ENERGY INDUSTRY GLOSSARY

Absorption: Process by which a substance is retained by another, for example, sulphydric acid and carbon dioxide contained in the sour humid gas, are retained in an absorbent compound that can be an amine and later can be liberated by temperature.

Bright Stock: Residual lube oil of high viscosity from which paraffin has been removed. It is generally obtained either from residues with acid treatment or by extraction with solvents and it is used in the elaboration of lube oils.

Residual oil: In petroleum refinement, it is the viscous fuel, or residual semi-liquids obtained from the crude oil distillation, it is used as adhesive, asphalt or as low grade fuel.

Lube oil or Lubricating oil: In general, they are mixtures of paraffinic basic oils (with or without additives). In Petróleos Mexicanos (PEMEX), they are obtained from the distillation of residuals in the refinery of Salamanca. The paraffinic basic oils come from a mixture of *Pozoleo* and Isthmus crude oil. They are classified in accordance to their consistency in semi-liquids, plastics and solids. They are utilized to diminish the friction between mobile surfaces or they are incorporated in materials used in manufacturing processes of other products.

Acetaldehyde (Etanal): Volatile colorless liquid, with a suffocating and spicy odor, it has a density of 0.778 g/cm^3 (20/4°C), boiling temperature of 20.2°C, soluble in water, alcohol, acetone, benzene, gasoline, naphtha and other solvents whose formula is CH_3CHO. It is obtained by direct oxidation of the ethylene with pure oxygen to pressure, it utilizes palladium chloride as a catalyst and copper in solution. In PEMEX, it is produced in petrochemical facilities like La Cangrejera, Morelos and Pajaritos. It is used to obtain acetic acid, vinyl acetate, alcohols, pentaeritritol, insecticides and aromatic elements. Its steam irritates the eyes, paralyzes the lung muscles and it is very flammable. It is transported by means of tank trucks and tank cars.

Acetonitrile (Methyl Cyanide): Aromatic colorless liquid, with a density of 0.783 g/cm^3, boiling temperature of 82°C, soluble in water and alcohol, great polarity and strongly reagent, its formula is CH_3CN. It is obtained as by-product of the propylene-ammonia process in the acrilonitrile production in a proportion of 3.6%. Actually, it is produced in petrochemical facilities as: Morelos, Independencia and Tula. It is used like selective solvent of organic compounds, for example, the butadieno and in the production of pharmaceutical products and synthetic perfumes. It is toxic and flammable.

Hydrocyanic acid (Cyanide of hydrogen, prussic acid): Below 26.5 °C is a colorless liquid, it has a spicy odor, its formula is HCN. It is obtained as a by-product in the acrylonitrile production in the petrochemical facilities of Morelos, Independencia and Tula. It is used in the production of methyl methacrylate to obtain sodium cyanide, laminate and transparent

objects and metionina for the preparation of foods for livestock. It is extremely toxic, it paralyzes the breathing centers in a very brief lapse. It is transported by pipelines.

Acrylonitrile (Vinyl Cyanide): Colorless liquid, it has a lightly spicy odor with a boiling temperature of 77.3°C, soluble in water and common organic solvents, whose formula is $H_2C=CHCN$. It is obtained by the reaction of a propylene, ammonia and air mixture, in presence of phosphorus, bismuth and molybdenum catalyst. Its by-products are hydrocyanic and acetonitrile acids. In PEMEX, it is obtained in the petrochemical facilities of Morelos, Independencia and Tula. It is used mainly in the production of acrylic fiber and ABS resins. It is toxic by inhalation and ingestion. It is transported by means of tank trucks and cylinders with a capacity of 200 l.

Additive: Chemical product that is added to another to improve or to increase its physical properties (odor, color, octane, conductivity, etc.). For example, the additives are used to improve lubricant properties of automotive oils.

Adsorption: Superficial retention of atoms, ions or molecules of a gas or a liquid (adsorbate) by a solid or a liquid (adsorbent).

Residual water: Water of varied composition proceeding from the discharges of municipal, industrial, commercial, services, agricultural, cattle and domestic uses, and, in general, from any other use, as well as the mixture of them.

Alkali: It comes from the Arab term *alkali* that means caustic soda and it is the name given to metallic hydroxides that due to they are very soluble in water can act as energy bases. Nowadays, the term alkali is being substituted by base. Its function is to neutralize acid substances. It is used in the process of sweetening acid gas.

Alkylation: Process by means of an *iso*paraffin (of short chain) is chemically combined with an olefin in the presence of a catalyst to form another *iso*paraffin (of long chain), called alkylate which has a high octane.

Alkylate: It is the result of the alkylation reaction between *iso*butane with butylene in the presence of an acid catalyst to a temperature between 0 and 10 °C to form ramified hydrocarbons, mainly *iso*octano, with an octane index of around 94, due this it is very appreciated to prepare high octane gasoline. There are alkylation plants in the refineries of Cadereyta, Madero, Salamanca, Salina Cruz and Tula.

Ammonia: It is a colorless gas of very irritating odor, lighter than the air, easily liquefied to pressure, soluble in water and methanol whose formula is NH_3. It is the result of the direct combination of hydrogen and nitrogen in presence of a catalyst and pressure in the petrochemical facilities like Camargo, Cosoleacaque and Salamanca. Anhydrous ammonia is mainly used in the production of nitrogen fertilizers. It is transported by pipelines and tank cars.

Carbon dioxide: It is a colorless gas, liquable; with a density of 1.97 g/l. It forms a colorless, heavy and volatile liquid with a density of 1.101 g/cm^3 (-37°C). Compressing the liquid forms a solid similar to ice (dry ice); density 1.56 g/cm^3 (-79°C). It is soluble in water, acids, alkalis and in majority of the organic solvents. Its chemical formula is CO_2. It is obtained as by-product in the production of ammonia. In PEMEX, it is obtained in the petrochemical facilities like Camargo, Cosoleacaque and Salamanca. It is a suffocating gas in concentrations bigger than 10%, in low concentrations 1 to 3% the ventilation of the lungs increases. It is used in the obtaining of urea, carbonates, bicarbonates, refrigeration and carbonated drinks. It is transported by pipelines and tank trucks.

Antiknocks: They are compounds used in fuels to avoid the knocking or detonation in internal combustion motors (increasing the octane) like the automobiles when they operate over their normal temperature in order to avoid the loss of power derived from this phenomenon.

Aromatics: Hydrocarbons with unsaturated cyclic structure that generally present odor and good solvent properties, for example, benzene.

Aromatization: It is called this way to the conversion from aliphatics or alicyclics compounds to aromatic hydrocarbons. Process by means of light olefins become aromatics. Through this process light naphtas are treated to reduce the present olefins with controlled production of aromatics increasing the octane number from 6 to 9 RON and from 7 to 13 MON.

Asphalt: Heavy fraction of the crude oil with black or dark brown color. Its consistency can vary from liquid to solid. Asphalt is the heavy fraction of the crude oil after its high vacuum distillation and mixed with other residues, diluents and polymers with the objective to be adjusted to specifications depending on asphalt type. At the moment the most common asphalt in the national market and for exportation is asphalt AC-20. In PEMEX, it is produced in the refineries of Cd. Madero, Salamanca, Salina Cruz, Tula and Cadereyta. It is used to coating and paving highways, streets, parkings lots, airports, as well as waterproofing and sealer, its transport is carried out by tank trucks and tank cars with heating system.

Environmental auditory: Process of systematic and documented verification to obtain and evaluate tests that determine objectively if specified environmental activities, events, conditions, administrative systems or information about this matter are adjusted to auditory criterions and to communicate this process results to the client.

Tank truck: Transport used and conditioned to transport oil or petrochemical products. It is the most flexible transportation available, since its speed of response to requirements is the biggest, and practically it does not require previous infrastructure for its use. On the other hand, it is the one with higher unitary cost.

Mass balance: it takes into account the material flow that enters and goes out from a system, the general form of the law of conservation of matter is expressed as a balance of

materials which is basically a flow accounting and mass changes in the system mass inventory, which indicates that accumulation is equal to the inputs minus the outputs.

Energy balance: It shows the set of balance relations that counts the physical flows through which energy is produced, it is exchanged with the exterior, transformed, consumed, etc. All this is calculated in a common unit, for a certain period (generally a year).

Barge: Deposit towed by ship. It is not a ship since is not propelled by itself. They are used to transport oil products by rivers, lakes, etc. A perforation system can be assembled on a barge, and it can be used to perforate wells in lakes.

Drill: It is a tool to perforate oil and/or gas wells. A drill consists of a cutting element and a circulation element. The cutting element can be made of toothed steel, buttons of tungsten or diamond. The circulation element is constituted by conduits that allow fluid to pass through the drill and use the mud hydraulic current to improve the speed of penetration.

Barrel: It is the unit of volume for petroleum and derived hydrocarbons; it is equal to 42 gal. (US) or 158.987304 lit. A cubic meter is equal to 6.28981041 barrels.

Equivalent oil barrel: It is the gas volume (or other fuels) expressed in barrels of crude oil at 60^{o}F, that it is equivalent to the same energy quantity (energy equivalence) obtained from crude oil. This term is frequently used to compare natural gas in units of volume of crude oil in order to provide a common measure for different energy qualities of gas.

Barrels per day (bpd): In production area, it is the number of hydrocarbons barrels produced in a period of 24 hours. Normally, it is an average of a period of longer time. It is calculated dividing the number of barrels during the year between 365 or 366 days, as it is the case**.**

Separation battery: It is a group of plants or production equipments working as a entire unit. It is used to separate the liquid components out of the gaseous ones within of a collection system. The separators can be vertical, horizontal and spherical. The separation is carried out mainly by the action of the gravity, this means the heaviest liquids fall to the bottom and the gas rises.

Benzene: It is the simplest aromatic compound and one of the most important raw materials in chemical industry. It is a colorless liquid, not polar, aromatic odor, boiling temperature of 80.1 °C, fusion temperature 5.5 °C, density of 0.8790 g/cm^3 (20/4°C), soluble in alcohol, ether, acetone, carbon tetrachloride, lightly in water. It is formula is C_6H_6. It is obtained by means of two processes: Naphtas catalytic reforming (BTX) and toluene hydrodealkylation. At the moment, PEMEX elaborates this product in petrochemical facilities as La Cangrejera and in the refinery of Minatitlán. It is used for the production of ethylbenzene, fenol, cyclohexane, dodecylbenzene, maleic anhydride, dichloro-difenyl-trichloroethane, nitrobenzene, cumene and hexachloridebenzene. It is transported by tank trucks and tank cars**.**

Bitumen: Any of the diverse natural mixtures of hydrocarbons with its non metallic derived products. The unprocessed crude oil, asphalt and tar are bitumens, their color is dark brown or black. They contain a little nitrogen, oxygen or sulfur. Oil bitumens are obtained from heavy petroleum residues using methods of deep concentration (residuals) and oxidation (oxidized). The bitumens are solid or liquid materials insoluble in water. They are widely used in highway constructions, and different civil and industrial engineering works, as well as in the production of materials to roof, asphalt lacquers and typographic ink.

