WHITE PAPER XIX

OUR MARBLE HILL PROBLEM

Prepared for Save The Valley, Inc., a Not-for-Profit Kentucky Corporation licensed in Indiana, Box 813, Madison, Indiana 47250. July 4, 1982.

by

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The light dove, cleaving the air in its free flight, and feeling its resistance, might imagine that its flight would be still easier in empty space.

Immanuel Kant
Crique of Pure Reason

The idea that liberty means freedom from limitation rather than freedom to choose our limitations is a particularly dangerous delusion for the overcrowded inhabitants of a rather small planet.

Sir Geoffrey Vickers

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Introduction

In this introduction we offer certain personal opinions: In the rest of this White Paper we shall be as strictly factual as possible, with conclusions based on these facts.

The status, circumstance, posture of Public Service Company of Indiana [PSI] and their Marble Hill Project as it exists now, in late 1982, can be stated quite simply:

"WE Have a Problem"

The "WE" consists of PSI, the Public Service Commission of the State of Indiana [PSC], and the rate-payers of the PSI service area who may be represented by the initial and persisting intervening non-profit organization Save The Valley [STV] as well as by several other citizen (i.e. non-governmental) organizations including the Paddlewheel Alliance [PA], the Citizens Action Coalition [CAC], which includes a number of other organizations of a similar non-governmental type, the Indiana Public Interest Research Group [InPIRG], and the Indiana Sassasfras Audubon Society [ISAS].

In the present circumstances there is no sense in taking adversary positions because:

THIS IS A NO-WIN SITUATION.

Nobody, not PSI, PSC, STV, PA, CAC, InPIRG, ISAS or the apathetic public can "Win." But likewise, all, together, may and possibly will, lose much more than would be necessary if we do not apply good sense to:

OUR MUTUAL PROBLEM.

First, let us calmly state and assess the factual situation with respect to the Marble Hill Project. We do not try explicity to assess blame. It is too late for that to be profitable (if it ever was). Instead we stick to as non-divisive a program as possible, realizing that this is our mutual problem. We ask, concerning our problem as it exists

today:

"WHAT ARE THE FACTS?"

A clear statement of facts should give us a rational basis for equitable solution of our mutual problem (suggested at the end of this White Paper). Of course, we do not propose to present all possible aspects of our problem in this Introduction. More is offered in the factual body of this White Paper: there facts are documented. What we endeavor to do is to present the most definitive and overriding facts. These show clearly that we are faced with a situation in which no-one can win and all can lose greatly. Perhaps, however, the facts may give rational insight into, and suggest ways to:

MELIORATE AND PERHAPS SOLVE OUR PROBLEM.

Let us repeat, as seriously as we can: "This is a no-win situation!" Of course, sophistries may be dragged in to rescue conventional thinking "well, we could win by not losing as much as we might have," and so on. But this present exigency is no time for sophistries.

Broadly speaking, the situation as we in STV assess it is this:

Marble Hill Project is partially built.

At least $1.5 billion has been invested in its construction and PSI is spending about $1 to $1½ million per day on the project.

At the same time energy, financial, regulatory and demographic climates have made it more and more clear that Marble Hill is not needed.

In terms of the energy climate, PSI has presently some 40 to 42% excess capacity. This will go up to 62% when their Gibson #5 comes on line, and the situation is not factually altered if they sell to their present customers part of the plant. Any excess capacity is a burden on rate-payers if the idle plant must be paid for and maintained.

Financially, PSI is required to raise capital at high rates of interest under progressive derating of its bonds, and now for its First

Mortgage Bonds and Preferred Stocks, to BBB+ or less.

The regulatory climate has permitted PSI a sequence of rate increases. Each of these, assessed in real dollar value, has correlated with decreased use (decreased demand for power) in a relation well-documented under the name of "price elasticity." As demand has decreased, need for excess capacity has decreased. But at the same time, what with borrowing for Marble Hill, and decreased rate-payments, repeated new rate increases are called for. Thus is constructed a no-win, downward spiral for the protagonist PSI and the other actors in this tragedy: PSC and the rate-payers.

The demographic climate is complex, but seems to indicate clearly, according to the latest figures from the U.S. Commerce Department's Office of Business Economics and Economic Research Service [OBERS], that Indiana is suffering an out-migration of people (to the South and Southwest), a slower population growth than the national average. Thus puts added pressure on PSI's financial returns from their service area, steepening the no-win spiral. Further, the present PSI rates are higher than those in neighboring regions, and so as they escalate further, we must expect that industries will be loth to settle in this area. Still another factor that exacerbates this doleful picture is the increasing tendency of industries (and now more and more private groups) in the face of excessive rates, to generate their own power as of yore, and so remove themselves from the PSI roster of customers: in fact, even adding to PSI's capacity.

There are, of course, a number of other factors which further complicate the picture. Social, political, cultural, economic, technological, environmental, and philosophic considerations have been brought forward from time to time. These will not be discussed in the body of this White Paper except cursorily as they festoon or hang from

a fact. Here we merely mention them for the record of complexity.

Perhaps the most misunderstood social factors are jobs and dislocations. Farmers who have been improving and nurturing their land, for several generations, especially, but also newcomers, see their families dislocated and their land expropriated, without recourse, for an unneeded plant. The community is invaded by a huge temporary work force. Relatively few jobs are provided for local people since the major need is for specialized and highly trained workers. Thus the local communities are disrupted and many new problems arise, such as need for school space, sanitary facilities, police and fire protection. These needs previously in reasonable equilibrium, now rear their undesired heads.

Political problems intrude in the form of regulatory agencies of an appointive and discretionary nature, such as the Indiana PSC is; taxes, the local take from which may be exaggerated in magnitude, and short term in beneficial effects; and so on.

Cultural problems may be suggested only; the shift from a quiet, rural environment to an industry-centered one, with attendant noise of construction; increased traffic at shift-change; neighbors with different values; etc.

Economic effects of the plant may not be as beneficial as expected. During construction the large numbers of workers come from nearby cities. They do their shopping and banking mostly at home. If the plant goes into operation only a few families settle nearby. The industry is so tremendously cost-intensive that these few jobs may represent an investment of 5 to 10 million dollars each. In other industries, such as light manufacture, e.g. the building of solar heaters, the investment per worker may be many orders of magnitude less. Further, it is surely economic idiocy to have to pay so dearly

for a power plant and then, in addition, pay for expensive plans so we can run for our lives in case of an accident.

