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WORLD ENVIRONMENT CENTER STAFF

TRIP REPORT

TO

ROMANIA

OCTOBER 11 - 25, 1993

**WORLD ENVIRONMENT CENTER
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I. ITINERARY

- October 10 - 15 - Ampelum, Zlatna
- October 16 - Travel to Bucharest
- October 17 - Meet Arpechim WMDP team and travel to Pitesti
- October 18 - Arpechim, Pitesti
- October 19 - U.S. AID, GOR, Bucharest
- October 20 - Ploiesti, Bucharest
- October 21 - Arpechim, Pitesti
- October 22 - U.S. AID, Ministry of Industry, Bucharest

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II. EXECUTIVE SUMMARY

WEC organized its first hot spot impact assessment team and visited Ampelum, a copper smelter in Zlatna. The team consisting of Drs. Wilson and Charnley, Messrs. Swan and Garcia, Liviu Ionescu, WEC country coordinator, and Thomas J. McGrath, WEC staff.

The trip was successful. Recommendations were made that could allow the smelter to operate and meet U.S. ambient air standards for a cost of approximately \$400,000. The proposal could be implemented over a one year period. This could help reduce severe pollution and ease potential socio-economic contractions in the region. Funding would also help establish a basic health and safety program for the workers at the smelter. Ampelum management pledged full cooperation.

The waste minimization demonstration project at Arpechim is underway. Monitoring equipment has arrived. All major department heads have been trained in waste management techniques; enthusiasm is very high at the facility and the equipment will be installed and operating by early November. WEC team will return in early December.

Thomas J. McGrath visited Dero, the largest producer of detergents in Romania, regarding a waste minimization demonstration project and Petrotel, a large refinery, regarding an environmental assessment.

Both enterprises appear to be very good candidates. U.S. AID Bucharest and the Ministry of Industry were informed of our progress. Ministry of Industry advised that both companies are important for the Romanian economy and requested WEC assistance. Plans are underway to organize a project for each facility.

III. MEETINGS

Monday - Friday, October 11 - 15

The meetings at Ampelum are covered in the following memorandum sent to U.S. AID.

"During the week of October 10, a four person WEC team visited Ampelum, a cooper smelter and the copper mines that supply the ore concentrate to Ampelum.

Each expert will prepare a report of their observations and recommendations. This summary will present my observations that suggest some options for consideration.

The environmental conditions at the smelter and in the town of Zlatna are severe. We found out that before 1991 the conditions were far worse because a third smelter, which has been torn down, was operating. Presently, only a new smelter is in operation and an older one is shut down.

The original purpose of our visit was to review a proposed plan to repair the existing old smelter and make other modifications which would bring the smelting operation into compliance with existing Romanian environmental regulations. Ampelum estimates that the cost would be approximately \$35 million. The WEC experts think the cost estimate may be low, but Ampelum plans to use Romanian material and labor. A feasibility study would determine if Ampelum's estimates are reasonable. We believe one could be done for a modest cost in a reasonable period of time.

The WEC team made a recommendation which, when implemented, could bring Ampelum into compliance with U.S. ambient air standards. Estimated cost is about \$400,000. The recommendation is to build a meteorological station and place sensors at strategic locations. Using weather data, the copper ore input to the furnace would be reduced when weather conditions would indicate that production should be reduced so that the emissions would not cause air pollution to exceed ambient air standards. This solution is practiced in the U.S.

We estimate that if funding is available and the weather station and sensors installed by January, 1994, reliable data will be generated within nine months.

There is pressure from Alba Iulia, capital of the region, to close the smelter. Should this happen, 36,000 miners and 2,200 workers at Ampelum would lose their jobs. The town of Zlatna, with a population of 9,000, would eventually become a ghost town because Ampelum is the only major employer.

If the smelter in Zlatna is closed, then its sister smelter in Baia Mare would also close. I don't have information on the potential economic impact in Baia Mare because we did not visit there.

Closing the smelter would deprive Romania of its only source of copper. Ampelum is prohibited by law from exporting electrolytic copper because it must be used to satisfy internal needs. Ampelum management said, and the Ministry of Industry confirmed, that Ampelum could obtain the money it needs for repairs if it could export and obtain hard currency. However, this solution would require Romania to import copper and spend hard currency. Also, closing the smelter could cause serious social unrest. The miners make it quite clear that they would "visit Bucharest".

