REVIEW OF ENVIRONMENTAL PROTECTION ACTIVITIES FOR 1978-1979

PROPRIETARY TO
IMPERIAL OIL AND
AFFILIATES

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ESSO

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File No. 801

Environmental Quality Committee Members
Toxic Substances Subcommittee of EQC Members
Corporate Managers
Marketing Region Managers
Refinery Managers
Region Environmental Advisors
Mr. R. G. Ernst - Esso Eastern Inc., Houston
Mr. L. B. Shore - Esso Europe Inc., London
Mr. H. B. Prall - Esso Inter-America Inc., Coral Gables
Mr. R. J. Campion - Exxon Company, U.S.A., Houston
Mr. A. M. Natkin - Exxon Corporation, New York
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Dr. H. R. Gould - Exxon Production Research Co., Houston
Dr. J. A. Price - Exxon Research and Engineering Co., Linden
Dr. M. B. Glaser - Exxon Research and Engineering Co., F. P.

Gentlemen:

I have attached for your information a copy of the Review of Environmental Protection Activities for 1978-1979 of Imperial Oil Limited.

Yours very truly,

H. H. Clare

HHC/js
Att.

(Copies of attachment
sent to Management Committee
and CAC by CAC Exec. Secy.)

ENVIRONMENTAL PROTECTION REVIEW AND COORDINATION ACTIVITIES 1978-1979

C O N T E N T S

III. COORDINATION ACTIVITIES

SECTION I

PERSPECTIVE - ISSUES AND LEGISLATION

1. INTERNATIONAL

A. Areas of Progress

The United Nations Environmental Program, despite political bickering, inadequate staffing, and uncertain funding, has provided excellent counsel to many UN agency program and policy forums. In his report to the Eighth Session of the General Council meeting in Nairobi, April 16-29, 1980, Dr. Mostafa Tolba listed 17 areas of progress. Nine of these are listed on Chart I.

Item 6 is worthy of comment since the UNEP Secretariat has been asked to produce a comprehensive report on the "State of the Environment" every five years in order to assess progress, prioritize problems, and develop remedial programs. The Global Environmental Monitoring System, by measurement of certain atmospheric, terrestial and aquatic parameters, enables a scientific evaluation of the globe as a habitat for man, other animals, and plants.

Chart 1

The development of uniform guidelines for cost/benefit studies and environmental impact assessments is being undertaken by the Commission on Environment of the International Chamber of Commerce.

B. Summary of Major Topic Issues

(i) Climatic Change, Carbon Cycle

The global biogeochemical carbon cycle is a very complex system. It is assumed that the major contributors of CO_2 are the burning of fossil fuels which has been level at 4.5×10^{15} grams per year and oxidation of carbon stored in trees and soil humus. The major sinks are the atmosphere and the oceans. The atmosphere in 1978 contained 695×10^{15} grams.

Chart 2

Removal of CO_2 is achieved by photosynthesis and each year it is estimated that forests take up 20×10^{15} grams of carbon. Since a forest removes several times the quantity of CO_2 removed by crops per unit of area, a major concern exists with respect to deforestation.

There is no doubt that increases in fossil fuel usage and decreases in forest cover are aggravating the potential problem of increased CO_2 in the atmosphere. Technology exists to remove CO_2 from stack gases but removal of only 50% of the CO_2 would double the cost of power generation.

UNEP has encourage several international bodies to intensify study of the carbon cycle.

(ii) Heavy Metals

The environmental health concerns with respect to heavy metals have emerged in the last thirty years. They are the result of industrial processes which put certain heavy metal into the environment in larger quantities and in forms more readily assimilated by plants and animals.

Evidence of a problem has nearly always shown up when chronic poisoning of a local population, usually by food intake, reached epidemic levels.

UNEP has sponsored many activities with the World Health Organization and other scientific bodies to determine the pathways, toxic and threshold limits for heavy metals in the environment and humans.

(iii) Transport and the Environment

The major concerns of road and air transport are in the realm of striking proper balances between individual rights and general needs for public transportation. There is growing concern over the withdrawal of productive lands for highways and airports and fuel efficiency losses incurred by air pollution control devices.

In the seas the major concern has been the environmental threat of oil pollution and the loss of coastal zone productivity from oil and urban and industrial developments.

UNEP activities are mainly toward guiding developing countries to strike a balance in the design and operation of transportation systems.

(iv) Environmental Effects of Military Action

There have been 130 civil and regional wars in the period 1945-1979. Global expenditures absorb $400 billion per year. There have been 667 nuclear explosions since the partial test ban in 1963. With the growing membership in the nuclear club, there is considerable fear of accidents and deliberate sabotage.

In the developing countries where problems of sanitation, medical service and schooling are most acute, military expenditures are growing most rapidly.

UNEP can obviously only help by dimensioning the environmental horrors of war.

(iv) Children and the Environment

The International Year of the Child (1979) focussed world attention on the appalling situation of millions of children in poor countries. The solution to this problem lies first, in effective birth control programs and secondly, in a determined effort by wealthy countries to give the financial, material, and management resources and ensure that they are used to provide water supplies, sanitation, better food and better basic shelter.

2. U.S. REVIEW

A. Legislation and Regulations

In 1978 and 1979, environmental legislation passed included the Environmental Pesticides Control Act, the Quiet Communities Act, and the National Parks and Recreaction Act but none with major consequences to the petroleum industry. This period witnessed intense regulatory activity to attempt to implement the objectives and complex provisions of the six* major pieces of environmental legislation passed in the previous three year period. Chart 3

The government's major slated purpose in passing and implementing environmental legislation continues to be protection of human health, a goal supported by industry. The means for reaching the goal are becoming increasingly stringent; ranging from guidelines, limitations and standards,

* Toxic substance Control Act (76), Clean Air Act (77), Clean Water Act (77), Resources Conservation and Recovery Act (76), Safe Drinking Water Act (76), Coastal Zone Management Act (76).

to outright bans. Industry's proper role continues to be: to insist that the degree of control applied be based on good scientific evidence, take account of the feasibility of compliance, and to assure that benefits are adequate to justify the costs.

A major concern of the U.S. petroleum industry has been and continues to be the "Oil and Hazardous Substance Spill Prevention and Control Bills" originally dubbed the "Super-Fund Bill" when it concerned only oil now dubbed the "Ultra Fund Bill" since chemical spills and hazardous waste dump problems have been added. Since oil interests have the deepest and most easily pilfered pocket there is no doubt petroleum will pay a disproportionate share of costs.

