REVIEW OF ENVIRONMENTAL PROTECTION ACTIVITIES FOR 1976-1977

PROPRIETARY TO IMPERIAL OIL AND AFFILIATES

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ENVIRONMENTAL PROTECTION REVIEW AND COORDINATION ACTIVITIES 1976 - 1977

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SECTION I

PERSPECTIVE - ISSUES AND LEGISLATION

1. International

The United Nations Environmental Program (UNEP) now coordinates or sponsors most, but not all, international activities in the environmental area.

The Governing Council of UNEP, of which Canada is a member, meets each year for two weeks in Nairobi, Kenya to hear and discuss reports on program activities and approve program contents and budgets for the current and following two or three years.

The Director General designated the four most pressing current issues as:

Chart 1

- International control of toxic chemicals
- Resurgence of malaria
- Handling of agricultural wastes from increased food production
- Energy conservation.

In 1976 and 1977 the list of international environmental conferences and their themes included:

June 1976 U.N. Conference on Human Settlements - Vancouver

Public participation in the policy formation planning and management of human settlement.

Mar. 1977 U.N. Water Conference

Constraints to the wise use of water resources, boundary water issues, and community and agriculture water supplies were discussed.

Sept.1977 The U.N. Conference on Desertification - Nairobi

Processes creating deserts were examined and action plans to combat and reclaim deserts proposed.

The 5th and 6th Law of the Sea Conferences

Appeared to make some headway in certain issues but were hung up by deep divisions over rights and exploitation of the Deep Seabed Resources (Oil and Mineral Nodules).

A UNEP-IPIECA Seminar on environmental impacts of the petroleum industry was held in Paris March 29-April 1, 1977. A summary report was issued previously.

Summary of 1977 Agreement on Conservation of Shared Resources

1. States agree to ensure activities within their boundaries do not cause damage to the environment of other states.

2. Duty to warn neighbouring states of emergency situations which might cause harm.

Chart 2

3. Responsibility to fulfill international obligations in the environmental field when using or conserving shared resources and subject to liability for damage by violation of agreements.

4. Remedies for adversely affected population should be shared.

5. Environmental assessments should be made before undertaking activity which would significantly affect the environment of neighbour states.

The agreement was signed by 26 countries with the goal of passage by the U.N. General Assembly and codification into international law by 1982.

2. U. S. Review

In the past two years, five major pieces of environmental legislation have been enacted:

Toxic Substances Control Act (1976)
Resource Conservation and Recovery Act (1976)
Safe Drinking Water Act (1976)
Clean Air Act (1977)
Clean Water Act (1977)

To develop strategies and regulation for the implementation of the complex provisions of these laws,

increased bureaucratic staff and activities will be required. President Carter proposed a 33% increase over 1978 in the 1979 operating budget of EPA from $850 million to $1.1 billion.

The Council on Environmental Quality reported that pollution control expenditures in 1977 for air and water were $40.6 billion or 2.15% of the gross national product. They predict pollution abatement costs will average $29 billion per year for the decade 1976-1985 and that this will not have a major effect on the economy. The major industry associations are all very apprehensive of major negative impacts being the result. The API has estimated that in 1985 the anticipated annualized cost to the industry of regulations being considered under these Acts will be $10.3 billion. If evenly distributed over all products, this would amount to 4¢ per gallon.

Thrust and Implications of the Five Acts:

The Toxic Substances Control Act has faced the petroleum and other industries with a complex series of proposed rules and regulations for identifying, cataloguing, reporting and controlling a vast number of substances that are toxic or potentially toxic. In the case of refinery waste waters, 65 compounds or classes of compounds have been designated as toxic and will have to be controlled to specified limits by the use of Best Available Technology (BAT). The limits must be set by EPA by July 1, 1980 and industry must be in compliance by 1984.

Chart 3

Under the Clean Water Act, EPA was required to identify so-called conventional pollutants which include BOD, oil and grease, suspended solids and pH by March 28, 1978. The agency will determine what is Best Conventional Pollution Control Technology (BCT) and industry will have to comply by July 1, 1984. Most refiners will probably be in compliance because of the 1972 Act requirement for BPT by July 1, 1977.

The Resources Conservation and Recovery Act provides federal authority to deal with solid waste problems. By April 1978, EPA must publish criteria for the identification and listing of hazardous wastes, taking into account toxicity, persistence, degradability, flammability, and other hazardous charactertistics. Then EPA must generate standards for generators, transporters, and ultimate disposers of hazardous wastes. Concern over oil imports has put pressure on the U.S. Government to legislate the use of alcohol as an automotive fuel component under this Act. Other alternate fuels from oil shale, tar sands, and coal will face land use and land restoration controls under this Act.

The Safe Drinking Water Act will have implications on the underground injection of brines and the disposal of toxic liquid wastes.

