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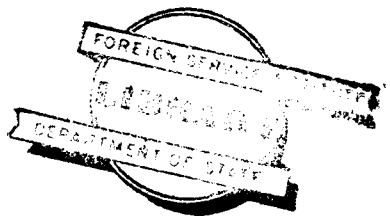
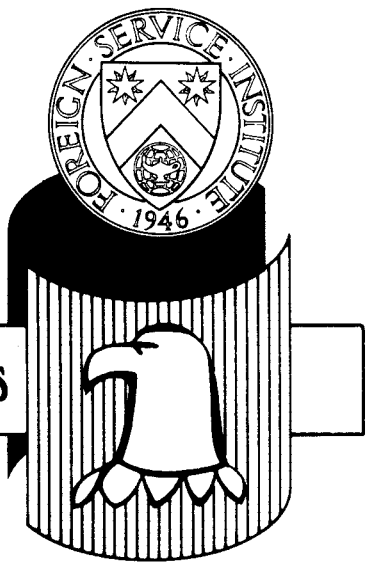
NUCLEAR POWER ON TRIAL





TWENTY-FIRST SESSION

EXECUTIVE SEMINAR IN NATIONAL AND INTERNATIONAL AFFAIRS

DEPARTMENT OF STATE

1978-79

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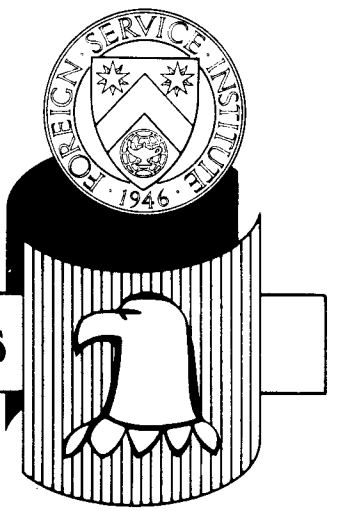
NUCLEAR POWER ON TRIAL

A Case Study by RICHARD ST. F. POST



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SUMMARY

The nuclear accident at Three Mile Island plant No. 2 in Londonderry Township, Pennsylvania, which began on March 28, 1979, has been termed the "worst civilian nuclear mishap the U.S. has had."[1] It has attracted world-wide attention, since the United States' decisions in the nuclear field may affect the plans of other countries to continue or to start to meet some of their energy needs through nuclear power. A number of countries have sent nuclear experts to provide first-hand reports to their governments, while others have relied on their embassies in Washington to furnish appraisals of the event and its consequences.[2]

The following case study takes the form of three reports to his government by a diplomat stationed in Washington, submitted some two weeks after the accident. To enhance the objectivity of the accounts, the imagined writer is not a nuclear expert but a political observer, detached from the controversy over nuclear power in the United States both by nationality and by training.

The first report provides an assessment of the probable consequences of the Three Mile Island accident and an analysis of the factors which will be important determinants of the future of nuclear power in the U.S. The conclusion reached is that there will continue to be electricity generated by nuclear power plants in the U.S., but that the future of the industry is clouded. The second report traces the growth of nuclear power as a political issue in individual states in the U.S. with an analysis of the factors present in localized situations which may influence the development of the issue on a national scale. The report concludes that nuclear power will probably retain its present level of support but that the previously neutral Americans will now move into the ranks of those who question whether nuclear power is worth the risks, real or potential. The third report assesses the lessons of Three Mile Island for foreign countries having or contemplating nuclear partnership with the U.S., concluding that the U.S. is likely to prove an even more unreliable partner than it has already proven in the past.

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Washington, D.C., 13 April, 1979

Nuclear Power in America after Three Mile Island

On the eve of the accident in the nuclear reactor at Three Mile Island, Pennsylvania, the future of the nuclear industry in America was already in some doubt. The reasons were primarily economic: reduced demand projections for electricity, lengthening lead-times for plant construction, rising costs. There was also mounting political opposition, albeit localized, which was broadening its sphere of activity from courts and regulatory hearings to town meetings, state-wide initiatives, gubernatorial elections; it was winning some victories and extending its constituency from the liberal fringe toward the political center. Three Mile Island vastly increased public awareness of the issues involved with nuclear power: many of the concerns previously raised by nuclear critics became reality--or very nearly so--in front of a nation-wide audience. The credibility of the industry and, to a lesser extent, the government, both of which had assured the American public that nuclear power was safe, was shaken by the incident.

Nuclear Power to Continue--Under Pressure

Three Mile Island does not mean that the end of nuclear power in America is at hand, although it has obviously intensified the pressures against it. Americans are too pragmatic to forego the benefits of nuclear power, particularly at a time of energy crisis (real or imagined) and certainly not when the associated risks seem acceptable. Three Mile Island revealed to many, who had considered nuclear power to be perfectly safe, that it does, in fact, have catastrophic potential, but also that its risks are not unmanageable: although it was the worst nuclear accident in U.S. history, no immediate deaths or serious injuries resulted. That feeling is likely to prevail, at least until it is established as fact that the low-level radiation released by the accident causes serious damage over the long run (one ghoulish entrepreneur in the area is selling T-shirts bearing the slogan: "I survived Three Mile Island ... I think").[3] To provide that portion of America's electrical energy contributed by nuclear power (12.6% in 1978)[4] no substitute source is immediately available except environmentally harmful coal and embargo-endangered imported oil (Americans seem so obsessed by the danger of an embargo that they fail to see the advantage of being able to burn up the energy of other countries while holding their own in reserve as a hedge against the future). Furthermore, leaping to extreme solutions such as a ban on nuclear power is

alien to the character of mainstream America, especially when many of those advocating that course have long hair, smoke pot, follow odd lifestyles, and also advocate an end to nuclear weapons (which looks to mainstream America like unilateral disarmament and smells of Soviet inspiration). Furthermore, any effort to impose a nuclear ban would founder against the inertial force of powerful vested interests, massive investments and installed infrastructures. The same obstacles would confront any effort to switch from the prevalent pressurized water reactor (PWR) to another type of fission reactor (even if the truth were generally acknowledged that the PWR, a stretch version of a nuclear submarine's power plant, is not necessarily ideal for generating 1,000 megawatts of electricity).[5] Under present circumstances, America's existing nuclear plants can be expected to continue to generate electricity, albeit under much more careful public scrutiny and more stringent governmental control.

