,
 - Safety



• Names of researchers:

- ANL:	Dai-Kai Sze	0.1 FTE + visitor
- UCSD:	Mark Tillack	0.05 FTE
- UW:	Mohamed Sawan	0.05 FTE
- ORNL:	Steve Zinkle	0.05 FTE
- IEENL:	Kathy McCarthy	0.05 FTE
- UCLA:	Alice Ying	0.05 FTE
- Total:		0.35 FTE + visitor



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- **Power Conversion:**

- **Key Issues:**

- To assess power conversion systems for different temperature range
 - To review key issues for different power conversion



- **Work plan and schedule:**
 - Evaluate various power conversion system, and assess the optimum parameters regime for each power conversion system
 - To assist each concept group to select the most attractive power conversion system

- **Name of researchers:**
 - ANL: Dai-Kai Sze 0.2 FTE + visitor
 - UCSD: Mark Tillack 0.2 FTE + student
 - Total: 0.4 FTE + visitor + student*

* 50% supported by ALPS



APPLE Concept

- Key Issues
 - Tritium breeding and recovery
 - Requirements for life time structure
 - Heat transfer to secondary system
 - Mechanical design (possible ways to eliminate the baffles)#
 - Penetration cooling
 - Power conversion



Work Plan and Schedule Tasks for 99:

- Literature survey and code development of heat transfer from solid particles to a solid wall in vacuum
- Mechanical design of the system
 - Particle inlet and exit system
 - Particle flow control
 - Penetration cooling and shielding
 - Start up
 - Divertor system
 - Flow stability and distribution



- Plasma interface issues:
 - Determine the effects to plasma from Li, O, and T back diffusion
 - Disruption effect

- Power conversion design:

- Safety:



• Name of researchers:

- ANL: Dai-Kai Sze, Rich Mattas, Mike Billone, Ahmed Hassanein, Surim Majumdar 0.7 FTE
- UW: Mohamed Sawan, Igor Sviatoslavsky 0.35 FTE
- UCSD: Mark Tillack 0.1 FTE + student
- UCLA: 0.05
- Supporting group:
 - Material, PIG, Tritium, Power Conversion, Safety
- Total: 1.2 FTE + student



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- **Tritium:**

- **Key Issues:**

- Define the tritium permeation barrier requirements
 - Develop tritium processes
 - Identify tritium processing issues



- **Work Plan and schedule for 99:**
 - For each breeding material/coolant, the tritium recovery methods have to be developed to both concentration and pressure limits
 - If the allowable limit can not be reached, R/D programs have to be defined to relax those limits
 - Define key impurities in the tritium stream, and identify steps that those impurities can be removed to a acceptable concentration



• Name of researchers:

- ANL:	Dai-Kai Sze, Mike Billone	0.2 FTE	
- LANL:	Scott Wilmms	0.1 FTE	
- UCLA:	Alice Ying	0.1 FTE	
- Total:			0.4 FTE*

* 50% supported by ALPS

