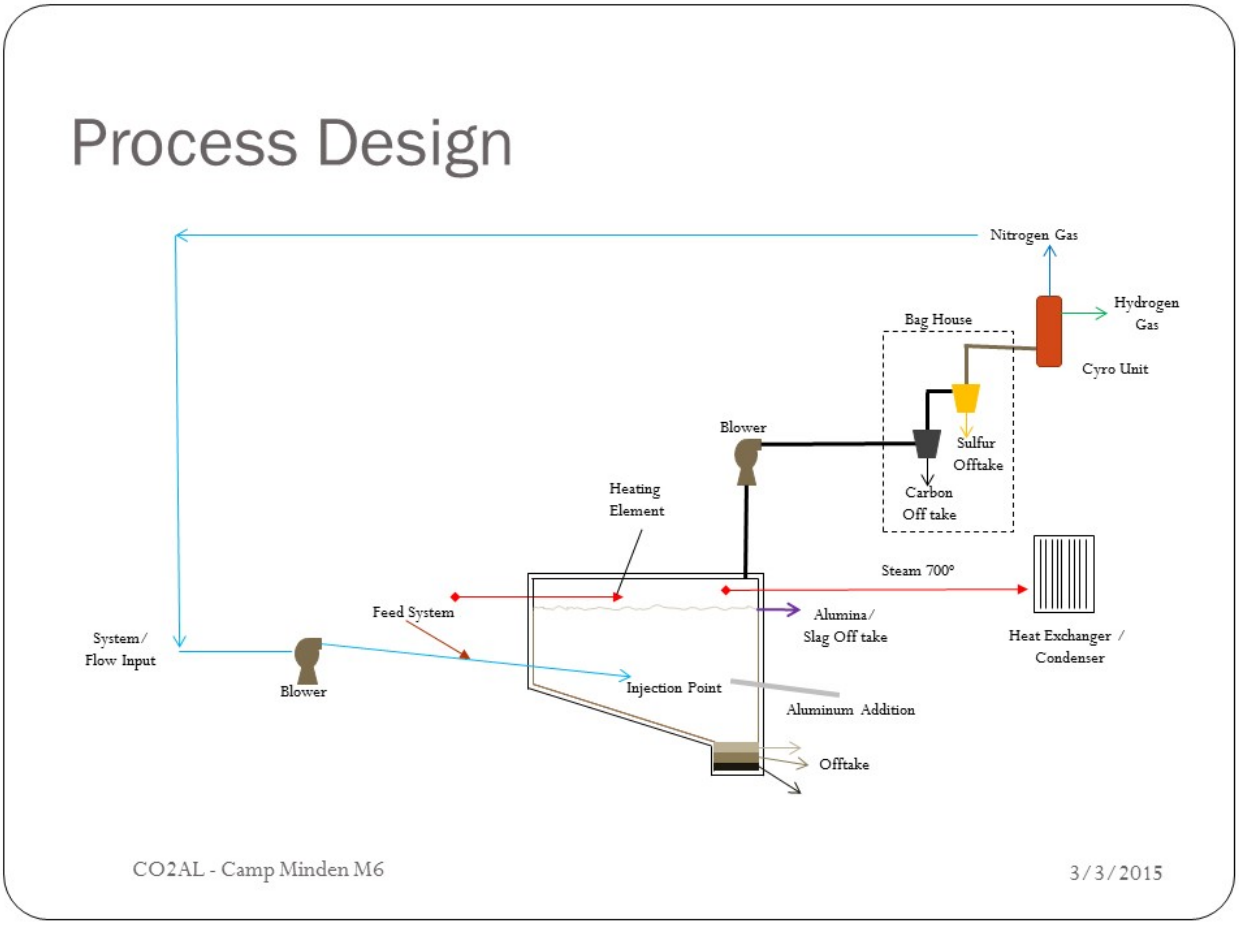
Technology

1) The bridge process uses a molten aluminum alloy in an anoxic environment to reduce compounds to their elemental state. The process operates from 600-900 deg C. The alloy is developed based on the compounds to be treated within the system. The system operates in oxygen free environment, generally either nitrogen or argon. Organic compounds are reduced to their elemental state such as carbon, hydrogen, sulfur. Some elements combine with the alloys to create metal oxides (alumina (Al2O3)) or salts (AlCl3). All the elements are captured for resale.
2)