Effect on Utilities and the Nuclear Industry

However, for the time being and for perhaps the next several years, it seems likely that the recent near-moratorium on new reactor orders by utilities, down from a high of 41 in 1973 to 2 in 1978[6], will become complete. While one of the factors which has slowed nuclear expansion, declining projections of future electrical consumption, may improve somewhat, other factors affecting costs are likely to worsen in the wake of Three Mile Island: Increased interventions in the regulatory process; litigation; civil disobedience; political pressures at federal, state and local levels to stiffen regulations, impose unattainable conditions on plant construction and operation, restrict transport of nuclear materials, etc. Developments may require an upward revision of cost estimates for temporary storage and eventual permanent disposal of radioactive wastes, as well as for decommissioning of plants. There may be increased resistance to the passing on of unforeseen costs, such as those caused by accidents, to ratepayers. With the prospect of these uncertainties and complications ahead, utilities requiring new central station capacity will be more inclined to invest in coal-fired plants. Utilities with nuclear plants in early stages of construction may decide to postpone or suspend work on them until they have a clearer idea of how long the current political heat will last and what additional costs it is likely to generate (by the end of 1978, 48 of the 92 plants under construction were less than 25% complete while another 16 were from 25% to 50% complete).[7]

There will undoubtedly be pressures to close down existing plants, but such efforts are unlikely to achieve more than temporary shutdowns while new safety devices are installed. It is possible that some utilities might close older plants to cut their losses if the Nuclear Regulatory Commission were to require major and expensive retrofits of safety devices (as happened in 1977 when the Consolidated Edison Co. of New York closed its oldest plant, Indian Point 1, rather than retrofit an expensive Emergency Core Cooling System, a safety feature not required when the plant was commissioned in 1962).[8]

More acrimonious and uncertain as to outcome will be the inevitable controversies over whether work should be stopped on plants in the middle to final stages of construction. The utilities will probably be able to win most such battles, but not without cost, in terms of time, money, and the ever-increasing politicization of nuclear power.

The four companies which manufacture nuclear plants--Westinghouse, General Electric, Combustion Engineering, and Babcock and Wilcox (the latter being the manufacturer of Three Mile Island)--have a combined capacity to produce 25 to 30 reactors per year. The 92 orders left after the 12 cancellations in 1978 were estimated to represent close to five years' work for the companies. Even so, prior to Three Mile Island, the companies were said to be in serious financial difficulties with one or more likely to have to abandon the nuclear business.[9] If a moratorium on new orders were to follow the accident, that would be bad enough for them; if in addition there were to be a substantial reduction in their back-log of old orders, they could be forced out of the business unless exports picked up markedly, which seems most unlikely.

Another cost which the industry seems fated to bring upon itself is decreasing political support. Until a muzzle was put on them several days into the incident, industry spokesmen invariably downplayed the crisis (even questioning if the event should be so termed), overplayed the company's ability to handle the situation, and gave reassurances which were immediately contradicted by the Nuclear Regulatory Commission and ultimately by the facts.[10] Their critics' portrayal of them as money-grubbers, interested only in profits, insensitive to public concerns was repeatedly confirmed throughout the incident by statements and actions by the Three Mile Island operator, Metropolitan Edison. They earned the prize for insensitivity when they announced that they would refuse to pay their pregnant employees who had failed to show up for work because they had heeded the advice of the Governor of Pennsylvania to evacuate the area.[11] That decision was subsequently altered, but the damage, of course, was done. The industry's public relations have also not been helped by allegations that the plant was rushed into operation before the end of 1978 in order to qualify for tax benefits of some $40 million and for a rate increase worth close to $50 million per year; adding insult to injury, the rate increase was announced by the Pennsylvania Public Utilities Commission the day after the Three Mile Island accident.[12]

Reaction of the Administration

The Carter Administration is thrown into something of a dilemma by Three Mile Island. Candidate Carter in 1976 said that nuclear power should be the energy source of last resort. President Carter in 1977 brought a halt to America's breeder and reprocessing programs, and he has appointed a number of nuclear critics to key positions in his Administration. Candidate-for-re-nomination Carter faces one clearly anti-nuclear rival for the 1980 Democratic Party nomination, California Governor Brown, and one potential rival who

is tilting in that direction, Senator Kennedy.

However, candidate-for-reelection Carter cannot be unmindful of the fact that recent polls show a growing trend toward conservatism, the area on the political spectrum where most support for nuclear power is to be found. That may be one reason why his actions following Three Mile Island have been supportive of the industry. Certainly his April 1 visit to the stricken reactor at the height of the crisis had that effect.[13] He has since specifically endorsed Energy Secretary Schlesinger's announced intention to resubmit legislation, on which Congress failed to act last year, designed to shorten the licensing procedures for new nuclear plants by, inter alia, limiting interventions by nuclear opponents. Giving that endorsement in his April 10 press conference, President Carter went on to state that "there is no way for us to abandon the nuclear supply of energy in our country in the foreseeable future."[14] It would clearly have been damaging to Carter's current top priority effort to convince the country of the existence of an energy crisis had he shown any hint of an inclination to do without the source of 4% of the nation's total energy and close to 13% of its electricity. It is unclear if Carter's press statement was in any way related to the resignation the next day of the National Security Council advisor on nuclear matters, Jessica Tuchman Matthews, who has a reputation as a critic of the nuclear power industry.

