

**REPORT OF THE
JOINT SUBCOMMITTEE STUDYING THE LICENSING OF
NUCLEAR GENERATION FACILITIES**

TO

THE GOVERNOR

AND

THE GENERAL ASSEMBLY OF VIRGINIA



SENATE DOCUMENT NO. 29

**COMMONWEALTH OF VIRGINIA
DEPARTMENT OF PURCHASES AND SUPPLY
RICHMOND**

1978

MEMBERS OF SUBCOMMITTEE

CLIVE L. DUVAL, 2nd, Chairman

GERALD L. BALILES, Vice-Chairman

J. HARRY MICHAEL, JR.

EDWARD M. HOLLAND

C. HARDAWAY MARKS

LEWIS W. PARKER, JR.

STAFF

JOHN A. BANKS, JR., DIRECTOR

DIVISION OF LEGISLATIVE SERVICES

L. Willis Robertson, Jr., Staff Attorney

Hugh P. Fisher, III, Legislative Research Associate

Report of the
Joint Subcommittee Studying the Licensing of
Nuclear Generation Facilities
To
The Governor and the General Assembly of Virginia

Richmond, Virginia

January, 1978

To: Honorable John N. Dalton, Governor of Virginia

and

The General Assembly of Virginia

SUMMARY

The Joint Subcommittee Studying the Licensing of Nuclear Generation Facilities was established pursuant to S.J.R. 136 of the 1977 General Assembly.¹ The Joint Subcommittee devoted substantial time and effort toward studying the issues of the safety and security of nuclear power plants operating in the Commonwealth. Because of the highly controversial and complex nature of the topic of nuclear power, the Subcommittee received many opinions and reviewed voluminous information on the subject.

Based upon the information presented to and reviewed by the Subcommittee, the Subcommittee concludes that nuclear power plants of the type now in operation or planned for operation in Virginia provide a proven technology for the production of electrical power, that the risks to the public health and safety from the operation of such plants are extremely low, and that the Commonwealth must continue to utilize such plants to meet its energy needs for the decades immediately ahead.

CONCLUSIONS

Under the date of April 29, 1977, the President of the United States issued his report entitled "The National Energy Plan." The Subcommittee believes that the portion of this report set forth below dealing with

"Nuclear Power," particularly the italicized sentences, well summarizes the central conclusion reached by this Subcommittee:

"Many countries view nuclear power as their only real alternative to dependence on costly and uncertain oil and gas imports. The United States is in a better position, primarily because of its vast coal resources. Coal does, however, have economic, environmental, and health and safety limitations; and, therefore, the United States also must continue to count on nuclear power to meet a share of its energy deficit.

"Light-water reactors provide a proven technology to produce needed electrical power. However, more advanced forms of nuclear power may entail significant risk, and must therefore be developed cautiously. The United States has been concentrating on the development of a breeder reactor that uses plutonium, a by-product of uranium in nuclear reactors. In addition, the United States has been developing reprocessing technology to recover the uranium and plutonium in the spent fuel from light-water reactors. Access to plutonium, or even the capacity to recover or isolate it, can lead to the risk of diversion of material that could be used for nuclear explosive devices...

"It is the President's policy to defer any U. S. commitment to advanced nuclear technologies that are based on the use of plutonium, while the United States seeks a better approach to the next generation of nuclear power than is provided by plutonium recycle and the plutonium breeder. At the same time, because there is no practicable alternative, the United States will need to use more light-water reactors to help meet its energy needs. The Government will give increased attention to light-water reactor safety, licensing, and waste management so that nuclear power can be used to help meet the U. S. energy deficit with increased safety."

The Subcommittee believes that there are risks arising from the operation in Virginia of light-water reactors utilizing uranium for fuel. However, the safety record of light-water reactors has been good, and the risks to the public health and safety from them appear to be very low compared with many other risks of life. The Subcommittee concludes that for the next 20 or 30 years there is no practicable alternative to the operation in Virginia of nuclear power plants of the type now in use at Surry or planned for use at North Anna.

The Subcommittee also deems it necessary to reiterate the point stated later in this report. Even if it had concluded that the operation of nuclear power plants in Virginia involved unacceptable radiation hazards, the Commonwealth does not, under present Federal law, possess the power to terminate their operation or prohibit the construction of additional nuclear power plants within Virginia on the basis of radiation hazards. Such power has, by law, been conferred upon the United States Nuclear Regulatory Commission (NRC).

RECOMMENDATIONS

Notwithstanding the conclusions of the Subcommittee set forth above, various matters covered in later portions of this report were brought to the Subcommittee's attention during its study and in its judgment require the following recommendations:

1. Because of the series of disquieting problems, as discussed throughout this report, involving safety considerations that have arisen during construction of the North Anna nuclear power station, the U. S. Nuclear Regulatory Commission should, as a matter of priority, assign a qualified employee to serve as a resident inspector at the station to monitor on a permanent basis the operations of any nuclear power plant or plants licensed to operate at this location. As a matter of lower priority, a resident inspector should also be assigned to serve at the Surry nuclear power station to monitor the operation of Surry Units 1 and 2. The Chairman of the Subcommittee is requested to transmit a copy of this report reflecting this recommendation to the Commission.

2. The Attorney General's Office should continue to participate as actively as practicable in any future proceedings involving the licensing of nuclear power plants within the Commonwealth, and in such proceedings, should vigorously seek to protect its citizens from any perceived safety hazards which the construction or operation of such plant might entail.

3. The funds appropriated in the past to the State's Department of Health to provide monitoring of low-level radiation emanating from nuclear power plants and other sources do not appear to the Subcommittee to be sufficient to protect adequately the public health and safety from this hazard; and the appropriation to the Department for this purpose for the 1978-80 biennium should be increased from the \$262,955 shown in the Governor's Recommended Budget (H.B. 30) to \$405,364 to provide for additional personnel and travel costs.

4. The Commonwealth's Office of Emergency Services should be empowered by appropriate legislation (Annex 1) to determine which additional counties, cities or towns in the vicinity of the Surry and North Anna nuclear power stations should, in the public interest, adopt appropriate emergency evacuation plans for their citizens, and must be further empowered to require any such county, city or town to adopt such a plan if it does not voluntarily do so.

5. Any county, city or town near the Surry or North Anna nuclear power stations which has adopted or is required to adopt an emergency evacuation plan should insure by publicity or other steps that such plan is readily available in several public places easily accessible to its citizens for their information and inspection, and should further insure the proper functioning of such plan by regular drills or other appropriate measures.

I. INTRODUCTION

1. The Subcommittee Study

Under S.J.R. 136 (Annex 2), the role of the Joint Subcommittee, which is composed of three members of the Senate Commerce and Labor Committee and three members of the House Corporations, Insurance and Banking Committee, was to study the procedure by which the United States Nuclear Regulatory Commission licenses the construction and operation of nuclear power generating plants within the Commonwealth and to assess the safety and security of such plants. The Subcommittee was also charged with the task of consulting with the State Corporation Commission and other informed sources to determine whether any action by the General Assembly was necessary or appropriate with regard to such matters.³

In carrying out its duties, the Subcommittee conducted two lengthy public hearings in Richmond, the first on August 16, 1977, and the second on October 3, 1977, at which the Subcommittee received testimony from a number of public witnesses representing the academic world, environmental and other groups, and pro-nuclear power associations and corporations as well as from many individuals speaking in their own behalf. The Subcommittee also held a number of other meetings at which it was briefed by the Virginia Electric & Power Company (Veeco) regarding its construction of nuclear power stations at sites in Surry County and at North Anna in Louisa County, its operation of two nuclear power plants at Surry, and a host of other relevant matters relating to the use of nuclear fuel to generate electric power.

The Subcommittee also heard from officials of the U. S. Nuclear Regulatory Commission (NRC) and various interested State agencies including the State Corporation Commission, and from representatives of local governments. During the period of study, the Subcommittee was advised by two consultants, Dr. Carlos G. Bell, Jr., a nuclear engineering and environmental engineering professor at the University of North Carolina at Charlotte, and Mr. Elbert P. Epler a nuclear systems consultant from Oak Ridge, Tennessee.

