DATED: 02/22/01

EXHIBIT V
TECHNICAL APPROACH STUDY PRODUCTS LIST

1. Mission Description (including at least the following)
   - 1.1. Mission Sequence of Events
   - 1.2. Launch period(s)
   - 1.3. Launch energies (Maximum C_3 for the launch period, start and end of launch period C_3)
   - 1.4. Launch vehicle, including any identified options
   - 1.5. Launch vehicle injection capability
   - 1.6. Trajectory description including relevant departure, arrival, and cruise plots and/or animations
   - 1.7. Arrival V_8 at Mars and Earth
   - 1.8. Relevant geometry quantities (including, but not limited to, Sun-Earth-Probe, Sun-Probe-Earth, solar conjunction periods)

2. Flight System Description (including at least the following)
   - 2.1. Overview of all flight system elements
   - 2.2. Mass lists and power requirements, including at least current best estimate and identification of mass and power growth rationale for margin levels, power budgets should identify power utilization and margins during critical mission phases (i.e. launch, maneuver, EDL, etc.)
   - 2.3. Functionality
   - 2.4. Block diagrams for system and critical subsystems (where appropriate)
   - 2.5. Computing needs and margins
   - 2.6. Degree of autonomy
   - 2.7. Identification of all relevant margins, including launch margin above expected mass including growth contingency
   - 2.8. Heritage assumptions
   - 2.9. Critical interface properties
   - 2.10. Robustness to off-nominal conditions
   - 2.11. Redundancy, treatment of single point failures

3. Planetary Protection
   - 3.1. Strategies for meeting forward and back planetary protection requirements
   - 3.2. Benefits of deviations from requirements

4. Required Infrastructure
   - 4.1 Deep Space Network tracking requirements
   - 4.2 -Mars Program infrastructure requirements at Mars (telecom network is one example)

5. Operations
   5.1. Operations concept
   5.2. Operations development
   5.3. Flight team composition and responsibilities
   5.4. Operations margins (for example, up and downlink flight system buffers and required data download intervals)
   5.5. Operations phase flow diagram showing data and command flow to and from flight system and including all ground elements and operations teams

6. Technology
   6.1. Assumed performance for advanced technology elements and basis of assumptions
   6.2. Fallback options if technology performance is not achieved and impact
   6.3. Required technology demonstrations

7. Cost and Schedule
   7.1. Overall mission schedule including development, integration and test, and operations
   7.2. Overall development cost, and cost profile per development phase and per NASA fiscal year
   7.3. Assumptions regarding benefits from duplicating systems flown in technology demonstrations
   7.4. Cost and schedule risk, cost uncertainty
   7.5. Basis of cost (nominal and uncertainty) and cost estimating methodology (analogy, parametric, grass-roots are some examples)
   7.6. Identify schedule and cost reserves
   7.7. Cost elements (estimates not required) for technology development and demonstration and for mission operations