Beam pumping: Artificial system of production in which the setting in motion of the sub-superficial pumping machine is originated in the surface and transmitted to the pump by the ascending and descending suction bars movement. Since a piston pump is used, the movement of bars causes a vacuum inside the work barrel making the liquid penetrate into the barrel through the foot valve occupying the empty space. The liquid displacement from the bottom of the well to the surface through the production interior pipe is carried out by means of the ascending and descending movement of the bars string. This system is the most used in shallow wells and medium depth wells; in offshore operations it is considered bulky and difficult to handle.

Gas lift: Artificial system of production in which special valves are introduced to a well, placed in the production pipe. Through these valves, gas is injected at pressure, which blends with the oil, contributing such oil to rise up to the surface.

Sometimes due to the depletion and/or to the low pressure of the oil field, the oil output may be so low that the pneumatic pumping turns little inefficient, since it is necessary to inject large quantities of gas. In such cases it could turn to another artificial system with pneumatic pumping.

Anchor buoy: Floating mark used in signaling systems, to restrict exploration, exploitation or spillage areas.

British Thermal Unit (BTU): It is the quantity of heat required to raise the temperature of one pound of pure water in one degree Fahrenheit at constant pressure of one atmosphere.

BTX: Acronym that represents aromatic hydrocarbons; benzene, toluene and xylene.

Tank barge: Ship divided in compartments used to transport crude oil and/or petroleum products. It is the mean of transport with a relatively low unitary operation cost and that allows large economies of scale. However, its infrastructure requirements are large and expensive, due to the tank barge acquisition just as port works required to operate. It is a very appropriate mean of transport when it is necessary to move large volumes through long distances.

Butanes: Hydrocarbons from the family of alkanes constituted by four carbon atoms and ten of hydrogen that take place mainly in association with natural gas process and some refinery operations like decomposition and catalytic reforming. The term butane embraces two

structural *iso*meric: N-butane and *iso*butane. Blended with propane, produces liquefied petroleum gas.

Cost and Freight (C&F): International trade term that means cost and freight. The seller must pay costs and necessary freights to take the merchandise to destination. Loss or damage risk, as well as any cost increases are transferred from the seller to the buyer, when the merchandise passes overboard of the ship in the embarking port.

Wellhead: Control equipment installed in the well-mouth, used to control flow and to prevent explosions. It consists of pipes, valves, outlets, explosion preventers, etc.

Specific heat: The amount of heat required to raise the temperature of a mass unit of a substance by one degree Celsius. In the International System of Units, specific heat is expressed in joules per kilogram and Kelvin degrees; sometimes it is also expressed in calories per gram and degree centigrade. The specific heat of water is a calorie per gram and degree centigrade, this means, a calorie is needed to increase the temperature of a gram of water by one degree centigrade.

Field: Geographical area in which a group of oil and gas wells produce from the same proved reserve. A field can only be referred to a superficial area or to underground formations. A simple field can have separated reserves of different depths.

Production capacity: It is the quantity of product that can be manufactured by a plant according to the process facilities.

Nameplate capacity: It is the production capacity specified or planned by the manufacturer of a process unit or the maximum quantity of a product that can be elaborated when the plant is operating to its maximum capacity.

Idle capacity: It is the component of operable capacity that is not in operation and that is not in active repair but able to be started in operation in less than 30 days; or capacity not in operation but under active repair that can be completed within 90 days.

Operable capacity: It is the percentage of operation capacity that is operating at the beginning of the period; or that it is not in operation or under active repair but able to be started operating within 30 days; or that it is not in operation but under active repair that can be completed within 90 days. The operable capacity is the sum of operation capacity plus idle capacity. It is measured in barrels and/or tons per day calendar.

Operating capacity: It is the real operating capacity of a plant.

Actual assets: It refers to the productive assets of long term (facility and equipment).

Tank car: Railroad boxcar used to transport liquids.

Catalyst: Substance that accelerates or slows down a chemical reaction without suffering alteration or chemical change during the process.

Cenozoic: Geologic era that began 63 million years before Christ. It includes Tertiary and Quaternary periods.

Vinyl chloride (chloroethylene): Easily liquefiable gas, with an ether odor. It is generally presented as a colorless and inflammable liquid; with a density of 0.912 g/cm^3, a boiling temperature of -13.9 °C. It polimerizes in the presence of light or catalysts. It is soluble in carbon tetrachloride, ether, ethanol, not very soluble in water. Molecular formula CH_2=CHCl. It is produced by dichloroethane disintegration, obtaining hydrochloric acid as a by-product. PEMEX currently produces it in the Pajaritos petrochemical facility. It is used mainly to elaborate polivinyl chloride (PVC), flooring, profiles and upholstery film among others. It is transported by tank trucks and tank cars**.**

CNGM: Gulf of Mexico North American Coast.

Oxidizing agent: Substance that oxidizes fuels, in other words, it activates or starts the combustion, being oxygen the most common, although in special cases there are others like chlorates and bromates.

Fuel: Substance used to produce heat through a chemical or nuclear reaction. Energy takes place due to mass fuel conversion to heat.

Fossil fuel: Those are the by-products derived from crude oil and natural gas such as diaphanous petroleum, gasolines, diesel, fuel oil, diesel oil, L.P. gas, butane, propane, methane, *iso*butane, propylene, butylene or any of their combinations.

Industrial fuel: Liquid fuel with a yellow brown color and with a oil odor. It is obtained from the fractions combination of crude oil atmospheric distillation, it is insoluble in water. It is basically used in boilers and industrial furnaces.

Solid fuel: They are varieties of mineral coal and petroleum coke whose fixed carbon content varies from 10% to 90% in weight.

Combustion: Fast chemical reaction between combustible substances and a oxidizing agent, generally accompanied by heat and light shapped as a flame. The combustion process is commonly initiated by factors like heat, light or sparks that allow to combustible materials reach the corresponding ignition temperature.

Fuel oil: It is the heavy fraction of crude oil after being putted on to high vacuum distillation; it is prepared as a mixture with other residues as catalytic residue, visbreaker residue and H-oil residue (hydro disintegrator of residuals); diluters are used to adjust required specifications; heavy fuel oil must contain 4% in sulphur maximum weight and a viscosity of 475 to 550 SSF (standard saybolt furol) at 50°C. It is produced in Cadereyta, Cd. Madero, Minatitlán, Salamanca, Salina Cruz and Tula. It is used as an industrial fuel, for electricity generation, in locomotives and ships; in the refineries it is used in direct fire heaters. Its handling, in the case of leaks, must be done carefully, due to it is manipulated to higher

temperatures than room temperature. It must be kept tanks with heaters at a temperature between 70° and 80°C.

Complex: Term used in the oil industry referring to a series of fields or plants sharing common superficial installations.

Condensation: It is the result of temperature reduction caused by the removal of evaporation's latent heat; sometimes the resulting liquid of the process is denominated condensate. Heat removal reduces the vapor's volume and makes the speed of its molecules diminish and the distance among them. According to the kinetic theory of matter's behavior, energy loss takes place to the transformation from gas to liquid.

Sour condensate: They are the condensed liquid hydrocarbons of natural gas called this way due to their sulfhydric acid, mercaptans and carbon dioxide content.

Sweet condensate: They are the condensed liquid hydrocarbons of natural gas called this way because they do not contain sulfhydric acid, mercaptans and carbon dioxide.

Stripped condensate: They are condensed liquid hydrocarbons of natural gas to which slighter hydrocarbons to propane have been extracted.

Bill of lading: It is the receipt signed by the bearer or a person that acts representing him, issued by the carrier, in which it is acknowledged that the merchandise described in it, has been shipped in certain transport and to certain destination. It is a proof of merchandise shipment.

Energetic consumption: Product consumption such as gasolines, natural gas, diesel, liquefied gas, electricity, fuel oil, kerosenes, etc. whose purpose is to generate heat or energy, to be used in transport, industrial or domestic.

No energetic consumption: Consumption of products such as gasolines, natural gas, diesel, liquefied gas, electricity, fuel oil, kerosenes, etc. to be used as raw material in processes.

Own use: Energy consumption to produce primary and/or secondary energy that a industry uses for its own operation, for example, the use of gasoline and diesel that engines require.

Coke: It is a gray to black porous solid mass. Coke consists of macromolecular hydrocarbons with a high grade of odor. It is obtained from tar coking and residues of disintegration (cracking) and by pyrolysis in Cd. Madero. It is used as a solid fuel for boilers and it is transported in bulk in gondolas and light trucks.

Fluid coking: Process through which solid fluids are thermally disintegrated to obtain liquid and gaseous products besides coke. This process utilizes heat from burning 25% of the produced coke (496-538°C).

Cryogenic Process: Refrigeration process to which natural gas is brought under with the purpose to recover the heavier liquid components, than methane, mainly ethane. In its operation, turbo-expanders are used to diminish the temperature of natural gas (from -100 to -145ºC) and separate, by means of liquefaction, the liquids contained in it. Under these conditions it is possible to separate 60-86% of ethane and the whole propane and heavier compounds.

Aromatic base crude oil: Crude oil that contains large quantities of low molecular weight and naphtene aromatic compounds, in addition with smaller quantities of asphalts and lube oils.

Asphalt base crude oil: Crude oil that produces high yields of tar, asphalt and heavy combustible oil.

Naphtene base crude oil. Crude oil that contains mainly naphtenes, this means, saturated cyclic compounds with naphtene and paraffin lateral chains, that can contain much asphaltic material. When these crude oils are refined, they produce lube oils that differ of those obtained from paraffin crude because they have a lower gravity and viscosity, as well as to show a smaller carbon content.

Paraffin base crude oil: Crude oil with high wax and lube oils fractions content, in addition, it contains small quantities of naphtenes or asphalts and with low sulfur, nitrogen and oxygen content.

Topped crude, reduced crude: Crude oil from which naphthas and other light hydrocarbons have been extracted for aromatics production**.**

Isthmus crude oil: (Istmo) Crude oil with a density of 33.6° API and 1.3% sulfur weight.