The Clean Air Act 1977 introduced new regulatory strategies and jargon which has profound implications for U. S. industry and U. S. society. These are Prevention of Significant Deterioration (PSD), Non-Attainment Areas, and Offsets or Trade-offs.

Under the PSD policy, the Act requires that in areas where ambient air quality standards are being met, any major new or modified source of emissions must not deteriorate existing conditions by more than small specified increments. Because the permitted increments are so small, there exists the probability that most energy development and industrial expansion projects will be blocked.

The Non-Attainment Offset Policy requires that in areas where one or more of the ambient air quality standards are not being met, any proposed new or modified source cannot proceed unless a greater than one-for-one offset in emissions can be obtained by reduction of an existing emission source through trade-off. This policy has considerable potential for a market in pollutant emission rights. Sohio were rumoured to be buying up dry cleaning establishments in Southern California for their proposed crude terminal at Long Beach.

In non-attainment areas, a requirement of more immediate concern to industry is that the States must revise their State Implementation Plans to achieve air quality standards for all pollutants by December 31, 1982. Stage II service station controls, entailing 90% recovery of hydrocarbon vapour during vehicle fuelling, will be required in major centres in non-attainment areas unless EPA considers that an API research project proves the feasibility of on-board vehicular control.

The Administrator of EPA must, under the 1977 Act, list, then regulate, any substance which is deemed a hazardous air pollutant. Benzene is already subject to rulemaking. Other substances which are being studied are polynuclear aromatics (PNA's), polycyclic aromatics, sulphates, arsenic, and cadmium.

Fuel additives were regulated under the 1972 Act requiring manufacturers to test and register additives, not only to fuels, but also to motor oils. MMT has been banned in California and will be phased out in other

states after September 1, 1978, unless a major fleet test with catalyst-equipped vehicles proves that it does not significantly reduce the effectiveness of catalytic emission control systems.

3. Canadian Legislation 1976-1977

Federal

- Under the Clean Air Act, regulations were promulgated, setting out National Emission Standards for: lead smelters, chlor-alkali plants, asbestos mines and mills.

- Guidelines were proposed for Natural Gas Plants and Petroleum Refineries, but are being reviewed after two years of vigorous discussion and criticism by PACE and CPA.

- The Fisheries Act amendments, passed in 1977, strengthened the federal power in pollution control to a potentially abusive degree vis-a-vis provincial rights.

- Regulations for Liquid Effluent Standards were promulgated for: metal mining, meat and poultry plants, chlor-alkali plants, metal finishing plants and potato processing plants.

- Under the Environmental Contaminants Act, regulations on use, including banning, were issued for: PCB's, dechloranes, mercury, mirex and PBB's.

Chart 4

- Federal Guidelines for Preparing Initial Environmental Assessment Statements were issued.

- Regulations under The Canada Shipping Act were issued covering Great Lakes Sewage Pollution Prevention from vessels.

Provincial Legislation and Regulations 1976-77

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

Alberta

- Environmental Impact Assessment Guidelines were issued.

- Oil Sands Surface Operations Regulations issued under Land Surface Conservation and Reclamation Act.

- Waste Water Effluent Guidelines for Petroleum Refineries.

- Waste Water Effluent Guidelines for Fertilizer Plants.

British Columbia

- Pollution Control Act amended by addition of a pollution emergencies section.

Manitoba

- Regulations issued under Clean Environment Act governing Storage and Handling of Gasoline and Associated Products.

New Brunswick

- Clean Environment Act amended to give greater scope and power to the Minister.

- Asphalt Paving Plant regulations issued.

Nova Scotia

- Environmental Protection Act amended to increase list of regulated pollutants.

Newfoundland

- Environmental Impact Assessment Guidelines issued.

Ontario

- Water Quality Management and Control of Industrial Waste Discharges - Objectives and Guidelines issued.

- A Model Municipal Noise By-Law issued in final form.

- Regulations for Transfer of Liquid Industrial Wastes issued.

- Additions to Regulated Pollutants on Schedule I of General Air Regulations issued.

- Contingency Plan for Spills of Oil and Other Hazardous Materials re-issued.

Quebec

- Draft regulation on Air Quality under revision.

- Pulp and Paper Mill Effluent regulations still in draft form.

- Regulations covering Liquid Effluent from Petroleum Refineries were issued.

- Montreal Urban Community issued a comprehensive revised Air Purification By-Law. The By-Law is shelved pending provincial action on its overreach into energy control areas.

Saskatchewan

Environmental Impact Assessment Policy and Guidelines issued.

4. Public Attitudes

In 1976 and 1977, environment (pollution, etc.) ranked fourth in the level of Canadian citizens' concerns, exceeded by unemployment, inflation and national unity issues. A poll conducted by Weekend Magazine in February, 1978 of 31 urban centres found that 80% of people believe air, water, and land pollution are serious problems. The majority of 53% felt that pollution was a problem in their own area, as well as a national concern. Industry was blamed for water pollution by twice as many people as the next highest culprit (municipalities). Industry was also named the main cause of air pollution by more people, outranking automobiles by 4 to 3.