B. Quality of the U.S. Environment

In a preface to the Tenth Annual Report of the Council on Environmental Quality, a body which analyzes and coordinates federal policy and advises the President and Congress on environmental matters, the President states that the report reflected a decade of solid achievement by congress and the American people in improving the quality of the environment.

CEQ has not seen fit or perhaps been able to develop a mathematical expression of an overall performance index to gauge progress in achieving environmental quality goals. They have developed some yardsticks to reflect the status in some elements of the equation and some pertinent examples have been selected from "Highlights" of the report.

Chart 4

(i) Air Quality

"Overall the nations air quality is improving". Combined data from 25 major metropolitan areas showed 15% fewer unhealthy days.

"Carbon monoxide has shown marked improvement".

"Sulfur dioxide problems are not widespread in the United States".

Fewer than 50 of 753 counties monitored showed any violation of the 24 hour ambient air standard.

"Counties in the Western U.S. displayed a decreasing number of violations of the ozone standard". The ozone standard has been increased from 0.08 ppm to 0.12 ppm.

"Pollution control systems are often found to be malfunctioning--Congress, therefore, has mandated that auto inspection and maintenance programs--be instituted in regions where attainment of the ozone standard will be delayed".

(ii) Water Quality

"Data shows that water quality in the U.S. has not shown vast improvement since early '70's but is not getting worse".

"Point sources (industrial plants and municipal sewer outfalls) affect water quality in 91% of basins, non-point source (agricultural and other land drainage) affect 81%.

"U.S. laws and social institutions are better equipped to deal with point sources than non-point source controls".

"Two-thirds of the nation's lakes have serious pollution problems".

"D.D.T., PCB's and other persistant chemicals are declining slowly in Great Lakes fish tissue".

(iii) Toxic Substances and Environmental Health

"Up to 50,000 disposal sites in U.S. may contain hazardous waste, anywhere from 1,200 to 2,000 may pose significant risk to human health. There are 500 to 800 abandonned waste sites".

"No public agency has enough money to clean up all inactive sites. Costs are estimated in the range of $28.5 to $55 billion".

"Rate of cancer mortality increasing by 0.5% per year". Fraction related to occupational factors 20 to 38%.

"About 1,500 substances suspected of being carcinogens have been investigated between 600 and 800 showed positive evidence of carcinogenicity".

"An increasing number of people are seeking compensation from government agencies for radiation damages claimed to have been suffered by past exposure".

(iv) Energy

"Energy use per dollar of GNP declined from 61,200 BTU in 1972 to 56,400 BTU in 1978".

"New car sales weighted fuel economy improved from 14.4 mpg in 1974 to 19.6 mpg in 1978".

"Federal financial commitment to developing and commercializing renewable energy technology was at level of $358 million in 1978 and expected to exceed $1 billion in 1980".

As of March 31, 1979, there were 70 nuclear power plants in the U.S. licensed to operate with a capacity of 51,000 megawatts. They supply 13% of U.S. electrical power and 4% of total energy.

(v) Natural Resources

"Water shortages of surface and ground water are increasing - ground water levels are declining 8 to 10 feet per year in Arizona and southern Nevada".

"Intensive irrigation is increasing soil salinity in California".

"Erosion of agricultural lands remains one of the nations most serious problems".

"48 of the 50 states have adopted farmland preservation measures".

"Bureau of Land Management has begun a wilderness inventory and evaluation of 174 million acres of its lands".

"Timber industry cutting exceeds growth by 21 percent".

"National Shellfish Register showed an increase in prohibited areas for commercial operations to 4.0 out of a total 14.6 million acres".

(vi) Economics

The Council stated that federal environmental regulations added 0.3% to the annual rate of increase from 1970 to 1978 and this same level would continue for the 1979 to 1986 period. The cost of complying with all federal regulations for the year 1978 was $26.9 billion. They estimated that benefits could be reasonably valued at $21.4 billion but of this amount $17 billion was attributed to reductions in mortality and morbidity.

Expenditures by various industry categories are reported in Section III.

3. CANADIAN REVIEW

A. Canadian Legislation 1978-79

Federal

Maximum tolerable levels for sulfur dioxide, carbon dioxide, oxidants (ozone), nitrogen dioxide, and particulates were introduced under the Clean Air Act.

Vinyl chloride emissions regulations and guidelines recommending limits on atmospheric emissions from packaged incinerators were promulgated under the Clean Air Act.

Chart 5

Bill C-14 was introduced to Parliament as an attempt to replace the 30-year old Nuclear Control and Administration Act.

Bill C-20 which contained some very onerous provisions concerning the regulation of oil and gas wells on federal lands was expected to die before the upcoming election.

Regulations under the Atomic Energy Control Act concerning the exposure of Uranium and Thorium miners to radiation were revised.

The Transportation of Dangerous Goods Act was introduced as Bill C-53 and after amendment was reintroduced as Bill C-17, later as Bill C-25 (now Bill C-18).

A total ban on all uses of PCT's was instituted under the Environmental Contaminants Act.

Provincial Legislation and Regulations 1978-79

Only legislation or regulations which may have a bearing on the Company's operations are listed.

Alberta

Guidelines describing wastewater controls and standards for coal mining operations were issued pursuant to the Clean Water Act.

New Brunswick

The Clean Environment Act became operative.

A bill was proposed to remove existing legislative limitations on environmental suits against polluting companies.

Chart 6

Ontario

Far reaching absolute liability provisions concerning toxic substances spills were proposed in a bill entitled An Act to Amend the Environmental Protection Act, 1971.

New water quality guidelines incorporating IJC recommendations were issued.

Strict regulations for the control of toxic substances were included in the Occupational Health and Safety Act proclaimed in 1979.

Quebec

Bill 50 established an Environment Ministry responsible for administering major pollution control schemes.

New MUC air pollution regulations taking effect in March, 1979, posed serious problems for area oil refineries.

Significant changes to existing occupational health and safety legislation were proposed in Bill 17.

B. Quality of the Environment

The Canadian Environmental Advisory Council was established in 1972 to advise the Minister of Environment on the state of the environment and threats to it, but

does not have the resource to issue a report like that of the CEQ (U.S.) Department of Environment makes an annual report to parliament which describes activities
Chart 7 of the department and provides qualitative information and limited quantitative data by which subjective judgements on status may be postulated. Unfortunately, the information is at least one year in arrears when issued.

The Environmental Protection Service data on air quality obtained by the NAPS* program is usually only six months in arrears. This data indicated that ambient air quality in nearly all regions of Canada improved in both 1978 and 1979 in four of the six parameters measured. Sulfur dioxide, total suspended particulates, carbon monoxide, and lead were all lower, while oxidants and nitrogen oxides remained relatively constant.

