Status and Plans for the US Contributions to ITER

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U.S. Burning Plasma Workshop

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Outline

- Highlights of the International ITER Project
- International Project Activities
- US ITER Project Scope
- Organization of ITER and US ITER
- US ITER Project Schedule
- Risk Management
- FY ’06 Expectations
- Summary

Highlights of the International ITER Project

- We have a site: Cadarache, France
  - From 12/2003 until 6/2005, EU/JA negotiations were the focus
  - JA withdrew its site offer in the context of:
    - 10% of EU's 50% of in-kind contributions (hardware and staff) to be provided by JA at EU expense
    - EU support for a qualified Director General nominee
    - EU/JA partnership on elements of a Broader Approach

- We have a Director General Nominee: Ambassador Kaname Ikeda
  - Nuclear engineer, JA science/technology/space program leader, diplomat

- We have resumed discussions and negotiations on the ITER Joint Implementing Agreement

- India was requested to join as a full ITER partner

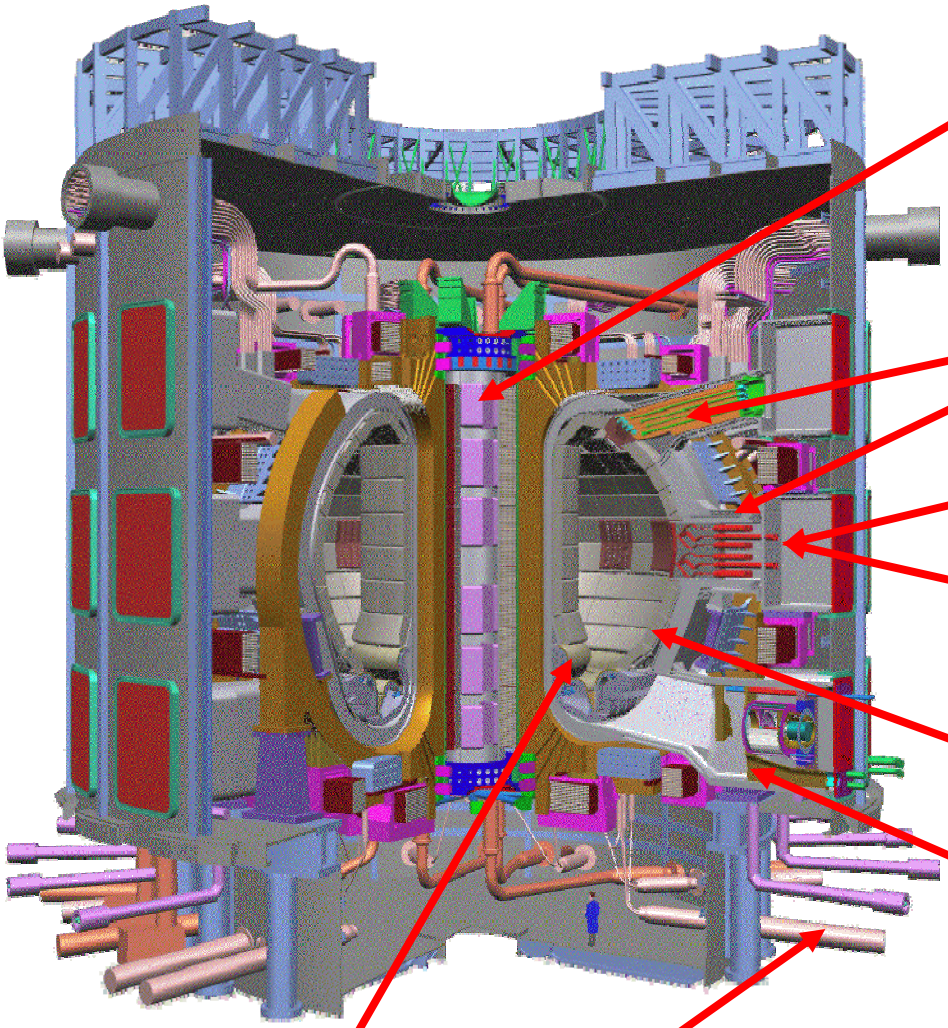
Topics for the ITER Joint Implementing Agreement