Our preliminary findings appear to indicate that if approximately \$400,000 for bringing the smelter into compliance with U.S. ambient air standards and \$100,000 for improving worker health and safety could be provided, the immediate air pollution and resulting health hazards would be brought under control.

The smelter still would need funding for improvements probably in the \$5 million range to insure that it would significantly reduce potential air pollution, improve worker health and safety, and significantly reduce health hazards to the people in the region. The cost estimates are rough guesses, but the WEC team feels they are "in the ballpark".

It appears that the situation at Zlatna presents an opportunity to make a significant positive impact at a comparatively reasonable cost. It may qualify for consideration by the committee that will administer the Environmental Action Program in Brussels.

We will try to have the four reports ready within 4-6 weeks. I would recommend that U.S. AID discuss the opportunity at Zlatna as soon as possible and not wait for the reports. Maybe you should consider having the team meet with you in Washington to hear their observations first-hand and establish a follow-up program.

The WEC visit was twice covered by Romanian T.V. The team reported its initial findings to the Romanian Council for Coordination, Strategy and Economic Reform.

When we briefed the Romanian Ministry of Industry on Friday, October 22, about the WMDP at Arpechim, which was very successful and also covered by Romanian T.V., Zlatna was again discussed. It appears to be a high priority of the Romanian government and the Ministry of Industry was very pleased with the

verbal report of the WEC team.

During our visit, we heard the comments of a local NGO in Zlatna which were very anti-Ampelum. While at Ampelum, the T.V. reporter thanked WEC for coming because he said the conditions in Zlatna are "dangerous to people". Whenever we mentioned that WEC visited Zlatna, people responded with similar comments.

I had a private meeting with Mr. Treger, the General Director, on our last day. He was with us all week and was candid in his comments and very cooperative. I told him that I did not know what action, if any, would result from our visit. I also told him that he and the management will have to improve its relationship with the NGO and local EPA. I suggested that if there is a follow-up program, that a task force with representatives from Ampelum, Zlatna and Alba Iulia municipality, local EPA and local NGO be established to implement the program. He agreed".

Monday, October 18

After our arrival, WEC and Arpechim management held meetings about the Waste Minimization Demonstration Project and arrangements were made to have the monitoring equipment released from Romanian customs.

The meetings held regarding the WMDP will be covered in Mr. Solovey's (Malcolm Pirnie, Inc.) report.

Tuesday, October 19

Participated in the United States Agency for International Development team that met with the Romanian Council for Coordination, Strategy & Economic Reform to report on the WEC team visit to Ampelum.

On Monday, the WEC team met with Mr. Richard J. Hough, U.S. AID Representative, and his staff. The summary of the points discussed in that meeting is included with this report.

Made arrangement to have the monitoring equipment released from customs for pick-up by Arpechim.

Wednesday, October 20

S.C. DERO, S.A.

Traveled to Ploiesti. Meet with Mr. Paulian Ionescu, General Manager and Mr. Gheorghe Lita, Technical Manager, S.C. Dero, S.A., to discuss the possibility of a waste minimization demonstration project.

Dero produces and markets powder and liquid detergents, sulphonated and sulphated products, naphthalenic acids, metallic naphthanates and octoates and organic solvents. It is the largest producer of detergents in Romania accounting for approximately 40% of Romanian detergent production.

The factory, which was built in 1955 on the ruins of an oil refinery destroyed in World War II, is located in one of the largest residential areas in Ploiesti, with approximately 40,000 people.

Main air pollutants are SO₂, SO₃, detergent powder and aerosols of naphthalenic acids.

Main water pollution is contamination from metallic naphthanates which are used by the lacquer and paints industry.

Dero has no mechanical or biological wastewater treatment facilities, but does treat its wastewater chemically.

Electrostatic filters of Romanian design were installed in 1975 and were 90% efficient for a period of time. Now for all practical purposes, they are useless.

Dero has a development program to improve production and decrease pollution. Their goal is to build a new filtration plant and to discontinue use of two old detergent powder units by building one automatic detergent production line.

A tour of the factory indicated much construction activity in various phases.

Mr. Ionescu strongly requested that WEC perform a WMDP. Since this was recommended by the Ministry of Industry as an important facility for Romania and the strong request and pledge of full cooperation by the General Manager, it is a good candidate for a reconnaissance visit which will be arranged by WEC.