Technological factors were touched on in connection with self-generation of power (cogeneration). We may call attention to a few other important ones. As lessons are learned, as from the Three Mile Island disaster, changes in design and in construction materials were made and should be incorporated in later plants. However, Marble Hill is described as a replica of the Byron-Braidwood plant of Commonwealth Edison, and one wonders whether reactor vessels and fittings, ordered years ago, have incorporated the new and improved technology learned later. Besides, given the inherent high flux of neutrons and other nuclear breakdown products it may be technologically inherently infeasible to build a safe plant economically.

Environmental factors are not discussed in this White Paper only because they seem to play little role in evaluating the plant. That there is continuous release of radiation, and that there is no lower limit below which radiation is not harmful to life; that wastes are produced of high toxicity and long life; that the plant itself must be embalmed after its short useful life and guarded for centuries, is met with virtual silence by those who make the corporate decisions.

Philosophical considerations are usually not discussed in connection with nuclear power by its decision-makers. It does, however, seem immoral, unethical, and philosophically unsound to pollute the earth with man-made radioactive poisons, laying upon unborn generations for thousands of years, the necessity for dealing with them. Further, the increasing amount of fissionable material (i.e. plutonium) that is a byproduct of the fission-power cycle raises the specter of illicit use, and more exigently that of "security" which can make the Nuclear Regulatory Commission [NRC] into an autonomous "police state."

So much for a relatively calm statement of the present situation with regard to PSI's Marble Hill Project. We feel, however, that a few less-objective comments may serve to underline the concern with which we rate-payers face the future of PSI and the un-ease that has followed the "preliminary report," at a hearing, made by Mr. Lewis J. Perl, National Economic Research Associates,,Inc. [NERA]. NERA was hired by the PSC, ultimately at our expense. It may be recalled that this is the same firm that testified for PSI at the ASLB hearing.

This White Paper is written as the date approaches when the Indiana Public Service Commission will have to decide whether or not to encourage Public Service Indiana [PSI] to continue their collison course to a foreseeable NO-WIN situation, and possible financial meltdown.

This no-win situation will come about when PSI have spent so much on the unnecessary Marble Hill Project that they will have reached so high a rate-base level that outraged customers will rebel. Rebellion can take many forms but its effect will be to decrease PSI's revenue. This require higher rates, would be followed by further revenue decrease in the spiral of no-win.

The Public Service Commission will be called upon by consumer groups and their own sense of fairness as well as their pragmatic political reason to think the unthinkable (to them!).

We are faced with a classic case of a "whited sepulcher" in modern dress.

The sepulcher is the Marble Hill Project. It is whited by reams of printout from an obedient computer that prints what it is told to print.

Let us justify this harsh opinion and so explain the odor of morbidity that surrounds the case.

PSI is on a collision course with a NO-WIN outcome and potential financial disaster.

But PSI has repeatedly been warned, bluntly as well as implicity. Specific facts are in the White Paper below.

In the 1977 hearings before the Atomic Safety and Licensing Board of the Nuclear Regulatory Commission [NRC] held in Madison, Indiana, Save The Valley [STV] consulting engineer Fred Hauck told the Commission and PSI that projections of need were exaggerated and faulty, and that Marble Hill was not needed. "Marble Hill" is shorthand for the "Marble Hill Nuclear Generating Station Units 1 and 2, Docket Numbers 50-546 and 50-547 of the NRC," presently under construction by "Public Service Company of Indiana, Inc. [PSI]."

Now we know that Fred Hauck was right. Every year, in the PSI Annual Report, forecast need has been reduced until it is <u>below</u> what Fred Hauck predicted for 1985 need. It will remain below his 1977 predictions for the rest of this century.

At these same hearings Dr. Gustave Linenberger of the Atomic Safety and Licensing Board by skillful questioning of the PSI president brought out quite clearly that PSI had no real idea of the special requirements of constructing a nuclear plant.

Here again a warning was clearly implied.

Once again, when in 1979 shoddy concrete and piping work construction was brought to the attention of the NRC, and the safety-related work was shut down for over-one-and-a-half years, Dr. Linenberger's concerns were proven justified; PSI had had another warning.

Still other warnings came from STV, as it became still more obvious that the plant was not needed. STV asked why rate payers should be required to pay for building and maintaining an unneeded plant <u>and</u> at the same time to pay for plans to run for our lives in case of an accident.

PSI was warned when Standard & Poor's derated their bond offerings. Now, recently (August 19, 1982) First Mortgage Bonds and Preferred Stock offerings have been further derated to BBB+. This is a severe and objective warning.

The plant is not needed. PSI is reportedly currently spending one to one-and-a-half million dollars per day on this unneeded project.

PSI's course, if pursued, would triple or quadruple their capital investment, to increase their already excessive capacity by 50%.

Today (September 1982) PSI has unused excess capacity between 40 and 50 percent. When Gibson Unit No. 5 comes on line in October of this year the PSI excess capacity will go to 60 to 62 percent. One Marble Hill unit would take it to a fantastic 90 percent and two to an incredible 120 percent.

As we wrote, PSI is heading on a collision course with financial disaster. They are approaching an eventual no-win situation.

As rates go up (if they are allowed to) use will go down as customers switch to cheaper gas for heating and even lighting.

As rates go up, industries will be repelled from Southern Indiana. Those already here will consider generating their own power, as they used to do.

As rates go up revenue will proportionately go down, requiring more and more rate increases.

At the same time we customers will be required to pay for idle power plants and for their maintenance.

The "unthinkable" that the Public Service Commission must approach is to refuse to place unneeded and exorbitant expenses in the rate base, a decision other Public Service Commissions have made in similar circumstances.

The Public Service Commission will be asked to decide to turn

off the tap of rate raises that in effect reward and condone what seems clearly to be incompetent top management behavior.

The unthinkable that the Public Service Commission will be asked to think is that rational and just action of this kind may lead to financial collapse of PSI if they do not abandon Marble Hill immediately.

For if they lose this automatic rate-base increase they will find it even more difficult to raise money; to mortgage our future.

If Marble Hill were stopped now, our rates might go up only 30 to 40% instead of tripling or quadrupling if the project is completed.

If PSI were to spend themselves into financial disaster it would not mean black-outs, except possibly for scare purposes.

What it could mean is that towns, cities, and rural cooperatives presently served by PSI would exercise their statutory rights to buy out the company at bargain rates, excluding the useless, unnecessary Marble Hill property (which could be turned into a novel amusement park--think of the rides!) and operate it through a consortium under new top management for the consumers.

In this period of severe economic stringency and increasing pressures on consumers the Public Service Commission has the opportunity and responsibility to act with courage in the clear interest of the public.