Chart 5

Chart 6

Chart 7

The most interesting finding of this survey is that people, although blaming industry, consider the responsibility for correcting problems lies with the government. Approximately eight times as many people believe that government rather than industry has this responsibility.

Chart 8

In the poll conducted for the Corporate Profile Study in December 1977, while 55% agreed that Imperial does show concern for the environment, only 21% claimed they were aware of any efforts Imperial was doing.

Ontario and British Columbia could be considered the hot-beds for environmental action, with Alberta following closely.

The issues are generally project-spawned and rapidly grow from specific to broad generalities. The environmental hearing process, by its nature, tends to turn all frogs into loathesome toads. Delays on projects for cosmetic surgery, or just to wear down opponents, are almost a certainty.

Notable examples of projects cancelled, remodelled, or delayed are:

- Canadian Arctic Gas Pipeline

Chart 9

- Reed Paper Company Pulp Mills - Northern Ontario
- Ontario Hydro's Generating Capacity
- Eldorado Nuclear Uranium Refinery - Port Hope
- Nanticoke Liquid Waste Disposal
- Maple Landfill Sites for Metro Toronto Garbage
- Kitimat Oil Terminal and Pipeline
- Spruce Budworm Spraying - Nova Scotia
- Camrose-Ryley Coal Mine - Calgary Power

Environmental action in Canada will be focussed in the next few years on nuclear projects, causes of acid rain, specific toxic chemicals--such as mercury, PCB's, and benzene--and any major oil spill from an offshore blow-out or marine disaster.

SECTION II

PERFORMANCE, PROBLEMS AND PLANS OF OPERATING DEPARTMENTS

1. EXPLORATION AND PRODUCTION

Accomplishments

Progress was made in combatting corrosion problems in the produced water handling systems at Judy Creek and Joarcam #1, and the number of corrosion failures have been reduced.

A draft Environmental Impact Statement for Davis Strait, based on extensive field work in 1976 and 1977, was submitted to DINA.

Additional studies in the Beaufort generally confirmed that island building and drilling mud disposal had only minor local impacts on the environment and no additional restrictions are anticipated.

In cooperation with industry and government groups, an air-bubble-barrier concept as an alternate to the standard oil spill diversion boom was tested with promising results, and further work is planned.

Major Problems Remaining

- Government environmental assessment guidelines require comprehensive contingency plans and countermeasures for a well blowout. Oil spill clean-up technology does not exist for severe environmental conditions and logistics are extremely difficult. Dispersants will of necessity be the major component of the plan.

- Federal environmental assessment regulations, procedures and reviews are becoming increasingly complex and time-consuming.

- Pipelines handling fluids with produced water continue to be a severe mechanical problem in terms of failures, spill potential and cost.

- Drilling sump fluid disposal in deep foothills wells has proven to be time-consuming and costly.

Plans

The corrosion in the produced water system will be reduced by eliminating trace oxygen from the fresh water injection, test lining of pipelines with polyethylene and conducting further linalog surveys.

Work will be continued with government agencies to try to streamline environmental assessment review procedures, reduce environmental study requirements and to develop more workable rules for drilling fluid disposal in the foothills.

2. NEW ENERGY RESOURCES

Accomplishments

- Study completed on environmental pits for spill clean-up.
- Design completed and construction started at May Pilot stack.
- A reforestration plan for Syncrude has been completed.
- Major background studies relating to SO_2 emissions at Syncrude have been completed.
- Preliminary environmental impact statement, plans for environmental control and field programs have been completed on the Cold Lake Project.

Plans

Major effort will continue to focus on water consumption and effluent disposal, as well as disposal of well drilling fluids, at the heavy oil operation. Further evaluation of containment of vapours emitted from wells is also required.

Particular attention will be given to the disposal of produced water and drilling fluids, the re-use of water and the final selection of production and upgrading facilities for the Cold Lake Project.

Syncrude's plans will include auditing of the performance of environmental controls, demonstration of the tailings pond operation, and particular surveillance of the ground level concentrations of sulphur dioxide.

All of the New Energy Resources' operations expect to give particular attention to employee awareness and training programs.

3. LOGISTICS

Accomplishments

- Sewer segregation projects completed at Montreal and Dartmouth.
- Longest continuous operation of Ioco Biox Plant meeting almost all of B.C. effluent objectives.
- Improved process control of Coker operations at Sarnia to reduce visible emissions during Cat shutdown periods.
- Reduction of potential H_2S flaring at Montreal.
- Improved reliability and efficiencies at Dartmouth sulphur plant.
- Disposal of Sarnia waste biox sludge at minimum cost through land farming on site.
- A four-year program for main-line block valve installations was completed on the Sarnia Products Pipeline.
- The leak detection capability was upgraded on the Sarnia Products Pipeline and the Quebec South Shore Pipeline, and studies were made on the Imperial Pipeline.
- A shipboard spill containment package, including a light-weight boom, work boat and portable skimmer was placed aboard the Imperial St. Clair.
- Pipeline staff participated in oil spill exercises at Sarnia, Winnipeg and Leduc.