PETROTEL

This is another large refinery in Ploiesti that was recommended by the Ministry of Industry. Met with Mr. Paul Stanescu, Manager, Technical Service and Mr. Cristian Modranescu, Head of Environmental Department. The WEC waste minimization demonstration program was explained as were the reasons why funding did not allow for one to be done at Petrotel. However, WEC proposed that it send two experts in waste minimization to work with the management to develop a waste minimization program. It would include the establishment of a waste minimization committee which would be trained in waste minimization techniques. Then waste minimization projects would be identified and, where possible, estimate of pollution reduction with resulting cost savings for each

potential project would be calculated. Reports for each project would be submitted to management for funding consideration.

Mr. Stanescu said he welcomed the proposal and requested we send experts as soon as possible.

Bucharest

Returned to Bucharest and rejoined Messrs. Swan and Garcia. Doctors Charnley and Wilson had returned to the U.S. Visited with Mr. Radu Dornean, General Manager, Cast, a supplier of environmental monitoring equipment.

Also visited with Dr. Dipl. Engineer Petru Moldovan and Dr. Eng. Nicolae Panait, professors at the Department of Non-ferrous Metallurgy, Polytechnic Institute. Messrs. Swan and Garcia discussed metallurgy as practiced in the U.S. and all shared experiences.

Thursday, October 21

Returned to Arpechim and participated in the waste minimization training program.

The total carbon analyzer monitoring equipment arrived and generated much interest.

Arpechim management calculated that the equipment would decrease hydrocarbon contamination in condensate which would result in an increase of 25% of salable condensate which Arpechim sells back to the state power company. This would result in a savings of \$185,000 to Arpechim.

Arrangements were made for a representative from Ionics, the equipment supplier, who would be present to assist Arpechim in installing and operating the monitoring equipment when Arpechim is ready for the installation.

Two meetings were held with Mr. Mihail Georgescu, General Manager, about the WMDP. He pledged his full support at a meeting which was filmed by Romanian T.V.

The WEC team tentatively scheduled its next visit for the week of December 6.

Friday, October 22

U.S. AID - Met with Mr. Richard J. Hough and Ms. Gianina Moncea and reported on the progress at Arpechim and on the visit to Dero and Petrotel.

Ministry of Industry - Reported to Mr. Georgescu and his staff about my visit to Dero and Petrotel. Also gave an update on the Arpechim WMDP. Mr. Mihail Paraschiv, Secretary of State, Chief of Department of Chemical and Petrochemical Industry, Ministry of Industry, joined us briefly during our meeting. He was informed about WEC programs, current and planned. He expressed his appreciation, support and requested we contact him if we need his help.

Chamber of Commerce and Industry of Romania

Met with Mr. Viorel Sandu and Ms. Roxana Ionescu to discuss their services as a public relations representative for the waste minimization impact program.

We reached an understanding in principle. WEC will send a letter of intent to Mr. Sandu.

International Executive Service Corps

While in Zlatna, WEC was requested to contact the local International Executive Services Corps representative.

Met with Mr. Paul Haures, Business Development Services, IESC, and discussed future possibilities where IESC and WEC could collaborate at an enterprise. Mr. Haures will contact WEC in the future when a suitable opportunity occurs.

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V. APPENDICES

TALKING POINTS - ZLATNA, OCT. 19, 1993
COUNCIL FOR COORDINATION, STRATEGY & ECONOMIC REFORM

MINE

1. Need new water pumping equipment for the mine.
2. Consider clean-up of discharge to stream.
3. Long-term problem of tailings.

SMELTER

1. What standard of air quality should Ampelum meet?
2. Need managed change to balance environmental improvements with continued employment possibilities.
3. Production curtailment and adjustments could enable Ampelum to meet ambient air standards. Would need to utilize meteorologic data to adjust production to air quality and climatic conditions and would need supplementary control systems.
4. Because of the mix of ores handled, need old smelter, the operation of which could be more efficient if enriched the gas stream by installing roasters which could lead to 80-85% recovery of fugitive SO₂ emissions.
5. Refurbishing old acid plant not really practical.
6. Understand that water treatment plant for smelter and acid plant and refurbishing of smelter to be completed by 3/94 and mid 1995 respectively.