Since most members of the Subcommittee were already familiar with Veeco's nuclear power plant at Surry (Units 1 and 2), several members of the Subcommittee inspected the company's nuclear power plant at North Anna (Unit 1) which is scheduled to go into operation during 1978. The Subcommittee's staff also reviewed the massive transcript of proceedings involving the application by Veeco for operating licenses for its plants designated as North Anna Units 1 and 2.

Finally, the Subcommittee received a evidence voluminous reports, written statements, newspaper and magazine articles and many other materials submitted by various individuals and group .

2. The Role of Federal Agencies in Licensing the Construction and Operation of Nuclear Power Generating Plants

The Energy Reorganization Act of 1974 abolished the old Atomic Energy Commission and established two new agencies—the Energy Research and Development Administration, now a part of the Department of Energy, to carry out research and development on all forms of energy, including nuclear, and the independent Nuclear Regulatory Commission to regulate commercial nuclear activities.⁴

Under this Act, the NRC became responsible for implementing all regulatory requirements of the Atomic Energy Act of 1954, as amended. These provisions make the Commission responsible for assuring protection of the radiological health and safety of the public and the common defense and security, as well as for assuring that licensing actions involving certain nuclear facilities are not inconsistent with the nation's anti-trust laws.

In addition, under the National Environmental Policy Act of 1969, the RC is responsible for a comprehensive evaluation and assessment of the full range of environmental effects of the construction and operation of nuclear power reactors and certain other types of facilities, and for balancing the benefits to be derived from the construction and operation of such facilities against environmental costs.

Thus, in summary, the Commission's major responsibilities in connection with the licensing and regulation of nuclear power reactors are to assure: (1) protection of the radiological health and safety of the public; (2) protection of the environment; (3) protection of the common defense and security; and (4) conformity with the anti-trust laws.

Licensing of a nuclear power plant is a two-step process: First, the applicant utility must obtain a construction permit from the NRC authorizing it to build such a plant at a specified site. After such a permit is obtained and the plant is near completion, the utility applies to the Commission for an operating license.

Each application for a construction permit or an operating license for a nuclear power plant is reviewed by the NRC staff from the standpoint of radiological safety by a group of about 20-25 highly trained and experienced professionals in all fields of reactor technology. On the average, these reviews take on the order of three years and require about five man-years of effort over that period. To date, for example, the North Anna operating license review has been under way for almost 4-1/2 years and has so far required about 11 man-years of staff manpower.

Following completion of the NRC staff review, the application is considered by the Advisory Committee on Reactor Safeguards, an independent group of safety experts that advises the Commission on each construction permit and operating license application. Following completion of this review, a public hearing on the issues is held by the independent Atomic Safety and Licensing Board. A construction permit is not issued without favorable findings by this Board. The Board's decision is, in turn, reviewable by the Atomic Safety and Licensing Appeal Board, by the Commission itself, and by the Courts.

A public hearing is mandatory at the construction permit stage, and, although optional at the operating license stage, a hearing would be scheduled if a person whose interest might be affected petitions for leave to intervene in the proceeding.⁵ Public hearings have been held at the construction permit and operating license stages for both Surry and North Anna plants in Virginia. In passing, the Subcommittee was pleased to note that the Attorney General's Office has participated in all phases of the North Anna licensing proceedings to represent the interests of the Commonwealth. The Subcommittee believes that the Attorney General's Office should continue its participation for this purpose in future licensing proceedings.

There is currently much controversy over whether the licensing process should be shortened. Generally, in this country it takes approximately ten years to build a nuclear power plant and get it into commercial operation, while in Europe and Japan this can be completed in about half the time. While electric utilities would like to see the process shortened considerably, opponents of nuclear energy do not favor a reduction in the licensing process.

Issuance of an operating license, and its detailed listing of license requirements, called technical specifications, do not end the NRC's responsibility. In addition, inspectors from the NRC's office of inspection and enforcement periodically visit the plant to conduct both announced and unannounced inspections.⁶

The Subcommittee was impressed with the comprehensive and time-consuming procedures designed to insure safety of operation. The Subcommittee concluded that the nuclear power industry's outstanding safety record in the U.S. can be attributed to the comprehensive licensing and regulatory system required by Federal law.

3. The Role of the Commonwealth With Regard to Nuclear Power Generating Facilities

The Subcommittee was advised by the Attorney General's Office (Annex 3) that under the Atomic Energy Act of 1954 (42 U.S.C. 2011 *et seq.*) any legislation, the primary purpose of which is to protect against radiation hazards, including those arising from the construction and operation of nuclear power plants, is within the exclusive jurisdiction of the Federal Government. Hence, with the few exceptions noted below, any law adopted by Virginia or any other state which seeks to regulate radiation hazards from such plants, or which has the effect of impairing Federal regulation of those hazards, would be preempted.⁷

Notwithstanding the general rule stated above, there are two areas of regulation with respect to radiation hazards from nuclear power facilities in which a state may regulate such hazards under certain conditions set forth in Federal law. These areas are: (1) Radioactive releases into the atmosphere from such a facility. The Clean Air Act says that a state may adopt radiation emission standards that are equally or more stringent than Federal standards. To date, the Administrator of the Environmental

Protection Agency has not issued any emission standards regarding radioactive particles, and in theory therefore, states could adopt such emission standards, subject to approval of the NRC. In practice, however, the RC has filled the gap by adopting standards limiting radioactive air emissions to levels "as low as is reasonably achievable," as that term is defined in RC regulations; (2) Transportation of radioactive materials to and from the facility. The Department of Transportation requirements preempt state regulations when there is a conflict between the two, except when the Secretary of Transportation determines (a) that the state regulations protect the public more than the Department of Transportation requirements, and (b) do not burden commerce excessively. As pointed out later in this report, the transportation of radioactive materials within Virginia is beyond the scope of the Subcommittee's study.

With regard to the State's authority to regulate radioactive emissions into the atmosphere, the Attorney General's Office told the Subcommittee that it is doubtful the State could close a nuclear power plant if the Commonwealth required radiation emission standards with which nuclear power plants could not reasonably comply. The Attorney General's Office further advised that if the Commonwealth sought to shut down nuclear power plants because they did not comply with such emission standards, it would be seeking to do something indirectly—i.e., prohibiting nuclear power in Virginia—that it could not do directly.

The Attorney General's Office further advised that Virginia may adopt emergency plans with respect to measures to be taken in the event of an accident at a nuclear power plant affecting the adjacent area.

The Atomic Energy Act of 1954, of course, does not remove from the states their traditional authority to regulate the rates and services of public utilities within their borders, even though the power supplied by the utilities is produced by nuclear power plants. In fact, Section 271 of the Act specifically reserves such regulation for state and local jurisdiction. Another section of the Act broadly preserves state authority to regulate public utilities for purposes other than protection against radiation hazards.

The Subcommittee has recently been advised by the U.S. Department of Energy (Annex 4) that President Carter's administration is currently preparing draft legislation for submission to Congress which would place increased responsibility on the states in two areas relating to nuclear power plants. As currently drafted, this legislative proposal places in the state involved, or if appropriate, in a regional body at the State's request, the determination of whether there is a need for the power to be produced by the proposed nuclear power plant. The draft legislation also provides that the states would be requested to assume responsibility for performing the environmental review with regard to the siting of a proposed nuclear plant. Only the future can tell whether any such legislation will actually be adopted by Congress.⁹

The Subcommittee also understands that the NRC has signed an agreement with the State Water Control Board to cooperate in considering water quality issues which may arise at early stages in the licensing

process for nuclear power plants in Virginia.

II. NUCLEAR PLANTS IN VIRGINIA—PROBLEMS AND PROMISES

1. Veeco's Power Generating Plants in Virginia

Virginia Electric and Power Company (Veeco) is at present the only utility which operates or plans to operate nuclear power plants located in the Commonwealth, according to the evidence submitted to the Subcommittee. Veeco now operates two nuclear power plants at a site in Surry County (Surry Units 1 and 2) each of which has a net electrical capacity of approximately 775 megawatts. Over the last several years, the two units have provided about 20-25% of Veeco's annual output of electricity. Veeco originally planned to build two additional units at this location, but has since cancelled Surry Units 3 and 4.