Plans

- Development of control plan at all refineries to minimize release and discharge of contaminants to sewer systems.
- Successful resolution at optimum cost of control strategies for SO_2 in Montreal East and Sarnia areas.

- Minimizing of capital expenditures for CO, SO_2 and particulate control on Cat units through improved catalyst selection and design of control equipment.

- If a decision is made to extend the service life of the Imperial Sarnia, several environmental features will have to be added to meet government and Imperial requirements (e.g. sewage treatment on board, manifold spill and drop collection system, etc.)

- Third party (e.g. contractors) damage to pipelines continues to be a major concern. At least one spill a year results from digging by a third party.

- Some pipeline security systems are of an age that they will soon require refurbishing and replacement of the electronics. Also some computer systems require upgrading.

- Continued attention will be paid to employee awareness and training programs.

4. MARKETING

Accomplishments

- The IOL study on control and reduction of underground tank leaks was nearly completed. It will enable all existing systems to be upgraded over a scheduled period.

- Major contributions were made to the PACE Task Force on underground tank systems, including working with five provincial governments to develop realistic legislation.

- Storage tank overfill protection installations are under way based on economics and/or risk analysis.

- Test programs to define an alternate tank standard are under way involving installation and monitoring of 29 fibreglass underground tanks at 8 locations. The U.L.C. standard for underground steel tanks was also upgraded.

- Montreal East Terminal drainage and spill protection system was completed.

- Implemented surveys re Consumer and Distribution Operations on employee benzene exposure.

Major Problems Remaining

- Leakage from underground storage tanks and the ensuing contamination of underground aquifers, affecting the potability of the water and possible safety hazards in basements remains the top priority problem.

- Possible regulation of air emissions and effluents from service stations and bulk plants, following the lead in the U.S., is a serious potential problem.

- Oil-proofing of soils in terminals and bulk plants is also of concern because of possible ground water contamination.

Plans

- The several aspects of the underground tank problem are being tackled, i.e. legislation via PACE and provincial associations, better leak-detection methods via PACE and PACE studies to better assess the problems and suggest solutions.

- Surveys and situation analysis are under way on service station and bulk plants regarding air provisions and effluents.

- a set of guidelines on oil-proofing should be issued in 1978 from a PACE R & D project.

5. ESSO CHEMICAL CANADA

Accomplishments

- Activated carbon unit for effluent treatment appropriated for Sarnia Chemical Plant.

- Design completed to meet hydrogen fluoride emission guidelines at Redwater.

- Met VCM emission requirements by Ontario Ministry of the Environment deadline.

- Developed plan for control of NO_x to meet Alberta requirements at the Redwater Plant.

- Developed plan to meet 1981 licence requirements for water management at Redwater.

Plans

- Control of hydrogen fluoride emissions from the gypsum pond and process units at Redwater.
- Control of odours from the aeration pond and asphalt fumes at the Building Products Plant, Edmonton.
- Control of contaminants in the effluent which contribute to fish toxicity and fish tainting at Sarnia.
- Continuing control of ethylene, VCM, and benzene emissions at Sarnia.
- Improvement to the effluent from the Building Products roofing mill to meet anticipated Quebec regulations.
- Improved control of dust emissions at the Redwater Fertilizer Plant.
- Reduction of waste disposal costs will receive attention.

6. ESSO MINERALS CANADA

The Environmental Impact Statement for the Gays River mine, which was filed in September 1976, was approved in principal by the Nova Scotia government.

As the activities in minerals accelerate, the environmental aspects will become increasingly critical to the success and viability of the projects. Problems are anticipated in the Midwest Lake Uranium project in Saskatchewan in controlling air and water quality in the mine. In addition, the entire nuclear industry is facing public and emotional challenges that go beyond the purely technical solutions to the problems. The results of the Bayda Royal Commission into the uranium industry in Saskatchewan will be carefully evaluated. A potential mine at a large sulphide ore prospect in B.C. would have the problems associated with contamination of water from the tailings.

7. OIL SPILL STATISTICS

The total number of spills in 1977 was down from 1976 by approximately 10%, with a corresponding reduction in total volume spilled. This reduction is attributable to Marketing Department which reduced its

Chart 10

spills from 275 in 1976 to 207 in 1977, a reduction of nearly 25%.

Chart 11

As in other years, the majority of spills in 1977 were in the 0-10 bbl. category. Nine per cent of the total spills were over 100 bbls. in volume.