OCCUPATIONAL SAFETY & HEALTH

1. The potential for exposure to toxic chemicals, noise, heat and ergonomic agents certainly exists.
2. Air flow for hoods (work with acids) not very effective; no PPE in use; no silencers on noisy equipment. Low-cost equipment could be installed to improve safety measures.
3. Control of exposure to these agents by the use of technical, educational, administrative or personal protection equipment (PPE) is limited.
4. Despite the fact that reported injuries are low, this could be related to a system of fining workers for accidents.

5. The tests described in the toxicological manual can not be done with the equipment available.
6. No evidence of effective safety committees.
7. Need education of personnel charged with monitoring safety; of workers about safety and occupational hazards and how to prevent problems.
8. Plant needs more modern air pollution monitoring equipment.

ENVIRONMENTAL HEALTH EFFECTS

1. People in the community around Ampelum are being exposed to levels of toxic chemicals in the air, soil, water, and food that are likely to produce adverse health effects.
2. Likely adverse health effects include acute and chronic respiratory diseases including cancer; skin diseases including cancer; kidney diseases including cancer; growth and intelligence deficits in children, and others.
3. Some adverse health effects have been documented:
 - a. high blood lead levels in children, which are associated with intelligence, growth, and physical deficits
 - b. impaired respiratory function in children, associated with increased risk of respiratory diseases
4. Currently, monitoring of chemical exposure levels and health effects is sparse. However, understand that the EC is funding a study of the possible effects of heavy metals and irritants (Bia Mare, Copsa Mica, Ploiesti and Zlatna) to be coordinated by the Institute of Public Health and Medical Research, Dr. Gurzau.

"PETROTEL S.A. - PLOIESTI", situated NE of PLOIESTI was established in 1904 under the name of ROMANIAN - AMERICAN, on the initiative of STANDARD OIL OF NEW JERSEY Consortium.

LOCATION AREA : 276 hectares.

MAIN DEVELOPMENT STAGES AFTER WORLD WAR II :

- 1952 - 1958 - LUBE OIL COMPLEX designed for an initial production of 80,000 t/year ; by modifications and capacity extension it currently produces approx. 150,000 t/year lube oils, 20,000 t/year paraffins and ceresin waxes, and 150,000 t/year bitumens.
- 1960 - 1964 - LUBE OIL ADDITIVE COMPLEX (approx. 8,000 t/year) for depressants, viscosity index improvers, antioxidants, detergents, wear, extreme pressure additives.
- 1972 - 1974 - II-nd LUBRICANT OIL HYDROFINISHING UNIT and extension of the range of manufactured additives, i.e. detergent and dispersant additives.
- 1974 - 1984 - FUELS AND PETROCHEMICALS DEVELOPMENT.

At present, PETROTEL S.A. has a combined complex profile for lubes, carburants/fuels, petrochemicals.

RAW MATERIAL SOURCES : crude oil, approx. 5,000,000 t/year pipelined from Constanta (3,500,000 t/year), and from domestic production.

OTHER RAW MATERIALS : transfers from others refineries : approx. 400,000 t/year by pipeline, and approx. 300,000 t/year by rail and surface.

UTILITY SOURCES : water-approx. 500 liter/sec from the accumulations of Paltinu and Valeni, completed with own resources.

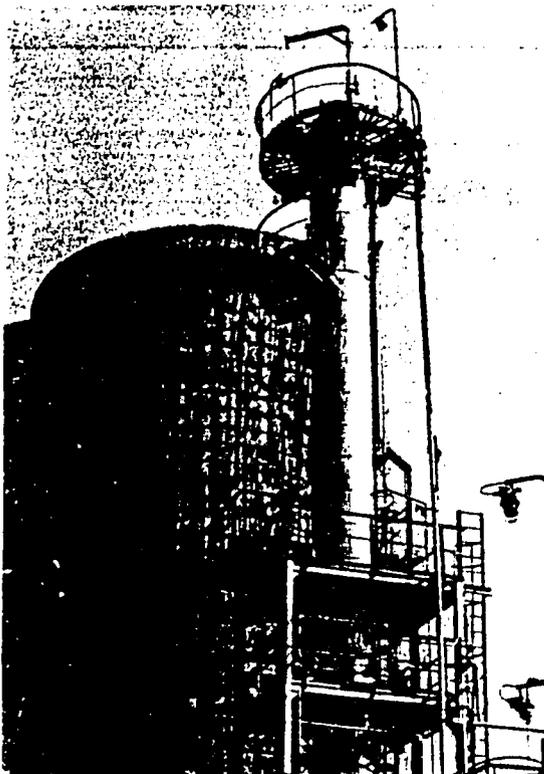
ELECTRIC POWER - approx. 400,000 MW/year from own power plant and from the National system.