Carter's present support for nuclear power is not inconsistent with his reprocessing and breeder positions, although it does conflict somewhat with his "last resort" statement. His current views are certainly consistent with what one might expect from an ex-nuclear engineer. His apparent confidence in reactor safety may well derive from the fact that he suffered no ill effects in 1952 when, as a member of a U.S. Navy team, he helped to disassemble the melted down core of the NRX nuclear reactor in Chalk River, Canada.[15] That harm-free personal experience with radiation undoubtedly fed his reported annoyance at what he considered to be media exaggerations of the dangers at Three Mile Island.[16]

Incidentally, describing that Canadian incident in 1975, Carter wrote that, "So far as I know, only one nuclear reactor (the NRX) ever went out of control."[17] It is unclear whether Carter was aware at that time of such other pre-1975 nuclear accidents as those at the EBR-1 reactor at Idaho Falls in 1955, the Windscale, England, reactor in 1957, the NRU reactor back at Chalk River in 1958, the Fermi reactor near Detroit in 1966[18] or whether he considered them of lesser magnitude than the NRX.

The Nuclear Regulatory Commission (NRC) will undoubtedly be making headlines by imposing new safety requirements on nuclear plants and will thereby hope to overcome criticism of past laxity highlighted by Three Mile Island. Earlier this year the NRC started to alter the pro-industry image it had inherited from its predecessor agency, the Atomic Energy Commission. In January, it endorsed a critique of the 1975 Rasmussen report which had been extensively quoted by industry to buttress their claims of reactor safety. On March 13 the NRC ordered five nuclear plants closed pending correction of a defect in their ability to withstand earthquakes, a move considered an overreaction

by industry but hailed by its critics. While the NRC may be inclined to be strict with the industry, initial indications are that any White House tilt will favor the industry rather than its critics.

Congressional Reactions

The Congressional picture is likely to be substantially different. The previous sole Congressional watchdog on matters nuclear the Joint Atomic Energy Committee, was abolished in 1977 under pressure from nuclear critics who contended that the Committee's 18 members kept all nuclear matters to themselves and invariably supported the industry. Scrutiny of nuclear affairs in Congress is now greatly expanded: seven different committees in Congress, not counting the two Appropriations Committees, have a role, with some 60 Senators and 180 to 200 Congressmen involved. Among the principal actors are Senator Gary Hart, who heads the Environment and Public Works Committee, and Congressman Morris Udall, chairman of the House Interior and Insular Affairs Committee and its Energy and Environment Sub-Committee. Both are considered to be critics of nuclear power. Both have announced hearings into the broad range of nuclear issues, with Udall having indicated that his hearings could last a full year. The Administration's resubmitted licensing bill is likely to be extensively worked over in Congress, which will undoubtedly look very closely at restrictions on intervenors, whose past representations have led to important safety changes (e.g. the emergency core cooling system).[19] Administration efforts to secure passage of a bill to facilitate a start on storage sites for nuclear waste will also be worked over to ensure Congressional monitoring of the program and also to prevent it from becoming another form of subsidy to the nuclear industry. An effort may be made to require that licensing of any new nuclear plants be contingent upon satisfactory waste disposal arrangements, which could represent a de facto freeze on licensing. Efforts may also be made to raise or remove the $560 million liability limit for nuclear accidents set by the Price-Anderson Act or to mandate a test of the constitutionality of that act, which was originally passed in 1957 when it became apparent that insurance companies would not, without such a liability limitation and government participation, provide insurance coverage for nuclear plants (in the absence of which, of course, none would have been built).[20] These and other possible initiatives will require Senators and Congressmen to take positions as either supportive or critical of nuclear power, but particularly those who are nuclear critics will want to avoid having a nuclear issue presented as a straight yes or no vote on nuclear power. The anti-nuclear position is still sufficiently out toward the liberal fringe to induce caution among politicians who recognize that straying too far from the center is risky in American politics. This may change under the impetus of the aftermath of Three Mile Island, but such changes take time.

The likelihood that the nuclear industry is headed for a difficult year in Congress is indicated particularly by the initial reaction to the accident from Senator J. Bennett Johnson, who heads the Senate Subcommittee on Energy Conservation and Regulation. Considered by the nuclear industry to be one of their staunchest

supporters, Senator Johnson predicted that Three Mile Island "could lead to an agonizing reappraisal of our use of nuclear power."[21]

Conclusion

Three Mile Island may go down in history as the beginning of the end of nuclear power in the U.S.A. It may, on the other hand, be remembered as the event that proved that nuclear plants are safe enough to withstand even a most unusual series of human and mechanical mishaps. Whether or not nuclear power is in the next decade restored to respectability (and even the waning hope for the breeder revived) will depend on a number of factors:

(1) Can the President, the Nuclear Regulatory Commission or any other governmental or non-governmental entity gain the trust of the American people as a reliable, unbiased authority on nuclear power? When, in 1953, President Eisenhower launched his Atoms for Peace program (designed in part to make America's Atoms for War more respectable), it was hard for many Americans to believe that the technology that had produced the atomic bomb could produce electricity. But they accepted it, because President Eisenhower gave his word. A quarter century later, their critical faculties made wary by Vietnam and Watergate, the American people are considerably less inclined to take even presidential words at their face value. For the Nuclear Regulatory Commission to free itself of its pro-industry reputation will require some time and an established record of actions reflecting strictness with the industry. It may be that some unique entity will be needed, conceivably modeled after the Keystone Radioactive Waste Management Discussion Group, which has brought together representatives from industry, academia, and environmental and other public interest groups, to work out among themselves a framework for solving waste disposal problems. The American public would seem to be doomed to the confusion of hearing diametrically opposed views from equally qualified experts unless some such source of unbiased advice is made available.

(2) Can the industry and the scientific community devise the technical means to satisfy the American people, particularly the responsible critics of nuclear power, that solutions are available to the industry's four major problems?