Water quality in the Great Lakes reported by the International Joint Commission showed some improvement over the early 1970's. The indications of this were slow recovery of the Lake Erie Fishery and higher rates of survival of herring gulls. The levels of mercury and PCB's in fish tissue have declined satisfactorily as a result of various regulatory control programs. Reports by provincial authorities indicate that gradual improvement in river and stream systems occurred during 1978 and 1979. The status of quality of recreational lakes is still of major concern because of accelerated entrophication from cottage wastes and acidic precipitation from remote sources.

The major areas of environmental concern in 1978 and 1979 as a result of industrial activities were: acidic precipitation, disposal of toxic wastes, radiation hazards in mining and in the nuclear refining and electricity generation sectors, large oil spills from offshore drilling land disturbance from energy projects, and damage to human health through the use of chemical pesticides and herbicides.

C. Public Attitudes and Participation

Attitude surveys would seem to indicate that public concern with respect to pollution in 1978 and 1979 had
Chart 8 continued to decline to where only 6% considered it a major issue.

* National Air Pollution Surveillance

Despite these findings of our Joint Industry Survey, the Federal Minister of Environment, in the spring of 1979, chose to announce results of a CROP survey in the following manner:

- 89% of Canadians consider deterioration of the environment a major issue outranked only by inflation, unemployment, crime and delinquency

- 87% of Canadians are ready to change life style to curb resource waste and pollution

- governments are not spending enough on environmental protection

- 63% more are concerned about quality of the environment today than they were five years ago.

- 96% hold industry as responsible

- 91% believe that early government action is needed

Public participation in environmental activist associations has not perceptably increased but the efforts of small groups of hard-core activists have been remarkably successful in postponing and delaying energy, mining, waste disposal and forestry projects.

The Environmental Impact Assessment process has become recognized by governments as a necessity to "hold them harmless" and maintain tenure. The inevitable next step is public financing of environmental intervenors.

SECTION II

PERFORMANCE, PROBLEMS, AND PLANS OF OPERATING DEPARTMENTS

1. ESSO RESOURCES CANADA LIMITED

A. Exploration and Production

Accomplishments

(i) Oil spill response was upgraded: additional staff was added; new contingency plans were developed and accepted by governments; a major industry offshore oil spill cooperative (E.S.R.A.) was formed; spearheaded industry participation in joint government/industry oil spill research programs.

(ii) A program to combat corrosion included expanded internal and external inspection, increased use of corrosion inhibitors and cathodic protection, extensive use of inert piping materials.

(iii) In cooperation with government and industry: developed a plan to reduce H_2S emissions at Redwater; developed guidelines for reduced field monitoring for Joffre and other gas plants.

Major Problems Remaining

(i) Inability to handle oil spills under adverse conditions will be an embarrassment at best and an impediment at worst in our frontier operations.

(ii) As the Environmental Impact Assessment process matures, more detailed information and longer lead times will be required.

(iii) Delays caused by the complex regulatory approvals system.

(iv) Disposal of hazardous materials and oil field wastes e.g., oil-based drilling mud from Norman Wells.

(v) Administration of government policies on ecological reserves and East Slopes.

B. Heavy Oil

(i) Mining (Syncrude)

Accomplishments

(a) Preliminary equipment commissioned to recover bitumen from tailings pond.

(b) Bird mortality at tailings pond decreased by mechanical and noise deterrent program.

(c) Surveys conducted on main Utility Plant Stack.

(d) Substantial revegetation program undertaken (20K seedlings).

Major Problems Remaining

(a) Further effort will be required to recover bitumen in effluent and from tailings pond.

(b) Land reclamation will be continued.

(c) Contingency plan for production cutbacks when plant emissions are high.

(ii) Operations - Pilot Plant

Accomplishments

(a) Installed vent gas compressors at Leming.

(b) Applied mud re-use system to two rigs.

Major Problems Remaining

(a) Fresh water consumption and re-use.

(b) Disposal of produced water and drilling muds.

(c) Sour gas emissions from well head venting.

(iii) Cold Lake Project

Accomplishments

(a) Completed final Environmental Impact Assessment.

(b) Studies on water problems included: waste water disposal, potential water sources, water quality monitoring.

(c) Air quality studies included: SO_2 emissions and their effects.

Major Problems Remaining

(a) Waste water treatment and disposal.

(b) SO_2 air emissions.

(c) Wildlife management.

C. Minerals

Accomplishments

(a) Baseline study for Midwest Lake completed and system developed to prepare E.I.S.

(b) Radiation protection procedures instituted at Midwest Lake.

(c) Preliminary environmental report on Kutcho Creek favourably received by B.C. government.

(d) Operational monitoring program for Gays River was approved by N.S. government.

(e) Study of effects of tailings discharge from Granduc quite favourable.

Major Problems Remaining

(a) Arsenic control in Midwest tailings.

(b) Acceptable post abandonment disposal method for radioactive and arsenic-bearing wastes.

(c) Government concern about permanent access road to Kutcho Creek.

(d) Detailed environmental assessment of Gays River diversion.

2. LOGISTICS

Accomplishments

(a) Water effluent treatment systems at Dartmouth and Montreal refineries have started up and now meet refinery effluent guidelines.

(b) Toxic substances inventory and control programs have been initiated at all refineries.

(c) Biodegradation of oily sludges has been developed to successful operation in several refineries and is a major asset available for use in all locations, as permits are obtained.

(d) In 1979, Marine delivered 23 MMB of product in 1 100 transfers to 70 terminals from the Lakehead to the High Arctic without a single spill or pollution incident. Montreal and Dartmouth harbour bunker barges attained a remarkable performance, with only two spill incidents and no measurable oil escape.

(e) Air management systems continue successful operation with new developments as required at all refinery locations. Significant strides have been made in the development of a model for Montreal East and in obtaining agreement from the Ontario Government for a real-time, reactive SO_2 control system.

(f) A new two-tower sour water stripper was started up in Montreal.

(g) The full fleet has now been equipped with PACE ship-board spill response capability.

(h) Crude oil washing has been accepted as a routine operation on tankers delivering crude to Dartmouth refinery.

(i) Replacement of Imperial Pipeline's supervisory control system with an improved leak detection package has begun.

Major Problems

(a) Inconsistent feed to water effluent treatment systems is a continuing problem at refineries.

(b) Spent caustic disposal is becoming increasingly difficult for eastern refineries.

