

LILCO, July 16, 1984

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of)
)
LONG ISLAND LIGHTING COMPANY) Docket No. 50-322-OL-4
) (Low Power)
(Shoreham Nuclear Power Station,)
Unit 1))

TESTIMONY OF CORNELIUS A. SZABO
ON BEHALF OF LONG ISLAND LIGHTING COMPANY

Q.1. Please state your name and business address.

A. My name is Cornelius A. Szabo. My business address is
175 East Old Country Road, Hicksville, New York 11801.

Q.2. In what capacity are you employed?

A. I am Manager, Resource Evaluation for the Long Island
Lighting Company (LILCO). Since joining the company in
1981, I have also held the positions of Manager of Fos-
sil Fuel Procurement, Manager of the Fuels and Chemical
Division and Administrative Assistant to the Vice Pres-
ident - Purchasing and Stores. I am responsible for
projecting oil and coal prices and availability, and
have testified as LILCO's expert witness in these

areas. In fulfilling these responsibilities, I spend a substantial portion of my time tracking oil-related supply and demand trends and oil-related commercial and technological developments.

Q.3. Please describe your educational background.

A. My professional qualifications are being offered into evidence as Attachment 1 to this testimony. To briefly summarize my educational background, I earned a Bachelor of Chemical Engineering degree from Manhattan College and was awarded the Prutton Medal for the outstanding chemical engineering graduate. I earned a Master of Science degree in Chemical Engineering from Columbia University, where I was a National Science Foundation Fellow.

Residual oil (the primary fuel used in LILCO's steam generating stations) is manufactured via chemical engineering technology, and my comprehensive chemical engineering education provides insight into the economics and availability of residual oil supply. Specifically, and as is discussed later, petroleum refiners, and particularly U.S. refiners, are investing billions of dollars in chemical-engineering-based processes to convert residual oil to higher-valued products. This trend of converting residual oil to higher-valued products is

decreasing the availability of residual oil, and in particular, residual oil derived from domestic crude oil.

Q.4. Please describe your professional experience.

A. I was employed for eight years in the petroleum industry with Mobil, Exxon and Shell in both marketing and planning related functions. I was a management consultant for ten years, and was designated a Certified Management Consultant by the Institute of Management Consultants. As a consultant, my clients included utilities in thirteen states, federal energy agencies and investment bankers involved in the financing of coal and petroleum projects. I conducted eight utility fuel-related management audits. I also served as a consultant to the state public service commissions of Connecticut, Delaware, Georgia, Massachusetts, New York and Pennsylvania in the areas of fuel procurement, supply and prices.

Specifically relevant to my testimony in this proceeding are my eight years of petroleum industry planning and marketing-related experience. That experience provided me valuable insight into the market strategies and tactics employed by the world's fuel suppliers. Furthermore, in 1977 I conducted a special management

audit for the Board Chairman of the Arabian American Oil Company ("ARAMCO"). ARAMCO is the world's largest oil producing company and produces over 90 percent of Saudi Arabia's oil. Saudi Arabia is the world's largest oil exporter as well as one of the largest suppliers of imported oil to the United States. Saudi Arabia, with up to ten million barrels a day of spare installed oil production capacity, is the world's leader in setting oil prices. Through my ARAMCO assignment, I acquired detailed knowledge of both Saudi Arabian oil operations and the problems involved in pricing fuel and in assuring a continuous, reliable supply of Middle East oil to world oil markets.

Q.5. Do you have experience related to nuclear fuel?

A. Yes. While Manager of LILCO's Fuels and Chemical Division from January 1982 through October 1983, my responsibilities included nuclear as well as fossil fuel. I was also responsible for the management audits of nuclear fuel at Omaha Public Power District, General Public Utilities and Georgia Power Company. The management audit of General Public Utilities was the first audit conducted subsequent to the Three Mile Island accident at the direction of the Pennsylvania Utility Commission.

Q.6. Please indicate your experience as an expert witness regarding utility fuels.