Courageous action of the Public Service Commission, were they to think the unthinkable, could mark the resurgence of Southern Indiana. Industries driven away by soaring rates for electric power would gain confidence to settle in Southern Indiana. Home owners might return to using electricity for heat and light confident of protection by a truly demonstrably Public Service Commission. Those about to move out might remain. The political effect on voters would be incalculably good.

The present situation in the utility industry recalls what took

place a century ago in the railroad industry: railroads were grossly overbuilt; stock was manipulated; vast fortunes were accumulated for a few persons. Finally, the bubble burst. Hundreds of thousands of small shareholders were destroyed. The railroads have not yet recovered from this debacle. Overbuilding in the electric utility industry can have a more sinister outcome because in addition to stockholders, the environment can be destroyed.

Turning to the rate-payer aspect of OUR problem, we must recognize that if Marble Hill were to be built, rate-payers would face continuously escalating rates. One can, indeed, predict that our present 6 to 8¢ per kilowatt-hour rates would go to 20 to 25¢ per kilowatt-hour if both Marble Hill units were constructed and put in the rate base.

These figures flow from a conservative estimate of the cost of Marble Hill (see below) together with the requirements for servicing the accumulated debt and paying if off, and the inability of PSI to sell excess power, especially at the high rates that would eventuate.

Clearly, the rate-payer has a stake in solving OUR problem.

We turn next to the parlous state into which PSI has worked itself. Because of the nature of the matter--we have expressed some opinions in this introduction--we shall turn to factual data, and let the facts themselves cry out, and rebel in the mind of the reader.

It will, we expect, become evident that PSI is the protagonist in this tragedy which we see as OUR problem, and that PSC and the rate-payers are actors in it. It will, we hope, become evident that the only recourse of all actors and the protagonist is to treat the matter as

OUR PROBLEM.

Initiation of the Marble Hill Project.

PSI president Hugh A. Barker, in a statement before a House of

Representatives subcommittee gave the following information about the initiation of plans for Marble Hill.

Load studies in 1970 were interpreted to show that additional generating capacity in addition to its "six steam electric generating stations. . . one hydroelectric generation station and 15 rapid start internal combustion engines" (1) would be needed by 1982 and 1984.

Preliminary studies completed in 1971 located 23 available plant sites, with three found most acceptable. A review of these by "an independent environmental consultant" in 1972 and 1973 found the Marble Hill site in Jefferson County Indiana to be the preferred site.

The nuclear project was publicly announced in November, 1973, Sargent & Lundy Engineers were chosen, and in 1974, Westinghouse was selected to supply the nuclear reactors.

During 1975 applications to the NRC and environmental and safety statements were processed.

During 1976 licensing proceedings and prehearing conferences, together with issuance of a Final Environmental Statement by NRC took place.

Environmental hearings before the NRC Atomic Safety and Licensing Board [ASLB] in the early part of 1977 led to the issuance of permits to do limited work.

A full construction permit was issued on April 4, 1978.

Justification by Forecast: Foresight Ignored.

In its justification of the need for Marble Hill, PSI projected growth rates of 7.1% and 8.2% per year for summer and winter peak demands (2). (The peak demand occurs, usually for a few hours only on one day in summer and one day in winter.) In the same place (2) the NRC staff suggested rates of 5.4% and 6.5% respectively.

Mr. Fred Hauck, from STV, pointed out a grave defect in these

projections: both PSI and NRC Staff had assumed compound growth, while the data submitted by PSI were actually better fitted by a linear curve at 156.6 megawatts [MW] per year, which approximates 4.12% though not compounded (3).

After careful study of relevant factors Fred and Dan Hauck concluded that future growth would fall within the range of 3.1 to 4% annually (4).

After this estimate had been made (5) Westinghouse Electric Corporation released a forecast of 4.12% annually for the remaining quarter of this Century (6). Later Dr. Alvin Weinberg's Oak Ridge Energy Institute came out with an indicated annual growth rate of 4% (7). The Ohio River Basin Energy Study [ORBES] gives figures from which it can be calculated (8) that if both national electricity consumption and GNP can be assumed to grow together annually at 4%, then Indiana's growth rate will not depart from this rate by more than 0.08%, that is, to 4.08% annually.

Further, the Haucks (4), pointed out that it was logical that constraints (beginning to operate on peak growth elsewhere) could bring growth to less than 4%. Such constraints are of two classes: those under control of the utility--such as time-of-day pricing and higher industrial demand charges--and those operating in the rest of the economy. These latter include the fall in use which goes inevitably with increased rates, more efficient appliances, more self-generated power, decreased population growth, and other factors. In total, these constraints might easily reduce the growth-rate by 30%.

At this time, also, it was evident that there was no shortage of electric power in the PSI region. A study by The Ohio Power Siting Commission (9) found that "electric demand has not grown [in Ohio] while the capacity to supply power has continued to increase. As of the the end of 1975, most Ohio utilities have sizeable excess capacity."

Moreover, the situation was regional. In the East Central Area Reliability Council [ECAR, to which PSI belongs] "at the time of the 1975 summer peak, generating reserves was in excess of 40% of total capacity" with new plants still coming on line.

The Report continued: "Nationwide, the growth in electric energy demand in 1975 will be less than 2%. As a result, an overcapacity situation presently exists in much of the country. . . ." (9)

In January 1978, in an open letter to Mr. Hugh A. Barker, president of PSI, Save The Valley wrote (10):

> Every indicator, from growth estimates of around 4% annually in peak demand, to projections of stable population in the region, or actual out-migration [. . . (11)], tell us that the proposed Marble Hill plant is not needed. With the Gibson units coming on line PSI should have adequate power to serve, with a 20% cushion, until the 1990's at least. If rational conservation were promoted, the plant may never be needed.

We have rehearsed this published factual information (only a small part of the mass of data) in order to show that PSI management should have been adequately warned, in 1977, 1978, not to undertake the Marble Hill Project. Prudent Management would have had repeated opportunity to stop Marble Hill construction and cut our losses since then.

Is Marble Hill Capacity Needed?

The answer to the question of need hinges upon two factors, each of which is complex: (1) demand by consumers, and (2) capacity of the producer.

The producer, being a monopoly given many accompanying privileges, also has responsibility to make reasonable efforts to provide electric power demand by consumers.

Historically, the demand curve of a utility that serves industry, commerical customers, and residential needs, consists of peaks of high demand and valleys of low. Valleys come at off-peak hours such as spring and autumn nights. Peaks come during times of high demand such as during the day when industries and commercial offices are open; when people are washing, cooking with electricity, heating water; and during hot hours of the day in summer--the summer peak--and in very cold weather in winter--the winter peak.