(a) The Major Accident Potential: The Presidential commission set up to investigate the Three Mile Island accident is charged with the task of finding means to ensure against repetitions of that incident. Its major task will be to establish its independence and competence, and thereby its credibility.

(b) The Hazards of Low-Level Radiation: The controversy over what constitutes permissible exposure to radiation (currently set for workers in nuclear plants at 5,000 millirems per year, or up to 12,000 millirems in exceptional circumstances[22]) will be extensively aired in Congressional hearings. The Administration is considering the establishment of an inter-agency group, chaired by the Department of Health, Education and Welfare, to supervise all radiation health research programs. A plan is also being considered to establish an inter-agency group headed by the Environmental Protection Agency to coordinate nuclear radiation regulations. The outcome will probably follow past patterns, i.e., a reduction of the permissible exposure levels.

(c) Safe Disposal of Nuclear Wastes: An interagency review group report published in March 1979 recommended that efforts proceed to investigate a number of different methods of long-term waste disposal, not just vitrification and burial in salt deposits, and that a variety of sites be identified for testing purposes.[23] States and localities selected are likely to resist designation as the nation's nuclear garbage dump. If federally owned land cannot be located for this purpose, the politically hazardous course of federal preemption may have to be considered.

(d) Diversion of Fissionable Material for Purposes of Terrorism or Nuclear Weapons Proliferation: A report is expected later in the year from the International Fuel Cycle Evaluation group which, it is hoped, will produce recommendations providing greater assurance that plutonium and other fissionable materials produced by reprocessing spent fuel or by breeder reactors can be adequately safeguarded. So-called "safeguards" at present consist of International Atomic Energy Agency inspections which may not only be ineffective but might induce a false sense of security.[24]

(3) Can research into alternative sources of energy present the American people with convincing, viable options to continued or expanded reliance on nuclear power? While there are many reports which sound promising about such limitless supply energy sources as solar power, especially for home heating and cooling, and hydrogen for transportation[25], these are matters requiring scientific and technical assessments beyond the scope of this report.

(4) Will growth in public awareness of the issues involved with nuclear power expand the political constituency opposed to or at least skeptical about nuclear power, or augment its supporters, and to what extent will nuclear power be made into a political issue, locally and nationally? (A report on this subject follows separately).

Other factors could affect the outcome. Another Arab oil embargo might quickly convince most Americans that they had no choice but to accept the risks of nuclear power. The same result might occur if it were firmly established that the "greenhouse effect" caused by carbon dioxide emissions would have disastrous effects on the climate if combustion of fossil fuels were not halted. On the other hand, another accident of the magnitude of Three Mile Island, especially if fatalities resulted, could, in fact, be the beginning of the end to nuclear power generation in the U.S.A.

Washington, D.C., 14 April, 1979

Nuclear Power as a Political Issue in the United States

The physical principle that every action has an equal and opposite reaction has operated with respect to nuclear power in the United States: the growth in nuclear power generation in the 1970's (61 of America's 72 plants started operating in the '70's)[1] has been accompanied by a growth in political opposition to nuclear power in that decade. Heretofore confined to particular states or localities, the nuclear power issue has now been projected onto the national political scene by the Three Mile Island accident. Even discounting the fact that the present perspective must necessarily be limited and that the present atmosphere is highly charged on the negative side, the likelihood is that dominant public attitudes in the United States toward nuclear power are in the process of changing from tolerant/supportive to questioning/skeptical.

The Growth of Opposition to Nuclear Power

Scarcely noticed by the population as a whole, who remained confident of the safety of nuclear power and who considered its critics to be too "far out" to merit serious consideration, political movements opposed to nuclear power were springing up in various parts of America in the 1970's. Branching out from court and regulatory intervention action, where even their losses were counted as gains in terms of delaying and increasing the costs of nuclear plants, the anti-nuclear forces began in the mid-1970's to utilize the formal political processes available at the state and local levels. Again, initial losses were counted as gains in terms of resultant heightened public awareness.

By the end of 1978, nuclear opponents had registered political successes in a number of states. While anti-nuclear initiatives in seven states were defeated in 1976,[2] the obtaining of sufficient signatures to have these proposals placed on the ballot represented an advance for the anti-nuclear forces, who additionally claim to have been surprised and pleased by the extent of voter support they achieved despite their losses. In one of these states, California, anti-nuclear political pressure was already sufficiently powerful to induce the legislature to pass laws just prior to the 1976 initiative vote which had the effect of imposing a moratorium on new nuclear plant construction.[3] At least two other states have reportedly followed California's lead.[4] In another 1976 initiative, Missouri voters by a two-to-one margin opposed the use in that state of the procedure called Construction Work in Progress (CWIP). CWIP enables utilities to increase rates to consumers in order to finance power plants while under construction (and therefore before the rate-payers are using any

electricity generated by those plants).[5] CWIP was the major issue in the gubernatorial election in 1978 in New Hampshire where the victory by the CWIP opponent has been claimed as a vote against nuclear power.[6] Also in 1978, initiatives were passed in Hawaii and Montana imposing such rigid conditions on licensing of nuclear plants as effectively to ban them.

Visits to and analysis of the factors operating in California, Montana and New Hampshire lead to the following conclusions which may affect the spread of anti-nuclear sentiment nationally:

> Need for nuclear power: Where doubt can convincingly be cast on the need for additional electric power and/or for its generation by nuclear rather than alternative energy sources, voters can be persuaded that they need not accept the associated risks, even without being totally convinced of the reality of those risks.

This was clearly the case in Montana, which has no nuclear plants (though some of the electricity it receives from the Bonneville power grid is nuclear-generated), does have very extensive coal supplies and some hydro-electric power and has no imminent need for expanded electrical production.

