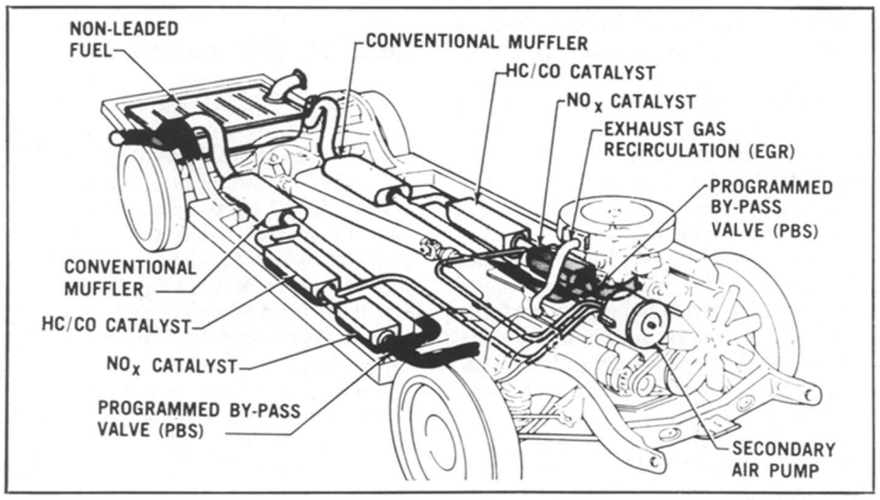
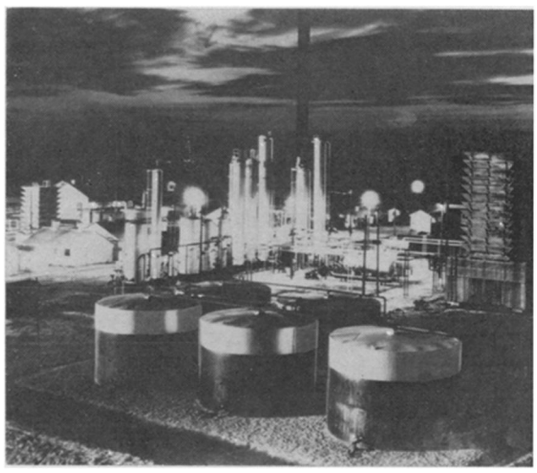
Getting the lead out



Ford Motor Co.

A catalytic muffler could curb emissions, but lead is a problem.

A solution to auto exhausts is unleaded gasoline and redesigned engines, but the oil and auto industries are saying "you first" to each other



Refining methods must be changed.

For several years, the auto industry and the petroleum industry have pointed accusatory fingers at each other. The auto manufacturers have claimed that air pollution from cars is the fault of the oil companies for not producing a better fuel. The oil industry has charged Detroit with delinquency in its automotive engineering.

This week the buck was passed to the oil industry when President Nixon said leaded gasoline must go in his environmental message to Congress. He noted that by 1972 the auto industry was preparing to have engines that would not need "and, indeed must not use leaded gasoline." He added, "I am confident that the petroleum industry will see to it that suitable nonleaded gasoline is made widely available for these cars when they come on the market."

Coming on top of new Health, Education and Welfare Department standards for reduced auto emissions, and topped off by Henry Ford's letter last week to 19 oil companies telling them he would build engines for unleaded gasoline if they would make it, the onus appears clearly on the oil industry.

Lead as a pollutant is very small when compared to some of the big offenders such as nitrogen oxides, hydrocarbons and carbon monoxide.

But lead comes under the gun not because it pollutes the air, but because it is preventing the development of control devices, especially the catalytic muffler, for other emissions. As Dr. George J. Huebner, director of research at Chrysler, puts it, "With lead, a catalytic muffler is impossible. Without it, it is possible."

Catalytic mufflers are devices containing ceramic granules coated with a metal such as platinum or chromium. Exhaust gases are recirculated over the catalyst, which oxidizes the carbon monoxide, hydrocarbons and nitrogen oxides to innocuous products: carbon dioxide, water vapor and nitrogen. The lead interferes by coating, or poisoning, the catalyst.

In addition, lead builds up on spark plugs and clogs valves and the carburetor, resulting in decreased engine efficiency and increased maintenance costs. Some scientists see it as a health threat.

Getting rid of lead in gasoline would leave a void, however. It improves the combustibility of gasoline, making possible today's efficient high compression engines. Without it, a car engine would knock. A gasoline's antiknock quality is measured in terms of its octane rating, that is, how well it compares with the combustibility of iso-octane, the standard.

Tetraethyl lead changes the shape of the hydrocarbon molecule so that it will burn better. This can be done without lead, but the effort required will be much greater and hence costlier. To get gasoline hydrocarbons with the right molecular weights would require more catalysts and higher temperatures.

If the oil companies switch to unleaded gasoline, the auto makers will have to redesign their engines. This is because the unleaded gasoline generally will have a lower octane rating than leaded gasoline for which today's engines are designed.

Thus, Detroit claims it cannot adequately design an engine until it knows the combustion characteristics of the new gasoline.

The few oil companies that have been heard from so far see the situation exactly in reverse. They contend that they must know the engine specifications first in order to make the gasoline. Atlantic Richfield and Standard Oil of Indiana, for example, have said they would make unleaded gasoline, provided Detroit builds the engine first. In short, the oil and auto industries appear to be getting ready to go at it again, this time each claiming the other has put the cart before the horse.

Although auto engineers do not know the specifics the new engine design would take, they do know that they would have to lower the compression ratio of car engines. A lower ratio

would mean a less powerful engine, and thus a step back from the direction in which the auto industry has been going all these years.