A. Since joining LILCO in 1981, I have testified as the Company's expert witness on fuels before the New York Public Service Commission in two rate cases (case numbers 28176 and 28553) and before the New York Department of Environmental Conservation in two hearings (the Port Jefferson Coal Conversion hearings and the Renewal of Special Fuel Limitations Applicable to Suffolk County Generating Units hearings). While a management consultant, I testified in the capacity of a staff member to the Delaware Public Utility Commission in two hearings (the 1980 Delmarva Power & Light Electric Fuel Adjustment hearings and the 1980 Delmarva Power & Light Gas Production Cost Adjustment hearings).

Q.7. What is the purpose of your testimony?

A. My testimony describes the potential benefit to LILCO and the public arising from the early performance of low power testing which in turn might lead to an earlier date for commercial operation. Specifically, I will describe LILCO's dependence on oil to fire its generating plants and the potential instability of the price and supply of that oil.

Q.8. Are all of LILCO's power plants now in operation oil fired?

A. Yes, however, natural gas can also be burned, when available during the warmer months, at the E.F. Barrett and Glenwood Steam Generator Units and the E.F. Barrett Internal Combustion Units. The total capacity of all dual fired units is 876 MW, less than a quarter of the total system capacity of 3721 MW.

Q.9. What types of oil does LILCO use at these plants?

A. About ninety-nine percent of the oil burned by LILCO at these plants is residual oil, with the remainder being middle distillates. Residual oil is that portion of the crude oil left over after the higher valued products such as gasoline, middle distillates including diesel oil, and petrochemicals are refined out of it. Residual oil (resid) is normally an unavoidable and unprofitable by-product of petroleum refining, and refiners -- particularly those in the United States -- are investing billions of dollars and developing the technology to convert residual oil to higher-valued products. Chemically, residual oil is a colloidal suspension of carbonaceous materials in very high boiling point hydrocarbons, and is not fluid without the application of external heat.

Q.10. Is LILCO predominately dependent on foreign countries for the residual oil used in generation?

A. Yes. Almost all of LILCO's oil is imported. Although precise numbers are not available, about 90% of LILCO's residual oil is derived from crude oil produced in foreign countries.

About eleven and a half million barrels of high sulfur resid and about three and a quarter million barrels of low sulfur resid are burned yearly by LILCO. The high sulfur resid is essentially all derived from foreign crude oil and essentially all manufactured in foreign refineries. Between 80% and 90% of this crude oil comes from Venezuela with most of the remainder coming from Mexico. Some Saudi Arabian crude oil is also used to derive the high sulfur resid burned by LILCO.

The situation with regard to low sulfur resid is not as clear cut, and not susceptible to precise quantification. In general, the principal refining regions supplying this low sulfur resid to LILCO are the U.S. Gulf Coast and South American countries such as Venezuela, Brazil and Argentina. Essentially all foreign refined resid is derived from foreign crude oil, and some of the resid manufactured in U.S. Gulf Coast refineries is also derived from foreign crude oil.

More than a quarter of the crude oil processed by U.S. refineries is foreign. Based on these factors, I estimate that about half of LILCO's low sulfur resid is derived from foreign crude oil.

Since LILCO's oil is approximately 80% high sulfur resid, essentially all of which is foreign oil, and 20% low sulfur resid, approximately one-half of which is foreign oil, overall LILCO's estimated dependence on foreign oil is 90%.

Q.11. Is LILCO's dependence on foreign oil unique or are other utilities in New York also dependent on foreign countries for the residual oil used in power generation?

A. It is my understanding based on a recent letter from Secretary of Energy, Donald Hodel, to Governor Mario M. Cuomo that New York State burns more oil to produce electricity than any other state (Attachment 2). Secretary Hodel's assessment is not inconsistent with my own experience in the industry.

Q.12. Are the availability and price of the domestic crude oil derived resid burned by LILCO affected by events related to foreign oil?

A. Yes, to a very great, if not total, extent. Crude oil is fungible, although there is some variation in price as a function of quality and transportation costs. Furthermore, the U.S. contains just 6% of the world's oil reserves, produces just 15% of the world's crude oil, and imports about 30% of its own oil requirements. With such a minor proportion of the world's crude oil reserves and production and such a major dependency on imported oil, the United States has little leverage in controlling world oil markets and in insulating itself from disruptions in world oil markets. And this situation is growing worse! For 1982, the latest year for which data is available from the Department of Energy (DOE), U.S. proven oil reserves declined 5.3% to reach their lowest level in 30 years. Furthermore, the United States recently suffered a major setback in efforts to slow down the depletion of its oil reserves. In December 1983, the billion dollar plus Mukluk exploratory effort off Alaska turned out to be a dry hole. With estimated potential reserves as high as five billion barrels, Mukluk had been the most promising oil prospect in the United States since the discovery of Prudhoe Bay, the nation's largest oil field, in 1968.