Veeco is also constructing a nuclear power plant complex at North Anna in Louisa County. It has received a construction permit to build four units at this site, and after a prolonged licensing proceeding, the Atomic Safety and Licensing Board recommended on December 13, 1977, to the NRC that operating licenses be granted to Veeco for Units 1 and 2. However, three days later the Board asked the Board to reopen the hearings to consider information that Veeco had failed to report promptly enough to the NRC a new potential safety problem involving computer codes used to check backup safety systems. Subsequently, the NRC staff charged that a second such problem (this one involving printed electrical circuit components) had also not been reported promptly enough by Veeco. Veeco denied that there had been a deliberate or undue delay in reporting the problems and said that established procedures had been followed in evaluating and reporting them to the NRC.

The NRC staff decision to delay issuance of operating licenses for North Anna Units 1 and 2 is not the first difficulty Veeco has had with regard to this nuclear station. As pointed out later in this report, the North Anna complex sits astride an ancient geological fault, which has been the subject of considerable controversy and lengthy hearings. A U. S. Justice Department memorandum charged, and Veeco denied, that the company improperly concealed information regarding the fault. Subsequently, Veeco was fined for making material false statements regarding existence of the fault. The company has appealed that decision to the U.S. Court of Appeal for the Fourth Circuit. According to the Atomic Safety and Licensing Board, Veeco has also been fined a total of \$79,900 on three occasions for various infractions or deficiencies in NRC standards, arising out of its construction of the North Anna Station.

Nevertheless, when the Atomic Safety and Licensing Board recommended the granting of operating licenses for North Anna Units 1 and 2 on December 13, 1977, it said that Veeco's performance in operating its first nuclear power plants at Surry and later in constructing the station at North Anna did not demonstrate that the company lacked the commitment or technical qualifications, or both, to operate North Anna

Units 1 and 2 safely and in compliance with all applicable radiological health and safety requirements. The Board also stated that Vepco's various infractions of NRC standards were not numerous or serious enough to be cause for denying operating licenses for North Anna Units 1 and 2.

epco has already been permitted to load nuclear fuel for Unit 1 at North Anna, and the company is still hopeful that an operating license will be granted for Unit 1 and that this unit, with an electrical capacity of 934 megawatts, will be in operation sometime in the first half of 1978. However, at the date this report is written (January 16, 1978) the licensing proceeding is still open. If North Anna Unit 1 is licensed and goes into operation, nuclear power will account during 1978 for about 24% of epco's total annual output. North Anna Units 2, 3 and 4, which will each have approximately the same electrical capacity as Unit 1, are in different stages of construction. Unit 2 is nearing completion, and, subject to receipt of an operating license, this unit is scheduled to go on line early in 1979. Subject to the same requirements, Units 3 and 4 are scheduled to commence operations in the late 1980's. To date, Vepco's investment in Units 3 and 4 totals about \$395 million.

All of Vepco's nuclear power plants in operation or planned for operation in Virginia are of the type which utilize and produce energy from light-water reactors. Ordinary ("light") water is used as the coolant in this type of reactor. A brief description of a nuclear power plant utilizing this type of reactor follows in the next section of this report.

2. Description of a Typical Nuclear Power Plant

The essential feature of a nuclear power plant is the reactor core, which contains uranium fuel. The fuel, in the form of uranium pellets, is contained in metal rods approximately 1/2 inch in diameter and 12 feet long encased in tubes of zircalloy or other metal. The rods are formed into bundles of between 50 and 200 rods. Each reactor contains several hundred fuel bundles, holding about 100 tons of uranium.

The energy produced in a nuclear power plant comes from a physical reaction called fission. Great quantities of heat are produced when a uranium atom is split into two parts. Besides heat, the splitting of this atom also releases one or more neutrons. These neutrons trigger the splitting of adjacent uranium atoms, releasing more heat and more neutrons. This process is termed a "chain reaction." Control rod assemblies, which absorb the free-moving neutrons, are used in the reactor core to control the chain reaction.

During a chain reaction, the heat flows outward into the casing of the metal rods holding the fuel pellets. This heat is absorbed by the reactor coolant, which flows through the steam generators to produce steam. The steam turns a turbine, which in turn, drives the generating units that produce electricity.

Light-water reactors (using ordinary water as the coolant) account for the bulk of present reactors (approximately 65) operating in the United

States. Today, these plants provide about 10% of the United States' supply of electricity. The fuel used in a typical nuclear power plant like those in operation in Virginia is a uranium fuel with a readily fissionable uranium-235 content of only 3%. This fuel cannot initiate a nuclear explosion. However, as discussed in later sections of this report, use of the fuel involves other hazards.

The basic design of a nuclear power plant includes a number of safety features intended to protect against these hazards. The metal casing around the fuel rods helps protect against fission products being released into the cooling fluid. The nuclear reactor core is housed in a heavy steel containment vessel with walls 6 to 12 inches thick. In turn, the reactor vessel is located inside the containment building, which itself is composed of metal and reinforced concrete and which could resist tremendous pressures from within.

The containment building and the other structures of a nuclear power plant are surrounded and protected by an extensive security system.¹⁰

Babcock and Wilcox, Inc., in Lynchburg, Virginia, is a major manufacturer of "new" (unused) nuclear fuel and ships fuel to a number of states across the country. The "new" fuel shipped by Babcock and Wilcox is very low in radioactivity compared to spent fuel (fuel that has been used in a reactor).¹¹

3. Radiation Risks and Safeguards at Vepco's Nuclear Power Generating Plants in Virginia

A. Meltdown

As already stated, the type of fuel used in Vepco's nuclear power plants in the Commonwealth cannot cause a nuclear explosion. While the nuclear reactor cores at these plants could, at least in theory, be subject to the type of potentially serious accident known as a "meltdown", for the reasons stated in succeeding pages, the Subcommittee concludes that the risks of such an accident are extremely low. In fact, the evidence indicates that "meltdown" accidents have not occurred anywhere in the world in the case of commercially-operated nuclear power plants of the type now in service or planned for service in Virginia. The U.S. Central Intelligence Agency has recently confirmed that on two occasions, about 20 years ago, some sort of nuclear catastrophe actually happened in the Soviet Union. Facts are not available to determine definitely what caused them, but sparse information indicates that they may have resulted from the mishandling of spent fuel. There is no evidence to indicate that either resulted from a reactor core meltdown.¹²

In theory, a "meltdown" could occur due to loss of coolant in the reactor core so that a chain reaction accelerates out of control, resulting in catastrophic overheating of the reactor core. Under these circumstances, heat levels could exceed 5,000 degrees Fahrenheit, at which point fuel elements and rods could melt together to form a molten mass which would eat its way through the concrete floor beneath the containment vessel and

into the earth underlying the plant. During this process, radioactive particle could contaminate groundwater and also escape to the surface as water or steam, leading to the introduction of radioactive particles into the atmosphere. Another hypothetical possibility would be a steam explosion caused by the intense heat of the melting reactor core, severe enough to breach the containment vessel. In either type of accident, radiation exposure could cause widespread deaths and property damage near the plant.¹²

However, Mr. Elbert P. Epler, one of the Subcommittee's consultants and an authority on nuclear reactor safety, cited an authoritative Reactor Safety Study known as Wash-14 or the Rasmussen report, sponsored by the U. S. Atomic Energy Commission and completed by the U. S. Nuclear Regulatory Commission, which found the probability of a core meltdown accident to be only one in 20,000 reactor years of operation. Mr. Epler further testified that these estimates might well be too conservative, since there will be improvements in reactor safety as power companies gain operating experience. Mr. Epler also stated that to further reduce risks to the public, nuclear power plants should be constructed in fairly remote locations removed from any population center. From this viewpoint, he felt that both Veeco's nuclear stations are situated in excellent locations—at sites which compare favorably with those of most other nuclear power plants throughout the country.¹⁴ Both the Surry and North Anna plants are, of course, located in areas of low-density population.