(c) There are no major problems for Marine and Pipeline Division.

Plans

(a) Logistics anticipates the need to discuss new licence requirements for both air and water as present licences at each refinery expire. Anticipatory planning continues. Similarly, Marine and Pipeline Division plans to improve performance with the effect of discouraging further regulation.

(b) Employee awareness and training programs are a regular feature of communication with employees.

3. MARKETING

Accomplishments

(a) Based on field test results, a new fiber glass reinforced plastic standard was issued for underground tanks.

(b) The upgrading program for steel U/G storage tanks was continued.

(c) Service station tests for benzene exposure were favourable.

Major Problems Remaining

(a) Trend in legislation to make the owner of the product liable along with the carrier for spill clean up and damage costs.

(b) Hydrocarbon vapour conservation likely at bulk plants and service stations toward the end of the decade.

(c) Continued pressure to upgrade underground storage facilities and tank form bases because of increased contamination of underground aquifers.

4. ESSO CHEMICAL CANADA

Accomplishments

(a) Plans and a compliance schedule for the restriction of VCM emissions has been accepted by the Ontario Ministry of the Environment.

(b) A new vacuum system reduced VCM emissions prior to opening reactors.

(c) A total water management program at the Redwater Fertilizer Plants has been initiated.

(d) The activated carbon effluent treatment facility is on stream at the Sarnia Chemical Plant.

(e) A program to improve noise and dust levels at Building Products of Canada plants has been effective.

(f) Benzene monitoring has shown concentrations to be less than 1 ppm in the air.

Major Problems

(a) Continuous phenol containment at the Sarnia Chemical Plant has not yet been achieved.

(b) Fluoride emissions at the Redwater Fertilizer Plants are of continuing concern.

(c) Diversion of chromate at the Redwater Fertilizer Plants to avoid contamination of the North Saskatchewan River is a concern.

Future

(a) New licence requirements must be anticipated for the Redwater Fertilizer Plants, the Sarnia Chemical Plant, and those of Building Products in Quebec.

(b) Employee awareness and training programs are an ongoing activity at all locations.

5. OIL SPILL STATISTICS

Chart 9

The number of oil spill incidents in 1979 rose slightly over 1978 with the increase largely arising from production operations due to aging of facilities and accelerated pipeline corrosion as a result of the increasing volume of salt water in oil produced.

An increase in spills of crude and product occurred in 1979 at refineries, most of which was contained on company property. Sixty-five percent of the refinery spills were caused by work error.

In general, oil spill incidents appear to be remaining stable in marketing and rising somewhat in refineries and production over the last two years.

SECTION III

COORDINATION ACTIVITIES

1. TECHNICAL EFFORT, EXPENDITURES, BUDGET

Chart 10

The total technical effort for environmental protection programs and studies declined in 1978 to 88 equivalent M.P.T. employees, then rose to 103 in 1979. The number of full-time professionals has increased steadily from 38 in 1975 to 56 in 1979. The swings in total technical effort are very dependent on the number of new ventures the company has under design at any one time and on status of government regulatory developments. As in previous reports, the statistics do not include effort expended on our behalf in S.R.A. and P.R.A. programs nor for contracted research for environmental baseline information.

Chart 11

The cost of environmental research directly contracted, performed at Sarnia, billed by affiliates, or undertaken by support grants to universities amounted to $3,567,000 in 1978, and $3,819,000 in 1979. There is a considerable range of subject matter represented in these efforts such as: biological baseline data, toxicity and carcinogenicity of products, new and improved pollution control process, and evaluation of pollutants in air masses and aquatic environments.

Chart 12

Capital expenditures for environmental control were $40.8 million in 1978 and $70.4 million in 1979 representing 9.7 and 10.5 percent of the total corporate P.C.B. expenditure. The large increase in 1979 results from the capitalization of high cost exploration activities in the Beaufort Sea and off the East Coast.

Rationalization of the statistics with earlier years is difficult because figures for other functions represent physical assets which are booked to the plant account. Expenditures are predicted to remain in $50 million range through to the end of 1983 and will then likely increase as the Cold Lake project proceeds. The predictions are based on the assumption that there will not be any irrational regulations for the control of acid rain or toxic chemicals.

2. INDUSTRY ACTIVITIES

A. Arctic Petroleum Operators' Association
East Coast Petroleum Operators' Association

These organizations continued environmental research programs for several aspects of cold weather operations. The East Coast Operators' formed and equipped the East Coast Oil Spill Response Association to cope with a major oil spill in that area.

B. PACE

As of December 1979, there were 13 member companies supplying approximately 100 individuals who have contributed to the substantial success which PACE has enjoyed in past years.

Research and development continues to account for almost one-half of the total budget during 1978 and 1979. Efforts have been made to improve the organization for greater operating efficiency and to accommodate new challenges. A technical committee on environmental assessment was formed.

Chart 13

The media relations program has been strengthened, and in 1979, interviews were arranged with five leading periodicals. In each instance, a feature article resulted. Three radio interviews were arranged and a background kit supplementing the PACE booklet was sent to editors of all daily newspapers, electronic media, and trade publications.

During the past year, PACE published eleven project reports and three guideline bulletins.

Liaison and cooperation with other Canadian petroleum associations has been increased and enhanced. Internationally, PACE is a member of the International Petroleum Industry Environmental Conservation Association and is cooperating with API on a number of environmental matters.

PACE presented seven briefs on federal matters in 1979, and in cooperation with other industry associations participated in or supported briefs on six legislature or regulatory actions by provincial government.

Research and Development

During the past two years, nine research and development project have been completed and final reports issued. Future plans include research projects on the effects of H_2S in toxic concentrations, the design and development of an underground tank leakage monitor, investigations in respect to long-range transport of acidic precipitation and a study of Neoplasia in Fishes of the Great Lakes.

Waste Disposal

Increased attention is focussed on industrial waste disposal problems. A refinery waste survey with 100% participation has been completed. PACE has played a prominent role in liaison with governments on the development of good practices with respect to used lubricating oils. It has provided significant guidance to government on the classification of industrial waste and to industry on the degradation of oil sludges by land spreading.

Water Pollution

Recently there have been three interfaces with the International Joint Commission concerning the 1978 Canada-U.S. Agreement, the probability of establishing an Industrial Advisory Board to the IJC and on the matter o limited use zones. PACE is giving serious consideration to Environment Canada's proposal to convert Refinery Guidelines under the Fisheries Act to Regulations. Additionally, PACE strongly supports a meeting with appropriate representatives of Quebec industry and the Quebec Government with respect to potential regulation as a result of the St. Lawrence River Study.