- Management guidelines --- Agreed 10/05
- Procurement systems guidelines --- Agreed 10/05
- Legal aspects – tentative agreement 12/05
- Council decision-making - tentative agreement 12/05
- Resource management - tentative agreement 12/05
- Intellectual property - tentative agreement 12/05
- Staffing regulations – some questions remain
- Annexes to the Agreement
  - Use of the resources “saved” by the possible entry of a new partner
  - Procurement Allocation Revisions

International Project Activities

- **The project is completing R&D and design work prior to construction**
- **The Naka and Garching co-centers will close (as co-centers) and activity will shift to Cadarache in 2006**
  - ~12 team members will work in Cadarache starting in January 2006
  - Waves of other staff will arrive ~June-December 2006
- **The ITER Organization staff will be selected starting in 2006**
  - Job position descriptions disseminated by the IT/IO to parties
  - Parties respond with candidates where appropriate
  - DG/IO selects staff, to be supported by their parties as IO employees/secondees
  - In exceptional cases, the DG can hire staff outside this normal arrangement
- **The DG, working with the IT and parties, will develop the ITER Organization's structure, policies and procedures, etc.**
  - Much will be enacted provisionally prior to the JIA coming into force

U.S. Provisional "in-kind contribution" Scope (2003): Being Refined for Entry of New Party and to Reduce Project Risk



4 of 7 Central Solenoid Modules

Steady-state power supplies

15% of port-based diagnostic packages

44% of ICRH antenna + all transmission lines, RF-sources, and power supplies

Start-up gyrotrons, all transmission lines and power supplies

Blanket/Shield 10%

Roughing pumps, standard components

Tokamak exhaust processing system

Pellet Injector

Cooling for divertor, vacuum vessel, …

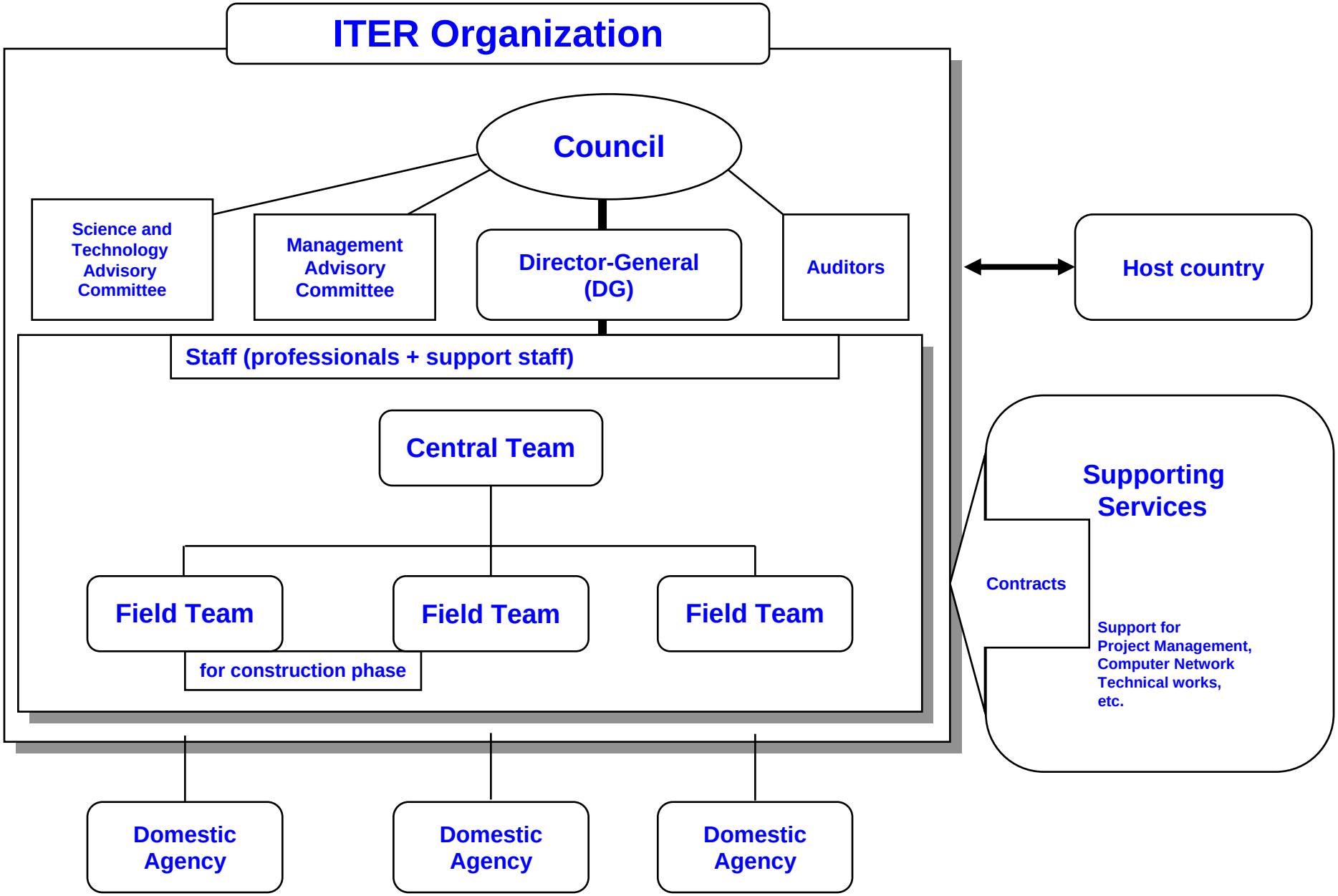
US ITER Major Elements of Scope (March 2005)