METHANE GAS - from the National system, approx. 300,000,000 Ncm/year and gas from own production (approx. 150,000,000 Ncm/year) and fuel oil (approx. 250,000 t/year).

PROCESS STEAM : from own production.



DIVISIONS : Mecanical - Automation - Electrical - Division and separately the Pyrolysis Complex and the Power Plant .



FUEL DIVISION, including three Process Sections has the following capacities and produces the following final products :

- one Vacuum and Atmospheric Unit for 3,500,000 t/year crude oil which provides raw materials for secondary processes and furnace fuels.

- one Gasoline Hydrofinishing Unit (Hydrotreater) for a 900,000 t/year throughput, dedicated to catalytic reforming (500,000 t/year), and pyrolysis process.

- one Gas oil - Kerosene Hydrofinishing Unit for 1,000,000 t/year throughput.

- one Gas Fractionation Unit for 135,000 t/year throughput producing petrochemical raw materials (C4, nC4, iC4, nC5 and iC5).

- one N - paraffin Separation Unit of approx. 10,000 t/year for the detergents industry.

- one Catalytic Cracker of approx. 1,000,000 t/year throughput - vacuum distillate.

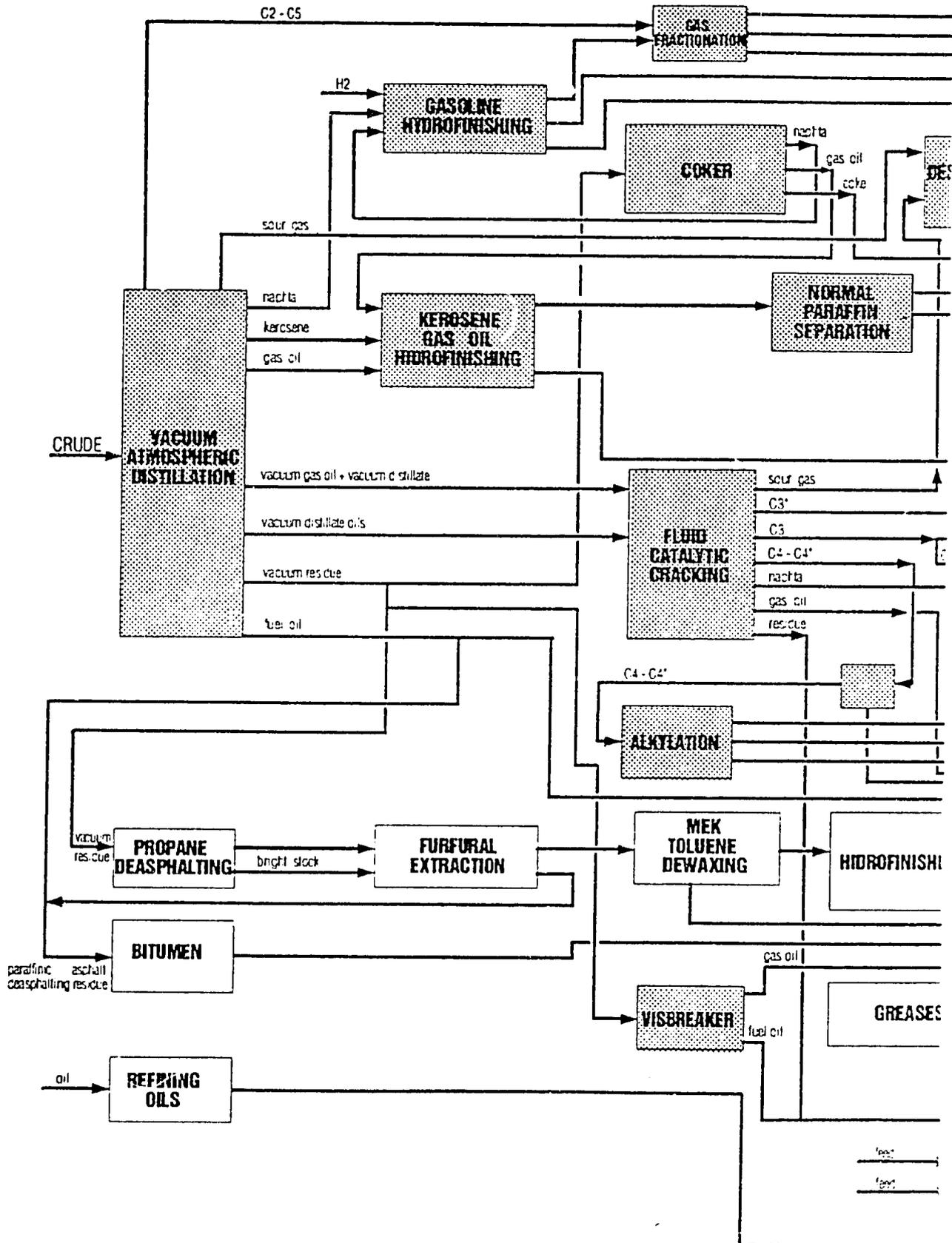
- one HF Alkylation Unit for isobutane - butane fraction of the Catalytic Cracker which produces alkylates (throughput : 70,000 t/year