Light crude oil: Crude oil with a density higher than 27° and below to 38° API. The most important productive regions of this type of crude oil in PEMEX are: Region Marina Suroeste, Activo Poza Rica and Activo Cinco Presidentes.

Mayan crude oil: (Maya) Crude oil with a density of 22° API and 1.3% sulfur weight.

Mixture crude oil: Crude oils combination exported by Mexico, constituted by Mayan, Isthmus and Olmeca crude oils.

Olmeca crude oil: Extra light crude oil with a density of 39.3° API and 0.8% sulfur weight.

Heavy crude oil: Crude oil with same or below density to 22° API. The most important productive regions of this type of crude oil in PEMEX are: Activo Altamira y Region Marina Noroeste.

Enriched oil: Crude oil blended with pentane and light napthas injections**.**

Extra light oil: Crude oil with a density higher than 38° API. The most important productive regions of this type of crude oil in PEMEX are: Activo Integral Bellota-Jujo, Activo Integral Muspac and Activo Samaria-Luna.

Cumene, *iso*propyl benzene: Colorless liquid, soluble in ethanol, carbon tetrachloride, ether and benzene, insoluble in water, with a boiling temperature of 152.7°C and formula C_6H_5-$CH(CH_3)_2$. It is obtained from benzene and propylene (chemical grade) catalytic alkylation or propylene of C_3 cut from refinery gases. This reaction is performed between 200 and 250°C at a pressure of 400-600 lb/plg^2. It is currently produced in La Cangrejera petrochemical facility. It is used basically in phenol and acetone production. Toxic by ingestion, inhalation, skin absorption, narcotic in high concentrations.

Chalán: Type of boat sometimes used to transport a great variety of products through canals.

Derrickman: Name given to the operator that works on the top of the perforation tower. The Derrickman holds the top of the perforation string while it goes in or out of the well. He is also responsible for the circulation equipment and perforation fluid conditions.

Density: Magnitude that represents a substance mass by the volume that this one occupies. In the International System the unit used is kg/l.

Deasphalting: Process by which the residue of vacuum distiller is introduced into a tower where it is putted on contact with liquid propane that dissolves all the constituents except asphalt which is deposited in the bottom of the column. It is operated at pressures of about 35 kg/cm^2 to maintain propane in liquid state to the operation temperatures.

Debutanization: Distillation carried out to separate butane and components lighter than natural gasolines.

Unpacking: It is the extraction process of stored and compressed product within pipelines or equipments.

Dehydratation: Action of extracting liquids from gas pipes; as well as, the extraction of water from emulsified crude oil and from liquid and/or gaseous hydrocarbon currents.

Dehydrogenation: Process by which hydrogen of chemical compounds is removed. For example, the removal of two atoms of hydrogen from butane to form buthylene.

Cracking: Rupture of large molecules of heavy hydrocarbons (non distillable residues) in smaller molecules of lighter hydrocarbons, with the purpose of transforming these residues into more valuable products, mainly gasolines, light hydrocarbons and distilled items.

Thermal cracking: Process used originally for gasolines and light distilled production. Currently used to reduce the viscosity of residual fractions or for coke production. It is called thermal because the load is undergone to high temperatures of 455ºC and pressures higher

than the atmospheric. As in the case of the catalytic disintegration, the products contain olefinic hydrocarbons.

Catalytic Cracking, TCC: Process performed in the temperature interval of 455-540°C and at pressures lightly higher than the atmospheric pressure, but in presence of a catalyst. This process converts a load (generally of gas oils) in gasoline with higher quality than the one obtained from thermal cracking, besides other light and distilled olefinic hydrocarbons.

Desorption: Inverse to adsorption process in which the adsorbed material is removed from the adsorbent.

Dewaxing: Process by which the waxes present in lube oils are separated by crystallization at low temperatures. The conventional processes consist for example on putting in contact the oil with a solvent: methyl-ethyl-ketone that dissolves oil and waxes. When cooling the solution, waxes crystallize and can be separated by filtration.

Depentanizer: Fractionating column used to separate pentane from natural gasolines.

Distillation: Process that consists on heating a liquid, until its more volatile components, it vaporlzes, then, after cooling, recover this components in a liquid form by condensation. Distillation main objective is to separate a mixture of several components taking advantage of its different volatilities, or to separate volatile from non volatile materials.

Vacuum flashing: Refining process whose load is residues coming from the atmospheric distillation. It is carried out on low pressure and therefore on normal temperatures to avoid decomposition or cracking of the material that is being distilled, increasing this way the output of more valuable light distilled products.

Atmospheric distillation: It is a primary process used in crude oil refinement to separate its components. Oil is heated at atmospheric pressure at temperatures between 315 and 374°C (depending on the crude oil and desired products nature) in presence of water vapor; with draw of products in different points of the distillation tower, corresponding to different boiling temperatures of the mixture (cuts or fractions) to be cooled and condensed later.

Fractional distillation: Separation of the components of a mixture of liquids by vaporization and collection of the fractions or cuts that condense to different temperature ranges.

Middle distillates: Group of products that due to their composition characteristics are identified by their boiling interval that goes from 193°C to 399°C. This fraction is constituted by diesel, industrial fuel and kerosenes.

Light distillates: Group of products that due to their composition characteristics are identified by their boiling interval that goes from 0°C to 280°C. This fraction is constituted by: liquefied gas (LPG), gasolines, naphthas and jet-fuel.

Heavy distillates: Group of products that due to their composition characteristics are identified by their boiling interval that goes from 330°C to 500°C. This fraction is constituted by: lubricant, paraffins, greases, asphalts, coke, vacumm gas oil, fuel oil and others.

Detergent: Additives used to inhibit formation of deposits in the fuel and in the internal systems of automobiles.

Pig: Petroleum-industry term used to describe the equipment used to clean and inspect pipelines. In order to clean, the pig is introduced in the pipeline and transported by the pressure of operation through it. An instrumented pig is the one equipped with sensors which verify corrosion levels or pipeline defects.

Diesel: Liquid fuel obtained from crude oil atmospheric distillation between 200 and 380°C. Later, it receives a treatment in hydrodesulfuration plants. It is heavier than kerosene and it is produced in all the refineries managed by Pemex-Refinación. This product is used as a fuel in the automotive and industrial branches. Due to its diverse uses and with the object of fulfilling the restrictions of emission of environmental pollutants, more and more, strict in the international sphere, PEMEX offers to the market its PEMEX Diesel products for automotive use; Industrial Diesel for use in the industry and Special Sea Diesel for ships.

Low sulfur industrial diesel: Industrial fuel with a maximum sulfur content of 0.05% in weight for exclusive use of open flame burners like boilers and steam generators.

Special sea diesel; Fuel with a maximum content of 0.5% sulfur in weight and with cetane index of 40 minimum, a maximum temperature of 350°C to 90% of distillation, for exclusive use by the marine sector.

Statistical difference: It is the difference among measuring points in a balance and it can be due to evaporation losses, compression and transport.

Dike: Wall built to contain liquids. In the case of ships, it is the place where they are cleaned, built or repaired. In storage terms, this barrier contains fuel spills.

Availability: Volume of middle or final products, which are ready to be used for self-consumption, sale, or load to plants.

Distribution: Group of activities mainly dedicated to hydrocarbons transportation and their by-products, toward different places, either of process, storage or sale, through pipelines, ships, tank trucks or tank cars.

Salt dome: Structure with a dome shape constituted by stratus of which its middle part or nucleus consists of rock salt. There are salt domes in the oil fields of the coast of Gulf of Mexico and often form oil deposits.

Pipeline: Connected pipes, generally buried or placed in the sea bed, that are used to transport crude oil, natural gas, oil or petrochemical products using mechanical elements, air

to pressure, vacuum or gravity as a motive force; outwardly, they are protected against corrosion with coal tar, glass fiber and asbestos plush. Their size varies between 2 and 48 inches of diameter according to their use and the type of land they cross over. It is the transport mean that offers maximum operation economy and maximum useful life, but also the one that requires the maximum investment and presents the minimum of flexibility.

Boiling: Physical process that ocurrs when the vapor pressure from a liquid is equal to the existent atmospheric pressure on such liquid. During boiling, vapor is formed inside the liquid that arises to the surface as bubbles.

Packing: Process of compression and product storage in pipelines or equipments.

Netpacking: It is the difference between packing and unpacking. It is also the difference between the volume injected to a distribution system and the volume extracted from it in a given time period.

Shrinkage: Gas volume decrease presented during its process, due to liquid hydrocarbons, condensate and sour gases extraction.

Shrinkage by acid gases: Gas volume decrease due to draw of acid gas from sour humid gas coming from fields in the sweetening plants. This sour gas is sent to sulfur production plants.

Net debt: Difference that results when comparing the expenditures for debt repayment with the incomes from loans allocations (dispositions).

Sweetening plant: It is a facility in which sour gases are separated from the sour natural gas or from condensates.

Final energy: It is the primary or secondary energy used directly by the final consumer. It is the energy just as it enters to consumption sector and it is different from net energy (without transformation, transmission, transport, distribution and storage losses) by the energy sector's own consumption. It includes energetics and non energetics consumption.

Unused energy: The energy that due to technical and/or economic availability of its exploitation, it is not being used at the present time, for example: spilled crude oil, gas sent to the atmosphere, etc.

Primary energy: The different energy forms just as they are obtained from nature, either, in direct form as in the case of hydraulic or solar energy, the firewood, and other vegetable fuels; or after an extraction process like petroleum, mineral carbon, geoenergy, etc.

Secondary energy: The different energy products that come from different transformation centers and whose destination is the consumption sectors and/or transformation centers.

Useful energy: It is the energy used in the final energy processes. Not all the energy that enters to a consumer system is taken advantage of and it depends on the efficiency of the

consumer equipments. It is the net energy to which losses have been discounted by the use of the equipment or device at user's level. It is applied either to own consumption as to final energetic consumption.

Production to be sold: Net production ± variation of inventories ± transfers to other products outside the producing center.

Compressor station: Station located each 60 km. or 80 km. along a gas pipeline and its operation consists on recompressing gas to keep its pressure and specified flows.

Service Station: Place where products elaborated by the refining industry, such as automotive fuels are sold,. These can be either property of Petróleos Mexicanos or franchised. According to the group of services offered, they can be classified in two stars and three stars cathegories.

Styrene, phenylethylene: Oily, fragrant, yellowish liquid, with a density of 0.945 (25/25°C), it is polimerized slowly in storage and quickly when it heats up or it is exposed to light or peroxides. Ethylbenzene becomes styrene by means of a catalytic dehydrogenation in presence of vapor (yield of 90%). It is marketed in two presentations: technical grade 99.2% and polymer grade 99.6%. It is obtained in La Cangrejera Petrochemical facility and mainly used in polystyrene production, rubber, latex and others. It is toxic by ingestion or by inhalation. It is transported by pipelines, tank trucks and tank cars.