In general, a utility likes to operate at around 80 to 85% of peak capacity. The extra 15 to 20% is to allow leeway for unusual demand: severer than usual weather, shutting down machinery for maintenance and replacement, and other contingencies.

Fifteen percent to 20 percent leeway--excess capacity--is considered adequate. But as power companies go to gigantic units (1000 to 1200 MW) they become nervous about even 20% leeway. This is because a breakdown or shutdown of a huge unit may remove a sizeable part of their producing capacity. In a letter to Fred Hauck, former Chairman Blanchard of PSI listed 17% to 20% as adequate PSI reserves.

In August, 1976, Mr. Fred Hauck made an analysis of PSI's own data on demand-growth rates (12).

In this conclusion he wrote "The data presented here indicate serious doubt that there is urgency in beginning construction of new generator capacity at Marble Hill."

Mr. Hauck pointed out that PSI's coal-fired hydro and standby capacity, together with that under construction could be expected to be adequate until about the year 1995. Further, he pointed out that the drop in demand related to rate increases--a well-studied phenomenon called "price elasticity"--could well obviate any need whatever for the Marble Hill Project.

At the hearings Save The Valley attempted to introduce what seemed rational organization into the order of procedure. It seemed to us that two overriding issues should be the first ones treated in the hearings: need for Marble Hill, and ability of PSI to finance Marble Hill.

In our opening statement (15) we said that need should be discussed first, for if as we thought, the plant was not needed, then there would be no necessity for continuing the hearing. Further, if the construction could not be financed by PSI and the Wabash Valley Power Association [WVPA] then the hearing could be terminated.

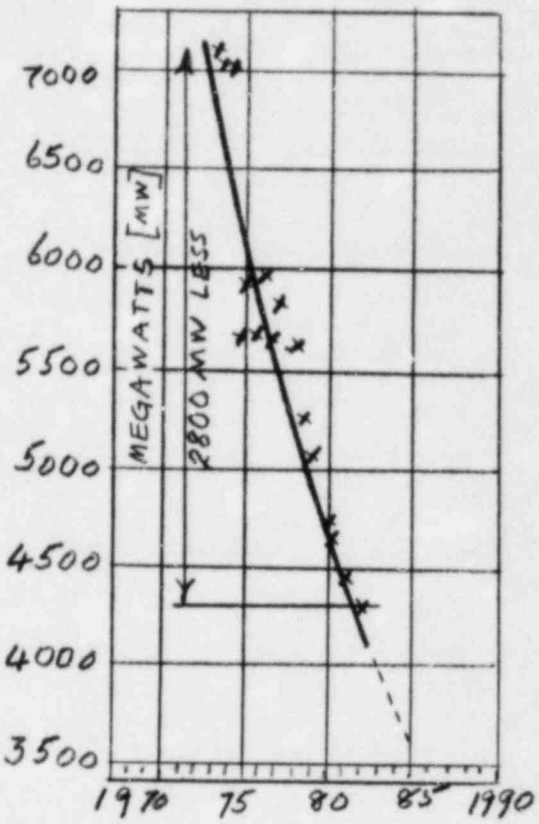
These suggestions were not acted upon. Both were relegated to places later in the hearing. For example, our testimony about need begins after page 4704; discussion of financial strength was barely touched on near the very end--beyond transcript page 6000.

Since 1977 and 1978 Fred Hauck's forecasts made for Save The Valley have proven right, and indeed, conservative. The financial weekly Barrons carried national electric utility sales growth statistics from 1964 through 1980 (13). Regression analysis of these data revealed continuing declining growth in national kilowatt-hour sales. The trend line suggested that the decline, continuing, would predict "that national sales growth of electricity will soon cease altogether, probably about 1985" (14).

Of greatest interest, perhaps, is PSI's own perception of their future need. Their forecast of future 1985 peak need dropped dramatically from 1973 to 1982. This demonstrates from their own publications (e.g. Annual Reports) that Marble Hill was not needed. By 1982 the forecast need had dropped by 2800 MW. This is far in excess of anything Marble Hill could have produced, for the intended two 1130 MW units (2260 MW total) in operation at the usually experienced 60% of capacity would yield some 1400 MW or less. See Figure 1.

PSI's all-time peak (01/11/82) was 3923 MW. Their listed system capacity is reported variously as 5662 MW, 5694 MW, 5716 MW (16). From these figures it follows that their current reserves are in the range of 44 to 46% above their all-time peak.

When Gibson coal-fired unit #5 comes on line in October, 1982, according to published reports, the reserves at that time will become 62% above their all-time peak. One Marble Hill unit would push this reserve to about 90%, and a second unit to 120%.



Fading 1985 need as perceived by PSI

FIGURE 1

Another way of showing PSI's excess capacity is in terms of capacity factor. A utility's capacity factor is the ratio stated in percent, of the amount of electricity sold in a year to the amount that could have been produced in that year if all generators had produced at full capacity.

Eleven years ago, 1971, PSI, was operated as one of the most efficiently managed utilities in the country. At that time PSI sold 52% of all the energy that all of their generators could have produced.

During the intervening years PSI's use of their equipment has steadily deteriorated. Today, this efficiency measurement--their capacity factor--stands at 38%. There is no demand anywhere for the

electricity that much of this capacity could produce.

The future will probably bring no improvement. Contrarily, in October of this year the advent of Gibson Station #5 will cause PSI's capacity factor to drop to around 34%, or lower.

This is because electricity from PSI is getting too expensive, and users are cutting corners and using progressively less. The advent of Gibson is accompanied by a demand for a 19% rate increase. The result will be further decrease in use.

These two data, the constantly increasing excess capacity due to a new plant and planned coming on line (Gibson No. 5) and due also to decreasing demand, over that overoptimistically expected, due to price increases, decreasing population growth, out-migration to the south and southwest, as well as change-over to increasingly more available, and foreseeably cheaper natural gas, would, one would expect have led a prudent and aware management to have shut down construction of Marble Hill in 1979 at the time of the shutting down of safety-related construction (17). Or later on the occasion of the Congressional hearing on "Construction Problems at Marble Hill. . . . " (18). Or still later, in early 1980, when a national investment firm downgraded PSI stock from "buy/hold" to "hold" (19). And with increasing exigency as time passed.

Much evidence was available to prudent management on the factors we have listed that forecast decreasing demand. Documentation of a portion of it will emphasize the above stricture: the above conclusion based on fact, namely that prudent management would have been aware of these facts.