Q.13. Will LILCO become increasingly dependent on foreign crude oil for its low sulfur resid requirements?

A. Yes. Structural and irreversible changes in American crude oil production and the American refining industry will make LILCO's dependency increasingly severe.

Production from the U.S. Gulf Coast, which supplies essentially all the domestic crude oil from which LILCO's resid is derived, is declining. This region has been producing oil since early in the century. There is small potential for large new oil discoveries or the economic application of enhanced oil recovery methods beyond those currently being employed. The East Texas Field, the largest ever discovered in the lower 48 states, has been producing oil since 1930 and is already more than three quarters depleted. Latest available data show that March 1984 Texas oil production has already declined 30% from its March 1957 peak.

Furthermore, structural changes in the U.S. refining industry will decrease the amount of U.S. produced resid available to LILCO. During this decade U.S. refiners have invested billions of dollars in processes which convert resid to higher-valued products such as gasoline and diesel oil. They also have closed more than two million barrels a day of less profitable

refining capacity. In general, these shutdown refineries were the older and less sophisticated ones which yielded a greater percentage of residual oil than the refineries kept in operation. Through the first five months of 1984, Gulf Coast refineries reduced their average resid yield percentage by almost half when compared with the first five months of 1980. Within the next few years, additional major resid conversion investment will come on stream and unprofitable refining capacity will be shut down, further reducing the percentage yield of low sulfur resid derived from the declining supplies of domestic crude oil.

Q.14. Please give examples of foreign oil market disruptions causing major price increases for American consumers.

A. During the 1967 Mideast War, Arab oil producers also attempted an oil embargo; however, the United States still had enough spare oil production capacity to abort it. By 1973, however, the United States had lost its ability to control world crude oil markets and insulate itself from disruptions in world oil markets. The Arab Oil Embargo in 1973 quadrupled oil prices. The Iranian Revolution in 1979 further tripled oil prices. Despite the three-year long current oil glut, prices are still closer to the level reached during the Iranian Revolution than the level before that disruption.

Should the current hostilities in the Persian Gulf Region between Iran and Iraq result in a cutoff of supplies from all the Persian Gulf oil producers, it would cause a major worldwide oil shortage. Persian Gulf countries not only contain half of the world's entire oil reserves, they also contain about three quarters of the world's spare installed production capacity and produce about 20% of the entire world's output. The world will become increasingly dependent on the Persian Gulf Region. This will occur, in part, because production will be declining in many of the world's major oil producing regions including the U.S.S.R., the world's largest producer, and the U.S., the world's second largest producer. In addition, production will increase substantially in the Persian Gulf Region since its oil is the world's least costly to produce (\$1 per barrel for Saudi Arabia vs \$5-\$25 per barrel for the United States and the North Sea).

- Q.15. What effect would a major cutoff of oil supplies from the Persian Gulf oil producers have on the price of oil?
- A. It would increase the price of oil, but the amount and duration of the increase is subject to great uncertainty. I have seen references to estimates of prices as

high as \$100 per barrel, as well as references to estimates in the \$40 per barrel range. Subject to the great uncertainty involved, I estimate that a \$10 per barrel price increase to the \$40 per barrel range would be the likely outcome of a major cutoff of oil supplies from the Persian Gulf oil producers.

A myriad of unpredictable factors would determine the exact price increase. These include: the completeness of the cutoff; the duration of the cutoff; the possibility of military confrontation between the U.S. and U.S.S.R. in the Persian Gulf Region; the extent of panic buying and hoarding of tanks; the effectiveness of the Strategic Petroleum Reserve in dampening panic buying psychology; the degree to which oil producers outside the Persian Gulf such as Libya, Nigeria and Mexico show pricing restraint in the face of a booming seller's market; the effectiveness of conservation measures; the ability of governments to resist pressures to impose politically appealing but counterproductive oil price control and allocation measures; the extent of the resulting economic contraction and consequent reduction in oil demand; and the degree to which OPEC and other large oil exporters can successfully restrain production to defend the increased price levels.