The foregoing Reactor Safety Study (Wash-14) contains other findings of interest: The probability determined for a meltdown accident resulting in 10 or more fatalities is about one in 3 million per plant per year; for an accident resulting in 1,000 fatalities one in 100 million per plant per year. The likelihood that a person living in the general vicinity of a reactor will be killed in a meltdown accident (assuming 100 plants in operation) is one in 5 billion per year, while the probability of being injured is one in 75 million per year.¹⁵

Dr. Carlos G. Bell, another consultant to the Subcommittee, advised members that in his opinion the likelihood of a meltdown occurring in a commercially-operated nuclear power plant within the United States was slight. He believes that such an accident may occur before the end of this century, but if so that it will most likely happen at a plant outside this country, because safety standards applied to plants in the United States are much stricter than those in effect in other countries.¹⁶

Mr. Roger S. Boyd, an official of the U. S. Nuclear Regulatory Commission, advised the Subcommittee in the course of his testimony that no member of the American public has ever received a radiation injury from the operation of a nuclear power plant licensed by the Commission or its predecessor. He testified at some length regarding the defense in depth approach adopted by the Commission to assure the safety of power reactors, concluding with the statement:

"In closing my testimony I would say, without prejudice to the conclusions NCR might reach in any individual licensing proceeding,

particularly in this case the North Anna proceeding, that we are able to conclude that nuclear power plants designed, constructed, and operated in accordance with NCR regulations and requirements are safe; that is, they present no undue risk to the health and safety of the public.

"It would be nice to be able to say that there are absolutely no problems with respect to the safety of operating nuclear power plants, that perfection has been achieved, and that all risks have been eliminated. This is not the case. The fact is that we do not live in a riskless society. Nevertheless, the risk to the public health and safety from reactor operation is extremely low. Our intention in the NCR is to assure that this risk continues to be small when compared to the other risks of life."¹⁷

B. The Geological Fault Beneath the Vepco Nuclear Power Station at North Anna

In recent years there has been considerable discussion over the degree of risk of a meltdown or other accident at the North Anna complex resulting from a future earthquake or other severe shock in the area, which would cause slippage in the ancient geological fault discovered beneath the plant.

A document submitted by Vepco sets forth the position of the company as follows:

"A massive examination of the fault was carried out by the company, its consultants, the NRC and its consultants, followed by a public hearing where the question was whether the fault made the site unsafe for a nuclear power station. The Hearing Board found that the fault was ancient, typical of thousands of such features in this area and unlikely to move during the life of the station. In short, the fault did not compromise site safety. That decision was affirmed on appeal, both within the NRC and by the U. S. Court of Appeals for the District of Columbia Circuit."¹⁸

While Dr. Bell expressed his concern regarding the construction of a nuclear power station over the fault, he conceded that the likelihood of an earthquake or fault movement was slight--in the range of one out of a thousand over the 40-year life of the plant.¹⁹

The Subcommittee concluded that this issue was properly a matter for NRC attention and that, in fact, the NRC had conducted an exhaustive study of the geological fault issue and had concluded that the fault did not constitute a safety problem.

C. Ground Settling at the Vepco Nuclear Power Plant

During the course of its work the Subcommittee learned that there has been some ground settling in the area of the reservoir and pumphouse at Vepco's North Anna site. The reservoir and pumphouse at a nuclear power

plant are of major importance, since they serve as reserve sources of cooling water.

The Subcommittee was advised that the settling of the land at the North Anna station had caused significant stress on pipes leading from the pumphouse to the nuclear plant and that some of the pumphouse pipes had begun to crack. An NRC investigation sharply criticized Vepco's engineering and said that the NRC staff could not say that the pumphouse and reservoir would perform their functions reliably. Until very recently, the question of whether the pumphouse, reservoir and pipe system would operate effectively if pressed into duty had apparently not been resolved to the satisfaction of the NRC.²⁰

Vepco has said that the problems related to ground settling have not been as serious as environmental groups and the NRC contend they are. Moreover, the company points out that modifications were made in the design of the reservoir and in the connecting piping from the pumphouse to the nuclear plant. The company contends that these modifications will enable the pumphouse and the reservoir to operate effectively if they are ever used.²¹ The December 13 recommendation of the Atomic Safety and Licensing Board that an operating license be granted to Vepco for North Anna Units 1 and 2 made it clear that the Board was satisfied on the issue.

D. Is Low-Level Radiation a Risk?

The question of what injuries to human beings, if any, are caused by low-level radiation from nuclear power plants is unresolved. Many opponents of nuclear power hold that routine radiation emissions from these plants may be highly injurious if humans are exposed to them long enough. They argue that there is no agreed-upon safe level of radiation intake for humans.²² They also cite scientific evidence to demonstrate that people exposed to low-level radiation over a prolonged period of time tend to have much greater incidences of leukemia, lung cancer, and other types of cancer.²³

Conversely, proponents of nuclear energy cite scientific views which minimize the unfavorable effects of low-level radiation and make the point that individuals are constantly being exposed to radiation, both natural and man-made. They state that in a modern society it is impossible to avoid absorbing some radiation, pointing out that there is little worry about the radiation persons receive from medical X-rays or from a cross-country airplane flight.²⁴

Dr. Robert Jackson of the State's Health Department advised the Subcommittee that, in his view, there was more risk to the public from radiation received by them because of improper use of medical X-ray equipment than from radiation emanating from nuclear power plants. He further stated that based on a number of factors, including comparison of funds spent by other states to monitor low-level radiation emissions, the funds appropriated to the Department of Health for this purpose were insufficient to permit it to protect adequately the health and welfare of the

citizens of the Commonwealth.²⁵

The Subcommittee decided that on the basis of the evidence before it, it could not conclude that low-level radiation emanating from nuclear power plants in Virginia constitutes a proven public health hazard.

E. Disposition of Spent Fuel from Nuclear Power Plants

Spent fuel from nuclear power plants consists of metal rods filled with uranium pellets as described earlier in this report. While this spent fuel is considered to be a "low-level" or relatively innocuous waste compared to other "high-level" nuclear wastes, it remains radioactive for a number of years and hence must be stored safely, so as to protect the public from radiation and possible waste fuel accidents.

If spent fuel from nuclear power plants is reprocessed, high-level radioactive waste would be compact—for example, according to one estimate, by the year 2010 all high-level wastes from all U. S. commercial nuclear reactors could be stored on a single 100-acre site. However, until April 7, 1977, there was no definite Federal decision with regard to either reprocessing or storage of spent fuel from nuclear power plants. On that date, President Carter announced his decision to defer indefinitely any reprocessing of spent fuel—although his decision is still being questioned by Congress. If the President's decision holds, storage space for nuclear commercial wastes, mounting at the rate of many metric tons per year, will have to be found within the next few years; because storing spent fuel bundles without reprocessing them requires considerably more space. At present, most spent fuel from nuclear power plants is being stored on site, but many plants are running out of space. For example, Vepco's Surry Units 1 and 2 will run out of storage space in 1983.²⁶

In October, 1977, the Carter administration unveiled a plan by which the Federal government would take title to spent nuclear fuel rods and store them in a few selected sites in the United States, probably in deep underground rock salt formations. Site selection criteria are in the process of development by the NRC with licensing of the first repository scheduled for 1981.