Surface studies: Studies that are the base to consider the oil possibilities in an area. Their main objective is to determine different types of rocks and its characteristics, as well as the recognition of the stratigraphic associations and the deformations to which they have been put, with the purpose of determining the possible presence of structural type traps. These works are supported by three fundamental disciplines: Geology, Geochemistry and Geophysics.

Subsoil studies: These studies refer to the knowledge of the characteristics and composition of the underground layers by the perforation of wells known as exploratory.

Ethylbenzene: Colorless, denser than air liquid, with a density of 0.867 (20°C). It is presented in three qualities; technical, pure and for research use. It is produced by alkylation of the benzene with ethylene in vapor phase in La Cangrejera, and it is essentially used for styrene production. It is toxic and irritating.

Ethylene: Colorless gas with a sweet odor and flavor, with a density of 0.5139 (20°C). It is obtained by means of the disintegration of recovered ethane from natural gas liquids. Ethane with water vapor is pyrolised in a furnace at temperatures between 850 and 900°C. It is obtained in petrochemical facilities as La Cangrejera, Morelos, Pajaritos, Escolín and Reynosa, being mainly used in polyethylene production, acetaldehyde, ethylene oxide, dicloroethane and ethylbenzene.

Evaporation: Gradual conversion from liquid to gas without boiling. The molecules of any liquid are in constant movement, the mean speed (average) of the molecules depends only on the temperature, but individual molecules can exist with a much faster or much slower speed than the average. On temperatures below the boiling point, it is possible that individual molecules that approach the surface with a speed above the average have enough energy to escape from such surface and get into the space as gas molecules. As only quickest molecules escape, the average speed of other molecules diminishes; since temperature depends only on the average speed of molecules, the temperature on the remaining liquid also decreases.

Oil exploration: It is a group of field and office activities whose main objective is to discover new hydrocarbons deposits or extensions of the existing ones.

Fluid: Substance that yields immediately to any force tending to alter its shape, which therefore moves and adapts to the recipient's shape. Fluids can be liquids or gases.

Fractionator: Plant where small fractions of a mixture of hydrocarbons are separated by distillation.

Light fraction: Low molecular weight fraction (light), that it results from the first oil distillation.

Heavy fractions: Also well-known as heavy residuals, they are large oil molecules that emerge from the bottom of the fractionating column during crude oil refinement.

Acid gas: Gas containing large quantities of sulfhydric acid, carbon dioxide and water. It is obtained from the treatment of sour humid gas with bases easily regenerated as mono and dietanolamine (MEA and DEA) that are frequently used for this purpose.

Sour gas: Natural gas that contains hydrocarbons, sulfhydric acid and carbon dioxide (these last ones in concentrations bigger than 50 ppm).

Associate gas: Natural gas that is in contact and/or dissolved in the crude oil field. This can be classified as gas cap (free) or gas in solution (dissolved).

Gas lift: Gas injected to the well production pipe, through special valves to diminish the density of the hydraulic column in the pipe.

Formation gas: Innate to associated or non associated stratum. It is gas that comes from oil fields.

Gas of injection: Gas (nitrogen, carbon dioxide, dry gas, etc.) injected to the field to keep pressure, used as a secondary recovery system.

Sweet gas: Natural gas that contains hydrocarbons and low quantities of sulfhydric acid and carbon dioxide.

Wet gas: Natural gas that contains more than 3 gal/Mcf of liquid hydrocarbons.

Liquefied petroleum gas (LPG): Gas resulting from a propane and butane mix. It is obtained during the fractioning of gas or refinement liquids. It is the lighter fraction of crude oil utilized for domestic use and carburation. In PEMEX, it is produced in all the refineries administered by Pemex-Refinación and in the gas processing centers: Cactus, Nuevo PEMEX, Morelos, Cangrejera, Poza Rica, Reynosa and Matapionche. In the refining process of crude oil, refinement liquefied gas is obtained (Liquefied refinery gas, LRG) that is constituted by butane and/or propane and it can differ from gas LPG due to propylene and butylene, may be present.

Natural gas: Light paraffinic hydrocarbons mixture, with methane as its main constituent with little quantities of ethane and propane; with variable proportions of non organic gases, nitrogen, carbon dioxide and sulfhydric acid. Natural gas can be found associated with crude oil or independent in gas wells of non associated or dry gas. To be used it must fulfill certain quality specifications as: maximum liquables content 0.1 l/m^3; maximum humidity of 6.9 lb/MMcf; minimum heat power of 1184 Btu/cf; total sulphur 200 ppm maximum; maximum content of CO_2 + N_2 of 3% in volume. It is utilized for domestic use in industries and electricity generation.

Non associated gas: Natural gas that is in reserves that do not contain crude oil.

Residual gas: Gas obtained as a by-product during cracking process. It is constituted mainly by methane.

Dry gas: Natural gas without condensable hydrocarbons (basically methane).

Dry gas equivalent to liquid: It is the dry gas volume that due to its heat power is equivalent to crude oil.

Aviation gasoline: A high octane alkylate, with a high volatility and stability and a low freezing point. It is obtained as a result of catalytic cracking of heavy gasoils that in turn are a primary distillate of crude oil. It is used in helix airplanes with piston engines. It is flammable, long exposure to its vapors cause central nervous system depression. It is produced in the refinery of Ciudad Madero. Its handling is carried out by means of tank trucks, tank cars, and drums of 200 l.

Gasification: Process by which gaseous fuel is produced from solid or liquid fuels.

Natural line: Pipeline used for gas transportation.

Domestic gasoil: Liquid fuel, specified to be only used in open burners for domestic services, this product is expended pigmented in lilac color. It is a crude oil refined mixture that is produced in sales centers whose density is of 0.814 kg/l. In PEMEX, it is produced in the refinery of Cadereyta.

Light gasoil: By-product obtained from atmospheric distillation that begins its boiling point between 175 and 200°C and it concludes between 320 and 350°C. It is used as a fuel component for diesel motors.

Heavy gasoil: Distillation residual product whose boiling interval is between 423 and 600°C. It is used as raw material for catalytic cracking and mixed with other products to get fuel oil.

Vacuum gasoils: Light and heavy gasoil mixture coming from the vacuum distillation column that is used as a load to catalytic plants where in presence of a catalyst and suitable temperature it favors its molecular structures break, producing a high octane gasoline.

Automotive gasoline: Name that is applied in a wide way to the lightest products obtained by crude oil distillation. These products are subjected to different processes to give them the required physical and chemical characteristics for the suitable operation in automobiles internal combustion engines. The specifications for automotive gasoline under which a great part of this product is sold, vary considerably; it has an initial boiling point between 35 and 49°C, final point or final boiling temperature between 221 and 225°C. This fuel is produced in all the refineries and it has three types: PEMEX Magna, PEMEX Magna Reformulated (oxygenated) and PEMEX Premium, which are handled by tank trucks and pipelines.

Absorption gasoline: Gasoline extracted from natural gas or from refinery gas. The gaseous current gets in contact with absorption oil, which finally is distilled to get this gasoline.

Natural gasoline: Highly volatile mixture of C_4 and C_{5+} hydrocarbons and it is part of natural gas liquids. It is usually added to automotive gasoline to increase its vapor pressure, as well as the start up in low temperatures. Natural gasoline is also used in petrochemical to supply isobutane and isopentane that are used in the alkylation processes. It is separated by compression or by absorption, or by a combination of both processes.

Cracked gasoline: Mixture of reformed gasoline where octane has been increased by means of the process of catalytic reforming in which it has been subjected to a dehydrogenation.

Stripped gasoline: Primary gasoline where low boiling point components have been eliminated from**.**

PEMEX Magna gasoline: Primary gasoline that it is subjected to reforming processes. It is a mixture of reformed and catalytic gasolines to which high octane components (light alkylate) are added to fulfill quality required specifications, with an minimum octane index (RON+MON)/2 of 87; 4.9% maximum volume of benzene; maximum TFE 225°C and a PVR of 7.8 to 9.0 lb/in^2. This type of gasoline is produced in all the refineries.

PEMEX Magna Oxygenated gasoline: Gasoline added with oxygenated compounds (MTBE and TAME) that improves combustion and reduces the emission of unburned hydrocarbons to atmosphere, with specifications of an minimum octane index (RON+MON)/2

of 87; maximum TFE 225°C; a PVR of 6.5 to 7.8 lb/ in^2 for Mexico Valley and of 9 to 10 lb/ in^2 for Metropolitan Areas of Monterrey and Guadalajara; 1 to 2% maximum volume of benzene; 10 to 12.5% olefins maximum volume; 25 to 30% aromatics maximum volume; 1 to 2% maximum volume of benzene and of 1 to 2% oxygen weight. It is produced in Tula, Salamanca and Cadereyta refineries.

PEMEX Premium gasoline: Primary gasoline that is subjected to reforming processes. It is a mixture of reformed and catalytic gasolines to which high octane components (light alkylate) and oxygenating compounds (MTBE) are added to fulfill quality required specifications, with an minimum octane index (RON+MON)/2 of 93; 2% maximum volume of benzene; Maximum TFE 225°C; 32% aromatics maximum volume; 15% olefins maximum volume; a PVR of 7.8 to 9 lb/ in^2 and of 1 to 2% oxygen weight. It is produced in Cadereyta, Cd. Madero, Salina Cruz, Tula and Minatitlán refineries.

Reformulated gasoline: Gasoline to which by chemical means volatility and aromatics compounds have been reduced, adding oxygenated compounds with the purpose of diminishing emissions produced during its combustion.

Geophysics: Science that is in charge of the indirect research of subsoil structure using physical and even chemical rocks properties, by means of equipments and special methods based on the principle that in each observation place, all subsoil parts, in proportion to distance, express and denote their presence through their physical attributes. The geophysical methods are oriented to locate favorable geologic structures due the existence of deposits with possible commercial value. In oil exploration, seismology is the geophysical method more used.

Geochemistry: It is the study of the relative and absolute abundance of earth elements and of the processes either physical as chemical that have produced it, as well as their distribution. Geochemistry studies consist in the analysis on collected samples in the exploratory phase as well later on during perforation to determine the type and grade of alteration of the present organic matter in the rocks and to trace hydrocarbons presence.