US ITER Project Scope Proportions		
WBS	**Description**	**% of Total**
1.1.1	Magnet Systems	23%
1.1.2	Blanket/Shield	4%
1.2.1	Cooling Water Systems	11%
1.3.1	Vacuum Pumping and Fueling System	5%
1.3.2	Tritium Plant Exhaust Processing	3%
1.4.1	Steady State Electrical Power Network	3%
1.5.1	Ion Cyclotron System	12%
1.5.2	Electron Cyclotron	8%
1.5.3	Diagnostics	7%
1.6	Project Support	7%
1.7.1	IT Support (cash and secondees)	17%
TOTAL		100%

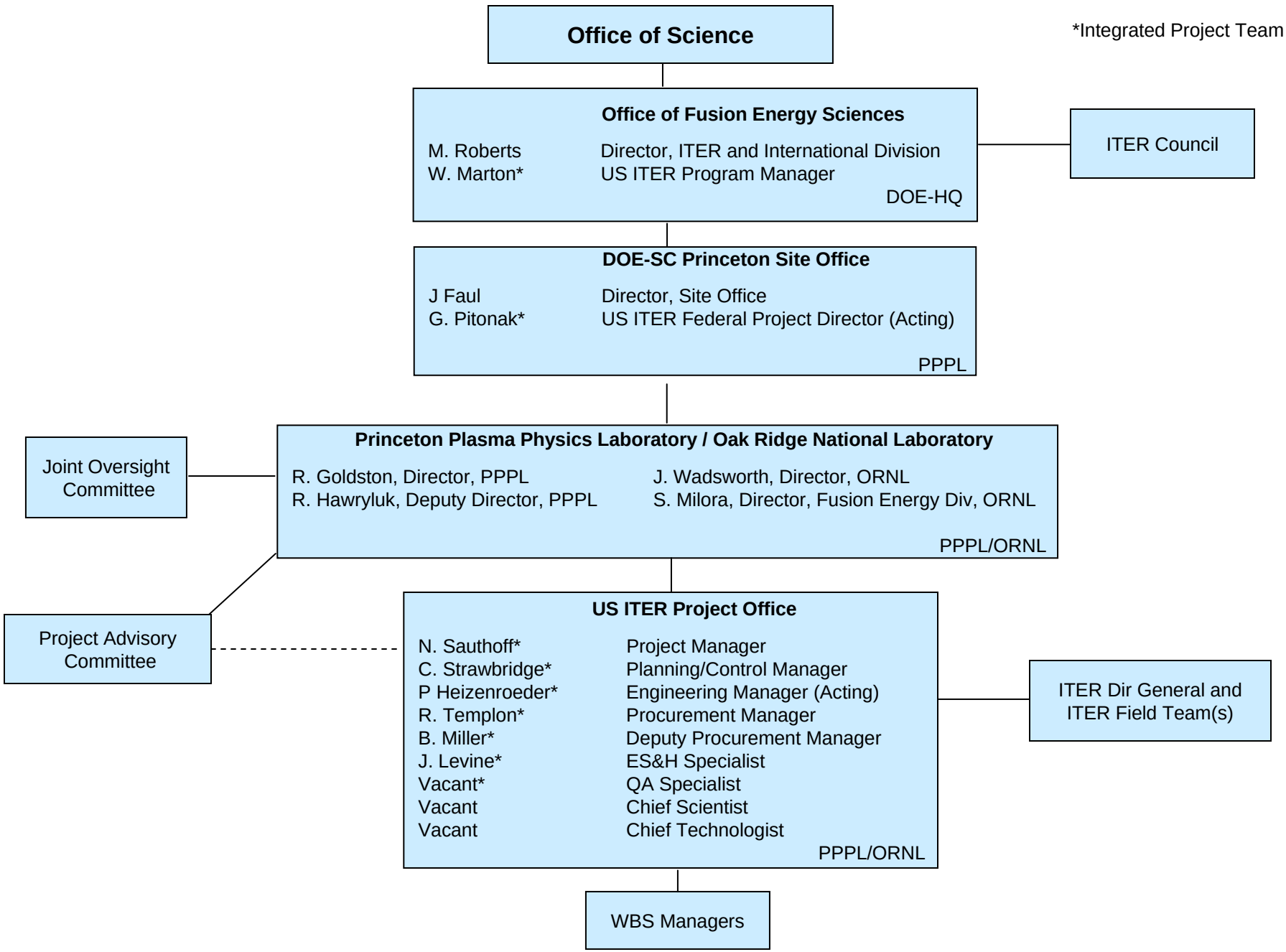
US Support to the International Team

- Scope:
  - Staff support negotiated at 456 person-years (PY)
    - For ITER Central or Field Teams
    - 180 professional person years (84 at ITER site, 96 in Field Teams)
    - 276 support person years (84 at ITER site, 192 in Field Teams)
  - Cash contribution for installation and common site expenses; with in-kind contributions, completes US commitment to ITER value

How ITER will be Organized



US ITER Project Organization



Activities of the US ITER Project

- US ITER Project Office/Domestic Agency was established in July 2004
- Pre-CD-1 DOE/SC “Lehman Review” in March 2005
  - Reviewed draft US project execution plan, acquisition strategy, etc.
  - Address the cost range including contingencies and risk management
  - Ready for CD-1 pending DOE independent cost review planned for late FY’ 06

Activities of the US ITER Project (cont'd)

- Development of the FY06 work plan
  - President's FY06 budget request: $6M (Prep) + $3.5M (OPC) + $46M (TEC)
  - Appropriated FY06 budget request: $6M (Prep) + $3.5M (OPC) + $16.1M (TEC)
    - Consistent with readiness to proceed, reduced due to ITER delays
  - FY06 tasks under review
    - Delayed by Continuing Resolution (Appropriations Bill now passed)
    - US seeking agreement on in-kind procurement allocations that reduce risk
- Preparation of the Team
  - Project Office solicited expressions of interest for staff candidates
  - Project Office is preparing solicitations for personnel and team selections
- Preparation for the DOE/SC and OECM reviews (April, Summer 2006)