In the meantime, the failure of the Federal government to produce a long-term, proven solution to the disposal of nuclear wastes, particularly those wastes which are "high level" and continue radioactive for hundreds of years, continues to furnish nuclear opponents with a major anti-nuclear argument.²⁷

F. Liability for Nuclear Accidents

As mentioned earlier, in the very unlikely event of a serious accident at a nuclear power plant, injury and damage claims could run into billions of dollars. Yet under existing Federal law (The Price-Anderson Indemnification Act) the liability of a utility such as Vepco operating the plant would be limited to \$560 million. However, this law has recently been declared unconstitutional in a Federal District Court. This decision has

been appealed to the U. S. Supreme Court.²⁸

G. Security Risks

The Nuclear Regulatory Commission is responsible for assuring that nuclear power plants, such as those operated in Virginia by Vepco, have adequate security systems to protect against plant sabotage, theft of nuclear fuels or wastes, and seizures of the reactor vessel by terrorists for blackmail purposes. In this connection, the U. S. General Accounting Office (GAO) after inspecting six nuclear power plants throughout the nation, released a report in late 1976 entitled "Security at Nuclear Power Plants—At Best, Inadequate." In this report, the GAO stated that it had found (1) vast differences in the degree of protection at these power plants and (2) shortcomings in guard forces at the plants which generally reduced their effectiveness.²⁹

Subsequently, the NRC promulgated a rule establishing a performance criterion for the physical protection of nuclear power reactors which requires high assurance protection against industrial sabotage conducted by "(1) a determined, well-armed, well-trained team of several outsiders assisted by a single insider or (2) a single insider acting alone."³⁰ To achieve such protection, the rule states that the onsite physical protection system and security organization shall include, but not necessarily be limited to, the following capabilities:

(1) A physical security organization including armed guards to protect the facility against industrial sabotage.

(2) At least two barriers to protect vital equipment, illumination of all outdoor areas, isolation zones extending on both sides of the protected area perimeter to permit observation of activities on both sides of those barriers, and a bullet-resistant reactor control room.

(3) Search of all individuals, packages, and vehicles prior to entry into the protected area; escort of all but licensee-designated vehicles while in the protected area; a badge system for identification of the level of plant access authorization; escort of visitors while in the protected area; positive access control of all points of personnel and vehicle vital area access.

(4) Intrusion alarms that sound in a continuously-manned central alarm station and in at least one other continuously-manned station.

(5) Continuous communication capability for on-duty guards with each alarm station; telephone and wireless communication between alarm stations and local law enforcement authorities.

(6) A nominal force of ten guards, and armed, trained personnel immediately available at the plant to fulfill contingency response requirements, with a minimum of five guards in this response force.

The NRC required utilities operating nuclear power plants to submit revised security plans in response to this rule by May 25, 1977.³¹

Vepco advised the Subcommittee that the security programs in force for its nuclear power stations at Surry and North Anna meet and will continue to meet the requirements of the rule, including administrative controls, a well-trained and equipped security force, and extensive physical security hardware. These programs include screening and special training of employees who are authorized unescorted access to protected areas of the station; rigorous training of its security personnel; and physical security controls involving physical barriers, vehicle barriers, intrusion detection systems, closed circuit television systems, protective lighting, bullet penetration-resistant defensive positions, electronic access control hardware, bullet penetration-resistant central and secondary alarm monitoring stations, wire and wireless communications systems, and appropriate weapons for the on-site armed response force.³²

Members of the Subcommittee and their consultant, Dr. Carlos G. Bell, Jr., during their tour of North Anna Unit 1, were given a detailed briefing on security systems at this station and personally inspected these systems. The Subcommittee agrees with Vepco that a detailed description of these security programs and the equipment and personnel involved is not necessary or desirable.

The Subcommittee concludes that the level of security at Vepco's North Anna station is high and would present substantial difficulties to any hostile group seeking to penetrate the security systems.³³

H. Emergency Evacuation Planning

The Nuclear Regulatory Commission requires all nuclear power plant licensees to provide the NRC with information relating to local emergency evacuation plans. The Subcommittee believes that in the unlikely event of an accident at the Surry or North Anna power stations involving the release of radioactive materials into the atmosphere, it might become necessary to evacuate communities near the station. To meet such a contingency the State Office of Emergency Services has drawn up detailed plans based on Federal guidelines to be followed in the event of such an accident, and such plans have been adopted by Surry, Louisa and other counties near the Surry and North Anna power stations.

The Subcommittee heard from the Operations Officer for the State Office of Emergency Services and from officials representing Surry and Louisa Counties regarding emergency evacuation plans for Virginia. Under the plans, emergency evacuation actions are initiated if certain levels of radiation are detected at the power stations involving hazards to persons in surrounding communities. For instance, in the case of an accident at a nuclear power plant involving serious radiation hazards, Radiological Response Level Red would be imposed. Under this plan Vepco officials would immediately notify the local county sheriff's office and the State Office of Emergency Services regarding the radiation hazards. The county affected would then have responsibility for alerting members of the public by telephone, television, radio, helicopters, and vehicles with public address systems to evacuate threatened areas and insure that evacuation takes place.³⁴

Local emergency evacuation plans are on file in public places accessible to citizens, such as the offices of the Clerk of the Circuit Court and the main public libraries of affected counties. The Subcommittee believes that each such county must insure by publicity and other steps that such plans are readily available for the information and inspection of their residents. Such counties by appropriate measures should also insure the proper functioning of evacuation plans in the unlikely event of an emergency. The Subcommittee further believes that all counties or other jurisdictions that might be affected by radiation arising out of an accident at the Surry or North Anna sites should adopt such plans. The Subcommittee was advised that at least one county which might be affected by an accident at the North Anna power station has not done so. The Subcommittee feels that the State's Office of Emergency Services must be given authority to decide which jurisdictions near nuclear power plants in Virginia should adopt appropriate emergency evacuation plans and to require them to do so if they do not voluntarily act.

III. ALTERNATIVES TO NUCLEAR POWER PLANTS

Opponents of nuclear power argued vigorously before the Subcommittee that construction of any further nuclear power plants in Virginia should be halted. Some contended that this halt should apply even to North Anna Units 1 and 2, both near completion; others would apply the halt only to North Anna Units 3 and 4, scheduled for completion in the 1980's, and to any other nuclear plants still on the drawing board. (With the cancellation of Surry Units 3 and 4, the Subcommittee knows of no nuclear plants definitively planned for construction in the State other than North Anna Units 1, 2, 3 and 4.) For reasons stated hereinafter, the Subcommittee does not accept such moratorium suggestions relative to the construction and operation of nuclear power plants in Virginia.

Opponents urge that the loss of electric power caused by cancellation of nuclear power plants in Virginia could be made up by reducing demand for power, making more efficient use of power produced by conventional plants, and turning to other sources of energy. First of all, they urge a variety of conservation measures: insulation of buildings, improved performance of electric appliances and light bulbs, turning down thermostats, recycling of materials, etc. They also urge such techniques as peak-load pricing of electricity and off-peak water heating.³³

As to other energy sources, these include oil, natural gas, coal, solar, wind, geothermal, hydroelectric, kerogen from oil shale, ocean thermal gradients and nuclear fusion.

There is substantial evidence that conservation can save our society sizable amounts of energy, and the Subcommittee feels strongly that the Commonwealth and its citizens should take every practicable action to conserve energy. At the governmental level, Federal and State tax incentives, and revision of the State's uniform building code offer real promise to increase such savings.³⁴ Nevertheless, the Subcommittee is not convinced that conservation measures could, without serious hardships to

residents of the Commonwealth, bridge the gap between electricity demand and power available in Virginia over the next two decades if either (a) all North Anna units were cancelled or (b) only North Anna Units 3 and 4 were not built. Even under alternative (b) the Subcommittee believes that the result would likely be serious increases in future electricity prices and possibly crippling shortages of power in Virginia over coming years, with potential reductions in our standard of living.

So far as other energy sources are concerned, the Subcommittee does not believe that any of them—or all of them in combination—can become viable alternatives to nuclear power in Virginia until at least the year 2000 and probably long thereafter. Oil and natural gas will increasingly be in short supply and extremely expensive. While coal is abundant, use of this energy form has serious economic, environmental, health and safety limitations. Solar energy offers great short-range promise for water heating but use for large-scale power production appears to be many years away. The other alternatives mentioned above either cannot produce enough power to make a dent in Virginia's or the nation's need for power, or the alternatives cannot be developed for mass production of power for 20 or more years.