Glycol: Organic compounds group that are characterized to contain in their structure two hydroxyl radicals. Monoethylenglycol is produced by means of thermal hydration of ethylene oxide in presence of a water excess. Diethylenglycol and triethylenglycol are obtained as reaction by-products. Oxide to glycol conversion is almost complete. PEMEX obtains them in La Cangrejera and Morelos. They are used to dehydrate gases or liquid hydrocarbons or to inhibit hydrates formation. In automotive radiators they are used as an antifreeze. Commonly used glycols are ethylenglycol, diethylenglycol and triethylenglycol. Generally, the ethylenglycols have a little toxicity and a minimum explosivity limit of 3.2% (air).

Specific gravity, Sg: Quotient of the weight of a given material volume by the weight of the same volume of water, measured at the same temperature, it is denominated by Sg=Tm/Ta.

API gravity: Gravity expressed in API grades. It is calculated by means of the following equation:

$$API^{\circ} = \frac{141.5}{SG_{60/60}} - 131.5$$

Hydrocarbons: Organic compounds group that mainly contain carbon and hydrogen. They are the simplest organic compounds and can be considered as the main substances from which all the other organic compounds are derived. The simplest hydrocarbons are gaseous to room temperature, as their molecular weight increases they become liquid and finally, solid. Their three physical states are represented by natural gas, crude oil and asphalt. Hydrocarbons can be of open chain (aliphatic) and simple links, which constitute the group of alkanes and paraffins as propane, butane or hexane. In the event of having an open chain and double links, they constitute the group of alkenes or olefins, like ethylene or propylene. Alkynes contain triple links and they are very reagent, for example acetylene. Either alkenes as alkynes, both unsaturated compounds, are produced mainly in the refineries especially in disintegration process (cracking). Close chain or cyclic compounds can be saturated (cycloalkanes) as cyclohexane or unsaturated. The most important group of unsaturated cyclic hydrocarbons is the aromatics one, they have a six carbons ring and three double links as a base. Among the most representative aromatics compounds are benzene, toluene, anthracene and naphthalene.

Total liquid hydrocarbons: It is the addition of petroleum and condensate volumes, plus natural gas liquids obtained in plant.

Total hydrocarbons: It is the addition of crude oil, condensates, gas liquids, volumes, and the equivalent liquid of dry gas, calculated according to its heating power equivalence factor.

Hydrodenitrogenation: Process that it takes place simultaneously to the hydrogenation processes in which nitrogen and oxygen are eliminated, improving the quality of catalytic disintegration fractions.

Hydrodesulfurization: Process by means of which sulfur is eliminated transforming it into sulfhydric acid, in the gaseous current, which can be separated easily and to become elementary sulfur.

IEPS: Special tax on production and services. Tax by means of which Federal Government burdens self-consumption and sale of gasolines, diesel, and carburation natural gas that Pemex-Refinación and Pemex-Gas y Petroquímica Básica carry out to authorized retailers who in turn sell directly to the final consumer.

Direct tax: Tax imposed directly by government to natural and artificial individuals on their incomes or profits respectively. The income tax of individuals and the tax on the benefit of companies are examples of this. They are the main fund sources of the governments.

Indirect tax: Taxes that assess the sale and consumption of specific goods. Indirect taxes can be, either a fixed amount, increasing the price of all the goods that burden in a same amount, or a percentage of the initial price, therefore, the price of the most expensive goods will increase more, for example: IVA (VAT –Value Added Tax-), IEPS, and gas, gasolines and others' rights.

Intermediate 15: Fuel for Maritime use constituted by a mixture of gasoil and diesel. The proportions of these products vary but in general they are near to 70% and 30%, respectively.

Stock: List on which goods and their quantities or existences, either finished products or in process, raw materials, machines, tools, etc. belonging to the entity, to a certain date, are specified in detail.

Air drive: Mechanical process that provides in a continuous or intermittent way, gas or compressed air to the well to displace produced fluids, generating a pressure reduction in the well bottom and increasing substantially petroleum extraction rate.

ISO 9000: Term applied to a series of standards sponsored by the International Organization for Standardization (ISO). The ISO created ISO 9000 with the purpose of standardizing quality systems that should be established for manufacturing and services companies around the world. It is a consequence of and almost parallel to british standard BS-5750 and it is almost identical in the majority of the aspects to European standard EN-29000 and to American standard Q90 sponsored by the American Society for Quality. ISO 9000 is a system to establish, to document and to keep a procedure that assures the quality of the final product.

Isomerization: Process by means of which the fundamental arrangement of the atoms of a molecule are altered without sticking or subtracting anything from the original molecule. Butane and other olefins are isomerized to *iso*butane to be used in the *iso*butylene alkilation for the production of high octane hydrocarbons like *iso*octane (2,2,4,-trimetilpentano). Natural gasoline fractions (C5/C6) and other refinement currents are isomerized to get high octane products like in the production of high octane enriched gasolines.

IVA (VAT): Value Added Tax.

Liquefaction: Process where a gas is changed to its liquid state by the application of low temperatures and high pressures.

Natural gas liquids (NGL): Liquids obtained in the gas/liquid separators of the field fittings; during the handling, transport and compression; and in the gas processing plants. NGL are constituted mainly by ethane and heavier hydrocarbons, they are classified in sour condensates, due to its content of sulfhydric acid and mercaptans, sweet condensates which do not contain sulfur compounds, and stripped condensates in which all the light gases and CO_2 haven been extracted from them.

Drilling mud: Fluid that is used during a well perforation. Besides its function of taking the cuttings from the drill to surface, drilling mud cools and lubricates drill and perforation string, it prevents lack of control avoiding the manifestation of the pressures of the formations from the underground, and it forms a coating in the inner wall of the hole to prevent loss of fluid toward the formation. Although originally it was an earth mixture, made mainly of clays and water, the drilling mud used at the moment is more complex, since it is a mixture of liquids, reagents and inert solids, the mixture most commonly used is made of barium oxide, clays, water and chemical additives mixture.

Hoisting engine: It is one of the most important parts in the perforation equipment. It has the following functions: It is the control center where the perforator operates the equipment; it contains clutches, chains, machines' accelerators gears and other mechanisms that allow to direct the power of the motors to the particular operation that is developed, also containing a drum that picks up or feeds the perforation cable.

Predictive maintenance: Group of techniques for diagnosis, which generally consist on measurements and registrations for periodic interpretations that indicate the behavior of the equipment in a certain time, providing the possibility to anticipate to a failure and to make the corresponding corrections that allow to maintain the equipment in an appropriate operation.

Preventive maintenance: These techniques are based in the statistic and in the periodic and systematic revisions that allow to take precise actions to avoid a failure. Preventive maintenance allows us to plan and to program corrective maintenance. With this technique, the periods between opportune changes of replacement parts and relief equipments are scheluded.

Corrective maintenance: It refers to repairs or rehabilitations of the equipment that has been damaged or deteriorated because inadequate conditions on operation variables or due to normal wear during continuous operation for a long time.

Carbon black: Hydrocarbon derived from petroleum or from carbon which contains black smoke. It is obtained from a high aromatic hydrocarbons cut. It is used in the synthetic and natural rubber industry for the production of tires, transporting bands, etc.

Spot market: International market where crude oil and its derived products are sold for immediate delivery to spot price.

Mercaptans: Strongly fragrant hydrocarbons that contain sulfur in their chain. They are frequently found either in gas or in crude oil. Sometimes they are added to natural and liquefied gas to add it odor for safety reasons.

Methane (CH_4): It is a gaseous, flammable paraffinic hydrocarbon. It is the main constituent and it is used as a fuel and raw material for ammonia and methanol production.

Methanol (methylic alcohol, wooden alcohol): Very polar, colorless, volatile liquid, with a density of 0.792 g/cm^3 (20/4 °C) and formula CH_3-OH. It is synthesized by the reaction of

hydrogen with carbon monoxide, these two components constitute the synthesis gas that is obtained from the natural gas reforming. At the moment it is produced in the Independencia Petrochemical Center in PEMEX. It is mostly used to get dimethyl tereftalate, formaldehyde and metacrilate. It is flammable and toxic by ingestion, it causes blindness.

Migration: Term used in exploration to denominate the movement that oil suffers, from the place where it was formed to the storing rock or trap.

Ministración: Term used in the Mexican Oil System to indicate the sending of money from PEMEX Corporative to the different subsidiaries organisms.

MTBE (Methyl-Tert-Butyl-Ether): Colorless liquid with a density equal to 0.746 g/cm^3. It is obtained from the *iso*butylene contained in the butane–butylene cut of the FCC catalytic unit and methanol, using as a catalyst a sour strong cationic resin, being able to feed currents with more *iso*butylene concentrations, favoring with this the production of MTBE. It is used to increase the gasoline octanage and oxygen percentage in the mixture to reduce emissions of hydrocarbons burned in the combustion motors toward atmosphere and to fulfill present environmental specifications.

Naphtha: Generic name applied to crude oil fractions and natural gas liquid products with a boiling temperature that oscillates between 175 and 240°C.

Light naphtha: Cyclic and paraffinic hydrocarbons that are in the C4 - C7 interval.

Heavy naphtha: Cyclic and paraffinic hydrocarbons that are in the C_{8+} interval.

Naphthenes: Also known as cycloparaffins. They are saturated chains of cyclic hydrocarbons (for example: cyclohexane, cyclopentane, etc.), many of them contain methyl groups in their structure. The presence of a great percentage of cyclohexanes and cyclopentanes in the gasoline is important because they are aromatic hydrocarbons precursors.

Octane number: Index by means of which gasoline anti-knocking capacity is measured. It is common to specify two octane numbers for motor gasolines, one known as RON that is measured in relatively moderate testing conditions, and another one identified as MON that is measured to higher motor temperatures and speeds. A high octane index provides more combustion efficiency, more power, less carbon deposits and a better engine performance, as well as a less pollution.

Crude line: Pipeline used for crude oil transport**.**

OPEC (Organization of the Petroleum Exporting Countries): International organization that is in charge of coordinating crude oil policies, elaborated by their members. OPEC was founded in 1960, and is constituted by 12 countries: Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Katar, Saudi Arabia, United Arab Emirates and Venezuela (Ecuador was incorporated in 1973, but it abandoned the organization in 1992). OPEC's headquarter is

located in Vienna (Austria). Their supreme authority is the Conference, composed of high level representatives of the government state members that meet at least twice a year to define policy to follow regarding oil exportations. The Committee of Governors applies the Conference Resolutions and manages the organization.

Other people's operations: Term used to describe those operations carried out by PEMEX and subsidiary organisms and that do not belong to the business. For example, the recoverable ones as: loans, saving funds, and the ones that are thirds' accounts: retention of income tax (ISR) to companies outside of the oil system. Revenues and expenditures exist because of other people's operations.

