**Department of Energy**
Washington, DC 20585

AUG 23 2001

Mr. Steve Woodward
Syntroleum
1350 South Boulder
Tulsa, OK 74119

Dear Mr.Woodward:

We are continuing to evaluate your petition, dated May 31, 2000, to have Syntroleum Fischer-Tropsch diesel fuel designated as an alternative fuel under the U.S. Energy Policy Act of 1992.

We are conducting a completeness review to determine that sufficient data have been provided, and a technical review of the data to evaluate the candidate fuel.

In order to be deemed "complete," a petition must include sufficient data to allow the Department to determine if the candidate fuel meets the statutory criteria, specifically, whether the fuel: 1) is substantially non-petroleum; 2) would yield substantial energy security benefits; and 3) would yield substantial environmental benefits. At the beginning of our technical review, we identified some questions that ,when resolved, will help us in making our determination.

One of the attachments to this letter contains tables that will assist you in recording the appropriate data needed by the Department to finish our completeness review. Adherence to this format is not required, but would facilitate our review.

As we continue our review process, we would like to inform you of our overall plans for disposition of your petition. The Department has received two petitions, similar to yours, to designate diesel fuels made using the Fischer-Tropsch process (or variants of that process). After performing the review process, we plan to hold a workshop to solicit information and comments on all complete petitions. This workshop will be open to the public and allow us to gather more input regarding Fischer-Tropsch processes and products.

When the notice is published, your petition, and the other two petitions, will be placed in the public docket. The approach we have chosen will facilitate an expedited petition review and allow the Department to initiate our rulemaking as soon as possible.

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We are requesting that the petitioners reply to us with the answers to the attached questions within 30 days of the date of this letter.

We believe this approach will facilitate an efficient resolution of your petition. Should you have any questions, please contact me at 202-586-6116.

Sincerely,

Linda Bluestein

Linda Bluestein
Program Manager
Alternative Fuel Transportation Program

Attachment 1

**Petition Reviewers' Questions**

1. ***Distinguishing between S-2 and FT Naphtha.*** The Syntroleum design produces naphtha and middle distillates (S-2, as Syntroleum calls it). Syntroleum states that S-2 can be used either as a CIDI fuel or a fuel cell fuel. But we thought that the naphtha from FT plants could be used as a fuel cell fuel, not the FT diesel. Please clarify.

2. ***Co-Generated Steam.*** In its 02/19/2001 response to DOE, Syntroleum states that its FT design produces low-pressure (LP) steam with 140 psi and high-pressure (HP) steam with 700 psi. We'd like to know the split between the two types of steam.

   Syntroleum indicates that it will upgrade LP steam to HP steam with tail gas or other process fuels. Please clarify if this is the design intention. In this case, we'd like to know if energy used for the upgrade is taken into account in energy efficiency calculations.

   In Tables 3 and 4, Syntroleum presents data for two different FTD plant designs – one with steam export only, and the other with steam and electricity export. Oddly, the amount of steam exported with the option of steam and electricity export is greater than the amount of steam exported with the option of steam export only. This may be due to different qualities of steam from the two designs. If so, please specify the pressure and temperature of the steam from each design.

   The pressure of HP steam (700 psi) is still far below the pressure of the steam from steam boilers in electric power plants for electricity generation (above 2000 psi and above 1000 F of temperature). Thus, it is conceivable that the efficiency of electricity generation with the FTD HP steam will be still below the efficiency of conventional electric power plants. What is the electricity generation efficiency with the 700-psi steam that is assumed by the Syntroleum in its analysis?

3. ***Water Export.*** Syntroleum states that roughly one barrel of water is produced for each barrel of FT product. How much of the water potentially could be exported as a commercial product, besides its use as boiler feed water in FTD plants?

4. ***Three Cases Analyzed.*** Among the three cases of FTD plant designs (standalone, steam export, and steam and electricity export), economics may prevent the third case (design with both steam and electricity export), especially when one notices the infrastructure requirement for and costs of exporting both steam and electricity. One might expect that FT plants may be designed to export only one of the two products, not both, in most cases.

5. ***P.47, Hydrogen and Process Fuel Requirements to Produce 15-ppm Diesel and Light Cycle Oil (LCO).*** Based on the input and output data in the table on this page, we calculate a refinery energy efficiency of 95% for 15-ppm diesel and 88% for LCO. The 15-ppm diesel efficiency seems too high. There might be some other refinery energy uses missing from this table. Please clarify this. In any event, please provide overall refinery energy efficiencies for 15-ppm diesel and LCO.

6. ***Sub-Quality Gas.*** On Page11 of the petition, Syntroleum states the potential use of "sub-quality gas" for FTD production. What are the energy efficiency and emission consequences of using sub-quality gas, relative to pipeline-quality gas?

7. ***Please Provide the following***:

   Density of the fuel (in grams/gallon)

   Carbon content by weight

   Sulfur content by weight

   Heat content (Btu/gallon, lower and higher heating values.)

8. What are the aromatic, olefinic and paraffinic contents of S-2 by ASTM D5291, or equivalent method?

9. What are the physical and chemical property specifications for S-2?

10. Are results available for the biodegradibility or S-2 per ASTM E1720-95 or equivalent method (OECD method 209 Pseudomonas putida Growth Inhibition Test)?

11. The petition gives a batch analysis of S-2 in with the emissions test results. Is this analysis typical of the S-2 fuel covered in the petition? If not, which fuel properties may vary? How much can the fuel properties vary from the results given in the batch analysis in the petition?

12. Provide the oxygen content, in percent, of the S-2 fuel.

Attachment 2

Table 1. Co-Product Outputs Per Million Btu of Fischer-Tropsch Fuel

| **Output** | **Relative Btu Content** |
|---|---|
| Fischer-Tropsch Fuel | 1 million Btu |
| Co-Product #1: _____ | _____ Btu |
| Co-Product #2: _____ | _____ Btu |
| Co-Product #3: _____ | _____ Btu |
| Co-Product #4: _____ | _____ Btu |
| Co-Product #5: _____ | _____ Btu |
| Co-Product #6: _____ | _____ Btu |

Table 2. Energy Inputs Per Million Btu of Fischer-Tropsch Fuel

| **Energy Inputs** | **Relative Btus** |
|---|---|
| Natural Gas | _____ Btu |
| Diesel Fuel | _____ Btu |
| Gasoline | _____ Btu |
| Petro-Chemical (specify all) | _____ Btu |
| Coal | _____ Btu |
| Electricity | _____ Btu |
| Other | _____ Btu |
| Other | _____ Btu |
| Other | _____ Btu |