Chart 12

Equipment failure accounted for the majority of Production spills, while work error accounted for the majority of Logistics and Marketing spills. This is similar to previous years. As in 1976, tank overflows accounted for a significant number of Marketing spills in 1977, indicating a continuous need for training of both employees and outside carriers.

SECTION III

COORDINATION ACTIVITIES

1. Technical Effort, Expenditures and Budgets

In 1976, technical effort for environmental protection programs and studies rose again to 107 equivalent full-time persons; then in 1977, effort fell back to 96 persons. The number of full-time people fell from 50 in 1976 to 42 in 1977 as a result of decreasing project design requirements in Logistics and Esso Chemical. The foregoing statistics do not include technical effort expended in the S.R.A., P.R.A., or contracted research for Environmental Impact Assessment studies. Nor do they include Imperial's share of expenditures in industry associations for environmental concerns.

Chart 13

Charts 14 15

Capital expenditures for environmental control were $52.7 million in 1976 and $35 million in 1977, representing 17.0% and 11.5% of total Net Corporate Physical Capital Budget expenditures. The significant drop was due entirely to the Syncrude project. Expenditures in the current and following three years are anticipated to average around $40 million or 10% of total Net P.C.B. expenditures.

Chart 16

The projection of capital expenditures are based on the assumption there will not be any irrational new regulations in the forecast period.

2. Industry Activities

Arctic Petroleum Operators' Association

The APOA continues to be very active in promoting joint research and liaison between industry, government and universities on Arctic matters. The membership during 1977 was thirty companies. The completed or active projects over the past eight years now total 129 at a gross cost of $24 MM. During the past year, 25 projects were undertaken or proposed at a cost of $5.4 MM.

Chart 17

Considerable effort was expended in 1977 in the Eastern Arctic Marine Environmental Study, which is an industry-funded program required by government. Eight projects costing over $3 MM were undertaken for the Davis Strait.

Other APOA activities include studies on ice/structure interaction, ice movement, ice geometry,

remote sensing of ice and oceans, a public information program and review, and identification of priorities for oil spill clean-up technology research.

PACE

PACE continues to maintain a high level of activity. 90 people of member companies contributed their time to its efforts. Almost one-half of the budget was devoted to research and development. Petro-Canada became a member during 1977. The activities of PACE have received increased public attention, and demand for a recently published PACE booklet exceeded expectation, requiring a further printing of 30,000 copies.

1. Oil Spill Contingency

- Recommendations for ship-based equipment for containment and clean-up were prepared and distributed.

- The PACE office has full responsibility for the distribution of training materials produced by the consortium of Canadian Coast Guard, Environment Canada, Ontario Ministry of the Environment and PACE. Field training was conducted in all regions, including the Arctic, and efforts were made to ensure a satisfactory level of commitment in these regions. Existing guidelines were revised in both languages and work has begun on five additional guidelines.

Chart 18

2. Research and Development

- Environment Canada, the Canadian Petroleum Association, and PACE jointly sponsored work on oil spill contingency action. Three R & D projects were finalized and four continued from previous year. Six new projects were initiated in 1978, one-half of which bear direct relationship to toxic issues.

3. Briefs to Governments

- Contacts with government officials and agencies continued at a high level throughout the year. PACE standing committees presented briefs to the IJC Water Quality Board, the Ontario and Federal Ministers of the Environment on the subject of amendments to the Great Lakes Water Agreement, the Department of Transport on the Maritime Pollution Claims Fund, and the

Department of the Environment on the proposed Refinery Emission Guidelines and the Fuels Information Regulation No. 1. A special task force was also struck to make a presentation to a federal intergovernmental group on the subject of Automotive Exhaust Emission Standards and Fuel Considerations for the Early Eighties. In addition, six presentations were made to provincial governments through designated provincial petroleum associations.

- The National Emission Guidelines for Petroleum Refineries are still pending. Recent advice from Environment Canada indicates there will be a change in policy and it is anticipated that concerns for existing refineries will be left in the hands of the provincial authorities.

4. Other Regulation Development

- More frequent and wider contacts with governments at all levels have been instituted by the PACE office.

- A special committee is preparing a "state of the art" document as a basis for an industry position on the benzene issue.

- Constructive comment has been made on occupational health draft legislation in both Saskatchewan and Quebec.

5. Technical Advice

- Industry has initiated studies to provide the basis for a cooperative solution to further control of sulphur dioxide emissions in the Montreal East area.

- At the request of the Ontario Ministry of Consumer and Commercial Relations, the Ontario Petroleum Association considered the over-all problems relating to unprotected steel underground storage tanks and will make proposals dealing with the problems. PACE members are contributing as part of the industry task force involved in this work.

- The Water Quality Committee has advocated the institution of a national body to standardize water sampling and testing methods. The Water

Pollution Control Branch of the EPS is in agreement and work will proceed with this important task.