O-xylene (1,2-dimethylbenzene): Toxic, colorless liquid of density 0.881 g/cm^3 at 20/4°C. Formula 1,2-$C_6H_4(CH_3)_2$. It is obtained from the aromatics fractioner, where xylenes are separated. O-xylene is separated from main mixture and p-xylenes by distillation. Its production in PEMEX is carried out in La Cangrejera Petrochemical Plant. It is used to produce phthalic anhydride, although it can be used in the production of vitamins and pharmaceutical synthesis. It is toxic by ingestion and by inhalation. It is transported by means of tank trucks and car tanks.

Ethylene oxide (Epoxyethane): Colorless organic compound that has a gaseous appearance at room temperature, it liquefies at 12 °C, soluble in organic compounds, miscible in water, its density is 0.8711 g/cm^3 (20/20 °C). Formula (CH_2-CH_2)O. In PEMEX it is obtained by means of ethylene's catalytic oxidation in La Cangrejera, Morelos and Pajaritos plants. It is used for ethyleneglycol production, tensoactive agents, ethanolamines, etc. It is identified as a potential cancerigenic material. It is transported by means of car tanks.

Paraffin wax: It is a solid, white, translucent, odorless and brittle material that at the moment PEMEX produces at the refinery of Salamanca. It is obtained from crude oil distillate or from residuals by cooling, dewaxing, and/or by precipitation. It is mainly used in chlorinated paraffin production, candles and waxed paper. It is transported by means of tank trucks and car tanks.

P-xylene (1,4-dimethylbenzene): Colorless or solid liquid (monoclinic colorless crystals) whose fusion and boiling temperatures are 13 and 138°C respectively, density 0.861 g/cm^3 (20/4°C); soluble in alcohol, ether and other organic solvents in all proportions; practically insoluble in water. It is volatile at normal atmospheric conditions and inflammable at temperatures higher than 27 °C. Formula 1,3-$C_6H_4(CH_3)_2$. It is produced in PEMEX at La Cangrejera plant by means of naphtha catalytic reforming, which is distilled to separate the components from the mixture. It is used in the production of dimethyl-terephthalate (DMT) and terephthalic acid, both of them are raw materials in textile industry, for the manufacturing of polyester fibers. It is toxic by ingestion and by inhalation. It is transported by means of pipelines and car tanks.

PEMEX Diesel: Light yellow fuel with a content of 0.05% in weight of sulfur and a minimun cetane index of 48; a maximum temperature of 275°C at 10% of distillation and 345°C at 90% of distillation; a maximum aromatics volume of 30%. Its use is mandatory in the Metropolitan Areas of Mexico City, Guadalajara and Monterrey for auto transport industry.

PEP: Acronym which the subsidiary organism Pemex-Exploración y Producción is known with, which is part of PEMEX Group. Its main objective is to maintain crude oil global levels of production and to incorporate proved reserves of hydrocarbons that assure a long term availability**.**

Losses: Those decreases of volume that happen during the activities that are performed since the product is manufactured until it arrives to the final consumer. Among others, losses could be due to storage, transport and distribution.

Development perforation: Perforation that is made after the discovery of a hydrocarbons reserve. Several wells are generally required to develop a reserve.

Permeability: Characteristic of the storing rock that allows fluids movement through interconnected pores. The measure unit is milidarcy.

Petroleum: Petroleum is a nature mixture that is predominantly constituted by solid, liquid or gaseous hydrocarbons; at normal atmospheric conditions its solid state is denominated natural bitumen, its liquid state is denominated crude oil and its gaseous state is denominated natural gas. There are two theories about the origin of petroleum: the inorganic one that explains oil formation as a result of geochemical reactions between water and carbon dioxide and several inorganic substances, such as carbides and metal carbonates, and the organic one that assumes that petroleum is a product of a decomposition of the vegetable organisms and animals that existed in certain periods of geologic era.

High sulfur oil: Oil that contains from 0.51 to 2.0% of sulfur; in this case the gasoline fraction contains not more than 0.15% of sulfur. The fuel for jet motors not more than 0.25%, and fuel for diesel motors not more than 1%.

Light sulfur oil: Oil that contains not more than 0.5% of sulfur, with the particularity that the gasoline fraction does not contain more than 0.15% of it, fuel for jet motors not more than 0.1% and fuels for diesel motors not more than 0.2%.

Equivalent crude oil: It is the sum of crude oil, condensed oil and dry gas equivalent to liquid (see the definition of equivalent crude oil barrel).

PGPB: Acronym which the subsidiary organism Pemex-Gas y Petroquímica Básica is known with, which is part of PEMEX Group. Its main objective is to process natural gas and its derived liquids, transport, distribute and commercialize natural gas and liquefied gas in México, and produce and commercialize petrochemicals for petrochemical industry.

PMI: Acronym which PMI Comercio Internacional, S.A. de C.V. is known with, company where PEMEX participates with a part of the social capital. PMI Comercio Internacional is responsible of the international trade operations of PEMEX, such as crude oil exportation and, exportation and importation of oil products, petrochemicals, chemical and catalysts.

PIDIREGAS: This term is used to designate the group of long term projects for productive infrastructure.

Absorption plant: Plant used to recover condensates from natural gas or refinery gas, that absorbs the hydrocarbons from the ethane and heavier by means of absorption oils followed by the separation of liquids from the liquid absorbent (ethane plus).

Platform: Fixed sea structure built on piles from which wells are perforated and operated. Every platform consists of a substructure and a superstructure. Substructure is the inferior part that is supported by the ocean basin and embedded by means of piles. Superstructure is the superior part that houses perforation rigs, production equipments, etc., according to every platform type.

Compression platform: This kind of platform houses the compression equipment that supply to gas, the necessary pressure for its transport, as well as its conditioning, for example, the sweetening of sour gas**.**

Connection platform: This kind of platform collects the crude oil with gas that comes from the production platforms and distribute for its further process; also here the ducts that collect the crude oil are connected with the pipelines that transport it to land. In these platforms the reception and dispatch wellheads of crude oil and gas are installed.

Perforation platform: This kind of platform houses the equipment, tower, pipelines and accessories that will allow the perforation and exploitation of the well and facilitates the installation of the wellhead where the production platform will be installed later; its cover consists of two levels, one of production at 16m above sea level and the other for perforation.

Production platform: In this kind of platforms, equipments and devices are lodged to separate gas from crude oil and to pump the oil to land; it is composed of a substructure with eight columns and a superstructure that consists of two levels as in the perforation platforms.

Re-Pumping platform: In this kind of platform, pumping equipment is located with the purpose of increase the pressure for the transport of the crude oil from the half point between the connection platforms and the installations on land. They house the gas turbines that drive the pumps and electric generators with enough capacity to satisfy their own electric power requirements**.**

Work platform: Platform placed in the perforation tower, in the rotational system, approximately at the height of the perforation pipes sets, it is useful to accommodate the worker (*Derrickman)* who drives them**.**

Habitation platform: this kind of platform creates the appropriate living conditions for the workers in the working place. It has the capacity to harbor from 45 to 127 workers with the facilities of a heliport, a radio station, fire-fighting equipment, sewage water-treatment plant, kitchen, dining rooms, recess living rooms, library, electric power generation plants, clinic and gym**.**

Calorific value: Quantity of heat produced by the complete combustion of a combustible substance. This quantity can be measured in a dry condition or saturated with water vapor; the terms "net" or "gross" are defined. “Gross” means that water vapor produced during the combustion has been condensed to liquid, liberating in this way its latent heat. On the other hand, "net" means that water stays as vapor. The term commonly used are "dry" and "gross."

Products pipeline: Ducts used for the transportation of oil and petrochemical products.

High density polyethylene (HDP) and Low density polyethylene (LDPE): White Solid. The density of HDP is superior to 0.950 g/cm^3 and 0.915 g/cm^3 for LDPE, its fusion temperature is 135°C and 115°C respectively, water insoluble, high electric resistance. Its chemical formula is $(-CH_2-CH_2-)_X$. It is obtained by means of the polymerization of the ethylene in presence of a catalyst made of aluminum and titanium at normal atmospheric pressure and at 60 °C, it is not required to use high purity ethylene but it is necessary to eliminate the main impurities. In PEMEX, they are produced in La Cangrejera (LDPE), Escolín (HDP and LDPE), Morelos (HDP) and Reynosa (LDPE). They are mainly used in the production of containers for soft drinks, bottles, boxes, toys, wire insulations, etc., it is not toxic but is flammable. It is handled in bags of 25 kg.

Polymerization: Process in which two or more simple molecules are joined together to form a bigger molecule called polymer. In oil refinement, the temperature and pressure are used to polymerize light hydrocarbons into bigger molecules, as those that are used to produce high octane gasolines. In petrochemical production, unions are generated to form plastics, for example the polyethylenes.

Catalytic polymerization: Process by means of which the refinery gases enriched with olefins are polymerized in order to produce high octane motor gasoline and derived petrochemical.

Thermal polymerization: Thermal process that converts gaseous light hydrocarbons in liquid fuels. The paraffinic hydrocarbons are cracked to produce olefinic material which is generally polymerized by means of pressure and heat to polymeric gasoline.

Polymer: Substance that consists of big molecules formed by many small units that are repeated, called monomers. The number of units that are repeated in a big molecule is called polymerization grade. Examples of polymers are polyethylene and polypropylene.

Polypropylene: Crystalline solid with a density of 0.90 g/cm3, its fusion temperature is between 168°C and 171°C, insoluble in organic solvents, it is softened with hot solvents,

formula $(C_3H_5)N$. In PEMEX it is produced in Morelos plant. It is used in plastics, tubes, bottles, artificial grass, etc., it is not toxic, it burns slowly.

Porosity: Relation between the existent pores volume in a rock *Vs* its total volume. It is a measure of the storage capacity of the rock.

Potential hydrogen (pH): Measure of the acidity or alkalinity of a system. The reference temperature for the measurement of the pH is 25°C and its range goes from 0 (highly acid) to 14 (highly basic), for pH = 7 the solution is neutral.

Well: Perforation for prospecting or production of crude oil, natural gas or to provide services related with this activities. The wells are classified according to their objective and resulting products as: Oil and associate gas wells, dry gas wells and injection wells.

Development well: A well perforated and finished in a proved area of a field, for the production of crude oil and/or gas**.**

Exploratory well: Perforation performed in an area where it does not exist production of oil and/or gas at the moment, but oil exploration establishes a probability of hydrocarbons existence. The exploratory perforation is a direct technique that consists on making a well through the different structures of the underground, taking data and samples of each one of it in a systematic way, from which precise information can be obtained about the characteristics of each rocky layer and about the possibility of finding exploitable accumulations of hydrocarbons.

