6 October 1975

To: P. D'Addario/F. Faust

From: J. E. Levangie

Subject: 15 October AIAA Energy Speech Notes

Copy: H. Rosenbaum

For your use in drafting Paul's AIAA energy speech for 15 October, I have gathered the following items for possible inclusion:

A. Introductions

1. Paul's background, pleasantries, etc.

   a) Energy and Environment Subcommittee role

   b) Represents Rte 128 and many aerospace companies (eg, Avco, Mitre, Raytheon)

   c) Unresolved energy problems and unemployed aerospace engineers don't make sense

2. Agenda: Want to briefly touch upon possible answers to four basic questions:

   a) Just how real and how permanent is our present "Energy Crisis"?

   b) How is New England's energy position different from that of the rest of the country

   c) How will ERDA help?

   d) What role can New England technologists play?

B. The Energy Problem is Real!

1. As President Ford put it in presenting his January Energy message to Congress, "I've got some bad news and I don't expect any applause." Energy problems have reinforced already severe problems of unemployment and inflation.

2. The higher cost of oil caused the United States in 1974 to suffer its second worst trade deficit in history--$3.07 billion. As Secretary of Commerce Frederick B. Dent pointed out, "Without the burden of tripled petroleum import costs our trade account would have been in surplus by $14 billion."

3. History tells us, however that man is resourceful. Since the dawn of time, man has faced and eventually solved one energy crisis after another.

   a. According to the New York City Museum of Natural History, the first "energy" shortage occurred during the Paleolithic times, the second period of the Stone Age, when early man exploited large herds of mammals and subsequently faced a shortage of animal food. Result: the development of agriculture.

   b. Thousands of years later, the ancient Romans based their economy on manual labor and when the population dropped sharply in the fourth century A.D., Rome faced a manpower shortage. Result: the Romans developed water power.

   c. Some 1,000 years later, the reliance on timber to fulfill energy requirements drove up the price of firewood eight times between the end of the 16th and the middle of the 17th centuries. And in 1653 in England, the shortage reached crisis proportions prompting the government to impose conservation measures. Result: coal replaced firewood.

   d. In recent years, industrial nations have satisfied their huge energy requirements with fossil fuels such as oil, gas and coal which today are becoming increasingly more difficult to find and more costly to produce. Oil and gas may run out domestically within 40 - 50 years.

4. The Middle East situation has greatly aggravated the problem.

   a. Political blackmail using oil is increasingly a threat to our economy; Saudi Arabia and Kuwait, for example, are in a position to cut back oil production by 6 to 7 million barrels a day.

   b. Since Sept. 1973, just before the Arab oil embargo, fuel prices have soared:

i. natural gas for homes is up 36%

ii. gasoline is up 51%

iii. home heating oil is up 117%

5. The real root of our problem stems from our acknowledged affluence.

a) As 6 percent of the world's population, we consume one-third of its resources.

b) Our energy demand curve is accelerating

i. It took 50 years (1900-1950) for our rate of energy consumption to increase from 4 to 16 million barrels per day of oil-equivalent

ii. It only took 20 years (1950-1970) for the 16 million to become 32 million.

c) Since GNP is directly correlated to energy consumption policies to cut back energy consumption per se could severely impact our economy.

6. The real answer lies in improved efficiencies through conservation and in developing additional energy sources.

C. The Problem is More Severe in New England

1. New England has no immediately identifiable source of indigenous fossil fuels that can be economically extracted.

2. New England is more dependent on oil than the rest of the country; 88% of the region's total energy needs come from petroleum.

3. Costs of fuel in New England are 20% higher than the national average, and at least 30% higher than that of the lowest state.

4. The high energy costs in Massachusetts are literally driving industry out of the state. While 29% of the industry in the nation is rated energy-intensive, only 8% of Massachusetts' industry fits into that category (and service industries have not fully replaced mills, etc.).

5. New England's energy options are limited:

   a) Curtail demand (requires conservation)

   b) Expand exploration (offshore, etc.)

   c) Expand nuclear capability

      i) Expected to go from 2% of supply (1970) to 40% (2000).

      ii) Requires faster approval cycles

   d) Coal conversion (post-1985)

   e) Canadian imports (will be limited)

D. What About ERDA?

1. Purpose: "to bring together federal activities in energy R&D and assure coordinated effective development of all energy sources."