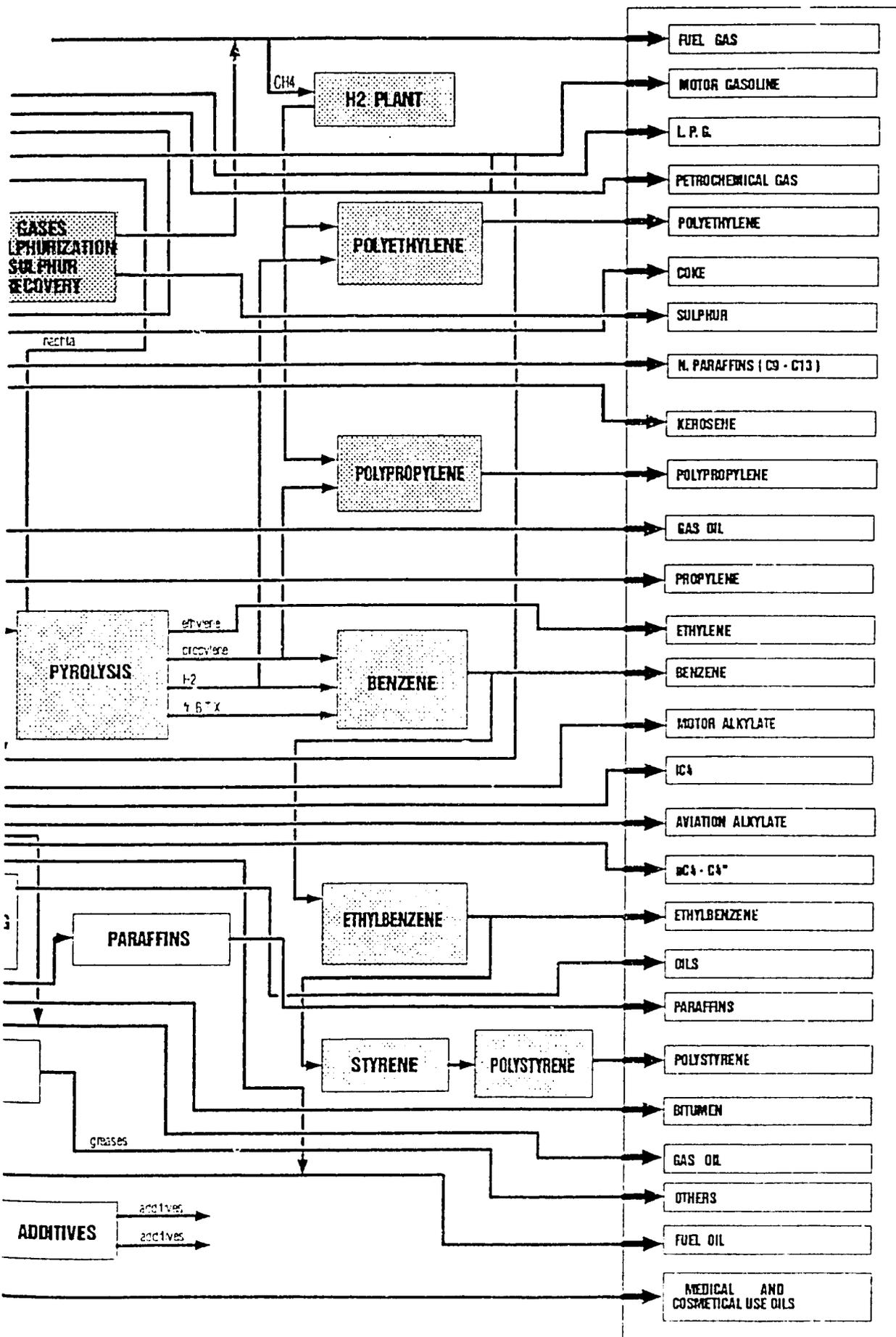
- one Delayed Coker Unit of 700,000 t/year heavy oil and short residue throughput.