3. Environmental Quality Committee

The Committee met five times in 1976 and six times in 1977. Highlights of 1976 meetings were as follows:

- The Burrard Inlet Oil Spill Cooperative Agreement was reported to have been approved by the participants' head offices.

- The conclusions drawn by Environment Canada from the $12 million Beaufort Sea Research Program were reviewed. The effect of a late season blowout was predicted to be disastrous to shore birds, but not an ecological calamity.

- An ad hoc Petroleum Products Health Hazard Task Force reported its activities and plans. Identification of potentially carcinogenic products was made and a customer advisory program initiated by Marketing.

- Toxic substance legislation was reviewed and need for a Corporate Policy Statement recognized.

Chart 19

- The need for Toxic Substance Subcommittees was suggested.

  Reporting requirements for toxic substances (to the Federal Government) and procedures drafted by the Coordination Department were reviewed.

- The Medical Director and E.R. Safety Coordinator reported on "New Thrusts in Occupational Health and Safety".

- Law Department reviewed implications of recent court decisions with respect to Product Liability.

Highlights of the 1977 Committee meetings were:

- The Imperial St. Clair stranding on December 23, 1976 on Telegram Rock was reviewed and public relations and clean-up monitoring agreed upon.

- The Coordinator's and Committee's recommendations to COMPOR to expand their terms of reference to include responsibilities for coordination of toxic substance control activities was reported to have been accepted.

- The circumstances with respect to charges laid by the Federal Environment Department against the company for exceeding legislated lead-in-gasoline levels at Churchill, Manitoba were reviewed. A guilty plea was deemed prudent and procedures within Logistics to correct and prevent future such incidents were reviewed.

- An action plan for a situation analysis with respect to potential benzene hazards was agreed upon and an interfunctional task force named.

- Industry and Imperial actions taken to respond to Thompson Inquiry for West Coast Oil Ports was reviewed and the PACE work plan endorsed.

- The Science Council report "Policies and "Poisons" and seminars relating to it on occupational health and safety were reviewed for implications to the Company.

4. Coordination Department Activities

The department represented the company and/or industry at several international and many domestic and U.S. committees, meetings, and forums. The Coordinator served as President of PACE in 1977 and attended UNEP/ Petroleum Industry Seminar in that capacity.

The group prepared and presented over twenty formal technical papers to industry, government or public meetings in the two-year period, covering a variety of environmental subjects.

Considerable guidance and assistance was lent to Production Department in connection with environmental studies for the Mackenzie Delta, Beaufort Sea, and Davis Strait exploration programs. The staff biologist designed a matrix for assessing the environmental impact from a Davis Strait well blowout. New Energy Resources were assisted in development of environmental studies and planning for the Cold Lake project.

The Coordinating Department members and other Imperial personnel, including the Regional Environmental Advisors and operating department specialists, provided leadership in many areas of industry environmental protection activities. These activities included:

- Oil spill contingency planning
- Federal/Provincial/PACE Task Force on Refinery Air Emission Guidelines
- Research and data for development of regulations for underground tank tankage
- Biological baseline studies in Davis Strait
- Briefs for the West Coast Oil Ports Inquiry.

The effective performance of these industry groups is due in large part to the strength of the technical and managerial contribution by Imperial.

The Coordination Department is participating by invitation in the API's Panel of Biological Experts and in two Exxon Corporation task forces. One of these is seeking to gain wider acceptance of oil spill chemical dispersants as an effective countermeasure for major marine spills; the other task force is developing an Exxon worldwide oil spill contingency plan. It appears that several features of the Imperial plan will be used as a model for other affiliates.

A study is under way with Medical Department to develop plans and procedures to manage the flow of scientific information from Exxon Research and other sources, on the toxicity of products, air and water emissions, and wastes. When implications indicate coordinated corporate action is required, this will be effected through the Toxic Substance Subcommittees of EQC and the operating departments.

The importance of adequate environmental assessment studies and impact predictions to approval and construction scheduling of projects cannot be over-emphasized. Earlier and more extensive involvement of the Coordination Department in the planning and design of environmental studies would improve efficiency.

The Coordination Department plans to work directly and through industry associations with government agencies for procedural changes which will shorten the environmental approval process.

Chart 1

UNEP DESIGNATED PRESSING ISSUES 1978

- INTERNATIONAL CONTROL OF TOXIC CHEMICALS
- RESURGENCE OF MALARIA
- HANDLING INCREASE OF AGRICULTURAL WASTES
- ENERGY CONSERVATION

Chart 2

1977 INTERNATIONAL AGREEMENT ON CONSERVATION OF SHARED RESOURCES

1. ENSURE INTERNAL ACTIVITIES WILL NOT HARM NEIGHBOUR STATES ENVIRONMENT.
2. WARN NEIGHBOUR STATES OF POTENTIALLY HARMFUL EMERGENCIES.
3. MUST FULFILL INTERNATIONAL OBLIGATIONS IN USE OF SHARED RESOURCES. LIABLE FOR DAMAGE FROM VIOLATION.
4. REMEDIAL ACTION SHARED.
5. E.I.S. REQUIRED BEFORE COMMENCING ACTIVITIES WITH SIGNIFICANT EFFECT ON NEIGHBOUR STATE(S).