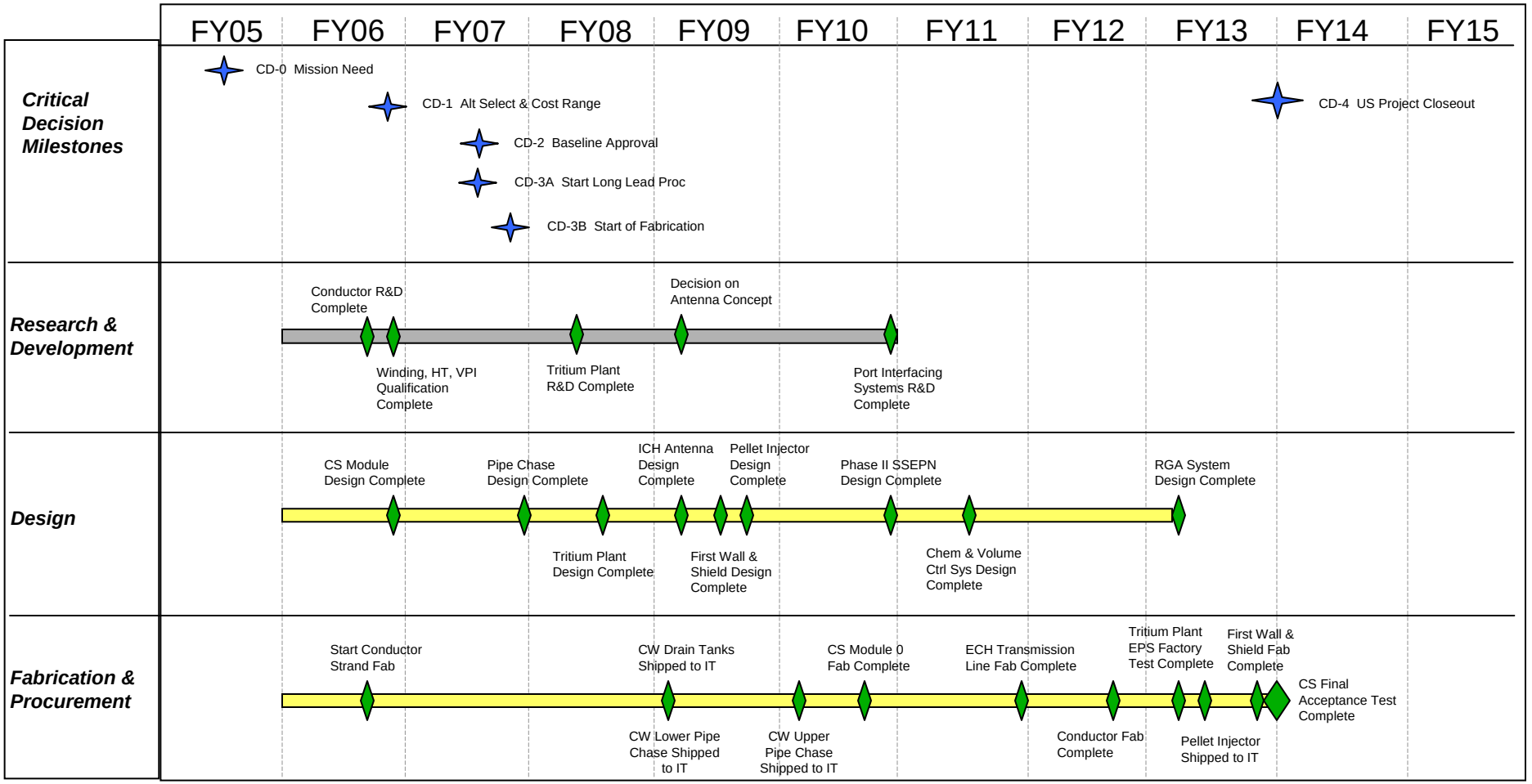
The Project Issued a Solicitation of Expressions of Interest

- **To explore interest in positions on the USIPO, the USIPO requested expressions of interest in US ITER positions:**
  - Chief Scientist
  - Chief Technologist
  - Project Engineer
  - Magnet Team Leader/Support
  - Blanket/Shield Module Team Leader/Support
  - Diagnostics Team Leader/Support
  - ICH Team Leader/Support
  - ECH Team Leader/Support
  - Tritium Team Leader/Support
  - Vacuum/Fueling Team Leader/Support
  - Electric Power Team Leader/Support
  - Cooling Water Team Leader/Support
- **230 responses were received by the deadline**
- **The USIPO is using the responses in our planning of procurements**
- **We expect to issue personnel actions and team-procurement actions later this year**