The Subcommittee's consultant, Dr. Carlos Bell, advised us that in his judgment the hazards and problems of nuclear power do not warrant a ban on completion of any of the four North Anna units. However, he also testified that after construction of such plants, he would favor a "pause" in the construction of any new nuclear power plants in Virginia and would favor the utilization of coal-fired plants to fill future power needs.³⁷

IV. MATTERS BEYOND THE SCOPE OF THE SUBCOMMITTEE'S

STUDY

During the course of the Subcommittee study, many matters which were of significance but outside the scope of the Subcommittee's investigation were brought to its attention through testimony and the submission of materials. Several of these are important enough to warrant mention here, although the Subcommittee did not attempt to reach any conclusions or develop recommendations regarding these matters.

I. Other Nuclear Installations in Virginia

In the course of the study, the Subcommittee learned that there were a number of other nuclear installations in Virginia which utilize various types of nuclear fuels and produce nuclear wastes. Hence the e installations may involve the same type of safety and security problems considered by the Subcommittee in connection with nuclear power plants. For in tance, the Subcommittee was told that there are a number of Department of Defense installations and naval vessels in the Tidewater area which utilize enriched nuclear fuel and produce high-level wastes.

It was advised that there are also nuclear reactors used for research at the University of Virginia and at Virgini Polytechnic Institute and State University. In addition Babcock and Wilcox Company has a fuel fabrication plant and a research center in

Campbell County, six miles from Lynchburg.

2. Transportation of Nuclear Fuels and Wastes Over Virginia Highways and Railroads

The Subcommittee discovered that both nuclear fuels and wastes are shipped over the highways and railroads of the Commonwealth. These shipments are subject to regulations imposed by the Nuclear Regulatory Commission intended to protect the public from accidents, hijackings or other hazards. If the State sought and received approval from the Federal government, these shipments might also become subject to State jurisdiction. At least one accident has occurred in the United States involving the spillage on a public highway in another state of nuclear materials understood to be relatively innocuous.³⁸ Whether such risk justifies Virginia in seeking some level of jurisdiction over shipments of nuclear fuels or wastes within its borders is a matter for future State consideration.

3. Reliability and Cost of Operating Nuclear Power Plants as Compared to Operating Plants Powered by Coal, Oil and Other Fuels

The Subcommittee heard extensive testimony to the effect that electricity produced by nuclear power plants was not, in fact, cheaper than electricity produced by plants utilizing other fuels—because of the high costs of constructing nuclear power plants, escalating nuclear fuel costs, the extent to which nuclear units, for a variety of reasons, are unable to operate reliably, and other factors. Vepco submitted extensive evidence to show that nuclear power plants are reliable and that the weighted average total cost per kilowatt hour generated by nuclear fuel is considerably lower than similar costs per kilowatt hour generated by coal or oil. Similar evidence was received by the Subcommittee from other sources.

4. Are NRC Licensing Proceedings Too Extensive and Time Consuming?

As mentioned previously, Vepco contends that the NRC licensing proceeding now required before a utility can obtain either a construction permit or an operating license for a nuclear power plant is unnecessarily lengthy and, hence, contributes substantially to the high cost of constructing a nuclear power plant. Therefore, Vepco urges that the present licensing procedure should be simplified and shortened. Opponents of nuclear power plants, on the other hand, insist that present licensing proceedings still do not adequately assure that nuclear power plants will operate properly and safely. They contend that the present licensing procedure should be retained or made more rigorous.

5. Supplies of Uranium Fuel

Opponents of nuclear power contend that there will be a critical shortage of U. S. reserves of the uranium fuel needed to power light-water reactors within the next decade or two. In rebuttal, Vepco cites estimates of the U. S. Energy Research and Development Administration that the United States has enough uranium resources and reserves to operate every reactor built in this country prior to the year 2000 for its full 40-year

operating life.

6. Problems of Decommissioning Nuclear Power Plants

Opponents of nuclear power plants point out that at the end of a plant's presumed 40-year life, portions of the plant will be radioactive and unsafe, posing hazards to the public. Vepco submitted evidence based on recent engineering studies that decommissioning of large nuclear power reactors is both technically and economically feasible and can be accomplished without safety hazards.

Respectfully submitted,

Clive L. DuVal, 2nd, Chairman

Gerald L. Baliles, Vice-Chairman

J. Harry Michael, Jr.

Edward M. Holland

C. Hardaway Marks

Lewis W. Parker, Jr.

FOOTNOTES

1. General Assembly of Virginia, Acts of Assembly: Volume 2, Session 1977 (Richmond, Virginia: Department of Purchases and Supply, 1977), pp. 1606-7.
2. Executive Office of the President-Energy Policy and Planning, The National Energy Plan (Washington, D. C.: U. S. Government Printing Office, 1977), pp. 69-70.
3. General Assembly of Virginia, Acts of Assembly: Volume 2, Session 1977 , pp. 1606-7.
4. Roger Boyd, Paper presented before the Subcommittee on October 3, 1977, pp. 2-4.
5. Ibid.
6. Ibid. , p.4.
7. Anthony Gambardella, "Statement with Respect to Preemption...", Statement written for the Subcommittee, pp. 4-8.
8. Ibid.
9. John F. Ahearne of the U. S. Department of Energy. Letter to Senator DuVal dated October 12, 1977.
10. Nuclear Power: Report of the Committee on Mines and Energy Management of the Pennsylvania House of Representatives , Bernard F. O'Brien, Chairman (Harrisburg, Pennsylvania, 1976), pp. 5-8.
11. C. DuVal Holt of the Babcock & Wilcox Co., Inc., Comments made during a telephone conversation with Subcommittee staff on November 3, 1977.
12. "Soviet Diasters Revealed by Exile," Washington Post, November 7, 1976, p. 2.
13. Pennsylvania Report , p.8.
14. Elbert P. Epler, Comments made before the Subcommittee on October 3, 1977.
15. The Reactor Safety Study , The U. S. Nuclear Regulatory Commission (Springfield, Virginia: National Technical Information Service, 1975), pp. 5,6 and 9.
16. Carlos G. Bell, Comments before the Subcommittee on October 3, 1977.
17. Boyd, Paper presented before the Subcommittee, p.8.

18. "The North Anna Fault Proceedings," Veeco statement distributed to the Subcommittee, p.1.
19. Bell, Comments before the Subcommittee on October 3, 1977.
20. The North Anna Environmental Coalition, memorandum to interested parties, January 14, 1976.
21. Statement by E. A. Baum, Executive Manager of Veeco's Licensing Quality & Assurance Department, to a staff member of the Subcommittee; December 15, 1977.
22. John W. Gofman, "The Case for a Nuclear Moratorium," Environmental Action , p.1.
23. Mary K. Meredith, Paper presented before the Subcommittee on August 16, 1977, p.2.
24. E. A. Baum, Statement submitted to the Subcommittee; September 8, 1977, pp. 1-3.
25. Dr. Robert Jackson, Comments made before the Subcommittee on September 12, 1977.
26. Joanne Omang, "Nuclear Waste Storage a Problem," Washington Post , September 23, 1977, p. A-10.
27. Ibid.
28. James B. McMillan, text of the case of Carolina Environmental Study Group V. Atomic Energy Commission.
29. "Security at Nuclear Power Plants—at Best Inadequate," by the Comptroller General's Office of the General Accounting Office, April 7, 1977, p.i.
30. Lee V. Gossick (of the NRC), Letter to Thomas J. McTiernan of the GAO; March 17, 1977.
31. Ibid.
32. E. L. Crump, Letter to Subcommittee staff; November 4, 1977.
33. Bell, Comments made before the Subcommittee on October 3, 1977.
34. Norman S. McTague, Paper presented before the Subcommittee on September 12, 1977, pp. 1-3.
35. Piper Hollier, "Some Possible Pathways Toward a Non-Nuclear Energy Future For Virginia," Paper presented before the Subcommittee on October 3, 1977.

36. Ibid.

37. Bell Comments made before the Subcommittee on October 3, 1977.

38. Margot Hornblower, "Crash Spills Toxic Matter," Washington Post , October 8, 1977, p. A-1.

ANNEX I

A BILL to amend and reenact § 44-146.19 of the Code of Virginia, relating to powers and duties of political subdivisions.