Q.16. If there is a major disruption in foreign oil markets, would LILCO likely be able to buy domestic oil?

A. LILCO would find it very difficult, if not impossible, to buy residual oil derived from domestic crude oil. Refiners would use their conversion units to convert as much resid as possible to urgently needed transportation fuels such as diesel oil and gasoline. Because the United States refining industry is the world leader in the technology for conversion of residual oil to higher-valued products, such as diesel oil and gasoline, much more of this emergency-caused conversion of resid to transportation fuels would occur in the United States than elsewhere. It is probable that little or no resid derived from domestic crude oil would be available to LILCO.

Q.17. Will operation of the Shoreham Station reduce LILCO's use of foreign oil?

A. Yes. The exact reduction in LILCO's oil consumption will depend on many factors. For 1986, the first full year of Shoreham operation, the reduction could be in the neighborhood of seven million barrels assuming the Suffolk County Special Limitations are not renewed, no natural gas is available for electric generation and no electricity is available from Nine Mile Point 2. More

than half this reduction will probably be foreign oil. The remaining reduction in domestic oil is also a great benefit as the availability and price of domestic oil is affected to a very great, if not total, extent by events related to foreign oil.

Q.18. In your opinion, would LILCO and the public benefit from early operation of Shoreham?

A. Yes. Shoreham will improve LILCO's ability to protect its ratepayers from the impact of oil shortages and price increases that would result from a major disruption in oil markets. Given the extreme volatility in the Persian Gulf Region and Middle East, including but not limited to an ongoing major war, such a disruption could happen at any time. In contrast, uranium to fuel Shoreham is in plentiful supply, and a major uranium supply disruption having an equivalent impact on LILCO ratepayers as a major oil supply disruption is very unlikely.

PROFESSIONAL QUALIFICATIONS

Cornelius A. Szabo

Manager, Resource Evaluation

LONG ISLAND LIGHTING COMPANY

My name is Cornelius A. Szabo. My business address is Long Island Lighting Company, 175 East Old Country Road, Hicksville, New York 11801. As the Manager of Resource Evaluation for the Long Island Lighting Company, I am responsible for forecasting oil and coal prices and availability. Since joining LILCO in 1981, I have testified as the Company's expert witness on fuels in two hearings before the New York Public Service Commission and in two hearings before the New York Department of Environmental Conservation. I received my Bachelor of Chemical Engineering Degree from Manhattan College in 1962 and was awarded the Prutton Medal for the outstanding chemical engineering graduate. I earned a Master of Science Degree in chemical engineering from Columbia University, where I was a National Science Foundation Fellow. I was elected into the national honor societies for Scientific Research; Chemistry, and Engineering.

From 1963 to 1971, I was employed in the petroleum industry with Mobil, Exxon and Shell in both marketing and planning related functions. The former included: customer technical service, market research, and sales. The latter included: new business venture analysis and implementation of process linear

programming, income projection, and supply-demand marketing planning models. During the eight years that I was employed in the petroleum industry, I gained valuable insight into petroleum industry planning, and the market strategies and tactics employed by the world's fuel suppliers. Furthermore, in 1977 when employed as a management consultant by Deloitte Haskins & Sells, I conducted a special management audit for the board chairman of the Arabian American Oil Company (ARAMCO), the world's largest oil producing company. Saudi Arabia is the world's largest oil exporter as well as one of the largest suppliers of imported oil to the United States and ARAMCO produces over 90% of Saudi Arabia's oil. As the world's largest oil exporter and holder of up to 10 million barrels per day of spare oil production capacity, Saudi Arabia is the world's oil price setting leader. During my ARAMCO assignment, I gained detailed knowledge of both Saudi Arabian oil operations and the problems involved in pricing fuel and in assuring a continuous, reliable supply of oil from the Middle East to world oil markets.