To be sure we are on common ground, we define current dollars and constant dollars. Current dollars are the ones we spend today. They buy less and less as inflation takes its toll: the 1955 current dollar bought twice as much of most commodities as the 1975 current dollar. Constant dollars are our current dollars adjusted for shrinkage in

buying power to some reference dollar. Thus if we take the constant dollar reference as the value of the dollar current in 1975 namely $1.00, and apply the commonly used Bureau of Labor Statistics "Cost of Living Index" adjustment, the 1955 dollar would be valued at $2.01, and the 1965 dollar at $1.71. Use of constant dollars is a device for dealing with the most troublesome variable, inflation.

Next, we must distinguish between annual or monthly consumption and instantaneous demand. We have already touched on this matter.

Annual or monthly consumption of electric energy is measured in kilowatt-hours of energy used over the entire year (or month, for the monthly bill). Demand is the measure in kilowatts of the amount of power used at any one time.

It is peak demand that determines the amount of generating capacity that an electric utility would need to meet these special demands. Usually, the utility charges an industry a consumption charge and in addition a special demand charge for maximum surges of power. This charge tends to encourage the industry not to have power surges, or peaks. Today residential demand charges are being considered by utilities to level out demand. This is known as "peak-trimming" or leveling device, and may substitute for investing in new capacity.

We now turn to the stated factors that a prudent management would be expected to evaluate, starting with the effect of price (20).

Effect of price on demand for electricity. A Federal Power Commission [FPC] task force report of 1975 (21) says, in part, "current projections of future demand which omit price effects may seriously exaggerate the need for generating capacity. . . ."

In different words, the Ford Foundation Report Perspectives on Power (22) said, in 1974:

most future expansion plans [of utilities] are based upon

"need" projections that are themselves based upon growth rates taken from a period of declining electric prices. To the extent that the future appears to be a period of rising prices, environmentalists would like to see a downward adjustment in future consumption estimates and therefore in facility "need" forecasts.

The relation between price and amount used as related to electricity follows a law which has been very thoroughly studied. The relation may be stated as $(Q_o/Q_1) = (P_o/P_1)^E$, where Q represents quantity and P represents price in constant dollars, each before "o", and after "1", the change.

In words, this relationship says "The change in consumption equals (the change in price) raised to a certain "exponent" E, the value of which is determined factually by analysis of data. The exponent measures "elasticity of demand" for the particular commodity--in this case electricity.

The FPC (21) gives averagecost and average use of electricity in 9 regions of the Country over several years. From such figures E-values can be determined. The values fit well in any given set of data. Such values have been calculated by many economists over perhaps 30 years (22).

A recent communication with David Freeman of Tennessee Valley Authority [TVA] reports (23) that "E" values in their area are: residential, -0.8; commercial, -1.4; industrial, -1.1. Weighing these gives a value of approximately -1.0. The minus sign indicates an inverse relation between price and use. In words this relation with an E-value of -1.0 says that each 1% increase in real-dollar (a constant-dollar) price will mean a 1% reduction in electricity consumption.

<u>Demographic Influences Upon Demand.</u> Data from the U. S. Commerce Department's Office of Business Economics and Economic

Research Service [ORBERS](24) for 1977 when STV was saying that Marble Hill is not needed, showed that the industrialized midwestern states grew in population only 25% as fast as the rest of the country during 1970-1977, and are forecast to grow only 45% as rapidly to the year 2000. Explosive growth was taking place in the south and southwest.

Relative total personal incomes from the OBERS report show that the midwestern region is expected to grow at an 86% rate compared with an expected 117% for the fast growing states, to the year 2000.

Another factor offered a warning in 1976, 1978, that growth in demand would decline.

A well-known demographer, Lester Brown of the Worldwatch Institute, estimated in 1976 that U. S. population gain would be only 0.58% (25). The Census Department had projected 0.9%. A more recent survey by the Census Department (1978) confirmed continued steady progress toward Zero Population Growth (26).

Energy Efficiency. Over the last many years improvements in efficiency of electric motors and of other users of electricity (i.e. from vacuum tubes to solid-state electronics) have led to decreased demand for electricity. Most of these improvements cannot be laid at the door of the present recession because they began much longer ago than this recession.

Change-over to Alternative Energy Sources. The potential for natural gas to replace residential electric heating is enormous. Careful research by Fred Hauck indicates that even with deregulation the cost of gas per million Btu (in 1978 dollars in the year 1990) will be less than half that of electricity from coal. Electricity from nuclear plants would be even more expensive than from coal.

Gas will displace electricity for heating homes. By about 1985 the Alaska natural gas pipeline (27) will be bringing about 2.5 billion

cubic feet of natural gas per day into the U.S. This is approximately equivalent to 22,500 MW of electrical energy, or about 10 2-unit nuclear plants the size of the projected Marble Hill, and will cost half as much as the cost of the nuclear plants--with no refueling and no waste storage costs.

It would certainly appear, then, that PSI management could have had plenty of warning about decline in demand. That they had such knowledge is the conclusion from Figure 1, above. Knowledge of the kind reflected in Figure 1, above, coupled with the clear evidence of overcapacity presented above, would surely teach a prudent management to shut down Marble Hill.

Two further considerations must not be burked.

The repeated rate increases that PSI must seek mean that rates to customers will inevitably increase. If Marble Hill were shut down now (September 1982) it is expected that PSI would need a residential rate increase of some 40% to about 8½¢ per kilowatt-hour. One unit of Marble Hill would raise the rate needed by PSI to some 15¢ per kilowatt-hour; and two units to close to 22¢ per kilowatt hour. Industrial rates and commercial rates would be proportionately increased.

It has to be concluded that facing such rates for electricity new industry would be repelled from the PSI service area.

Further, industries already located in this southern Indiana region would turn seriously to possible alternate sources of energy. Those which could might turn to gas. Others would consider generating their own electricity. As Sheldon Novick writes (28):

> The competitors of the power companies are now, as they were in 1900, the power companies' own customers. . . .
>
> The "isolated plant" which Samuel Insull and Thomas Edison sought to drive from the market place is returning,

pressed forward by the rapid growth of fuel costs that overshadow the modest economies of scale which utilities are able to obtain in their power plants. . . .

Another time of recent date underlines in two respects PSI's lack of need for Marble Hill's excess capacity. In phone conversations with TVA officials STV has found that 500 to 750 MW of their surplus capacity is available to PSI through interties that are already in place. An additional 1000 MW could be added quickly in response to any PSI request.