Unproductive well: Finished well until the objective without oil production, because it is dry, because it is not commercial, due to an accidental geologic column or because there is water invasion.

Input well: Well that is used to inject water, air or gas to a stratus of the underground with the purpose of increasing the pressure of other wells in the field.

Flowing well: Well from which oil goes out to the surface due to the pressure that comes from underground stratus. The spontaneous output of oil represents losses of oil and gas and it can produce fire or a sudden destruction of the well.

PPQ: Acronym which the subsidiary organism Pemex-Petroquímica is known with, which is part of the PEMEX Group. Its main objective is to elaborate and commercialize diverse basic petrochemical products that serve for the manufacturer and chemical industry.

PR: Acronym which the subsidiary organism Pemex-Refinación is known with, which is part of the PEMEX Group. Its main objective is to transform the crude oil in oil products that fulfill the most strict ecological standards and to satisfy the growing domestic demand through its complex distribution network.

End user price: Sales price to the consumers of the finished products, including taxes (IVA, IEPS, etc.).

Price of reference: Trade price established in the outstanding markets for hydrocarbons produced or acquired by PEMEX. This price is the most representative to simulate the competition conditions in an open market.

Resale price: Price that is fixed to another branch or organism so that it resells the product.

Transfer price: Inner price that is assigned to the currents inside a complex or process center (between plants).

Informative price: It is the price used as basic input for the calculation of the reference prices to fix the exportation price of crude oil and/or products.

Interoganisms price: Price that PEMEX fixes according to its price policies to value the products that are exchanged among its subsidiary organisms. This price incorporates a quality adjustment and logistics cost according to the balance between the offer and the demand of each product in the national market: Interorganisms price = reference price + quality adjusment + net cost of logistics.

Netback price: It is the price that due to its characteristics of competitiveness in the international market for those products that PEMEX produces or acquires, is considered as the most representative to simulate the competition conditions in the open market.

Producer price: Price of the finished product valued in the center where it was produced.

Process: Group of physical or chemical activities relative to the production, obtaining, conditioning, packing, handling and parcel up of intermediate or final products.

Girbotol process (Sweetening): Process that is performed in the sweetening plants of wet sour gas and sour condensates whose function consists on absorbing the mercaptanes and carbon dioxide. The process consists on washing the sour gas with a watery solution of Dietanolamine (DEA) or Monoetanolamine (MEA). The most often used is the DEA due to its low corrosion range, these substances absorb the mentioned impurities and in the following stage of the process the DEA or MEA are regenerated with a vapor treatment and are recycled, releasing CO_2 and the sulfur absorbed as sulfhydric acid.

Merox process: Process in which the sour liquid components are treated with caustic soda that contains an organometallic catalytic, to transform mercaptanes into insoluble caustic disulfurs. The Merox solution is regenerated by mixing it with air and oxidizing agents. By means of the use of the Merox solution a high grade of removal of mercaptanes is obtained in a stream of liquids. If a complete removal is desired, Merox also provides a catalytic conversion of fixed bed to transform mercaptanes into disulfurs. These disulfurs will not be removed from the liquid stream, however the disulfurs do not generate such an odor as the mercaptanes do.

Flush production: Production emitted by a well during the initial period, before its level of pressure diminishes to the value of pressure of the wells that have been producing for some time in the same field.

Gross production: It is a term used in Pemex-Refinación to designate exclusively the production of the refinery in the crude oil process, excluding therefore the products obtained in the process of other external inputs.

Own production: It is a term used in Pemex-Refinación to designate the production of the refinery in the crude oil process and in other primary inputs, excluding all the external inputs of the mixture. Own production = Total production - Transfer of external products.

Total production: It is a term used in Pemex-Refinación for the quantity of finished product obtained with the quality specifications in a refinery, excluding the external transfers of the same product. It is calculated in the following way: Total production = shipments + consumptions - receipts of the same product + variation of inventories.

Final product: Those finished products that are dispatched for sales and that fulfill the quality standards.

Intermediate products: Those products that are inputs for plants, processes and mixtures to finish final products.

Propylene: It is a colorless, suffocative, flammable and explosive gas with a lightly sweet odor, soluble in alcohol and ether, lightly soluble in water; boiling point at -47.7 °C, and formula $CH_3CH=CH_2$. It is obtained as a sub-product in the FCC catalytic plants that are used to increase the quantity and quality of the gasolines. A little part is obtained as a sub-product of the ethylene plants (when ethane is thermally cracked). At the moment in PEMEX it is produced in La Cangrejera and Morelos facilities. Three purity grades are marketed: 95% (refinery grade), 99% (polymer grade) and chemical grade used for research. It is mainly used in the production of acrylonitryle, propylene tetramer, dodecilbenzene, cumene and isopropyl alcohol.

Oil deposit prospecting: Technique by means of which reserves discovery and evaluation is performed, as well as the process for the commissioning of the exploitation of oil and gas fields. It consists of two stages: Search and Prospecting. In the search stage, the geological, aeromagnetic, and gravimetric surveys of the location are performed, also, rocks and water geochemical research and the drawing of different maps.

Then, the survey of prospecting is made with the exploration wells. The result of the search stage is the preliminary evaluation of the reserves of new fields. The main objectives of the prospecting stage are to point out the field limits, to determine its potential and the saturation of its stratus and the horizons of oil and gas. Once concluded the prospecting stage, oil proved reserves are calculated and recommendations are elaborated to begin the field exploitation.

Strategic investment project: Those are the ones whose performance depends on decisions that compromise the direction of the institution; that in the short and medium term utilize huge amounts of resources of the company and that require long periods for their maturation.

Operational investment project: Those are the ones that respond to operative problems of short term; their investment amounts are proportionally smaller than those required by the strategic investment projects; their maturation lapses are short to be able to respond to immediate needs and generally, it concerns of complementary or maintenance projects of the actual productive plant.

Pilot project: It is the one carried out in a small representative sector of a field in which tests are made similar to those that would be accomplished in the whole area of the field. The objective is to collect information and/or to obtain results that can be used as base of conventional studies or a mathematical simulation of the whole field.

Flaring: Lighter for controlled and safe burning of gas that can not be used due to technical or commercial reasons.

Kerosene: Liquid fuel constituted by the crude oil fraction that is distilled between 150 and 300°C. It is produced in all PEMEX refineries. It is used as a fuel for food cooking, lighting, engines, refrigeration equipments and as a solvent for domestic use bitumens and insecticides. It is handled by means of tank trucks and cylinders with a capacity of 200 l.

MTBE Raffinate: It is a mixture of hydrocarbons mainly butanes, by-product of the processes of elaboration of MTBE. It is used as a component of the liquefied gas and it is produced in Cadereyta, Salamanca, Salina Cruz and Tula refineries.

TAME Raffinate: It is a mixture of hydrocarbons mainly pentanes, by-product of the processes of elaboration of TAME. It is used as a component of the PEMEX Magna gasoline and it is produced in Salina Cruz and Tula refineries.

Chemical reaction: Process by which a substance or group of substances interact, affecting their molecular structure.

Reagent: It is any substance that due to its capacity for entering in certain reactions it is used to determine, to examine or to measure other substances, or to prepare a substance different than the original one.

Previous recognition: Oil exploration begins with this stage, which is based on general studies that embrace very wide areas and whose objective is the identification of areas of interest for the development of the oil activity, according to the information obtained in previous studies and to the cartographic support and of aerial photography (referred fundamentally to the study of the topographical characteristics of the area) to determine the possibilities to carry out an intensive exploration.

Enhanced recovery: It refers to the additional extraction of oil after the primary recovery, adding energy or altering the natural forces of the reservoir. This one includes water injection, or any other means that completes the processes of reservoir recovery.

Primary oil recovery: Oil extraction using only the natural energy available in the reservoirs to move the fluids, through the reservoir's rock toward the wells.

Secondary oil recovery: It refers to techniques for additional oil extraction after the primary recovery. This one includes water or gas injection, with the purpose in part of maintaining the reservoir pressure.

Differed resources: Hydrocarbons volume discovered with exploratory wells and confirmed with pressure-production tests that are not technical and/or commercially exploitable to current conditions. This resource, in the event of changing the conditions favorably will pass to proved reserves category and viceversa.

Viscosity reduction: Thermal cracking process whose feeding comes from the bottoms of the vacuum distillation tower with the purpose of converting heavy loads into distilled products with a greater economic value. This cracking is carried out at a temperature of 435°C and a pressure of 15 kg/cm^2; this process is used where crude oil heavy mixtures are processed.

Refinery: Workplace where the crude oil it transforms into its derivatives. This transformation is achieved by means of the processes of atmospheric distillation, vacuum distillation, hydrodesulfuration, thermal cracking, catalytic cracking, alkylation and catalytic reforming among others.

Catalytic Reforming: Refinement process to high temperatures in which the reaction is performed in presence of a catalyst. It is used to improve the octane rate of desulfurated gasolines, that's why it constitutes the most important process to improve gasolines. In the reforming process, reactions of paraffins isomerization to *iso*paraffins; reactions for formation of cyclic structures from paraffins to naphtenes; dehydrogenation of naphtenes to aromatics; cracking of naphtenes to butane and light by-products as well as detachment of lateral aromatic chains to form light by-products, are performed.

Thermal Reforming: Process that uses heat (but non catalysts) to make a molecular rearrange of low octane naphthas to a high antiknock quality gasoline.

Gas-oil relation: Indicator that determines the gas volume per unit of oil volume measured to superficial conditions. It is used in the analysis of reservoir exploitation behavior.

Oil reserves: The feasible recovering portion from the total volume of existent hydrocarbons in the subsoil rocks.

Original reserve: The volume of hydrocarbons to atmospheric conditions that is expected to recover economically with the methods and applicable exploitation systems in a specific

date. It can be also said that it is the resource fraction that will be able to be obtained at the end of the reservoir exploitation.

Possible reserves: The amount of hydrocarbons volume estimated to a specific date in not perforated traps, defined by geologic and geophysical methods, located in areas far from the producers, but inside the same geologic producing province, with possibilities of obtaining technical and economically production of hydrocarbons, at the same stratigraphic level where proved reserves exist.

Probable reserves: The amount of hydrocarbons volume estimated to a specific date, in perforated and not perforated traps, defined by geological and geophysical methods, located in adjacent areas to producing reservoirs where it is considered that probabilities exist of obtaining technical and economically production of hydrocarbons, at the same stratigraphic level where proved reservations exist.