Reducing the ratio is easily done by increasing the volume of the combustion chamber. This can be done by putting a thicker head gasket between the cylinder head and the cylinder block or by lowering the piston head.

As a result, if the switch to unleaded gasoline is made, one auto spokesman estimates a 10 percent drop in performance for cars using premium fuels, assuming that the unleaded gasoline maintains present regular grade antiknock characteristics.

But conversion is not a great problem for Detroit. "We're prepared to make engines for unleaded gasoline," calmly states Dr. Paul Chenea, vice president for research at General Motors. "We think it is inevitable," he adds.

"It's not a great engineering problem," seconds Dr. Huebner. "It will probably constitute a problem for the customer."

Although the consensus in the motor city is that unleaded gasoline will come, Dr. Huebner's remark illustrates the one sticking point: money. To make efficient unleaded gasoline costs more than it does to make the leaded version. The oil companies will have to spend more on capital investment to revamp and expand their refineries, and the extra cost will be passed on to the customer.

Ethyl Corp., for example, estimates that the complete elimination of lead would cost the industry about $6 billion and the public about four cents a gallon. However, there are other estimates. John Logan, president of Universal Oil Products, an oil-processing firm whose business would increase if the switch were made, estimates the cost will amount to approximately one cent a gallon.

If present technology is employed, points out consulting chemical engineer Jack Dart of J. C. Dart and Associates in Washington, D.C., the shift from leaded to unleaded gasoline will further drain dwindling United States petroleum reserves, since it takes more barrels of crude oil to make unleaded gasoline than it does to make the same amount of leaded gasoline, both with the same octane rating.

Although Dart agrees the change will come, he sees a less drastic one than his counterparts in Detroit. Says Dart, "We will ultimately move in the direction of using less lead. I don't see them completely eliminating lead because it gives gasoline better burning characteristics. I don't see this for the immediate future, I don't expect it to happen within at least 5 to 10 years." □

ENVIRONMENT MESSAGE

Clearing the waters

President Nixon, who stressed concern for the environment in his State of the Union address (SN: 1/31, p. 122) and again in his budget message (SN: 2/7, p. 147), once again declared his commitment to action this week in a special message to Congress. The message was more detailed and comprehensive than his earlier statements on the subject. Nevertheless, earlier reservations about the Administration program expressed by critics such as Sen. Edmund Muskie (D-Me.) appear not to have been all answered.

In the latest message, the President touched on both financing and enforcement. He detailed an Environmental Financing Authority to purchase municipal bonds for sewage treatment plants and interceptor sewers. According to the plan, the Federal Government will make up the difference between interest rates paid to the agency by the municipalities, and the rate paid by the agency in the commercial market, to enable municipalities to match with $6 billion the $4 billion Mr. Nixon hopes to commit over the next four years and spend in the next eight.

On the enforcement side, Mr. Nixon proposes more rigorous enforcement of water pollution control laws, including fines of up to $10,000 a day for industrial violators of control standards. He would also extend Federal jurisdiction to include intrastate waterways, as well as those interstate and navigable streams now covered by Federal law.

Presently, action against water polluters relies on a complex of laws. The Justice Department, for example, brought charges this week against 11 companies and one individual charged with polluting waters in the Chicago area, acting under an 1899 law, which provides for a $2,500 fine. Later water pollution control laws—including the 1965 Federal Water Pollution Control Act and the 1966 Clean Water Restoration Act —do not provide criminal penalties, although under the 1965 act it is possible for a violating plant to be ordered closed. Enforcement duties under present law are shared by Federal and state governments, with the Federal Government empowered to act if states fail to move against polluters.

The President is not proposing an array of new procedures; he is simply escalating the penalties.

In financing the construction program, says Russell Train, chairman of the newly created Council on Environmental Quality, actual expenditures would come over an eight-year period, with Federal contributions of $1 billion a year to represent the amount of contract obligations in each of the four years. Train says that such an obligation "will assure the municipalities that Federal contract authority will in fact be available in each of those years." The 1966 Clean Water Restoration Act actually authorizes more funds, as Sen. Muskie points out. But there have been no Federal commitments to cities and Congress never appropriated the full amount. President Nixon hopes the contractual obligation he proposes will help insure the appropriation.

The President's proposal also calls for faster action against firms in violation of water pollution control laws, plus a range of air pollution proposals that rely mainly on existing law. Among these would be establishment of auto emission standards in 1973 and 1975, and uniform national air pollution emission standards for industrial plants.

Other Presidential proposals include tougher emission standards for vehicles, and research into unconventional vehicle propulsion, uniform national standards for emissions from stationary industrial plants, research into better techniques for disposal of solid wastes, bounties for disposing of auto hulks and the development of degradable packaging materials.

President Nixon's message, the first of the Congressional session, included a package of 23 legislative proposals and 14 measures to be taken by executive action.

His program, he declared, is designed to "rescue our natural habitat," rolling back pollution levels rather than simply preventing additional inroads.

It would, he said, "call for fundamental new philosophies of land, air and water use, for stricter regulation, for expanded government action, for greater citizen involvement and for new programs to insure that government, industry and individuals are called on to do their share of the job and pay their share of the costs."

As a start, besides the Chicago enforcement action, President Nixon last week repeated President Johnson's Executive order to Federal agencies, setting new deadlines for them to clean up their own installations in compliance with water pollution control standards of the states in which they are located.

The Johnson order never had any great impact because, under the pressure of other issues, allocation of funds in the agency budgets to implement the order never was given a high enough priority. President Nixon is riding the tide of a different time when environment is a byword.