Air Pollution

A survey of emissions from all Canadian petroleum refineries for the year 1978 has been completed. The Federal Government has been briefed on MMT and alternate octane improvers at its request. PACE has made significant advances in the extension of techniques for air management, including the use of mathematical models.

Oil Industry Contingency Plans National Coordinating Committee

This committee has developed the concept of using air bubble curtains to deflect oil on rivers, which is a major breakthrough in the technology to contain oil in

river currents. It has also prompted the formation of an industry coordinating group to help in development of Environment Canada's Arctic Marine Oil Spill Countermeasures Program, and the Eastcoast Spill Response Association at a cost of about $2 million in equipment and materials, and an annual operating cost projected at $250 000. Additionally, the Joint Oil Spill Response Executive Planning Committee was formed to develop an improved response to a major marine oil spill. The committee consists of three senior representatives from Transport Canada and three Directors of PACE.

C. Canadian Chemical Producers' Association

Probably the most active committee in C.C.P.A. is the Environmental Quality Committee. Over the past two years it has prepared or been involved in the preparation of briefs to governments concerning Federal Organic Chemicals Regulations, Federal Alkali Regulations, Federal Transportation of Dangerous Goods Act, Ontario Spill Regulations, Confidentiality Issues, O.E.C.D. Committee work, Ontario Spill Control Bill, Ontario Way Bill System, Federal Solid Waste Task Force, Federal Regulation Reference, the I.J.C. Great Lakes Water Quality Agreement and Alberta Hazardous Waste Siting hearings.

It has held meetings with government groups including Federal, Ontario and Quebec. It has conducted surveys of member companies concerning pollution levels, solid waste disposal, public opinion, and waste disposal sites. About ten task force groups are active at any given time dealing with the development work that has to precede the final presentations referred to above.

Esso Chemical personnel play an active leading role in this committee.

D. Canadian Manufacturers' Association

The Environmental Quality Control Committee of CMA is a large committee which must represent all the interests of CMA members in thirteen jurisdictions in Canada. In each of the years 1978 and 1979, the committee met as a whole, four times, but various task forces and two subcommittees met on numerous occasions.

Important submissions were made to governments on: the Environmental Contaminants Act, Socio-Economic Impact Assessment process, Occupational Health and Safety Legislation, The Ontario "Spill Bill", and regulations with respect to Industrial Wates in several jurisdictions.

E. Cost (To I.O.L.) of Environmental Associations

Chart 14

The costs to the Company of activities performed by industry associations were approximately $1.4 million in 1978 and $860,000 in 1979. These activities involve research, government consultations, public information and monitoring of pollutants in receiving waters and neighbourhood air sheds. Two major oil spill cooperatives are also included--Burrard Clean and the Eastcoast Spill Response Association. Imperial's share of the total costs of these efforts ranges from 10 to 25%, hence, the company gains considerable benefit from the divisor effect.

3. ENVIRONMENTAL QUALITY COMMITTEE

A. Summary of Activities

The Committee met seven times in 1978 and six times in 1979. The minutes of the bimonthly meetings were circulated widely within the company and, in effect, served as an Environmental Affairs Newsletter.

The highlights of activities in 1978 included:

Chart 15

- a program was developed to notify government officials, customers, dealers, etc., as a result of the Exxon No. 2 Fuel Oil Alert which was based on long term animal carcinogenicity tests with No. 2 fuel which had given positive results. The diluent for Spruce Bud Worm spray was changed from cracked to straight run as a result.

- an interfunctional Benzene Task Force was formed to conduct an internal audit of exposure in response to proposed reductions in the occupational exposure limits. The data showed exposure levels were generally satisfactory and solutions were developed for the few potential problem areas which were uncovered.

- legislation was reviewed, implications were assessed and appropriate response were agreed upon inter alia;
    - Montreal Urban Community Air Regulation
    - Transportation of Dangerous Goods Act

- frequent reviews were made of the Exxon Oil Spill Response and the Ontario Major Oil Spill Cooperative programs as they developed and approvals were obtained for the level of participation

- response was coordinated to the Exxon Environmental Health program which included establishment of a senior management E.H. Advisory Committee.

- preparation of a corporate plan was initiated for communicating about asbestos and asbestos related diseases

- the Toxic Substances Subcommittee began to function

The highlights of 1979 included:

- several pieces of significant legislation were assessed including

  • Transportation of Dangerous Goods Act
    - various drafts

  • Amendments to Ontario Environmental Protection Act
    - liability and clean up fund provisions

  • Amendments to Canada Shipping Act

  • Amendments to regulations under the Fisheries Act

- the Esso Chemical Emergency Response Plan was reviewed

- the Marketing Department audio-visual training program for increasing awareness regarding underground storage product leaks and inventory control was reviewed.

- guidelines were completed to assist management in communicating about Toxic Substance issues

- a toxic substances inventory was prepared by the operating departments

- Exxon Environmental Health group placed emphasis on evaluating the carcinogenicity potential of synthetic fuels (including Syncrude)

- the Exxon Oil Spill Response and the Ontario Clean Oil Spill Cooperative move into the final development stages for management approval

- a government/industry committee, JOSREP, was formed to develop a national response plan for a marine super spill

B. Toxic Substance Control

During 1978 and 1979, there has been steady progress toward the development of sound organizational patterns, an industrial hygiene program tailored to meet current and future demands and efficient communication systems with Exxon. Exxon is the primary source of earlier identification of those substances which may require attention. We rely heavily on them for interpretation of new scientific and technological information and for guidance on perspective.

Environmental Protection Coordination plays a key role in initiating work and assisting where coordination is required. The Toxic Substances Subcommittee of EQC is used where matters of interfunctional interest would benefit from committee discussion. Matters which can be handled most efficiently by existing functional organizations established to deal with toxic substances issues are used preferentially.

The Toxic Substances Subcommittee has held eight meetings, one in November, 1978, and seven in 1979. Early matters of concern included the need for testing with respect to Syncrude materials and heating oil, re-enunciation of the hazards of asbestos and company-wide distribution of communication of this information was provided to managers.

With major input from Employee Relations and External Affairs, a comprehensive booklet on "Guidelines for Communicating About Toxic Substances" was given wide distribution throughout the Company. The subcommittee has been the medium for discussion of potential concerns with respect to specific Company products as related to the possible need for revised or new data sheets.

More recently, Environmental Protection Coordination has initiated through the committee a company-wide program to ensure appropriate listing of chemical substances within our operations. The responsibility for action rests with individual functional managements and the committee will provide a means of intercommunication and a forum to ensure a uniformity of approach consistent with Company policy.