Chart 3

MAIN THRUSTS OF NEW U.S. LEGISLATION

TOSCA

- 65 SUBSTANCES IN REFINERY WASTE WATER CONTROLLED TO SET LIMITS
- WORKER PROTECTION COSTS TO ESCALATE FOR MANY HAZARDOUS SUBSTANCES

RCRA

- TRANSPORTATION AND DISPOSAL COSTS ESCALATE
- ALCOHOL AND GASOLINE – STRAIGHT OR MIXED

SDWA

- UNDERGROUND INJECTION OF BRINES AND TOXIC LIQUIDS TOUGHER

CAA

- PROJECT SITING IMPOSSIBLE FOR P.S.D.
- EMISSIONS OFFSETS FOR PLANT EXPANSIONS
- EMISSION FROM VEHICLE FUELING SERVICE STATION CONTROLS OR ON-BOARD
- MMT – BAN OR STAY

Chart 4

IMPLICATIONS OF CANADIAN 76-77 LEGISLATION

- ALL NEW PLANTS WILL HAVE AIR, WATER FEDERAL EMISSION GUIDELINES
- EXISTING REFINERIES MAY GET TOUGHER WATER REGULATIONS
- LAND RECLAMATION PLANS REQUIRED FOR LAND DISTURBING PROJECTS
- ENVIRONMENTAL IMPACT ASSESSMENT FOR MAJOR PROJECTS
- PACKAGING AND RECYCLING REGULATIONS TO GROW

Chart 5

ISSUES OF MOST IMPORTANCE TO THE PUBLIC ARE . . .

	%					
	1972	1973	1974	1975	1976	1977
UNEMPLOYMENT	46	22	9	14	20	38
INFLATION	30	43	63	59	39	36
ENGLISH/FRENCH, FEDERAL/PROVINCIAL RELATIONS	6	4	5	4	15	12
ENVIRONMENT & POLLUTION	17	15	11	12	12	7
ENERGY	–	–	2	3	5	3
U.S. INVESTMENT	–	7	5	4	4	3

WHILE 7% OF THE PUBLIC FELT THAT ENVIRONMENT & POLLUTION WAS THE MOST IMPORTANT CANADIAN ISSUE, A TOTAL OF 26% RANK IT AS ONE OF THE THREE MOST IMPORTANT (1977).

Chart 6

PUBLIC RANKING OF THE POLLUTION PROBLEMS

	Water	Air	Land
VERY SERIOUS	57%	46%	36%
SOMEWHAT SERIOUS	31	39	42
NOT SERIOUS	10	13	18
DON'T KNOW	2	2	4

Chart 7

THE MAIN CAUSE OF POLLUTION IS

	Water	Air	Land
INDUSTRY/ INDUSTRIAL WASTE	37%	43%	8%
MUNICIPALITIES	18	–	16
CAR EMMISSIONS	–	33	–
GENERAL PUBLIC	8	–	29
INSECTICIDES/ CHEMICALS	–	–	5
OTHER	12	19	10
DON'T KNOW	25	15	32

Chart 8

PROBLEMS SHOULD BE CORRECTED BY

	Water	Air	Land
GOVERNMENT	55%	52%	47%
INDUSTRY	6	8	3
PRIVATE CITIZENS	17	19	24
CITIZENS AND GOVERNMENT	5	4	5
DON'T KNOW	17	18	20

Chart 9

PROJECTS CANCELLED OR DELAYED FOR ENVIRONMENTAL REASONS

CANADIAN ARCTIC GAS	N.W.T.
REED PAPER	ONT.
ONTARIO HYDRO EXPANSION	ONT.
ELDORADO NUCLEAR REFINERY	ONT.
NANTICOKE LIQUID WASTE	ONT.
KITIMAT OIL TERMINAL	B.C.
SPRUCE BUDWORM SPRAYING	N.S.
CAMROSE-RYLEY COAL MINE	ALTA.