A better case for the need for nuclear power could be made in the case of New Hampshire, which is located in "the section of the country (New England) where nuclear technology probably has the greatest economic advantage over coal."[7] However, New Hampshireites have learned to be leery of the electricity demand projections of the state's main utility company, Public Service Company of New Hampshire, which is building the Seabrook, N.H. plant: in 1972, the company estimated a demand increase of 9% per year for a decade; in 1978 those estimates dropped to 6.5% per year; however, 1978 estimates by the New England Power Pool for the region as a whole range down to 2.2% per year.[8] Whether or not New Hampshire voters were aware of the latter projections and of the existence of "significant excess generating capacity" in the region,[9] skepticism about the need for more electricity in the state may well have been at the back of their minds, even though that was not an issue in the gubernatorial campaign.

Doubt about the need for additional, especially nuclear-generated power in California was apparently in the background of the state legislature's 1976 decisions although that was, again, not the issue. The laws it passed imposing a moratorium on new nuclear plants were reportedly designed to pre-empt the ground of the initiative going to the voters which was much more drastic and would have closed existing plants. However, even the pre-emption goal would not have induced the legislators to vote the moratorium if they had had any serious worries about the state's future electricity supplies.

Nationally, there is likely to be skepticism about the extent of the energy crisis and consequently the need for increasing the nation's electricity supply, particularly that generated by nuclear energy. At the same time, the national audience will be more sympathetic to arguments that the nation must grow to be healthy and

growth requires energy (although the past assumption that a given percentage increase in Gross National Product (GNP) required a similar increase in energy consumption was disproved in 1977, when GNP rose 4.5% but energy consumption rose by only 2.3%.[10] As to whether future increases in electricity supply should come from nuclear or other energy sources, economic considerations before and, even more so, after Three Mile Island have made it highly questionable whether nuclear plants still enjoy a comparative advantage over coal-fired plants.[11] Of critical importance to the question of the need for nuclear power will be the extent to which domestic hydrocarbons and alternative energy sources can be developed.[12]

> Economic gains or losses: Where voters can be convinced that nuclear plants will either not bring them any measurable benefits or will result in personal economic costs to themselves, they can be persuaded to register negative votes even when they are otherwise favorably inclined toward nuclear power.

No nuclear plants were either under construction or planned for Montana, so that passage of its Initiative 80 cost the electorate neither electricity nor jobs.

Opposition to the prospect of having to pay electricity rates now to help the Public Service Co. of New Hampshire finance future generating capacity (which might not even be consumed in New Hampshire or by today's rate-payers) was the main reason New Hampshire voters defeated pro-CWIP incumbent Republican Governor Meldrim Thomson and elected anti-CWIP challenger Hugh Gallen. Apparently many traditionally Republican voters swallowed hard and voted for Democrat Gallen both to avoid increases in their electricity rates and also to prevent what in their minds came close to socialistic intrusion into their economic freedom.

In California, the potential loss of jobs in nuclear construction was too miniscule a factor to worry the legislators, who also could be confident that California would not suffer in the future for lack of electricity (skeptics might point out that this confidence was possible because California will be able to draw on power to be generated in the future by the five Palo Verde nuclear plants planned for commissioning between 1982 and 1990 just across the border in Wintersburg, Arizona).[13]

On a national level, the issue of personal costs is likely to be focussed on the extent to which tax dollars have been used in the past or will be in the future to, in effect, subsidize the nuclear industry. Federally legislated liability limits for nuclear plants, federal research made available to industry, increasing rates to consumers to cover accident costs, the burden of costs of waste disposal and plant decommissioning--these could prove to be the national equivalents of CWIP. Businessmen, mindful of the actual and especially the potential damage to business concerns in the Three Mile Island area, will be inclined to think twice before supporting the construction of nuclear plants anywhere near their own businesses.

Control over own destiny: Electorates can be expected to want to have the final say themselves on issues as important to health, safety and well-being as nuclear power, rather than being forced to live with the results of decisions made by outsiders and/or made largely on the basis of corporate profit; electorates may be influenced by resentment at what is perceived as outside interference in their affairs.

On of the most attractive attributes of Montana's Initiative 80 for that state's voters was the fact that its approval would empower Montana voters to approve or reject any future proposed nuclear power facility to be sited in the state. This was the aspect given greatest emphasis by supporters of the initiative, who pointed out that Montanans would otherwise have little say in whether a major nuclear plant were to be built in the state (shortly before the vote, press reports revealed that Fort Peck, Montana, had almost been selected in 1948 for the federal EBR-1 breeder reactor which went instead to Idaho Falls, Idaho: in 1961 three workers were killed by radiation in an accident there).[14] The initiative gained when its supporters could point to the fact that outsiders and money from outside the state were involved in the campaign to defeat it. With a considerable amount of their funds coming from out-of-state corporations, opponents of the initiative outspent proponents 20 to 1. Debates prior to the vote pitted Montanans favoring the initiative against nuclear engineers brought in from out-of-state.[15] A letter-writing campaign to editors of Montana newspapers also backfired: all the letters sent by the campaign's organizers to the editor of The Missoulian were not only from Idahoans, but, whatever the address of the writer, were all postmarked "Pocatello." The Missoulian declined to print any of them on the grounds that only local residents' comments on local affairs should be published in local journals.

The issue of local control was also in the background of the legislative decisions of 1976 in California. In case after case, utilities forged ahead with plans or proceeded with construction of nuclear plants on sites which had been found to be on or uncomfortably near to geological faults. At Bodega Head, 60 miles north of San Francisco, six years of efforts by area residents were required to convince the California utility, Pacific Gas and Electric (PG&E), that it should abandon plans for a nuclear plant at the site which was only a few thousand feet from the San Andreas fault.[16] Local citizen action also brought about the closing of the Humboldt Bay reactor in 1977, built by PG&E directly on top of a small but potentially active fault.[17] Citizen group action to prevent the operation of nuclear plants in close proximity to faults continues with respect to Diablo Canyon plants 1 and 2, now awaiting NRC operating licenses following earthquake-proofing alterations which resulted from citizen pressure, and San Onofre 2 and 3 in San Clemente due to open in 1981 and 1983, respectively.