C. Oil Spill Contingency Planning

In 1978, as a result of the Amoco Cadiz incident, Exxon Corporation conducted a review of its oil spill response capability which concluded significant improvements were desirable and possible. Recommendations were made in the Fall of 1979 which included establishing an interregional assistance team, equipment stockpiles, and an R&D programme. In addition, regions were encouraged to upgrade their contingency plans, to play a leading role in industry cooperatives and to form corporate interfunctional oil spill committees. Imperial's annual financial involvement in the Exxon programme could be in the $300-600K range over the next few years depending on developments. Management approval was given early in 1980, and steps were taken to initiate implementation of the programme within Imperial. The membership and terms of reference of the Imperial Corporate Oil Spill Committee are shown in the appended charts.

Charts 16-22

4. COORDINATION DEPARTMENT ACTIVITIES

A. General

Members of the department continued to represent the company and/or the industry on many affiliate and industry committees and in various public forums. While the number of formal technical papers prepared and presented declined somewhat, the number of informal presentations increased.

Guidance and assistance to Esso Resources for the conduct of baseline studies and the preparation of Environmental Impact Statements continued at a high level of activity.

The department organized or participated in several research projects, conducted by PACE and Exxon, to gain wider acceptance or improve the efficiency of the aerial application of chemical dispersants for major marine oil spills.

G. R. Fern played a significant role in the development of Exxon's Worldwide Oil Spill Response Plan for major events. Fern also provided considerable administrative and technical advice to the Ontario Petroleum Association in the development of an organization for a

major oil spill clean-up cooperative for the petroleum industry in the Province of Ontario (PIMEC).

A. L. Scott coordinated the preparation of a company manual for "Communicating About Toxic Substances". This manual is designed to assist all levels of management in the handling of toxic substance issues with employees, the media, and the public.

E. C. Birchard has played a major role in the design of biological research studies for Esso Minerals, Exxon, PACE, and the Biological Advisory Subcommittee of API.

A two-day seminar was held each year for the Regional Environmental Advisors for discussion of common regional problems and to update them on technical and organizational matters.

B. Exxon Environmental Health Activities

The Exxon organizational structures in the Environmental Health and Toxic Substance Control areas were reported to C.A.C. in May, 1979. The E.P. Coordinator represents Imperial on the Petroleum and Synthetic Fuels Planning Group. The principle concerns of this activity are to input business line needs to Exxon Medical Department's Research Programs and to recommend appropraite business actions as a result of research findings.

Exxon Medical Department requested and obtained approval of management to set up an Advisory Committee on Potential Environmental Health Hazards and the E.P. Coordinator represents Imperial on this committee. The committee was struck because regulatory obligations under the U.S. Toxic Substance Control Act could have significant impact on affiliate operations even outside the United States.

Section (8e) of TOSCA requires that anyone who discovers through research or otherwise information, previously not reported, that a material or substance in commercial use is or may be a significant risk to human health must report such findings to the Environmental Protection Agency within 15 days.

The reporting of such information entails certain action steps in addition to notifying the administrator

of EPA.

These steps may entail:

- notification of the public
- notification to employees and/or customers
- recommendation to operating managements

Actions to be recommended to operating managements might involve:

Chart 23

- avoidance of use of specific substances
- reformulation or cessation of production
- changes to occupational exposure limits
- process and/or engineering changes

A systematic appraisal of nearly all Exxon and Imperial products has been underway for some time to assess the toxicity and carcinogenicity of all company products. The number of products which are definitely carcinogenic to animals is significant but not alarming. Appropriate notification and corrective industrial hygiene measures have been made.

Chart 1

UNEP PROGRAMME ACCOMPLISHMENTS

1. REGIONAL SEAS PROGRAMMES
2. ENVIRONMENTAL AWARENESS IN DEVELOPMENT STRATEGIES
3. COST/BENEFIT ANALYSIS
4. E.I.A. GUIDELINES
5. COMBAT DESERTIFICATION
6. MONITORING (GEMS)
7. ADVICE TO LDC'S – PRIORITIES
   – LEGISLATION
8. IMPACT OF ENERGY – PRODUCTION
   – USES
9. GLOBAL PLAN FOR TROPICAL FORESTS

Chart 2

STATE OF ENVIRONMENT 1980 MAJOR TOPIC ISSUES REPORTED

1. CLIMATIC CHANGES, DEFORESTATION, CO_2 AND THE CARBON CYCLE
   – CO_2 IN THE ATMOSPHERE
   – 1850-280 PPM 1978-330 PPM
2. HEALTH HAZARD FROM HEAVY METALS
   PROBLEMS KNOW FROM:
   – CADMIUM, LEAD, ARSENIC, MERCURY, NICKEL
3. TRANSPORT AND THE ENVIRONMENT
   PROBLEMS – CONSUMPTION OF ENERGY AND LAND RESOURCES, AIR EMISSIONS, NOISE, ACCIDENTAL DAMAGE

Chart 28

4. ENVIRONMENTAL EFFECTS OF MILITARY ACTION
   - NUCLEAR WAR GREAT THREAT TO MAN AND HIS ENVIRONMENT
   - LARGEST CAUSE OF HUMAN SUFFERING
   - GREATEST FACTOR IN WASTE OF RESOURCES

5. CHILDREN AND THE ENVIRONMENT
   - MORE VULNERABLE THAN ADULTS TO POLLUTION AND STRESS
   - THEY WILL SHAPE THE FUTURE
   - BIRTH RATE DECLINE NOT SUFFICIENT TO PREVENT 50% CHILD POPULATION INCREASE IN POOR COUNTRIES.

