

My name is Lou Basel and I have lived in Stamford, Connecticut for 50 years. I am writing about the proposed Sewage Sludge Gasification plant for Stamford because I believe it is premature to appropriate money for a project whose technology has not been proven and whose economic feasibility has not been determined.

I am 82 years old and I've worked in the engineering design and construction of chemical plants for over 35 years. I have two degrees in chemical engineering from M.I.T. (B.S. 1949 and M.S. 1950). One of the very first chemical plants I designed was a coke oven gas plant for U.S. Steel in Gary, Indiana. I mention this because coke oven gas plants have similar problems to those associated with biomass gasification plants. As Chief Chemical Engineer and later President of Crawford & Russell, Inc., I have either designed or supervised the design of hundreds of chemical plants in the U.S. and abroad. I think I am qualified to comment on chemical process development and the design of chemical plants.

On Monday, March 23, 2009, I and a group of concerned Stamford citizens met with Jeanette Brown, Executive Director Stamford WPCA, and two engineers who were working on this sludge gasification project. We learned much about the status of this work. Following is a list of our comments regarding the development of a sewage sludge gasification process by the City of Stamford.

1. Engineers working for the City of Stamford have no experience in the design, development and/or operation of chemical plants and should not be attempting to develop a chemical process.
2. The Stamford WPCA has built the so-called Stamford Bio-Gas pilot plant which is described on the WPCA website. I was not impressed by the descriptions of the various steps in the process because I could see many potential problems in its design. Then, at the March 23rd meeting, we learned that the process being developed in the pilot plant was not going to be used in the full-scale plant but, instead, proven technology would be licensed from an outside source. This was good news, but why was the pilot plant built in the first place and why continue to operate it? The pilot plant should be shut down immediately and abandoned. Although some information would have been learned by the operation of this pilot plant, it would have been better to send a qualified chemical engineer to the Balingen, Germany plant which is operating using the proposed Kopf AG technology). He/she would have learned about any problems in the operation and if it was indeed a technology which could be used in the Stamford operations. A great deal of money would have been saved if this was done instead of building and operating the pilot plant.
3. We learned from the Stamford Bio-Gas website that engineering design of the full-scale sewage sludge gasification plant was being performed by CH2M Hill and Ms. Brown confirmed it at the March 23rd meeting. But, how can a full-scale plant be designed before the process technology has been selected? How does CH2M Hill know what to design? This is putting the cart before the horse. The technology has to be selected first! How was \$3,000,000 authorized for the full-scale plant design before the technology was selected and licensed? Didn't the Boards of Finance and Representatives require a feasibility study before authorizing the expenditure of such a large sum?

4. The Kopf company in Germany was one of the technology suppliers being considered by the Stamford WPCA for the sewage sludge gasification process. I checked their website (<http://www.stowa-selectedtechnologies.nl/Sheets/Sheets/Kopf.gasification.process.html>) and read the following statement “Until now one pilot-plant has been realised in Balingen (Germany), at a thermal power of about 120 kWh and a maximum sewage sludge throughput of 150 kg/h (85% D.S.).” This capacity is only about 25% of the required Stamford feed rate. This report is dated June, 2006. As far as I know, no other sewage sludge gasification plant using Kopf technology has been built anywhere in the world since the installation of the Kopf plant in Balingen. Why not? Have the Balingen engineers been contacted to find out how the plant is running? Has anyone asked Kopf why no other sewage sludge gasification plants have been built? I understand that, at the Board of Finance meeting on March 25th Ms. Brown mentioned a 2 MW plant using Kopf technology was being designed or built. She did not mention this proposed plant at our March 23rd meeting. Is this something new? I have sent an email this morning to the Kopf AG company asking them about any new plants using their technology. It would be good to learn from Ms. Brown more information about this proposed plant: where is it being built? What is its capacity? What is the feed material? What are its estimated capital and operating costs, etc.?