In New Hampshire, part of the political skirmishing over the nuclear issue has been at the level of the town meeting. In

that forum, the citizens of Seabrook, N.H., endorsed the idea of having a nuclear plant in their town when it was originally presented to them in 1968. By 1976, however, a small majority of the voters was opposed to a construction permit for the plant. Again in 1977 a Seabrook town meeting voted a ban on transportation of radioactive materials within the town limits, and seven nearby townships joined in votes negative to the Seabrook nuclear plant. The next year, a Seabrook town meeting voted not to sell any more water to the utility for use in constructing the nuclear plant, the anti-nuclear majority by that time exceeding 4 to 1.[18] Court orders have nullified these anti-nuclear votes and will probably be used to nullify efforts now under way to secure township votes that would require that the transmission lines from the Seabrook plant be buried under ground. However, continued frustration of the centuries-long democratic tradition of the New England town meeting will increase local resentment toward nuclear power.

Nationally, this local-control issue is likely to compound so-called "grass roots" pressures on Senators and Congressmen whose constituents' views of national nuclear issues will be colored by local issues. More important is the likelihood that national objectives in the nuclear field may clash with local feelings. This has already been evident in New Mexico, long a willing host to nuclear activities, where considerable opposition has grown up to challenge federal plans to site a Waste Isolation Pilot Project near Carlsbad. Another past willing host to things nuclear, South Carolina, is beginning to feel edgy: on April 11, the state's Health and Environmental Control Department turned back a shipment of radioactive waste from Three Mile Island destined for the temporary waste storage facility at Barnwell (which was also to have been the site for a reprocessing plant until President Carter stopped the program).[19]

> Political incapacity of the industry: Industry can be counted upon to take actions which will harm itself politically either through inadvertence or because it is by nature more responsive to immediate corporate financial considerations than to somewhat longer range political factors.

In California, utilities have persisted in plans for nuclear reactors on sites near to faults despite the adverse publicity such persistence brings them. Presumably, to them the costs of abandoning the investment they have already made of stockholders' funds outweigh the political costs of proceeding. PG&E's persistence may be understandable in the case of a Diablo Canyon, where discovery of the fault came at an advanced stage in plant construction. However, similar persistence for six years at Bodega Head, where the utility's costs were limited to land acquisition and some excavation, seems politically obtuse, particularly when such utility attitudes contribute to political acts harmful to the industry as a whole, such as the 1976 moratorium.

In Montana, one of the most helpful factors for the supporters of the initiative against nuclear plants in the state was the decision by Montana Power Company to throw its weight against it. Montana Power is the largest company in the state and thereby represents big business. To most Montanans, who recall the bad old days when the then-largest company, the Anaconda Copper Company, controlled the state economically and politically for years, big business means pursuit of company interests to the neglect and detriment of individual citizens' rights and welfare. Had Montana Power stayed out of the fight, the initiative would not have attracted as much attention as it did. By openly opposing it, and by securing funds for the campaign from corporations outside the state, Montana Power stimulated the anti-big business vote and the anti-outsider vote, as well as provoking suspicions of its own motives (why would Montana Power, which has no nuclear plants and claims to have no plans for any, be so concerned?).

The New Hampshire case provides perhaps the most egregious example of a utility's political ineptitude. Public Service Co. of New Hampshire's preferred candidate for Governor was campaigning in favor of CWIP on the grounds that the company needed the financial help CWIP would provide if it was to be able to meet the state's presumed needs for electricity from the Seabrook plant. As the political campaign headed into its last month, the company raised its stockholders' dividend by 12.7%. Presumably this was intended to support a stock issue the company planned to float the following month. Whether or not it had a beneficial effect on the stock offering, it ensured the defeat of the company's candidate for Governor.[20]

The peculiar knack nuclear utilities seem to have for being their own worst enemies politically was demonstrated for a national audience during the Three Mile Island event. The refusal of the company, Metropolitan Edison, to pay its pregnant female employees for the period they were absent from work after having been urged to evacuate by the Governor is only the most piquant of a series of company political blunders.[21] Since the nuclear utilities face increased costs, they presumably will not invest in the services of expert political and/or public affairs advisors--which is probably just as well since the advice of such experts would probably have to be ignored if it conflicted with management's business judgement.

> Avoidance of a yes-no vote on nuclear power: In the present climate, if a nuclear issue were presented to voters as a direct choice between continuation or termination of nuclear power, nuclear power would win.

In both Montana and California in 1976, the issue put before the voters, albeit in overcomplicated and abstruse language (especially in California), was in fact whether or not to ban nuclear power in their state, which in California would have meant closing down the three plants then in operation. The voters' answer was no to the ban by a wide margin in both states. The Montana nuclear critics learned that lesson. Despite the fact that their Initiative 80 imposed

Herculean conditions on any eventual nuclear plant operator, they defeated in court an effort by their opponents to have the initiative officially labeled a ban on nuclear power and, by the result, apparently succeeded in defeating similar efforts on the hustings. In New Hampshire the issue did not arise since both candidates favored nuclear power despite their differences over its financing.

The first electoral test of nuclear power in the post-Three Mile Island era was in Austin, Texas, where a bond sale to finance the city's share of a four-city nuclear project passed in a close vote April 8, despite predictions that the effect of Three Mile Island would cause its defeat. The pro-nuclear victory resulted in large part because of a last-minute media campaign in support of the vote by the city's mayor, Carole McClellan. She is particularly popular with women voters among whom, polls had shown, anti-nuclear sentiment had been growing. There were other local factors to explain the outcome which does, in any case, bear out the contention here that nuclear power will win straight yes/no votes in the present climate.