Be it enacted by the General Assembly of Virginia:

1. That § 44-146.19 of the Code of Virginia is amended and reenacted as follows:

§ 44-146.19. Powers and duties of political subdivisions.—(a) Each political subdivision within the State shall be within the jurisdiction of and served by the Office of Emergency Services and be responsible for local disaster preparedness and coordination of response. Each political subdivision may maintain in accordance with State emergency preparedness plans and programs an agency of emergency services which, except as otherwise provided under this chapter, has jurisdiction over and services the entire political subdivision.

(b) Each political subdivision shall have a director of emergency services who, after the term of the person presently serving in this capacity has expired and in the absence of an executive order by the Governor, shall be the following:

(1) In the case of a city, the mayor or city manager, who shall have the authority to appoint a coordinator of emergency services activities with consent of council;

(2) Notwithstanding the provisions of § 15.1-50 of the Code of Virginia, in the case of a county, a member of the board of supervisors selected by the board or the chief administrative officer for the county, who shall have the authority to appoint a coordinator of emergency services activities with the consent of the governing body;

(3) A coordinator of emergency services may be appointed by the council of any town to insure integration of its organization into the county emergency services organization;

(4) In the case of towns with a population in excess of five thousand having an emergency services organization separate from that of the county, the mayor or town manager shall have the authority to appoint a coordinator of emergency services with consent of council.

(c) Whenever the Governor has declared a state of emergency, each political subdivision within the disaster area may, under the supervision and control of the Governor or his designated representative, enter into contracts and incur obligations necessary to combat such threatened or actual disaster, protect the health and safety of persons and property and provide emergency assistance to the victims of such disaster. In exercising the powers vested under this section, under the supervision and control of the Governor, the political subdivision may proceed without regard to

time-consuming procedures and formalities prescribed by law (except mandatory constitutional requirements) pertaining to the performance of public work entering into contracts, incurring of obligations, employment of temporary workers, rental of equipment, purchase of supplies and materials, levying of taxes, and appropriation and expenditure of public funds.

(d) The director of each local organization for emergency services may, in collaboration with other public and private agencies within this State develop or cause to be developed mutual aid arrangements for reciprocal assistance in case of a disaster too great to be dealt with unassisted. Such arrangements shall be consistent with State plans and programs and it shall be the duty of each local organization for emergency services to render assistance in accordance with the provisions of such mutual aid arrangements.

(e) Each local and interjurisdictional agency ~~should~~ shall prepare and keep current a local or interjurisdictional emergency operations plan for its area. The plan shall include, but not be limited to, responsibilities of all local agencies and shall establish a chain of command. *Each political subdivision having a nuclear power station or other nuclear facility within ten miles of its boundaries shall, if so directed by the Office of Emergency Services, prepare and keep current an appropriate emergency plan for its area for response to nuclear accidents at such station or facility.*

ANNEX II

SENATE JOINT RESOLUTION NO. 136

Requesting a joint subcommittee of the Senate Commerce and Labor Committee and the House Corporations, Insurance and Banking Committee to study the licensing procedures for nuclear generation facilities.

Agreed to by the Senate, February 28, 1977

Agreed to by the House of Delegates, February 25, 1977

WHEREAS, nuclear powered generating stations are presently operating in the Commonwealth and additional stations are under construction; and

WHEREAS, the safe, reliable and economic operation of such generating stations is of importance to the citizens of the Commonwealth; and

WHEREAS, the proceedings for licensing the construction and operation of such generating stations by the United States Nuclear Regulatory Commission, and matters related thereto such as the safety and security of such generating stations are of interest to the General Assembly; now, therefore, be it

RESOLVED by the Senate, the House of Delegates concurring, That a joint subcommittee composed of three members each from the Senate Commerce and Labor Committee and the House Corporations, Insurance and Banking Committee be appointed to study such licensing proceedings for matters relating to the safety and security of generating stations and to consult with the State Corporation Commission and other informed sources within the nuclear field for the purpose of determining whether any action by the General Assembly is necessary or appropriate with regard to such matters.

The joint subcommittee shall report its findings to the Senate Commerce and Labor Committee and the House Corporations, Insurance and Banking Committee not later than November one, nineteen hundred seventy-seven.

ANNEX III

OFFICE OF ATTORNEY GENERAL

STATEMENT WITH RESPECT TO PREEMPTION BEFORE THE JOINT SUBCOMMITTEE ON NUCLEAR LICENSING PROCEDURES

October 3, 1977

The Joint Subcommittee has requested the Office of the Attorney General to provide its views with respect to the preemption of state regulations of nuclear power facilities by the Federal government for purposes of its study of nuclear licensing procedures. I am pleased to offer to the Committee today those views, and I thank the Committee for the opportunity to do so. The discussion which follows assumes that regulation with respect to nuclear electric generating stations is the primary concern of the Subcommittee.

BASIC FEDERAL LAW

Regulation of the uses of atomic energy began with the Atomic Energy Act of 1946 (60 stat. 775). That statute was passed at a time when the Federal government deemed it essential that information concerning radioactive materials and nuclear energy be kept secret to protect the national security. No private participation or state regulation in nuclear energy programs was provided under that act.

In 1954, Congress substantially revised the Atomic Energy Act of 1946. The Atomic Energy Act of 1954 is the basis of the existing regulatory scheme. 42 U.S.C. 2011, *et seq.* One of the primary purposes of the act of 1954 was the development and use of atomic energy for the production of electricity. S. Rep. No. 1699, 83rd Cong., 2nd Sess., p. 3. It permitted private parties to participate in the development of nuclear energy for peaceful uses, but provided that comprehensive regulatory requirements designed to protect the public health and safety must be followed. Under the 1954 Act ownership of special nuclear material remained in the Federal government, and it was not until 1964 that private parties were permitted to own special nuclear material as defined under the act.

Section 271 of the 1954 Act (42 U.S.C. § 2018) reserved for state and local jurisdiction, the traditional areas of public utility rate and service regulation. In 1959, § 274 was added to the act (42 U.S.C. § 2021) to provide that, by agreement with the Federal authorities, the states may exercise limited regulatory authority over byproduct materials, source materials, and special nuclear material in quantities not sufficient to form a critical mass. However, the section expressly prohibited the Atomic Energy Commission (AEC, now the Nuclear Regulatory Commission or NRC) from discontinuing its exclusive control and regulation of the

construction and operation of facilities regulated under the Atomic Energy Act, such as commercial nuclear power plants. Subsection k of Section 274 provided that nothing in the section "... shall be construed to affect the authority of any state or local agency to regulate activities for purposes other than protection against radiation hazards." (42 U.S.C. § 2021(k)).

The Atomic Energy Act, as amended, is the basic federal law pertinent to this inquiry today, with the exceptions which I will discuss below. Under the Supremacy Clause of the Constitution of the United States (Article VI, Clause 2), state law on the subject matter regulated by Federal law is superseded when its operation obstructs "... the accomplishment and execution of the full purposes and objectives of an act of Congress." Hines v. Davidowitz , 312 U.S. 52, 67 (1941). Congress has declared in Section 1 of the Atomic Energy Act that: "Atomic Energy is capable of application for peaceful as well as military purposes." 42 U.S.C. § 2011. Sections 2 and 3 of the act state the findings and purpose of Congress in enacting that legislation and contemplate that atomic energy will be developed, subject to requirements to protect the public health and safety established in the act and by various regulatory authorities pursuant to the act. 42 U.S.C. '§ 2012, 2013. The full purpose of Congress which the General Assembly must accomodate in any legislation includes both the development of atomic energy in the public interest and protection of the public health and safety.

The Atomic Energy Act does not purport to resolve all questions of preemption with respect to nuclear facilities. The legislative history of the 1959 amendment described above revealed that the draftsman of that legislation felt that it was "... practically impossible to try to define, taking into account all of the various gray areas and special circumstances that might arise, where these areas of preemption should begin and end." Hearings before the Joint Committee on Atomic Energy on Federal-State Relationships in the Atomic Energy Field , 86th Cong., 1st Sess., 307, 308 (1959). There can be no doubt that the Atomic Energy Act of 1954 as amended, creates an area of preemptive federal jurisdiction. Northern States Power Company v. Minnesota , 447 F. 2d 1143 (8th Cir. 1971), affirmed 405 U.S. 1035 (1972). The precise boundaries of the area of preemption were left for definition by the courts.

