

MOBIL'S TECHNOLOGY BASE

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I. D. PUBLIC AFFAIRS ORIENTATION

JUNE 8, 1989

- o A COMPANY FOUNDED ON TECHNOLOGY AND COMMUNICATIONS.
 - Familiar story/new lessons

- o R&E TODAY IS MOBIL'S TECHNOLOGY BANK
 - Patents
 - Research: building on strengths in seismic imaging, catalysis, synthetic lubes
 - Engineering: New emphasis on innovation
 - EHS: Best tox lab in the business

- o TECHNOLOGY TRANSFER
 - Communications the key
 - Research: Early involvement of profit centers
 - Pioneering technology fund (see separate write-up)
 - Technology transfer workshops

- o RECRUITING
 - Declining enrollments/changing demographics/poor image
 - Hiring more foreign PhDs
 - Communications: Image building on campus and in professional societies

- o THE ENVIRONMENT
 - 20% of R&D effort
 - Issues: Clean air, oil spills, global warming, alternative fuels, public involvement, etc.
 - Communications: Dealing with public outrage
 - Environmental Covenant

- o TOP MANAGEMENT RECOGNITION/SUPPORT
 - Technology key to meeting challenges
 - Endorsed Strategy/Computer study recommendations

R&E OVERVIEW
J.V. D'AMBRISI
INTERNATIONAL PUBLIC AFFAIRS MEETING
NEW YORK, JUNE 8

R&E IS MOBIL'S TECHNOLOGY BANK

- o Mission: to develop and transfer to Mobil's operating divisions technology to find and produce oil and natural gas, and to transform these resources into high quality products.
- o Major R&E Units: Research, Engineering, EHS
- o High Tech Assets: Seismic imaging, reservoir simulation, catalysis, synthetic lubes

CORPORATE ATTITUDE TOWARD TECHNOLOGY

- o Top-level recognition of importance of technology
- o Profit Centers need technology to meet challenges: Frontier exploration. Processing more of the barrel. Quality products for new engine technologies. Meeting environmental challenges such as lead phase down in Europe, increasing environmental regulations worldwide.

POSITIONING R&E TO MEET CHALLENGES

- o Basic philosophy: Work closely with business units; Maintain research continuity; focus resources for high return in areas of technical and business strength.
- o Strategy study: Beefing up key areas: Catalysis, Reservoir Management, Premium Lubes
- o Computer Study: Adding computer resources for: E&P research; Engineering Dept. Innovation
- o Strategic Alliances: Academics, national labs: Leveraging research and taking advantage of outside technology
- o Technology transfer: More risk sharing, communications, getting the profit centers involved earlier in the process
- o Recruiting: Image-building on campus, prof. societies; hiring more foreign PhD's, women and minorities
- o Environmental Covenant: Renewal of commitment.

NEW ENVIRONMENTAL HEALTH AND SAFETY ORGANIZATION

- o Worldwide mission: to guide and coordinate Mobil programs on environmental protection, Product Safety Stewardship, employee facility and community safety, and toxicology evaluations.
- o Mobil's Environmental Covenant as outlined by R.F. Tucker in his speech to AIChE:
"Safeguarding our environment from unintended consequences of industrialization is one of our highest priorities. Preventing pollution at its source must be industry's goal...and we all share in this responsibility."
- o Mobil's first formal environmental policy was in 1956.
- o Three major trends dominating environmental area:
 1. Call for zero risk
 2. Increased public involvement
 3. Increasing environmental regulations
- o Environmental issues
 - Public "outrage": Need for communications
To the industry it's HAZARD = RISK X EXPOSURE
To the public it's HAZARD = RISK + OUTRAGE
 - Oil spills: Mobil's response capability (see separate write-up)
 - Lead phase down
 - Animal Rights (see separate write-up)
 - Clean Air (see separate write-up)
 - Global warming
 - Alternative fuels (Methanol, etc.)
 - Product Safety
 - New EHS responsibility: manage Mobil's U.S. involvement in clean-up of abandoned toxic waste sites under Superfund law.
- o EHS contribution to Mobil's bottom line
- o MACSIN (Mobil Automated Chemical Safety Information Network): worldwide, computerized information network for information on Mobil products and process streams and use chemicals
- o Material Safety Data Bulletin: health hazard and safe handling bulletin on a specific material
- o Non-Carcinogenic Bright Stocks (see separate write-up)
- o Mobil Environmental and Health Science Laboratory:
Cadillac of the Industry
Opened at MTC in December, 1983

The Environment

Our growing emphasis on environmentally-driven research is part of a company-wide reaffirmation of what is coming to be known as Mobil's Environmental Covenant -- our long-standing commitment to protect the health of our environment.

Our strategy is to concentrate, where possible, on developing technology to attack the problem at the source -- to change the hardware and chemistry of our operations and our product line -- before it becomes an environmental problem.

A few of our projects to help protect the environment include a technique to remove radioactive scale deposits from drill pipe, development of a new FCC additive catalyst that can cut NO_x emissions in FCC regenerator exhaust by more than 50%, and a reformulation of our hydraulic oils to replace the zinc anti-wear additive with an environmentally benign material.

Clean Air

Last year the U.S. spent nearly \$35 billion on air pollution controls. Two examples of Mobil activities in this area are:

1. Participation in an effort now underway for joint research with the U.S. auto industry to develop low emission cars and to improve fuels.
2. NO_x , which is one cause of acid rain and is a forerunner of ozone, is also receiving the attention of our researchers. We are looking at new techniques for reducing NO_x emissions. One promising idea is a better FCC catalyst for NO_x reduction. The new catalyst would be used in existing process equipment, requiring no capital investment to add new equipment. Once commercialized, the new catalyst would give greater flexibility in the use of crudes with high nitrogen content. This is of special interest to refineries like Woerth in Germany where there are strict NO_x emission requirements. Although there is more development work to be done on this new catalyst, we are seeing NO_x reductions of 50% in the FCC pilot unit at our Paulsboro Laboratory.

- Energy efficiency (conservation)
- Alternative fuels
- CO_2 recovery
- Global cooperation key

4. IMPACT OF THESE CHANGES ON MOBIL

- Pressure toward conservation
- Reduced demand for fossil fuels
- Replacement of coal and oil with natural gas and renewable energy resources
- Opportunities to "sell efficiency"

GLOBAL WARMING

1. GREENHOUSE EFFECT AS PROCESS

- Greenhouse gases essential for climate maintenance
- Industrialization and population growth causing build up of greenhouse gases
- Dependence on fossil fuels major factor in CO₂ build up
- Question is whether continued build up will cause global warming

2. WHAT HAPPENS IF PROCESS GOES UNCHANGED

- EPA projects significant global warming
- Warming trend will change climate -- maybe drastically
- Climate change could cause major social, economic change
- Real risk that delaying action will exacerbate problem

3. WHAT CAN BE DONE TO CHANGE THE PROCESS

- Energy efficiency (conservation)
- Alternative fuels
- CO₂ Recovery
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