The Safety Issue

Spokesmen for the nuclear industry constantly, and quite rightly, point to the extraordinarily good safety record of the commercial nuclear industry: as of 31 December 1978, U.S. commercial nuclear reactors had accumulated 463 years of operating experience[23] without a single fatality.* They contrast this, again quite rightly, with the annual toll in death, injury and disease which the American public suffers from other energy sources, such as coal.[24]

Given these facts, it does not seem rational for obsessive fears about the hazards of nuclear power to persist among Americans, but nonetheless they do. Those fears, plus perhaps an admixture of guilt complex, keep the image of a mushroom cloud in the background of Americans' consciousness about nuclear matters. In contrast to known hazards from coal, such as black lung disease, with which Americans have lived and from which they have died for generations, the hazards of radiation have the extra menace of being new, unfamiliar and seemingly especially insidious given such possible effects as birth defects and genetic damage.

In recent years nuclear critics have paid less attention to reactor safety as such than to the hazards of low-level radiation, waste disposal and proliferation. This was apparently due in part to the industry's excellent safety record and also because of the conclusions of an exhaustive Reactor Safety Study, in 1975, the so-called Rasmussen Report, which found that the likelihood of a major reactor accident was extremely remote.[25] A series of events in the first three months of 1979 re-focussed attention on reactor safety

* The fatalities mentioned earlier at the Idaho Falls, Idaho, plant occurred not in a commercial reactor but in a federally-owned and operated experimental breeder reactor.

as well as a host of other nuclear-related problems:

- - On January 18, the Nuclear Regulatory Commission (NRC) withdrew "any explicit or implicit past endorsement of the Executive Summary" of the Rasmussen Report, accepting the critical findings contained in a review group report (the so-called Lewis report).[26] This weakened one of the principal props to support the claim of reactor safety.

- - Also in January, controversy erupted over what should be done, and paid for by whom, about a shut-down reprocessing plant at West Valley, New York, where a sizeable quantity of high- and low-level wastes were awaiting final disposition.[27]

- - In February, the press reported the discovery in Denver of radioactive emissions from waste dumps left over from the days when radium was used for cancer treatment and for luminous watch dials.[28] Homes had been built over some of the tailings.

- - On March 6, jury selection began in Oklahoma City, Oklahoma, in the case of Karen Silkwood, a former worker in a nuclear fuel plant, whose family was charging her employer, the Kerr-McGee Company, with negligence resulting in Miss Silkwood's contamination by radiation. The company claims that Miss Silkwood, an anti-nuclear activist, had deliberately contaminated herself to incriminate the company. The case had sinister overtones: Miss Silkwood had been killed in a car accident in 1974 as she was driving to meet a New York Times reporter, allegedly bringing with her documents proving safety violations by the company (none of which was found). A dent on her car was cited as indicating that she may have been forced off the road by another car.[29]

- - On March 8 a previously-classified federal report was made public revealing for the first time that residents of southern Nevada and Utah had been exposed to radiation levels higher than considered safe following atmospheric nuclear bomb tests in 1958.[30] The government had not informed the residents of the dangers. Higher than normal leukemia rates occurred among those residents.

- - On March 9, the Progressive, a magazine in Wisconsin, was prevented by a court order from publishing an article providing details on the manufacture of a hydrogen bomb.[31]

- - Also on March 9, police in New Hampshire and Massachusetts arrested 155 people conducting a civil disobedience protest against the movement of a reactor vessel to the Seabrook nuclear plant.[32]

- - On March 13 an interagency review group published its report to the President in which, inter alia, it raised some question as to whether vitrification and burial in salt should, as previously assumed, be accepted as the best method for radioactive waste

disposal.[33]

- - On March 13, the NRC ordered five nuclear plants to shut down within 48 hours pending correction of a defect in the plants' ability to withstand an earthquake. This action both demonstrated determination on the part of the NRC to ensure plant safety even at the expense of millions of dollars worth of electrical generation, and also confirmed critics' contentions that the possibility of human error compromised claims to plant safety.

- - "The China Syndrome," a film about an imaginary accident in a nuclear reactor, was released nationwide on March 15. It pulled together many of the strands of nuclear criticism, casting particular doubt on reactor safety, and preparing a national audience for its real-life embodiment, which occurred less than two weeks later.

The Three Mile Island "event," as such accidents are euphemistically termed in the nuclear trade in America, provided the crescendo toward which the nuclear debate had been building. The inherent drama of the event, the enhanced audience created for nuclear news by the preceding series of nuclear happenings, and the absence of major competing news stories all combined to ensure that the Three Mile Island affair became one of the most heavily reported media events in recent memory. It dominated the press, television and radio news for over two weeks, a sustained media coverage rare in the U.S. A Gallup poll completed twelve days after the event found that 96% of the people polled had heard or read about Three Mile Island, a remarkably high proportion.[35] The extent of the coverage and the fact that the nation confronted what seemed to be an imminent catastrophe for days make it probable that the public memory of the Three Mile Island as a near-disaster is likely to persist for some considerable time.

The accident has vastly increased awareness and understanding of a host of terms, concepts and issues pertinent to nuclear power. It has certainly jolted any complacency that may have existed about reactor safety and the possibility of human or mechanical error. On the other hand, it probably introduced many Americans for the first time to the somewhat reassuring knowledge that an accident in a nuclear plant will not and can not result in a mushroom-cloud type explosion. But if the mushroom cloud has gone, it has been replaced in the American subconscious by the equally-menacing symbol of Three Mile Island: the four looming carafe-shaped cooling towers clustered around the reactor building on that ill-fated island. Nuclear power has now irreversibly become a national political issue in America. Three Mile Island put it there. The zealous anti-nuclear activists, for whom the issue is "the moral equivalent of war," will ensure that it stays there, and they may, in areas targeted for new nuclear plants, be joined in their protests by their ideological antipodes, the local business community, fearful of what might happen to their businesses if another Three Mile Island were to occur.