- one Gas Desulphurization and Sulphur Recovery Unit for a 30,000 t/year throughput and approx. 4,000 t/year sulphur production.

- one Bitumen Unit for approx. 200,000 t/year industrial bitumen, isolation and road bitumen, paraffinic and special purpose.

PETROTEL S.A. - FLOW DIAGRAM





PETROCHEMICAL DIVISION, includes two Process Sections with the following capacities and final products :

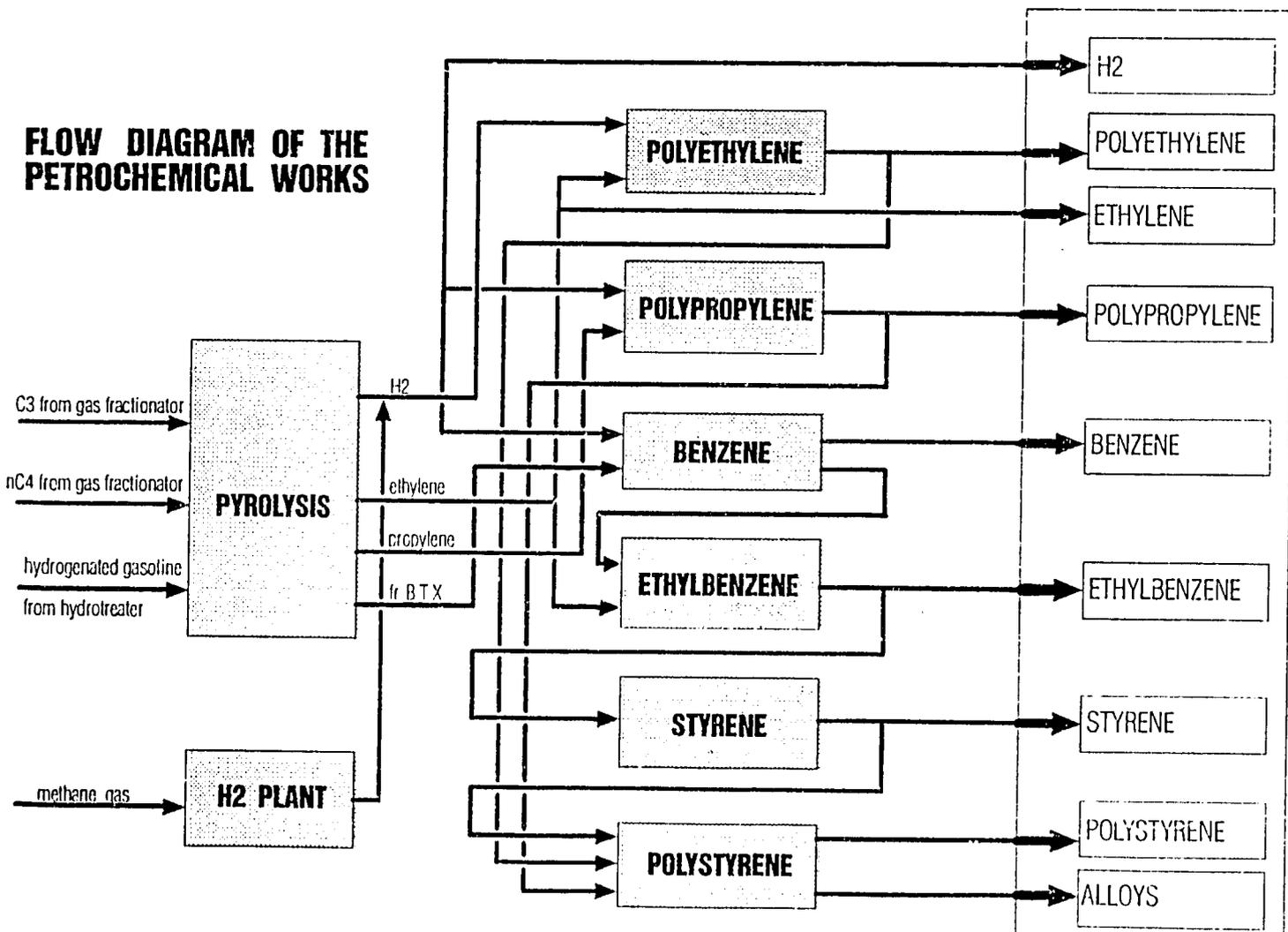
- one unit for 60,000 t/year polypropilene
- one Styrene - copolymer Unit for a production of 25,000 t/year ;
- one Styrene Plant wich produces 50,000 t/year by catalytic dehydrogenation of ethylbenzene ;