Thus if PSI were really in need of more electricity it could reasily be obtained from TVA. Further, PSI would not be able to sell excess power because the entire region is overbuilt, as we have pointed out. Emphasizing this fact is a remark from a TVA official: 'Power Manager Hugh Parris said that more than 18 months of searching has failed to turn up any utilities interested in buying TVA's surplus electricity." (29)

That there is increasing rate-payer concern about the responsibility utility stockholders have for paying for cancellation of partially built unneeded plants is shown in an article in the Environmental Action Foundation publication Power Line (30) from which we quote a few excerpts:

In Ohio, an aggressive Consumer's Counsel Office succeeded in having the state supreme court overturn an Ohio Public Utility Commission decision to saddle rate-payers with termination costs for two Davis-Besse and two Erie units. The court ruled that the Ohio Public Utility Commission (PUC) had "unreasonably and unlawfully exceeded its statutory authority" when it allowed the Cleveland Electric Illuminating Company (CEI) to charge ratepayers for the $56.4 million invested in the four cancelled, partially-built nuclear power

plants. The PUC had approved CEI's request by a determination that the Company's decisions were "reasonable and prudent" throughout the planning process. The court, however, ruled that this "prudence test" was irrelevant, since the costs were not "normal, recurring expenses," as required by statute. Subsequently appeal by the PUC, the U. S. Supreme Court refused to hear the case.

Similarly, in 1980, the Arizona Corporation Commission noted that even if a prudent test was appropriate, prudent management would have prepared for the possibility of plant cancellation. The commission suggested that the Arizona Public Service Company look to its own stockholders and to other participating utilities to pay for the termination of Palo Verde Project units 4 and 5. They stressed that the ratepayers should not be held financially responsible, since "the planning and construction of new units is a management function under the control of the stockholders. If units are planned and then cancelled, this commission feels that the stockholders should therefore bear any cost related to such cancellations."

Also in a 1980 decision, the Iowa State Commerice Commission saw, "no justification for allowing common stockholders to profit equally from successful and unsuccessful investments." The Iowa Commission added, "stockholders are permitted a return commensurate with the risk they bear in their investment in the utility. Iowa Power's proposal would virtually eliminate the risk that the investment in the Vandalia project would fail."

In Connecticut, the Department of Public Utility Control (DPUC) has allowed two utilities to collect only $22.1 million of $33.1 million spent on the cancelled Montague units. Since

the DPUC had ruled in 1977 that the companies' involvement in the plants was ill-advised, the commission prevented amortization of costs incurred after that point.

The Massachusetts Department of Public Utilities (DPU) also noted in a May 1982 decision that Boston Edison should have recognized by July 1, 1980, the Pilgrim 2 project was financially unsound. The DPU allowed amortization of 70 percent of the cancellation costs, or $327 of $460 million.

In a dissenting opinion in that case, George Sprague, one of the three Mass. DPU commissioners, wrote: "I am of the strong opinion that all of the (Pilgrim 2) expenditures should be borne by the shareholders of the company, rather than its ratepayers. In our free enterprise system, it is a fundamental business principle that the owners of a corporation benefit when a corporate strategy profits, but bear the burden when funds are expended in ventures which fail."

In an effort to address regulatory commissioners' concern over stockholder response to termination cost decisions, Greg Palast, an Industry analyst for consumers, testified in behalf of the City of Gary, Indiana in a case on the $205.6 million spent on the cancelled Bailly Nuclear project. Palast said, "Commissioners are afraid to deny costs to a utility" because of what it might do to the company's market rating. He released a study to the Indiana Public Service Commission which indicated "Utilities were virtually unaffected by the decision to disallow or allow amortization of cancelled plants." His conclusion is that, in fact, stockerholders' sharpest, most predictable reactions have been "the overwhelmingly positive response to the cancellation of shaky nuclear projects."

Despite some total or partial victories, consumers have also suffered a number of defeats in fights over termination costs in recent months. In January, the New York Public Public Service Commission found that all costs in the cancelled Sterling nuclear plant were prudently incurred and allowed four utilities to collect $91.2 million invested in the the project from customers. Two months later, in March, the New Jersey Board of Public Utilities allowed Public Service Electric and Gas Company to charge its customers $290.75 million for the cancelled Hope Creek 2 nuclear plant.

And, since this article was written, the Bailly debt was placed upon the ratepayers.

PSI's Inexperience.

We return now to support an earlier statement (in the Introduction) that PSI seems to have had no real knowledge of what they were getting into with nuclear power, and should at that time have exercised the prudence that goes with humility instead of proceeding as they did.

Mr. Hugh A. Barker was on the stand as a witness for the applicant PSI; he was being questioned by Dr. Linenberger, a member of the Atomic Safety and Licensing Board. References are to pages in the transcript referred to in reference (3), from which excerpts are copied verbatim:

DR. LINENBERGER: . . . what gave you the confidence to move ahead with a nuclear unit which would represent a new technological venture for the company?

WITNESS BARKER: The early part of that again, the decision was basically an economic one, to proceed to nuclear.

DR.LINENBERGER: Now, then the next one.

WITNESS BARKER: Proceeding from there, as to the obvious things that are very different in taking only the construction of a nuclear plant, we felt for a number of reasons a high degree of confidence that we could proceed with it to a successful conclusion and I would like to run down a number of items which gave us substantial confidence in that area.

First of all, of course, the fact that we have had a considerable amount of fossil fuel plant experience. As a company, we have built eight plants since 1941, which includes some 27 generating units. That amount of capacity would exceed five million kilowatts of capacity.

By the way, that did include, I am including the units which are in advance stage of construction at Gibson now, that is Units 3 and 4, at Gibson.

We have been--we have had a long-term experience with the designer, the architect-engineer who is on this job Sargent and Lundy Engineers . . . . (pp. 5985-5986)

DR. LINENBERGER: Then who will perform the construction work. What organization will be your principal constructor?

WITNESS BARKER: The principal contractor on the job is Newberg. In terms of our organization, really the top of our construction management personnel is Mr. Crews, who is here on the panel. Aside from those things, we have,of course, spent a good deal of time in the study of other nuclear plants, both operational and under construction and have reviewed thoroughly the various utility's experiences with those plants.

I would name particularly the Zion Plant of Commonwealth Edison, as well as their Byron-Braidwood facility. At the Cooke Nuclear Plant of American Electric Power, at the Zimmer Plant of Cincinnati Gas and Electric and the Three Mile Island Plant of Jersey Central. . . . (5990)

DR. LINENBERGER: The experience and qualifications of your contractors and suppliers, of course, are extremely important, but left alone they are not going to produce a quality product for you, as I am sure you will appreciate.

Speaking of Zion, for example, I can say from personal experience and as a matter of public record, Commonwealth Edison and Sargent and Lundy had a great deal of problems with quality assurance, with the Zion station. It took a considerable amount of meeting and coercion from the Atomic Energy Commission at Zion to guide that effort in directions that the AEC regulations clearly required they be guided, but for whatever reason did not so happen for quite some time.