Conclusion

Again and again, Vietnam recurs in interviews and in the literature concerning the nuclear power debate in America:

- - Anti-nuclear activists are denigrated by their opponents as being former anti-Vietnam-war protestors "and that sort of person;"

- - The anti-nuclear activists take pride in having inherited the anti-Vietnam-war mantle and are confident that their cause, like that of the Vietnam protestors, will eventually prevail;

- - The Washington Post editorializes that the credibility gap between the public and government/industry over Three Mile Island is analogous to "the Vietnam syndrome;"[36]

- - Congressman Udall warns, with respect to reliance on nuclear power, that what might be wrong, "as in Vietnam, is persisting in a mistake when you see you are going down the wrong road."[37]

Such analogies are clearly inexact and can be misleading. While there is a menacing aura about nuclear power, it is not killing any, let alone thousands of Americans. The alleged benefits of the Vietnam involvement were intangible and difficult to define--something to do with the over-used "national interest"--while the benefits of nuclear power are as tangible and obvious as the nearest light switch.

Nonetheless, opposition to nuclear power has made significant political advances in the past few years. In parts of the country where nuclear power has become a local political issue and where, as a consequence, awareness of the issues involved went beyond the zealots at either extreme, the resultant enhanced public consciousness has swelled the ranks of those opposed to or skeptical about nuclear power. Now that Three Mile Island and its attendant sustained national publicity have made nuclear power into a national political issue, repetition on a national scale of the pattern observed in several states will lead to a realignment of attitudes, to the relative disadvantage of nuclear power. While the ranks of nuclear proponents will probably hold, the ranks of the opponents/skeptics will increase. A Gallup poll taken after Three Mile Island tends to confirm this expectation: a majority of Americans still feels it is important to develop nuclear power to meet future energy needs; however, the percentage of those who favor a cutback in nuclear plant operations until stricter safety regulations can be implemented has grown from 40% in a 1976 survey to 66% now; the number of those who would object to having a nuclear plant near their homes has gone from 45% to 62%.[38]

At the risk of belaboring the Vietnam analogy, Three Mile Island may prove to be nuclear power's Tet: a victory for the safety of the technology despite an egregious series of human and mechanical failures; but a psychological and political defeat.

Washington, D.C., 15 April, 1979

U. S. Reliability as a Nuclear Partner After Three Mile Island

Discussions of this topic with diplomatic colleagues lead to the following conclusions:

Prolonged uncertainty must be expected by those countries which are, or contemplate becoming America's nuclear partners. In the absence of overriding policy concerns, it would seem unwise for others to delay efforts to ensure their own energy futures against the hope of being able to rely on America in the future. Both past experience and the possibility that America will emerge from its nuclear debate as a crusading opponent of nuclear power argue against reliance on the U.S. by those who feel their future energy needs must include nuclear power.

Having convinced the world of the superiority of its pressurized water reactor over other, probably safer, designs, the U.S. in 1974 closed its books to further orders for enriched uranium required to fuel the reactors its companies had sold abroad. Having convinced the world that the inefficient use of fuel by the pressurized water reactor could be offset by reprocessing spent fuel and recycling the recovered fissionable uranium and plutonium, the U.S. imposed a moratorium on its own reprocessing and put pressure on others either not to reprocess or at least not to recycle the recovered fissionable products. Having convinced the world that the pressurized water reactor was merely a bridge to the breeder after which there need be no future worries about fuel supplies for electrical generation, the U.S. put its own breeder reactor program in a holding pattern and is urging others to go slow.

The order books on enriched uranium are again open and the fear is understandable that proliferation of nuclear weapons might follow plutonium production through reprocessing or by the breeder. Nonetheless, it is also understandable that others would not want their fuel supplies to be hostage to domestic American politics, that others, lacking America's uranium reserves (not to mention coal and other energy sources) should bridle at the suggestion that they should forego not only the limitless fuel available from the breeder, but even the extra 20% to 30% recoverable through reprocessing their spent fuel. This is particularly true when that suggestion carries with it the implication that they are not to be trusted with plutonium.

It seems unlikely that the results of the International Nuclear Fuel Cycle Evaluation will be such as to reinstate the plutonium cycle and the breeder in America's nuclear good graces. The most that

can realistically be hoped for is that the U.S.A. will not oppose reprocessing by its European allies and will not stand in the way of the use of the resultant plutonium for breeder research. Over the longer term, the Americans might be induced to amend their Non-Proliferation Act at least to remove some of its inflexibilities and the ex post facto nature of some of its provisions.

However, to the record of American unreliability with respect to nuclear power must now be added uncertainty as to the direction of even America's domestic nuclear program. It seems unlikely that America will abandon the pressurized water reactor technology. Too much is at stake in terms of existing plants, planned plants and America's international prestige. It is probable that most or all existing plants will continue and many, possibly most of those on order will be completed. However, America demonstrated in Vietnam that it is prepared to forfeit even a huge investment in lives and money if domestic pressures rise too high. That is not by any means an immediate prospect with respect to nuclear power, but the anti-nuclear constituency is zealous and growing, not unlike what happened with regard to Vietnam. Over the long run, it cannot be ruled out that nuclear power will come to a standstill in America. This is, admittedly, the bleakest of scenarios, but it is not an incredible scenario. Prudent policy of other countries will accept it as possible and plan accordingly.

Since it is quite possible that additional reactor orders will be cancelled by American utilities in the course of this year, there may well be a buyer's market available for foreign buyers. However, such purchases should be approached with some caution. If the pessimistic scenario suggested above should come to pass, it is not impossible that the United States will embark upon a world-wide campaign to end reliance on nuclear power. In that case, it can be expected to bring pressure to bear in the first instance on countries relying on it for spares, fuel or technology. It could make its overall bilateral relations with other countries hostage to what it then considers acceptable nuclear behavior, just as it has done in recent years with regard to human rights.

Under the circumstances, wisdom dictates that other countries take steps now to free themselves from reliance on the United States for nuclear supplies or equipment. Fortunately other supplier countries are now available.

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