Appendix 1. Work Breakdown Structure

Current status: 611/1451 hrs, 42% Completion

1. Preliminaries and Research – 75% complete, 65 hrs remaining
   a. Research (145/165 hrs)
      i. Feed Selection (25/40 hrs)
      ii. General Gasifier Technology (40/40 hrs)
      iii. Reactor Design (30/30 hrs)
      iv. Tar Production (20/20 hrs)
      v. Efficiency (20/20 hrs)
      vi. Synthesis Gas Analysis (10/15 hrs)
   b. Project Definition (15/15 hrs)
   c. Project Planning (20/40 hrs)
      i. Work Breakdown Structure (10/20 hrs)
      ii. Gantt Chart (10/20 hrs)
   d. Consultations (17/41 hrs)
      i. Remelts (3/3 hrs)
      ii. Elenbaas (4/8 hrs)
      iii. Jasperse (10/30 hrs)

2. Design – 67% complete, 64 hrs remaining
   a. Define Design Alternatives (52/49 hrs)
      i. Reactor Type (10/10 hrs)
      ii. Feed Selection (2/2 hrs)
      iii. Air Feed (5/5 hrs)
      iv. Heat Exchanger (10/10 hrs)
      v. Manifold System (15/5 hrs)
      vi. Reactor Dimensions (5/7 hrs)
      vii. Ash Removal (5/10 hrs)
   b. Design Decisions (52/80 hrs)
      i. Reactor Type (10/10 hrs)
      ii. Feed Selection (2/5 hrs)
      iii. Air Feed (5/10 hrs)
      iv. Heat Exchanger (20/25 hrs)
      v. Manifold System (8/15 hrs)
      vi. Reactor Size (5/8 hrs)
      vii. Ash Removal (2/7 hrs)
   c. Modeling (15/30 hrs)
   d. AutoCAD (10/20 hrs)
   e. Functionality Tests (2/16 hrs)

3. Documentation – 46% complete, 210 hrs remaining
   a. Posters (15/25 hrs)
   b. PPFS (140/130 hrs)
i. Outline (5/5 hrs)
ii. Drafting (105/105 hrs)
   1. Intro (4/4 hrs)
   2. Table of Contents (4/4 hrs)
   3. Project Management (20/20 hrs)
   4. Requirements (5/5 hrs)
   5. Task Specifications and Schedule (10/10 hrs)
   6. System Architecture (2/2 hrs)
   7. Design Criteria (10/5 hrs)
   8. Design Decisions (35/30 hrs)
   9. Testing and Optimizing (5/5 hrs)
  10. Business Plan (10/10 hrs)
  11. Conclusions (10/10 hrs)

iii. Revising (20/20 hrs)
   c. Presentations (20/70 hrs)
   d. Devotions (5/5 hrs)
   e. Final Report (0/160 hrs)
      i. Outline (0/5 hrs)
      ii. Drafting (0/120 hrs)
      iii. Revising (0/35 hrs)

4. Construction – 5% complete, 577 hrs remaining
   a. Order Materials (20/25 hrs)
   b. Learn Shop Procedures (8/20 hrs)
   c. Construction (0/90 hrs)
      i. Cut Pipes (0/20 hrs)
      ii. Cut Sheet Metal (0/20 hrs)
      iii. Insulation (0/10 hrs)
      iv. Mounting (0/20 hrs)
      v. Finishing (0/20 hrs)
   d. Startup (0/90 hrs)
   e. Optimization (0/150 hrs)
      i. Air Feed (0/50 hrs)
      ii. Fuel Feed (0/50 hrs)
      iii. Temperature (0/50 hrs)
   f. Design Revisions (0/40 hrs)
   g. Optimization Stage 2 (0/150 hrs)
      i. Air Feed (0/50 hrs)
      ii. Fuel Feed (0/50 hrs)
      iii. Temperature (0/50 hrs)
   h. Final Revisions (0/40 hrs)