Chart 3

1978-1979 U.S. LAWS AND REGULATIONS

LAWS – ONLY 3 – NOT GREAT CONSEQUENCE TO INDUSTRY

REGULATIONS
- MYRAID – UNDER PREVIOUS ACTS
- MORE STRINGENT STANDARDS
- SEVERE OPERATING LIMITATIONS
- BANS ON SOME SUBSTANCES

Chart 4

QUALITY OF U.S. ENVIRONMENT (1978-1979)

AIR QUALITY
- OVERALL IMPROVEMENT
- CO MUCH BETTER
- SO_2 LOCALIZED
- OZONE – CALIFORNIA STILL

WATER QUALITY
- NOT VAST IMPROVEMENT
- INDUSTRY MAINLY IN COMPLIANCE

TOXICS
- MAJOR CONCERN
- UP TO 2000 SITES MAY POSE SIGNIFICANT HEALTH RISK

ENERGY
- EFFICIENCY OF USE IMPROVED
- NUCLEAR PROGRAM STALLED BY SAFETY PERFORMANCE QUESTIONS

NATURAL RESOURCES
- AG. LAND PRODUCTIVITY AND PRESERVATION SERIOUS CONCERN

Chart 5

CANADIAN LEGISLATION (1978, 1979)

FEDERAL

TRANSPORT OF DANGEROUS GOODS ACT
- WILL IMPROVE SAFETY THROUGH UNIFORM REGULATIONS

PCB'S REG'S
- WORKING TO PHASE OUT

VINYL CHLORIDE REGULATIONS
- ECC COST $2 MILLION IN COMPLIANCE BY 1/4/81

CANADA OIL AND GAS ACT
- BILL C-20
- 2-REVOLVING ENVIRONMENTAL FUNDS $15 MILLION EACH
- NO INDUSTRY SAY ON SPENDING RATE
- ACREAGE FEES TO REFILL FUND

Chart 6

CANADIAN LEGISLATION (1978-79)

PROVINCIAL HIGHLIGHTS

ONTARIO

"SPILL BILL"
- AMENDED EPA ACT
- ABSOLUTE LIABILITY TO OWNERS AND TRANSPORTERS – FOR CLEANUP AND DAMAGES

OCCUPATIONAL HEALTH AND SAFETY ACT
- RIGHT TO REFUSE WORK
- SAFETY COUNCILS MANDATORY
- STRICT REGULATIONS ON TOXICS

QUEBEC

BILL 50
- SEPARATE ENVIRONMENT MINISTRY

BILL 17
- SWEEPING OCCUPATIONAL HEALTH AND SAFETY CHANGES

NEW M.U.C. AIR REGULATIONS
- TOUGH REFINERY STANDARDS

Chart 7

QUALITY OF CANADIAN ENVIRONMENT (1978-79)

AIR
- GENERALLY CLEAN ACROSS CANADA
- SO_2, TSP, CO, Pb, ALL LOWER

WATER
- GREAT LAKES AND STREAMS IMPROVED

MAJOR CONCERNS
- "ACID RAIN"
- TOXIC WASTE DISPOSAL
- RADIATION HAZARDS
- LARGE OIL SPILLS
- CHEMICAL PESTICIDES AND HERBICIDE USE

Chart 8

PUBLIC ATTITUDES

JOINT INDUSTRY SURVEY

- ONLY 6% CONSIDER POLLUTION A MAJOR ISSUE

CROP SURVEY

- 89% CONSIDER ENVIRONMENTAL DETERIORATION A MAJOR ISSUE
- 87% CANADIANS WILL CHANGE LIFE STYLE TO CURB POLLUTION, STRETCH RESOURCES
- GOVERNMENTS NOT SPENDING ENOUGH TO HELP
- 63% MORE CONCERNED NOW THAN FIVE YEARS AGO
- 96% HOLD INDUSTRY RESPONSIBLE
- 91% BELIEVE GOVERNMENT ACTION NECESSARY

Chart 9

1979 OIL SPILL STATISTICS

FUNCTION/AFFILIATE	Number		Volume (M^3)	
	1979	1978	1979	1978
ERCL				
PRODUCTION OPERATIONS	66	58	336	244
HEAVY OIL	3	0	1	0
	69	58	337	244
LOGISTICS				
REFINERY	82	73	730	275
MARINE	2	5	1	50
PIPELINE	2	3	15	25
	86	81	746	350
MARKETING				
CONSUMER	59	59	370	297
DISTRIBUTION/OTHER	27	33	288	198
	86	92	658	495
TOTALS	241	231	1741	1089

Chart 10

ENVIRONMENTAL MANPOWER SUMMARY
(MAN YEARS)

	1977		1978		1979	
IMPERIAL OIL LIMITED	FULL TIME	PART TIME	FULL TIME	PART TIME	FULL TIME	PART TIME
LOGISTICS	18	21.5	24	18.5	16	33.5
MARKETING	–	9.4		8.9	–	8.6
REGION ENV. ADVISORS	6	–	6	–	6	–
ENV. PROT. DEPT.	4	–	4	–	4	–
RESEARCH	2	1	1.0	1.5	2	0.5
ESSO CHEMICAL	2	3	3	5	3	3.7
ESSO RESOURCES CANADA LIMITED						
EXPLORATION/PRODUCTION	9	18	9	–	7.5	–
MINERALS	–	–	1	–	7.5	–
HEAVY OIL/COLD LAKE(1)	1.5	0.5	5	1.3	9.5	2.25
	42.5	53.4	53	35.2	55.5	47.55
	95.9		88.2		103.05	

(1) SYNCRUDE IN 1979 – 38 MAN YEARS

Chart 11

COST OF ENVIRONMENTAL RESEARCH

Sponsor/Project	Nature	Cost 1978	Cost 1979
COLD LAKE	BIOPHYSICAL DATA	$ 670,000	$ 530,000
MIDWEST LAKE	BIOPHYSICAL DATA	–	1,104,000
S.R.A. (EXXON)	CODE 500 (GEN. ENG.)	200,000	200,000
	POLLUTING PROCESSES	600,000	700,000
	POLLUTING PRODUCTS	300,000	300,000
P.R.A. (EXXON)	FATE + EFFECTS OF OIL, CLEAN UP TECHNOLOGY	176,000	138,000
SARNIA LAB	IMPROVING PROCESSES	385,000	365,000
A.P.O.A.	N.A.	1,140,000	340,000
PACE	AIR QUALITY H.C. LEAK DETECTION	38,000	40,000
UNIV. RES. GRANTS	12 PROJECTS	58,000	67,000
EXXON OIL SPILL RESPONSE		–	35,000
TOTAL		$3,567,000	$3,819,000

Chart 12

ENVIRONMENTAL CAPITAL EXPENDITURES

($M)

DEPARTMENT	1978	1979	1980	1981	1982	1983
LOGISTICS	19.8	15.5	9.7	7.2	2.4	5.0
MARKETING	2.5	2.5	3.1	2.8	2.6	2.7
ESSO CHEMICAL	0.9	1.0	10.6	3.5	1.1	1.1
ESSO RESOURCES						
PRODUCTION	2.5	12.6	14.2	14.1	16.0	17.0
EXPLORATION	11.1	34.2	31.6	21.0(1)	22.0(1)	20.0(2)
HEAVY OIL	3.3	3.3	1.4	1.4	1.4	1.4
MINERALS	0.7	1.3	1.3	0.8	–	–
	40.8	70.4	71.9	50.8	45.5	47.2
% NET CORP. PCB	9.7	10.5	8.6	4.0	–	–