5. There was some misinformation given at the March 23rd meeting. It was stated that the synthesis gas (syngas) produced in the pilot plant (using the gas composition reported on the WPCA website) has a high heating value and that it is 75% of the heating value of propane. This is false! The syngas heating value is less than five percent of that of propane. The heating values of carbon monoxide and hydrogen were also reported as being “high”. False again; the heating value of these gases is 310 btu/cubic foot, the lowest of all the commonly used fuel gases. Stamford syngas is 61% nitrogen and 10.8% carbon dioxide both with zero heating values. The calculated heating value for the Stamford syngas is 118 btu/cf. (compared to 1000 btu/cf for natural gas). Thus, the synthesis gas produced in the Stamford Bio-Gas pilot plant is a very poor fuel. And it is expected that the synthesis gas produced in the Kopf process would have similar characteristics. How could a syngas which is composed of 72% inert gases have a heating value which is 75% of propane. This claim is ridiculous.

6. At the meeting with the SWPCA, the removal of CO₂ from the internal combustion exhaust gas was discussed. The use of some sort of bio-filter to sequester the CO₂ was mentioned. I am not up-to-date on developments in CO₂ removal but my guess is that any such devices are expensive and not suitable for a full-scale design. If they are practical, every coal burning power plant in the world would be using them. I did look on the internet to see what was being done to remove CO₂ from stack gases, and what is discussed mostly is the sequestering by compressing the CO₂ and burying it in deep underground formations. I don't know what the economics are for this method or if it is even allowed on the East Coast. My guess is that you would have to use a lime scrubber to remove the CO₂ which results in the problem of neutralizing and disposing of nasty lime sludge.

7. Regarding the economic feasibility of the project, an estimate should be prepared of the capital and operating costs (including amortization) of a full-scale facility using the Kopf operating data from the Balingen, Germany plant. This requires a conceptual design of the plant which need not be too costly because it is not a detailed design. Any competent chemical engineering design

company could do this. This would tell you if the sewage sludge gasification project should be considered any further after comparing it with other means of disposal of the sewage sludge. Until a feasibility study is conducted, **no one** knows what the economics are of this project. How can an expenditure of \$40,000,000 be authorized for a project with unknown economics?

~~8. It was mentioned at the SWPCA meeting that the pelletized sludge is raw sewage which has not undergone secondary treatment. Does this mean that all of the secondary treatment facilities at the Stamford sewage works are sitting idle? At a previous meeting with the WPCA, I was told that \$130,000,000 had been spent in upgrading or building new sewage treatment facilities for Stamford. And I believe that \$15,000,000 was spent on the sludge drying and pelletizing plant. If some of these facilities are no longer being used, has much of this money been wasted?~~

Paragraph deleted by Mr. Basel 3/28/09.)

9. The proposed \$40,000,000 was based on a sewage sludge gasification plant producing an initial 1 megawatt of electricity, which would be expanded to 15 megawatts. That would have required the feeding of sewage sludge from 14 cities the size of Stamford to the WPCA gasification plant. The sewage from half the population of the State of Connecticut would have to be trucked into Stamford. Now we learned that Ms. Brown has reduced the size of the expanded plant to 5 megawatts. This would require sewage sludge from a population of about 600,000 people or all of Bridgeport, New Haven, Hartford, and more. Are the citizens of Stamford prepared to see trucks hauling sewage from all over Connecticut into our town? Furthermore, the proposed \$40,000,000 which was based on a 15 megawatt plant should have been reduced to one-third for the 5 megawatt plant, but even that figure is just a wild guess. There is no capital cost estimate of the full-scale plant of any capacity. How can money be authorized for a project of unknown cost?

These are some of the reasons why I and other Stamford citizens are concerned about the proposed WPCA projects. In my opinion, the SWPCA should shut down the pilot plant, stop all design work by CH2M Hill, withdraw the appropriation request for the sewage sludge gasification project, and re-think the strategy behind this whole concept. There is an orderly way in which such projects should be progressed; what is being done with the proposed sewage sludge gasification project makes absolutely no sense.

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