Chart 10

IMPERIAL OIL LIMITED
1977 OIL SPILL STATISTICS

	Number		Volume (BBLS)	
Function	1977	1976	1977	1976
PRODUCTION	33	32	922	1320
LOGISTICS	87	69	1800	1457
MARKETING	207	275	4968	≈6000
DNER	6	—	206	—
	333	376	7896	8777

Chart 11

IMPERIAL OIL LIMITED
1977 OIL SPILL STATISTICS

Function	Size Classification (BBLS)		
	0 - 10	10 - 100	100+
PRODUCTION	19	11	3
LOGISTICS	77	7	3
MARKETING	128	55	24
DNER	2	3	1
	226	76	31

Chart 12

IMPERIAL OIL LIMITED
1977 OIL SPILL STATISTICS

Function	Causes (%)		
	Work Error	Equip. Failure	Other
PRODUCTION	18	79	3
LOGISTICS	52	44	4
MARKETING	76	24	-
DNER	57	43	-

Chart 13

ENVIRONMENTAL MANPOWER SUMMARY
(MAN YEARS)

DEPARTMENT	1975 Full Time	1975 Part Time	1976 Full Time	1976 Part Time	1977 Full Time	1977 Part Time
LOGISTICS	13	11	26	25.25	18	21.5
EXPLOR./PROD'N.	6	18	6	18	9	18
ESSO CHEMICAL	5	4.5	5	4.5	2	3
TRANSPORTATION	–	3.1	–	–	–	–
MARKETING	3	11.5	1	9	–	9.4
NEW ENERGY RES.(1)	–	0.1	–	0.6	1.5	0.5
MINERALS	–	–	–	–	–	–
REG. ENVIR. ADVIS.	6	–	6	–	6	–
E.P. DEPT.	3	–	3	–	4	–
RESEARCH	2	0.25	2.75	0.25	2	1
	38	48.45	49.75	57.6	42.5	53.4
TOTALS	86.45		107.35		95.9	

NOTE: (1) SYNCRUDE – 22 MAN YEARS (FULL-TIME) IN 1977

Chart 14

COST OF ENVIRONMENTAL ASSOCIATIONS (1977)

Name	Total Budget	I.O.L. Share
APOA	$2,893,000	$ 959,000
PACE	408,000	102,000
LAMBTON	401,000	56,000
LAVAL	273,000	44,000
	$3,975,000	$1,161,000

Chart 15

COST OF ENVIRONMENTAL RESEARCH (1977)

Category/Area	Nature	Cost
BEAUFORT SEA	WHALES, FISH, MUD DISPOSAL	$ 217,000
DAVIS STRAIT	FISH, BIRDS, MAMMALS, CLIMATOLOGY, OCEANOGRAPHY	1,300,000
COLD LAKE	FLORA, FAUNA, SOILS, CLIMATE, SOCIO-ECONOMIC	546,000
S.R.A.	PRODUCTS, PROCESSES, AIR, WATER AND NOISE POLLUTION	1,050,000
PACE	TRACE METALS, BIOSLUDGES, U.G. TANK LEAK DETECTOR, OXIDANT LEVELS	50,000
UNIV. RES. GRANTS	12 PROJECTS	57,000
I.O.L.	10 PROJECTS	290,000
		$3,510,000

Chart 16

ENVIRONMENTAL CAPITAL EXPENDITURES

($MM)

DEPARTMENT	1976	1977	1978	1979	1980	1981
LOGISTICS	7.8	10.1	22.0	7.4	2.4	15.6
PRODUCTION	2.7	2.0	2.5	4.3	4.5	4.7
EXPLORATION	8.6	8.2	10.4	10.0	14.2	15.0
ESSO CHEMICAL	1.4	1.3	1.9	1.1	3.1	4.5
MARKETING	3.5	3.7	3.3	2.0	2.2	1.7
MINERALS	–	–	0.65	1.3	0.3	0.3
NEW ENERGY RES.						
(A) COLD LAKE/H.O.	–	0.2	2.6	0.6	0.6	0.5
(B) SYNCRUDE	28.7	9.5	1.7	0.5	1.4	9.5
	52.7	35.0	45.05	27.2	28.7	51.8
PER CENT* OF NET CORP. P.C.B.	17.0	11.5	11.0	8.0	8.2	10.0

*BASIS
1977 L.R.O.

Chart 17

ARCTIC PETROLEUM OPERATORS' ASSOCIATION

- 38 MEMBER COMPANIES
- 25 PROJECTS IN 1977 - $5.4 MILLION
- EASTERN ARCTIC MARINE ENVIRONMENT (EAMES)

OBJECTIVE

- TO OBTAIN DRILLING PERMITS IN 1979

Chart 18

PACE

- 14 INTEGRATED OIL COMPANY MEMBERS
- COORDINATION OF OIL SPILL CLEAN-UP PLANNING
- RESEARCH OF INDUSTRY PROBLEMS
- BRIEFS TO GOVERNMENTS
- REGULATIONS DEVELOPMENT
- TECHNICAL ADVICE - GOVERNMENTS, MEMBERS

Chart 19

ENVIRONMENTAL QUALITY COMMITTEE

- MAJOR OIL SPILL CO-OP TERMS
- BEAUFORT SEA STUDY CONCLUSIONS
- TOXIC SUBSTANCE CONTROL
  - 3 SUB-COMMITTEES
- SPILL STATISTICS AND MAJOR INCIDENTS REPORTED
- ALL ENVIRONMENTAL LEGISLATION REVIEWED