For the next period, preparations are made for the start up of the followings :

- one unit for the production of 60,000 t/year of low pressure high density polyethylene;
- one Benzene - Pyrotol Unit (approx. 150,000 t/year benzene) by hydrodealkylation of aromatic concentrates;
- one Ethylbenzene Unit (approx. 60,000 t/year) by benzene - ethylene synthesis.



FLOW DIAGRAM OF THE PETROCHEMICAL WORKS



LUBRICANTS DIVISION, includes four Production Sections with the following capacities and final products :

- two Vacuum and Atmospheric Distillation Units for the production of distilled oils and paraffins, ceresin waxes (crude oil throughput : approx. 1,300,000 t/year, domestic production selected paraffinic crude).
- two Furfural Extraction Units for lube oils.
- two Dewaxing Units using ternary solvent (MEK - benzene - toluene).
- one Wax / Ceresin Deoiling Unit.
- one Oil Hydrofinishing Unit including two Hydrogen Plants for approx. 200,000 t/year base oils.

Batch wise plants :

- Additive Complex for approx. 12,000 t/year various additives (10 grades).
- Grades for general purpose, Emulsifying oils and Protection fluids (approx. 8,000 t/year).
- Sulphuric acid Refining Unit for cosmetic and medical use oils (approx. 1,500 t/year).
- Sulphuric acid Refining Unit for cosmetic and medical use greases (approx. 1,000 t/year).
- Sulphuric acid Refining and Clay Treating Unit for waxes (approx. 15,000 t/year).
- Acid Refining and Clay Treating Unit for turbine oils and bearing oils (approx. 5,000 t/year).
- Blending and Additivation Unit endowed to produce 150,000 t/year of lube oils within the following grades :
 - approx. 90,000 t/year spark and injection engine oils, including marine oils;
 - approx. 20,000 t/year transmission oils;
 - approx. 20,000 t/year hydraulic oils;
 - approx. 6,000 t/year industrial and turbine oils;
 - approx. 15,000 t/year base oils, raw materials for other refineries.

As continuous flow units with a prospect to immediate start up, the followings are to be mentioned :

- Visbreaking Unit for fuel oil (approx. 300,000 t/year throughput).
- Propane Deasphalting Unit for brightstock (approx. 200,000 t/year throughput).

MECHANICAL DIVISION, includes four sections :

- Spare parts production department: places orders for the production of spare parts;
- Mechanical machining : for repairs and maintenance of rotating equipment, valves, mechanical seals parts, etc.
- Boiler shop: for repairs and maintenance of statical equipment, spare parts fabrication, various civil works;
- Transportation : provides transportation means necessary for material procurement, personnel transportation, special vehicles.

UTILITY DEPARTMENT, includes four sections :

- Thermal / Water : for distribution and storage of fuel gas, cooling water, sewerage, wells, etc.
- Electrical : for distribution, separation and maintenance of electrical systems and equipment.
- Thermal Power Plant : for distribution and supply of thermal energy and electricity.

Apart from these, under the direct control of the Technical Manager in charge for Maintenance, Electrical and Automation three more sections are operated :

- Nitrogen Plant: operates at approx. 8,000 Ncm/h.
- Automation and Hardware : for maintenance, repair and provision of metering, control and automation systems

LABORATORY AND QUALITY CONTROL DEPARTMENT : provides interstage and final control for all products and for purified waste water.

RAILROAD DEPARTMENT : provides rail transportation within the refinery and contacts with the National Railway Company and the optimum utilisation of the rail cars and tanks in their use.