The question involved in the Northern States Power case was whether the state of Minnesota had authority to regulate radioactive effluent releases to water from nuclear power plants. The U. S. Court of Appeals for the Eighth Circuit held that it did not, concluding "... that the Federal government has exclusive authority under the doctrine of preemption to regulate the construction and operation of nuclear power plants, which necessarily includes regulation of the levels of radioactive effluents discharged from the plant." 447 F. 2d 1154. The Supreme Court affirmed that decision without opinion. The Eighth Circuit explained that it was the 1959 legislation which demonstrated that the purpose of Congress in the Atomic Energy Act was to give "... the sole authority to regulate radiation hazards associated with utilization facilities ..." to the federal government. 447 F. 2d 1149. The Court reached its conclusion in view of § 274 (k) which provides that the 1959 amendment shall not be construed to affect the authority of state or local agencies to regulate activities for purposes

other than protection against radiation hazards. Subsection k, it concluded, would be surplusage unless "... the Federal government possessed exclusive authority over radiation hazards ..." 447 F. 2d 1150.

Accordingly, the general principle which is established by the Atomic Energy Act is that legislation, the primary purpose of which is to protect against radiation hazards, is within the exclusive jurisdiction of the Federal government. However, Subsection k of Section 274 preserves state authority to regulate for purposes other than protection against radiation hazards. In addition, Section 271 of the Atomic Energy Act of 1954 preserves state authority to regulate the rates and services of its public utilities. The act, although it preempts legislation which is primarily for protection against radiation hazards, seeks to preserve to the state, under §§ 271 and 274, those areas of regulation which have traditionally been within state jurisdiction and which do not involve radiation hazards.

STATE REGULATION OF RADIATION HAZARDS

Notwithstanding the general rule stated above, there are two areas of regulation with respect to nuclear power facilities in which the state may regulate radiation hazards under certain conditions set forth in Federal law. These areas are radioactive releases to air, and transportation of radioactive materials to and from the facility. In addition, emergency plans may, in our view, be adopted by the state with respect to measures to be taken in the event of an accident at a nuclear power facility. Although emergency plans provide protection against radiation hazards, they do not involve constraints on the construction or operation of the facility. The plans, therefore, do not appear to fall within the preemptive area described by the Northern States Power case.

(1) With respect to radioactive effluents to air, recent amendments to the Clean Air Act provide that the term "air pollutant" under that act includes "... any physical, chemical, biological, radioactive (including source material, special nuclear material, and byproduct material) substance or matter which is emitted into or otherwise enters the ambient air." Pursuant to § 116 of the Clean Air Act which was not amended, the states may, at their option, adopt standards with respect to "air pollutants" as long as they are at least as stringent as any standards promulgated under the Clean Air Act. Since the Administrator of the Environmental Protection Agency has issued no air quality standards with respect to radioactive pollutants, the states are free to apply any standard to such pollutants except as discussed below.

A new § 122 is added by the Clean Air Act amendments and provides in part that any standard adopted by a state with respect to radioactive pollutants shall not apply to facilities regulated by the Nuclear Regulatory Commission if that Commission determines that the state standard would endanger the public health and safety. The effect of this provision appears to be that if a state chooses to adopt standards, they must be at least as stringent as existing NRC requirements.

It should be noted that existing NRC requirements with respect to the release of radioactive material in effluents during normal operation require that such releases be "as low as is reasonably achievable." 10 CFR § 50.34a(a); § 50.36a. The term "as low as is reasonably achievable" is defined to mean "... as low as is reasonably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety and other societal and socioeconomic considerations, and in relation to the utilization of atomic energy in the public interest." Numerical guidance for the compliance with this broad standard is provided in 10 CFR Part 50, Appendix I. These effluents are regulated to levels which are already very low. Accordingly, as a practical matter taking into account the state of technology, the state may have very little area for regulation between the existing standards and a standard which would require that nuclear power plants and other facilities in the Commonwealth simply cease operations.

(2) The NRC has licensing requirements for the packaging of shipments of nuclear materials. The Department of Transportation (DOT) regulates the labeling and other matters with respect to shipment of nuclear materials in NRC-approved containers. State regulations inconsistent with DOT requirements are preempted unless the Secretary determines, upon petition by the state, that such inconsistent regulations (1) provide more protection to the public health and safety than DOT regulations, and (2) do not unduly burden commerce. 49 U.S.C. § 1811. Procedures are provided by Federal regulations for the Secretary of Transportation to make such determinations. 49 CFR § 107.201.

NON-RADIOLOGICAL PURPOSES

As stated above, legislation which has the primary purpose of regulating the activity of owners and operators of nuclear power facilities for protection against hazards other than radiation hazards is not preempted by Federal law. This is true, in our view, even though the regulation may have some incidental effect upon operations which do have radiation protection as their primary purpose. At some point, however, the effect of state legislation may be to impair Federal regulation of radiation protection so as to raise the risk that, as applied, the state's statute could be held to be preempted. See, Florida Avocado Growers v. Paul, 373 U.S. 132, 142, reh. den. 374 U.S. 858 (1963).

In a recent case before the New Jersey Supreme Court, such a situation was presented. The Nuclear Regulatory Commission license conditions required a nuclear power plant to cease operations for reasons related to radiation control. The rapid termination of operation of the plant caused a fish kill in a nearby creek which, under New Jersey law subjected the utility to potential civil penalties for the fish kill. Although the Court ruled that there was insufficient causation shown between the fish kill and the plant shutdown, it went on to say that even if such causation had been proved the New Jersey statute could not be enforced because the NRC regulatory shutdown requirement preempted the state statute. State of New Jersey, Department of Environmental Protection v.

Jersey Central Power and Light Company , 69 N.J. 102 (1976). The state statute would apparently have required continued operation to avoid the fish kill and the NRC had determined that, for radiation safety reasons operation should not continue under the conditions stated in the license. Although the New Jersey statute was on its face a regulation for non-radiation hazard purposes, as applied in this particular instance it was found to be preempted.

For purposes of legislative action, it is impossible of course to foresee all the possible applications of a statute that might in the future be found to be in conflict with Federal law. In general, all that can be said is that in situations such as the case cited above, the statute itself is not preempted but its application in certain circumstances may be.

CONCLUSION

Legislation which clearly has as its only or primary purpose to regulate radiation hazards, is preempted under present Federal law with the exceptions noted above. The Commonwealth may adopt legislation with respect to nuclear facilities, the purposes of which are solely or primarily for protection against non-radiation hazards, and which does not impair the Federal regulatory program.

I thank the Committee for the opportunity to present these views, and I am available to answer questions which the members of the Committee may have. Thank you.

ANNEX IV

Department of Energy
Washington, D. C. 20585

October 12, 1977

Dear Senator DuVal:

In your role as Chairman of the Joint Subcommittee studying nuclear power plant licensing, I believe you would be interested in draft legislation currently being prepared by the Administration.

We have been working for the past several months on legislation which would improve the licensing process for nuclear power plants. Several segments of this draft legislation bear directly upon the Federal-State role, an issue in which I believe your committee is particularly interested. I believe the legislation that is finally submitted will include increased responsibilities for the states in at least two specific areas: determination of need-for-power and environmental reviews. As currently drafted, the legislative proposal places the determination of the need-for-power at the state level or, if appropriate, in a regional body at the state's request. A major section of the draft legislation addresses mechanisms by which the requirements of the National Environmental Policy Act (NEPA) can be fulfilled by the states. The states would be requested to take responsibility for as much of the NEPA requirements as possible, under a procedure developed under guidelines established by the Nuclear Regulatory Commission.

Both of these provisions would increase what we believe to be appropriate state roles in determining the need-for-power and performing the environmental review for siting of nuclear plants.

When a final form of the legislation is ready for transmission to the Congress, I will send you a copy.

Thank you for your interest.

Sincerely,

John F. Ahearne

Honorable Clive L. DuVal, 2d
P. O. Box 749
Arlington, Virginia 22216