Proved reserves: The volume of hydrocarbons measured to atmospheric conditions that can be economically produced with the methods and applicable exploitation systems as primary as secondary systems at the moment of evaluation.

Remaining reserve: The volume of hydrocarbons measured to atmospheric conditions that is left to be economically produced from a reservoir in a certain date, with applicable exploitation techniques. It is the difference between the original reserve and the accumulated production of hydrocarbons in a specific date.

Operation result: Income statement that shows at accrued level, the profit or loss reached by the subsidiary organisms in their productive and commercial operation that is the result of the difference between total revenues and expenditures. The revenues are represented by: internal sales, interorganisms sales, exports and miscellaneous revenues and the expenditures by variables (interorganisms purchases and imports), and fixed (operation expenses, labor liability provision, corporate expenses and depreciation). This statement does not include interests and taxes.

Coating: Name that it is given to the different segments of piping that are cemented inside the well. These coating pipes vary in their diameter and number according to the different perforated areas, depths and the producing characteristics of the well. Three pipes are generally coated in a well; the one with a bigger diameter is called superficial and control pipe, the following one is the intermediate and the one with a smaller diameter and greater depth, is called exploitation pipe.

Storing rock: Sedimentary rock (calcareous, sands or lutites) with a high permeability grade that allows oil to emigrate toward them, and due to its structural or stratigraphic characteristics form a trap that is surrounded by a seal layer that will avoid hydrocarbons leak.

Generating rock: Sedimentary rock constituted by very fine grain and with a plentiful organic carbon content that is deposited under reducing and low energy conditions, favoring the hydrocarbons generation through time.

Auxiliary services: They are those services carried out in facilities that are suitable to supply electricity, steam, water, compressed air and other additional services in the refineries and petrochemical complex. This term is not in accord with the importance of these services, if it is considered that they make the process plants operation possible.

Solvent: It is a substance, usually liquid, that is able to absorb to another either in liquid, gaseous or solid phase to form a homogeneous mixture. One of the most used solvents in the oil industry is the diethanolamine (DEA), which has as a particularity to absorb the sulphydric acid during the catalytic cracking process.

By-product: Product that is obtained in a secondary way during the manufacture process of another (main product of the reaction).

TAME (tert-Amyl Methyl Ether): Oxigenating compound that is mixed with gasoline to increase the octane rate and to reduce hydrocarbons emissions to the atmosphere. TAME is obtained from the etherification reaction of methanol with the *iso*amilenes contained in the current of catalytic gasoline from the FCC, using a strongly sour cationic resin as a catalyst.

Floating roof: Cover placed on the surface of liquid hydrocarbons contained in a tank that floats with the level of the liquid. A floating roof eliminates the vapor contained above the liquid in the tank and keeps the liquid light fractions.

Critical temperature: Temperature beginning at two fluid phases (liquid and gas) stop to be present, existing only a fluid phase.

Autoignition: The minimum temperature at which the vapors of oil derivative mixed with air are fired up with no external source of ignition. The principle of operation of the Diesel engines of internal combustion is precisely based on this oil derivatives property. Autoignition temperature is several hundreds of grades superior to its flammability.

Ignition temperature: The minimum temperature at which the analyzed product vapors, when introducing an external ignition source, forms a stable flame that does not extinguish. The ignition temperature is always higher than the flammabilty's one and frequently the difference is of several dozens of grades.

Storage and distribution terminal (TAR): Group of facilities designated for the receipt, storage, delivery and distribution of oil derivative products that generally supplies to its area, however, it can also can help to supply other areas, depending on the size of the facility.

There are several terminals located along the country and these can be by the sea or terrestrial. TARs are located in strategically selected points, due to demand reasons, geographical configuration and transportation routes.

Propylene tetramer, tetrapropylene: It is a colorless liquid fuel with similar to kerosene characteristics whose boiling range is between 183 and 218°C. Formula $(CH_2=CH-CH_3)_4$. It is produced by means of four propylene molecules condensation in presence of a catalyst. In PEMEX it is produced in Independencia Petrochemical Center and it is mainly used to produce dodecylbenzene.

Toluene (Methylbenzene): It is a colorless liquid, with an aromatic odor, density of 0.866 (20°C/4), boiling temperature at 110°C, soluble in ether, ethanol, acetone, benzene and insoluble in water, its chemical formula $C_6H_5CH_3$. In PEMEX it is produced by means of catalytic reforming of the aromatic naphthas (hydroforming) in La Cangrejera. During the process, a mixture of aromatic hydrocarbons is obtained. It is applied in the obtaining of benzene, benzoic acid, among others and it is used as a solvent of paintings, lacquers and varnishes. It is flammable, toxic by inhalation, by adsorption and by contact with the skin. It is handled by means of tank trucks and tank cars.

Absorption tower (absorber): Vertical and cylindrical recipient where heavy hydrocarbons are recovered, from a mixture in which light hydrocarbons predominate. It is also used to dehydrate gas by means of its bubbling in glycol.

Trap: In oil exploration, it defines an oil reservoir with a geometry that allows hydrocarbons concentration and it keeps them under favorable hydrodynamic conditions preventing them to escape.

TLC: economic agreement whose original name is North American Free Trade Agreement (NAFTA) that establishes the gradual suppression of tariffs and other barriers to free interchange in the majority of the manufactured products or sold in North America, the elimination of barriers to international investment and the protection of intellectual property TLC was signed by Canada, Mexico and United States on December 17, 1992 and went into effect on January 1, 1994.

Drill pipe: A group of pipes linked by means of unions or special conical joints that it carries in its lower end the drill bit or drill tool in the rotational system. The pipe segments that regularly are used, they are approximately of 9 m (30 feet).

Production pipe: Group of pipes joined by couplings and threads, that is introduced in the well when this will be commissioned, so that oil and/or gas hydrocarbons flow from the bottom to the surface in a controlled way.

Jet fuel: Crude oil fraction used as a fuel for retropropulsion airplanes; it is produced in all the refineries. It is obtained by distillation according to its molecular weight and boiling temperature; jet fuel fraction has a maximum limit of boiling temperature from 200 to 300°C, this primary product is exposed to a hydrodesulfurating process to get a jet fuel that fulfills the following specifications: 10% in volume, it distills at 205°C maximum, with a maximum final temperature of boiling at 300°C, freezing maximum temperature at -47°C; a maximum fall of pressure of 25 mmHg; a content of aromatics not bigger than 22% vol. and a specific

weight to 20/4 °C between 0.772 and 0.837, among others. The main client of this product is Aeropuertos y Servicios Auxiliares (ASA). Its sale to third-parties requires the approval of this organism and of Dirección General de Aeronáutica Civil, it depends on Secretaria de Comunicaciones y Transportes (SCT). It is handled by means of tank trucks, tank ships, tank cars and pipelines.

Urea: White powder, a little bit hygroscopic, similar to sugar with a fusion point at 132.7°C, also known as carbamide; it breaks down before reaching its boiling temperature; soluble in water, alcohol and benzene, nitrogen content of 46.55% in weight, with formula $CO(NH_2)_2$. Urea is produced due to the indirect dehydration of ammonium carbamate, intermediary formed when an excess of ammonia with carbon dioxide react to high pressure. Urea commercially prepared is used in the production of agricultural fertilizers. It is also used as a stabilizer in nitrocellulose explosives and it is a basic component of synthetically prepared resins. It is a little bit toxic; it is not combustible; it has diuretic and antiseptic effects in the human being.

Stocks change: It reflects the difference between the level of inventories at closing time Vs the level, at opening time corresponding to the analyzed period. A positive difference reflects an accumulation of inventories and a negative, a decrease.

External sales: Sales that PEMEX bills its clients outside of the national territory.

Domestic sales: Sales that PEMEX bills to its distributors in the national territory or that directly carries out to domestic clients for final or intermediate use. Sales value excludes taxes (IEPS and IVA) and distributors commissions.

Virgin Stock: Product that is directly obtained by crude oil distillation and that it does not contain chemically modified material.

Viscosity: Property of a fluid that tends to oppose to its flow when a force is applied to it. Viscosity in poises units (P) is defined as the magnitude of the force (measured in dynes by square centimeter of surface) necessary to maintain – in a balance situation- a difference of speed of 1 centimeter per second among layers separated by 1 centimeter. Water viscosity at room temperature (20 °C) is of 0,0100 poises; at boiling point (100 °C) it diminishes up to 0,0028 poises.

Reservoir bed, deposit: Unit of the subsoil constituted by permeable rock that contains oil, gas and water, which form a unique system.

USED ABBREVIATIONS

ASA	Aeropuertos y Servicios Auxiliares
°**C**	Grades centigrades
°**F**	Grades Fahrenheit

ABS	Acrylonitrile, Butadiene, Styrene
API	American Petroleum Institute
C_3	Propane and propylene. C_3+ includes heavier components
C_4	Butanes and butenes
C_5	Pentanes, pentenes y pentadienes
C_6	Hexanes, hexenes, hexadienes y benzene
C_7	Heptanes, heptenes, heptadienes y toluene
C_8	Octanes, octenes, octadienes y xylenes
cm	Centimeters
cm^2	Square centimeters
FCC	Fluid Catalytic Cracking
FOB	First On Board (LAB as in spanish)
g	Grammes
LPG	Liquefied Petroleum Gas
LRG	Liquefied Refinery Gas
HDPE	High Density Polyethylene
HDS	Hydrodesulphurization plants
IEPS	Special tax on production and services
ISO	International Organization for Standardization
ISR	Income tax
IVA	Value added tax
km	Kilometers
LDPE	Low Density Polyethylene
m	Meters
máx	Máximum
mg	Miligrammes
mín	Mínimum
ml	Milliliters
mmHg	Milimeters of mercury
MON	Motor Octane Number (It is measured simulating the driving conditions on a highway)
MTBE	Methyl Tert-butyl ether
OCDE	Organization for Economic Cooperation and Development (OECD)
PEMEX	Petróleos Mexicanos
in^2	Square inches
ppm	parts per million
PVR	Reduced Vapor Pressure
RON	Research Octane Number (It is measured simulating the driving conditions on a city)
SCT	Secretaria de Comunicaciones y Transportes
SEMARNAP	Secretaria de Medio Ambiente, Recursos Naturales y Pesca
SSF	Standard Saybolt Furol
TAME	Tert-Amyl Methyl Ether
TCC	Thermal Catalytic Cracking
TFE	Final Temperature of boiling
NAFTA	North American Free Trade Agreement (NAFTA)
vol	Volume