From 1971 to 1981, I was a management consultant with Deloitte Haskins & Sells (1971-77), Management Systems Development (1977-78), and Theodore Barry & Associates (1978-81). In 1981, I was designated as Certified Management Consultant by the Institute of Management Consultants. As a consultant, my

clients included utilities in thirteen states, federal energy agencies, and investment bankers involved in the financing of coal and petroleum projects. I also served as a consultant to the state public service commissions of Connecticut, Delaware, Georgia, Massachusetts, New York, and Pennsylvania in the areas of fuel procurement, supply, and fuel prices. In 1980, I testified in the capacity of a staff member to the Delaware Commission in the Delmarva Power and Light Electric Fuel Adjustment hearings and Gas Production Cost Adjustment hearings. I conducted eight utility fuel-related management audits.



THE SECRETARY OF ENERGY
WASHINGTON, D.C. 20585

ATTACHMENT 2

June 29, 1984

Honorable Mario M. Cuomo
Governor of New York
Albany, New York 12224

Dear Governor Cuomo:

The five nuclear power plants now in service in New York State have saved an estimated 315 million barrels of oil since they began operating. They are currently saving oil at the rate of 33 million barrels a year. This is a significant contribution to reducing our dependence on foreign oil to meet our energy needs. In spite of this, New York State still burns more oil to produce electricity than any other State, and is, therefore, in greater jeopardy from a potential cutoff of supply of oil from the Persian Gulf. And while America is dependent on imported oil for about 30% of our requirements, the Soviet Union is energy independent.

In my last letter to you, I pointed out that the Shoreham nuclear power plant could replace 7 to 9 million barrels of oil now used annually to produce electricity. Additionally, the Nine Mile Point #2 plant would roughly double that figure. These plants are vital to our national security because they can help reduce dependence on foreign oil.

There is also an economic incentive to these plants. Over the long term, nuclear power which replaces oil generation can potentially save the ratepayers money. We believe that ratepayers, especially on Long Island, will end up paying more -- not less -- if Shoreham never operates. These citizens have already suffered rate increases of over 100 percent since 1970 as a result of overdependence on foreign oil.

Decades of operation have shown that commercial nuclear power plants are safe. In fact, these plants have the finest record of safety of any form of power generation.

We share your concern for the health and safety of people -- inside and outside the plant. We all value human life and will not condone nor support any action which jeopardizes the safety of any of our people.

We do not believe that the Shoreham Nuclear power plant is a hazard to the people of Long Island; nor do we believe that it will jeopardize the safety of those people. We do believe, however, that they are jeopardized in both supply and price by continued dependence on oil generation. Furthermore, continued use of high sulphur oil has a potential negative impact on their environment. We recognize, however, that the Nuclear Regulatory Commission requires that as an extra margin of safety there must be an effective, workable emergency evacuation plan for Shoreham.

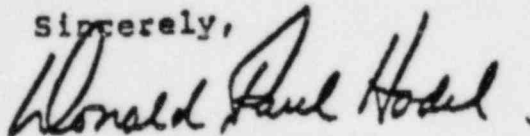
Your statements indicate that you do not believe that an adequate evacuation plan can be developed for Shoreham. What is more, you have made it clear that you are unwilling even to test such a plan. We have indicated our willingness to participate in a test of an appropriate plan, but you have refused even that. Instead, you have challenged the proposed plan and test in the courts and questioned our authority to try to help. We have not suggested that you change your opinions, only that you go along, in the spirit of cooperation, and allow us to join with FEMA to run a full-field exercise of a plan, jointly developed, and to then place it before the Nuclear Regulatory Commission for evaluation.

Needless to say, your refusal to even permit a test greatly disappoints and alarms us, as it does many Long Island residents, judging by the mail we've been receiving. We have made our offer and remain open to working with you to test an evacuation plan. Our position is clear. We do not favor the imposition of Federal Government authority over any State in matters such as this.

Our national security, our economic security and our energy security are each dependent upon the other. New York and this Nation must continue to reduce their reliance on oil. America's energy future affects us all, not just one county in one State, but all. Accordingly we would continue to seek to work together with you to seek appropriate answers to the critical issue facing us today.

This Administration wants to work with New York and all of the States to solve the problems facing America. Our joint efforts can accomplish much. I continue to offer to work with you toward this end. The people we serve deserve nothing less.

Sincerely,

A handwritten signature in dark ink, reading "Donald Paul Hodel". The signature is written in a cursive, flowing style with a large initial "D".

DONALD PAUL HODEL