(1) 1979 FORECAST
(2) ESTIMATE

Chart 13

PACE (1978, 1979)

- 13 MEMBER COMPANIES
- 9 R&D PROJECTS COMPLETED
- 11 PROJECT REPORTS, 3 GUIDELINE BULLETINS
- 7 BRIEFS TO FEDERAL GOVERNMENT
- REFINING INDUSTRY WASTE SURVEY COMPLETED
- AIR EMISSIONS SURVEY FOR 1978 UNDERWAY
- MAJOR OIL SPILL PLAN WITH M.O.T. STARTED

Chart 14

ENVIRONMENTAL ASSOCIATIONS
IOL SHARE ($)

	1978	1979
APOA	1,140,000	340,000
PACE	101,000	77,000
LAMBTON	58,700	78,400
LAVAL	39,500	60,900
BURRARD CLEAN	37,300	44,500
ESRA	–	256,000
	1,376,500	856,800

Chart 15

ENVIRONMENTAL QUALITY
COMMITTEE (1978-79)

- SEVEN MEETING IN 1978, SIX IN 1979
- BENZENE TASK FORCE PERFORMED INTERNAL AUDIT OF PERSONNEL EXPOSURE LEVELS
- ALL IMPORTANT ENVIRONMENTAL LEGISLATION REVIEWED FOR IMPLICATIONS
- REVIEWED AND ENDORSED MAJOR OIL SPILL PLANS
- INITIATED AND APPROVED COMMUNICATION PLAN AND MANUAL RE-TOXICS
- TOXIC SUBSTANCE INVENTORY TAKEN
- ALL MAJOR ENVIRONMENTAL INCIDENTS REVIEWED

Chart 16

EXXON OIL SPILL RESPONSE ACTIVITIES

- AFFILIATES ACCEPTED RECOMMENDATIONS:
  - SPILL SIZE – AFFILIATE < 10KB
    – EXXON < 10KT
  - NEED STOCKPILES – $20MM
    – OIL SPILL – 3(1)
    – SALVAGE – 1
  - FORM INTERREGIONAL ASSISTANCE TEAM
  - INTERFUNCTIONAL RATHER THAN SOLELY MARINE
  - FORM EXXON (AND AFFILIATE) CORPORATE O.S. COMMITTEE
  - NEED R&D EFFORT
  - UPGRADE CONTINGENCY PLANS
  - APPROACH SENIOR MANAGEMENT OF MAJORS

(1) EUSA BELIEVE PLAN BASED ON NON-DEDICATED RESOURCES CAN REPLACE STOCKPILE.

Chart 17

EXXON OIL SPILL PROGRAMME
ACTION ITEMS FOR IMPERIAL

1. CORPORATE ENDORSEMENT.
2. ESTABLISH CORPORATE INTERFUNCTIONAL OIL SPILL COMMITTEE.
3. INITIATE REVIEW OF CONTINGENCY PLANS.
4. DEFINE INVOLVEMENT IN EXXON TEAM.
5. ESTABLISH MECHANISM FOR OIL SPILL RESEARCH
   – EXXON
   – INTERNAL
6. FOLLOW DEVELOPMENT OF EUSA PLAN.

Chart 18

IMPERIAL HEAD OFFICE
INTERFUNCTIONAL OIL SPILL COMMITTEE

ROLE STATEMENT

1. INTERACT WITH EXXON
2. PROVIDE CORPORATE GUIDANCE IN EMERGENCY
3. APPROVE INTERFUNCTIONAL INVOLVEMENT IN DOMESTIC MAJOR COOPERATIVES
4. EVALUATE AND APPROVE OIL SPILL R&D
   - DOMESTIC
   - EXXON
5. APPROVE FINANCIAL AND MANPOWER COMMITMENTS
   - EXXON
   - DOMESTIC
6. ENSURE PERFORMANCE

Chart 19

IMPERIAL HEAD OFFICE
COOPERATE INTERFUNCTIONAL
OIL SPILL COMMITTEE

MEMBERSHIP

1) CHAIRMAN – ENVIRONMENTAL PROTECTION COORDINATOR
2) MEMBERS – FUNCTIONAL AGM'S
   - LOGISTICS
   - MARKETING
   - PRODUCTION
   - LAW
   - OTHER STAFF GROUPS AS REQUIRED
3) SECRETARIATE – ENVIRONMENTAL PROTECTION COORDINATION

Chart 20

EXXON OIL SPILL RESPONSE ACTIVITIES
FINANCIAL COMMITMENT

- IMPERIAL WOULD PAY ANNUAL FEE

	SK
1. R & D PROGRAMME	150
2. SALVAGE PACKAGE	120
3. OPERATION AND MAINTENANCE	100
	370
4. W. HEMISPHERE EQUIPMENT PACKAGE (1)	325

(1) DEPENDING ON OUTCOME OF EUSA NON-DEDICATED RESOURCES CONTINGENCY PLAN – LOW PROBABILITY.

Chart 21

INTERNATIONAL OIL SPILL COOPERATIVE

SCHEDULE

ESTABLISH COMMITTEES WORK GROUP	JUNE 1980
COMPLETE WORK GROUP PROPOSALS	OCTOBER 1980
REVIEW AND APPROVE	NOVEMBER 1980
FINALIZE AGREEMENTS /SIGN	JANUARY 1981

Chart 22

STATUS OF INDUSTRY COOPERATIVES

- MAJOR SPILLS (UP TO 10KB)
- MAJOR REGIONAL COOPERATIVES NEEDED IN PARTICULARLY SENSITIVE AREAS
  - BURRARD INLET
  - GREAT LAKES
  - MONTREAL/ST. LAWRENCE RIVER
  - ATLANTIC REGION
- EXXON EXPECT AFFILIATES TO HAVE 10KB CAPABILITY

Chart 23

ADVISORY COMMITTEE ON POTENTIAL ENVIRONMENTAL HEALTH HAZARDS

FUNCTION

- EXAMINE RESEARCH FINDINGS WITH MEDICAL DIRECTORY
- ASSESS HAZARD RISK
- RECOMMENDED TO OPERATING MANAGEMENTS
  - A) AVOIDANCE OF USE
  - B) REFORMULATION OR STOP PRODUCTION
  - C) CHANGE TO *O.E.L.
  - D) PROCESS AND/OR ENGINEERING CHANGES

*OCCUPATIONAL EXPOSURE LIMIT