2. $5 billion budget ---just started operations on 19 January--- formed from AEC, NSF, EPA, and Bureau of Mines

3. Just published a two-volume National Plan for Energy RD&D--- "must reading" for anyone wanting to deal with ERDA (Paul might want to have plan on hand for display purposes).

4. Scope of ERDA programs includes:

   a) Fossil Energy Programs

      - Coal conversion and utilization
        - liquefaction
        - gasification
      - Petroleum, natural gas, and oil shale
      - Advanced technology, including
        - Materials research
        - Combustion systems
        - Extraction technology
        - Offshore drilling technology
        - Reclamation technology

b) Nuclear Energy Program

- Reactor R&D including:
  - Liquid metal & gas-cooled fast breeder reactors
  - High temperature gas-cooled & molten salt breeder reactors
  - Advanced reactor fuels technology development
- Naval Reactors
- Space Nuclear Systems
- Nuclear Materials Production and Management

c) Environment and Safety Program

- Biomedical and environmental research
- Waste management and transportation
- Operational safety
- Reactor safety research coordination

d) Advanced Energy Systems Program

- Physical Research
- Geothermal Development
- Solar Development
- Controlled Thermonuclear Research
- Advanced Concepts

e) Conservation Program

- Advanced automotive power systems
- Electric power transmission and distribution
- Improved conversion efficiencies
- Large scale conservation demonstration
- Residential/commercial building efficiency (end use)

- Industrial process efficiency (end use)

5) Compared with the 1975 budget, the pending 1976 budget establishes certain trends:

- Advanced Energy Systems is up 511% (Δ $179M)
- Conservation is up 424% (Δ $ 72M)
- Fossil Energy is up 78% (Δ $153M)
- Nuclear Energy is up 26% (Δ $346M)
- Environment & Safety is up 23% (Δ $ 38M)
- Physical Research is up 17% (Δ $ 47M)
- National Security is less than 10% above last year's budget

6) Certain emerging ERDA policies are becoming clear:

a) Contracting will be competitive where possible

- Emphasis upon Requests for Proposals (RFP's)
- Also: Program Opportunity Notices (PON's) which are general calls for solicited "unsolicited" proposals.

b) Multiple wins for quality proposals are possible

d) Air Force/NASA-type Bid and Proposal (B&P) and Independent Research and Development (IR&D) expenses are now allowable costs helping aerospace companies better approach ERDA.

d) Patent policies--still pending--should be in the direction of being more liberal than old AEC patent policies.

e) Ultimate ERDA aim is to commercialize technology; this means cost sharing will be required at demonstration phase...cost-sharing can be very flexible (10/90, 50/50, 90/10).

f) Insured guaranteed loans will be possible.

E. Role of New England Technologists

1) ERDA is looking to New England for high-technology help

a) ERDA needs aerospace expertise---Bob Seamans background underscores this: (MIT, NASA; Air Force Secretary home is Salem, Mass.)

b) MIT, ADL, Avco, Mitre, et al, are cited as "proven high-technology quantities" to help ERDA

a) Many routes possible for such technological help:

a) NASA-type earth resources technology

b) Electronic equipment to improve process efficiencies

c) Advanced materials for severe high-temperature environments.

d) Sophisticated computer modeling for understanding many complicated energy environments

e) Aerospace technology applications in water purification, oceanography and marine biology---all of which are of concern vis a vis advanced energy.

f) Basic systems engineering and program management.

3. Type of ERDA activity in New England can take several forms:

a) Direct contracting to universities

b) Direct contracting to industrial R&D firms

c) ERDA offices (N.B.: there is no ERDA facility in New England---we are serviced out of Brookhaven N.Y.)

d) ERDA Laboratories

- Systems Engineering (ref: MIT proposal)
- Conservation Center (ref: MITRE proposal)

- SERI (relate history)...mention site selection criteria:
  - i. SERI should be housed in a single center
  - ii. It should be located near substantial laboratories either federally-related or university
  - iii. Weather and climate are no factor in SERI location. Where climate is a factor, a field station may be set up.
  - iv. Intellectual atmosphere, and the availability of technical operations and services to a laboratory of substantial size are important factors in the site selection.
  - v. SERI should be a separate, independent and dedicated facility

4. Mention Intern Program and Report (~ November)

5. Announce January 1976 AIAA Seminar and possible speakers.

6. Summarize high points (eg, ERDA good substitute for NASA/DOD kind of business, etc.)

I will be happy to amplify upon any of the foregoing items.

J. E. Levangie JEL,