Based on International and Domestic Project Status, the US Critical Decision Schedule Has Been Refined

CD-0	**Approve Mission Need**	**2005 (A)**
CD-1	**Approve Preliminary Baseline Range**	**2006**
CD-2	**Approve Performance Baseline**	**2007**
CD-3	**Approve Start of Construction**	**2007**
CD-4	**Approve Start of Operations (Project Closeout)**	**2013**

US ITER Schedule (March 2005)



Risk Management Under Way

- Risk management principles established in Preliminary PEP
  - Builds on lessons-learned from other collaborative projects (including SNS, NCSX)
  - WBS managers will identify risks and develop/implement mitigation plans, US ITER Project Office manages mitigation effectiveness
- Risks identified bottoms-up:
  - Structured method considered technical maturity, cost/schedule, likelihood/consequences
- Project contingency estimate considers risk-based assessments
- Initial mitigation strategies include:
  - R&D and prototyping
  - Early industrial involvement in fabrication planning

Many US ITER Risks Derive from ITER Responsibility for Design and Integration

- Technical
  - Designs shared with other Parties not mature (Blanket, Pellet injector…)
  - Some technical issues (i.e., conductor jacket material) unresolved due lack of ITER staff (recent dialogue indicates some improvement)
- Cost
  - ITER planned design activity has slipped, may require Parties to help recover (US ITER preliminary cost range includes added design)
  - Comprehensive design review anticipated by Director General
  - Complexities of International involvement (exchange rates, interfaces, change integration and approval…) (ITER Agreement, prioritize management systems input thru US secondees)
- Schedule
  - ITER Project schedule requires updating
  - ITER schedule delays (site, senior staff) may be dragging US beyond 2013
- Management
  - ITER procedures, processes, and staff are needed for procurement package approvals
  - Parties (include US) scope remains provisional until ITER Agreement

Expectations for FY '06

- International Organization
  - Selection of Director General, management team and key staff
  - Establishment of management arrangements and roles/responsibilities
  - Review and key decisions on the design
  - Finalization of procurement allocations
- US Project Activity
  - Advancement of the R&D and designs for US in-kind contributions
  - Achievement of Lehman Review, OECM review, and Critical Decision 1
  - Selection of team leaders and design-performers in most areas of contribution
- Linkages to the Physics Research Community
  - Selection and activity of the Chief Scientist on the US ITER Project Team, emphasizing bi-directional linkages
  - Engagement of the US Burning Plasma Organization in planning and execution of Physics Tasks and positioning for US Burning Plasma Research on ITER

Bottom Lines…

- The International ITER Project is moving toward construction (site selection and activation, DG, near finalization of International Agreement)
- The ITER Organization and party roles are being refined in light of possible entry of a new partner, of attempts to improve project effectiveness, and to reduce costs
- The US ITER project scope is being finalized and the Project is engaged in the DOE project management process, with emphasis on cost-reduction and risk management
- Research in science and technology, facilitated by the US BPO, is key to success of the design and positioning for ITER research
  - Design issues: materials, disruptions and ELMs, plasma control tools
  - Research issues: identification and extrapolation of hybrid and steady-scenarios to ITER and arguments for optimum mixes of heating and current-drive tools are needed

US ITER Project is Ready to Proceed as ITER Uncertainties are Resolved

- DOE 413.3 requirements and intent met for CD-1:
  - Integrated Project Team is established
  - CDR and Acquisition Strategy identify ITER and US ITER MIE as preferred design alternative and approach to meet the mission need
  - Acquisition Strategy minimizes US risk thru fixed-price, best-value fabrication procurements, clear closeout criteria, strong central management of domestic participants and up-front risk planning
  - Preliminary PEP contains collaborative management tools/approach
  - Preliminary cost estimate range is consistent with the maturity of the design and risks
  - Ready to continue with preliminary design following final scope allocations
- Preliminary schedule meets known ITER needs (but these needs may be changing)
- Risk management in progress, many risks to the US project are from non-US sources
- Plans and activities for preparing the US baselines are identified, aggressive, and depend on budget and ITER site, management decisions