What I am leading up to is, I would like to know how you see your own personal office life is going to be impacted here by way of assuring that the unhappy experiences between Sargent and Lundy and Commonwealth of Zion are not replicated, if you will, with this effort by Public Service?

WITNESS BARKER: Of course, we are not replicating Zion. We are replicating one generation beyond. I am pleased to address that, because my office life, as you put it, has already been impacted, and it has been true for the--at least two years, both in my present position and the position I held before, in that I have participated regularly in planning Sessions on the quality assurance matter.

I think to the best of my ability, and to the discomfort of some of my associates, I have voiced our strong commitment in those sessions

to quality assurance programs. As you, I am sure, are well aware, there are some discomforting things about the quality assurance program, and the amount of paperwork involved and so forth, that requires, I think, a strong commitment to make sure that we don't compromise it, as between areas in the company.

I don't recall exactly when we first constituted a quality assurance review committee, which I headed initially, which I still attend, but do not currently chair. That review group does meet bi-monthly currently, and I think there are very few sessions that I have not attended. . . . (pp. 5994, 5995, 5996.)

DR. LINENBERGER: Coming back to your comments regarding the meeting you attended on quality assurance, I have heard from what you--I infer from what you said, that certain things you learned resulted in a somewhat different perspective on your part, information that developed as a result of this meeting, can you amplify on that for us, please?

WITNESS BARKER: Well, let me--I may be wandering a little bit, but I would be glad to help. The persuasive influence of the QA operation on a nuclear project, I suppose, was the biggest realization that I received there.

It was quantified and discussed quite a bit in terms of the relative--let's say, the financial impact on the total project that quality assurance would have, and that it was a very substantial element of cost. There was a great deal of discussion about some of the extreme details that went into the quality assurance considerations, which I was impressed with, and at the same time, a little concerned with, in that I could see the--I could see, if the program were applied I think without sound management and judgment, that it could be used to create a mountain of paper which might not be that meaningful and that it might become an independent in itself. I did quite a bit of talking myself at that point, without people, that was not what we intended to do, and that is where I guess I developed this attitude myself, which was that we--our primary objective in prosecuting the program and planning it, was not to meet NRC requirements - that was a minimum, and that wasn't the end objective in itself.

The end objective was in fact to ensure quality. If what we were doing was creating documentation that was required by somebody and it wasn't in fact used to meet the later objective, it was meaningless, and would result in a great deal of cost that wouldn't pay off. I think we have within our organization a full realization of that now. That whatever we are doing in that regard, in the total quality assurance field, is in fact to meet an objective at the end of what we have a--top quality safetywise and operationally, a plant that we will operate at the end of the construction period. . . . (pp. 6000, 6001.)

DR. LINENBERGER: The last question at this point, for me, Mr. Barker, as you look across the total can of worms, if you will, that you have here as relates to Marble Hill, what do you see as the things that concern you the most? What unresolved matters--what kinds of things keep you awake these nights with respect to seeing the Marble Hill thing go through to a successful culmination?

WITNESS BARKER: Having a clear conscience, I do sleep at night. Well, seriously, I think the things that most concern me and tend to upset me a little bit is the seemingly protracted delays in getting to the point that we can actually be at the process of getting the job done.

Now, we are at work on the site now. That relieved some of that tension, but I will feel a great deal happier when we have the full rights to proceed under a construction permit. I think this isn't only my concern about Marble Hill. I think that is really what you addressed. I would say that is the number one concern, is time.

I think there are many others who are also conscious of that, that time is money. Unfortunately the great band of our consumers who are affected directly by those delays and by the costs associated with them perhaps are not vocal, but I think many of them do understand that it is their pocket that those dollars associated with delays are coming out of. That upsets me more than anything else. Not as they relate to necessary and productive phases of getting on with the job. And I would certainly not imply in any way compromise with the necessities of safety or of the quality-assured construction and operation, but I have seen far too much myself, just within the last two days, which would add to that concern that things don't add to the, let's say, productively, to this process of getting power on line, and I think that is a general matter of in this country we are going to have to overcome some of these things or place on ourselves in an economic position which will be of great concern, and by the time you are there, it takes many years to get out. (pp. 6027, 6028, 6029.)

DR. LINENBERGER: That was the next to the last question.

My last question is--and I mean this very, very seriously. I don't ask it in the derogatory sense. But it is extremely important.

Why should you have a concern about what is happening to cost if indeed, as you said, it comes out of the customer's pocket?

Why should cost concern you?

What is there that places on you an obligation to watch cost?

WITNESS BARKER: I guess the easiest answer I could give you would be if you can trade places with me for a few months, Number one, you imply by your question, and I can accept that, however, it is generally misunderstood that somehow there is a magic formula under which we have some kind of guarantee of a recovery of those costs.

That simply is not true.

There is no guarantee of recovery.

We will have an opportunity to recover, but not guarantee.

I would say, going back in history, in my own company, in another form of the utility business, that is the transit system, there was no guarantee when the automobile came into being that that transit system was going to be guaranteed a profit or guaranteed any continuation.

It simply was not.

To the extent that more than the entire equity of the company at that point in time was wiped out in losses, there is, number one, no guarantee, so we must be concerned with costs.

Secondly, it is simply a very difficult job operating and communicating with consumers, and giving them continual bad news, that their costs are going up.

It is a very difficult situation.

I will very happily return to the early days of the 1960s when we had--when we were able to give customers quite the other kind of news . . . . (pp. 6030, 6031)

We will not rehearse subsequent history leading to the exposure of shoddy work in constructing the safety-related parts of the nuclear plant, but close this account with a quotation from the statement of Mr. Cordell C. Williams, Construction Project Section Chief, Region III, NRC, before the Moffett hearing. This seems to summarize the matter:

> As I have indicated before, as a result of our being informed of allegations as described by Mr. Cutshall, on or about June 12, 1979, and also as a result of NRC's identification of serious problems with the control of concrete quality in early May, and the subsequent enforcement conference, NRC, at this time--June 1979--initiated 100 percent overview of all the licensee's and its subcontractors' actions directed at the control of concrete at the site. We found in the aggregate gross nonconformance across the board.
>
> Subsequent NRC inspections on July 9 through 27, 1979, of concrete placement and placement activities, which included 100 percent overview by NRC inspectors, identified noncompliances and weaknesses in the quality assurance and quality control programs. As a result, on July 20, 1979, Region III initiated another meeting with PSI management at the site. Based on the observed ineffectiveness of PSI

in directing Newberg to meet the quality requirements of the job, Region III concluded that safety related concrete work should be stopped again. PSI concurred in this assessment. A second immediate action letter confirming this action was issued on July 23, 1971.