3) We require natural gas, propane or electricity to initially heat the aluminum to the melting point. The process is exothermic and does require a heat source once it is operating. Once the system is operating, we will require electricity to operate the blowers, water pump, control system, cyro unit (should it be decided to capture the hydrogen) and the air quality monitoring system.
4) Aluminum 0.5 lb/lb of M6, and other metals in small quantities.
5) No special needs required.
6) The feed system is controlled, should the heat start to rise in the feed tube, the feed system will shut down, the blower system will continue to operate, forcing any material into process cell. Once the temperature has dropped to operable ranges the feed system will resume. The

temperature of the pool will be controlled using a negative feedback tied to the feed system. This negative feedback will maintain the pool at optimal temperature. The aluminum alloy has a high affinity for oxygen, as the material enters the pool, the aluminum will strip the oxygen from the various compounds in the M6 forming alumina. Alumina is very stable at the operating temperatures. Combining the stability of the alumina with the nitrogen environment of the treatment vessel, should limit the reaction with in the process cell.

7) No pretreatment is required.
8) We are working with an Engineering design company to develop a method to hand the M6 and feed it into the system. We also look to the DOD for direction in handling the M6.
9) No, this technology is not currently approved by the DOD

Equipment

1) The technology is designed off of 100 year old aluminum smelting technology, combining sparing technologies from the steel industry and other metal production technologies. The machine is designed with a 2 year run time, at which time the treatment vessel will need to be relined. We use standard off the shelf components to do the air quality monitoring. The process will only off-gas excess nitrogen. The hydrogen can be captured using a cyro, burned with oxygen to generate water or flared. The elemental material will be removed using a standard bag house.
2) We will need the about 1600 sq ft per machine.
3) No pretreating is required. We will use standard equipment (fork lift) to move the bulk materials: propellant and aluminum and the carbon, sulfur and alumina created by the process. Small batches of propellant and the aluminum feed bars will be transported by hand.

Relevant Experience

1) We have no experience treating M6 or CBI using this process. We have demonstrated its effectiveness in gasifying lignite coal.
2) We have no experience handling other propellants
3) We have not had the opportunity to visit the site to develop a plan to transport / manage and handle the propellant from the bunker to the disposal site. We would need to see the placement of the disposal site relative to the bunk to be able to develop this plan.
4) Yes, we have the backing to build the machines, delivery them to the site, setup and start the process.

Capacity & Throughput

1) The machine can be designed to handle various rates of throughput. We are looking at a design of 2 machines designed to handle a conservative flow rate of 30 lb/min. This would allow for full treatment of the M6 within 180 days of the start of operations.
2) The optimum operating efficiency of the system is to run 24/7/365.
3) This is not a batch process.
4) We envision running 2 machines.
5) No planned maintenance is required during the operational window.

Waste

1) Each potential off-gas point will have a dedicated GC to continuously monitor the off gas. The off gas can be returned to the process for treatment should the air quality monitoring system record an unusual spike in the off-gas.
2) We expect 100% destruction of any organic compound. Any compound containing an oxygen molecule will be reduced. The off gas will be monitored using a GC, if an unexpected spike is recorded the off gas will be returned to the process for treatment.
3) The process does not create "wastes". Everything recovered from the process is marketable, carbon, sulfur, alumina, hydrogen and possible some salts. We have already talked to companies that are interested in purchasing the alumina for their process.
4) We will sample all of the off take from the process on a daily basis to verify the effectiveness of the treatment process. Based on the chemical composition of the M6 provided to us for review, we do not expect to see any secondary compounds other than alumina.
5) We plan to sell the off take from the system on the open market.

Health and Safety

1) First and for most, all individuals must be trained in the safe handling of the M6 propellant and CBI. We will be dependent on the DOD, Louisiana National Guard and those at Camp Minden to train all personnel in the safe handling and transportation of these materials. Safe working procedures, JSAs and working documents will need to be developed, working with the DOD, Louisiana National Guard and those at Camp Minden.

   The feed system will need to be tested prior to full run up to ensure it operates as planned to prevent a flash back into the material holding vessel. The material feed system will need to be design to minimize the amount of propellant available to be oxidized and a water flood system should be designed into the holding vessel, should something unexpected occur.

   Care must be taken when operating the system as it extremely hot. Surfaces can reach temperature well about safe touch temperatures of 120 deg F. The molten alloy, alumina and other materials removed directly from the process must be handled with extreme care. Elemental alumina, carbon and sulfur, while stable can present a health hazard and procedures will be in place to insure the correct handling and transportation of these materials. Hydrogen is a lighter than air gas that burns readily and is explosive, based on the ultimate decision on how we will handle the produced hydrogen, when we get the contract, procedures will need to be put in place.