The lesson taught by NRC's Mr. Williams is that PSI was negligent in not keeping a close rein on Newberg Construction Co. They appear to have been operating under time and financial constraints to rush the safety-related construction job. At the same time it must be concluded that NRC was negligent. STV believes that PSI should have been warned by this debacle (31).

The net result of PSI's inexperience (see text of ref. 1, 3) is that some 160,000 tons of concrete (32) are in place, but in STV's opinion not adequately certified by actual, statistically valid testing to be radiation-safe in the critical areas such as the containment building. To have continued under these circumstances without valid testing of all the equipment of the safety-related area--concrete, pipes and welds--was in the opinion of STV reprehensible (33).

Questionable Technology.

It has been called to STV's attention (34) that the Indiana Sassafras Audubon Society requested of the Public Service Commission of Indiana a public hearing on Marble Hill concerning reliability of performance of steam generators under operating conditions. Two of these generators are of the kind expected to be installed at Marble Hill. (Westinghouse Steam Generator Models D-4 and D-5) Audubon noted that "At least 40 of the 47 operating pressurized water reactors [PWR] have steam generator problems. . . which have resulted in costly outages, repairs, and in some instances replacement of generators. . . ."

Audubon also pointed out that other countries have had problems with Westinghouse generators: Sweden's Ringhaus 4; Spain's Almaraz; Brazil's Angua 1; and Yugoslavia's Krsko. Audubon asked PSC to stay the installation of the steam generators that are already on site.

At the same time PSI has installed the reactor pressure vessel in unit 1 "one month ahead of the scheduled date" (36).

We call attention to these matters because of the cavalier attitude taken by NRC and PSI in the Madison Hearings (37). In our contention Number 1 we spoke of the holding tanks of Florida Power & Light Company's Turkey Run plant which had been leaking. The same kinds of tanks under the same supervisor were planned for Marlbe Hill.

We spoke of "hydriding and other effects of nucleons and radiations from the contained radioactive elements"--in the spent fuel rods, to be held in these tanks. However, we were not allowed to proceed along this line.

Now, the problems have become exigent. Robert Pollard, a former NRC engineer has pointed out that Westinghouse's steam generator tube deterioration problems are far from solved (38, 39). An NRC safety engineer, D. L. Basdekas, has called attention to the threat of thermal shock and the breaking of the 8-inch thick reactor containment vessel itself:

> There is a high, increasing likelihood that someday soon, during a seemingly minor malfunction at any of a dozen or more nuclear power plants around the United States, the steel vessel that houses the radioactive core is going to crack like a piece of glass (40).

Now the danger of hydriding is being reated seriously by more people, yet PSI has been continuing to replicate a plant that was not even shown to work, and to use materials stored on site since 1979,

and hence not even representative of improved technology.

We have presented a few of the data available about some of the more pressing and serious aspects of the Marble Hill Project. It must be clear that

WE HAVE A PROBLEM.

Approach to a Solution of OUR Problem.

A number of conclusions may be drawn from the facts of the Marble Hill Project. We state some of these conclusions without implying blame. (Though as always a reader is free to infer, if so inclined). What we try to do is draw the picture on the basis of the elements necessary to a solution, then we propose a possible solution.

PSI - The protagonist, having undertaken a Project for which it is ill-equipped (p. 29) and demonstrated "Gross nonconformance across the board" and "noncompliances and weaknesses in the quality assurance and quality control programs" as well as "observed ineffectiveness of PSI in directing Newberg to meet quality requirements of the job" (p. 29) has built on a base of doubtful safety (p. 31). Further, there has been increasing evidence by PSI acknowledgement that Marble Hill is not needed (p. 16). The cost of the recognized unneeded capacity has constantly escalated until it is approaching 6 times the original estimate . During the period under examination electricity rates have steadily gone up (p.17), with foreseeable ill effects on the ability of Southern Indiana to attract industry and keep its people (p. 21).

These data, representing only a partial account of the present state of PSI, lead to the conclusion that the management, and accordingly the Board of Directors, have been imprudent in not stopping construction many years ago such as in 1979 (pp. 17,ff). Further, PSI has been warned by seeing their offerings derated

several times (p. 2).

We must conclude that PSI is approaching financial trouble--possibly a financial melt-down (p. 7).

Ratepayers - The captive customers of PSI have been excessively apathetic. It may be thought that had they made an uproar in 1979 when shoddy construction was recognized (p. 29) PSI might have been prevailed upon to be prudent and close down the Project.

Intervenors - All the intervenors displayed naivete at the critical time of the Madison ASLB hearing (p. 7). They thought that NRC was there to protect them. After all, most are working people, intervening in their spare time, while Staff and Applicant work full time promoting Marble Hill, paid moreover, by the intervenors and opposing most of them. However, Paddlewheel brought off several actions in an attempt to raise public conscience of the issues; Audubon kept on with careful monitoring of the Project; at times protesting to the PSC. CAC was effective in defeating Construction Work In Progress (CWIP) bills twice. Save The Valley doggedly went through the Madison ASLB hearings, warned PSI at every step in their downward progress--and have consistenly told the truth without fanfare or exaggeration, and have consistently been proven right (p. 7).

NRC - During the Madison ASLB hearings the NRC seemed overall to support PSI in a decision which seemed to have already been made (in camera) to build Marble Hill. Indeed, in his prepared outline of opening remarks the head lawyer for the NRC Staff said: ". . . it can be seen that the Staff has not come to the hearing as a neutral party writing on a clean slate. We have conducted the review, we have conclusions derived from that review. .. . " (41). In other words, the Staff appeared to come to the hearing prepared to impose the decision to build--or start building--Marble Hill. The old AEC attitude of

promotion remains rampant.

The intervenors were impressed with the arrogance of the NRC attitude (shared with the utility). This "regulatory" agency, with discretionary powers appeared to have been having their own way too long. Further, being technologically better able to handle technical language and acronyms they could obfuscate an issue (perhaps not always intentionally) beyond the ability of the intervenors to understand.

PSC - The Public Service Commission of the State of Indiana is not without responsibility in OUR problem. In the first place, they appear not to have examined PSI's need for Marble Hill. Part of the problem may be political. The PSC is an appointed body, not elected by the public, so they are likely to represent the dominant Party, rather than the Public. Some constraints are, of course, placed upon Public Service Commissions. Some PSC's or their equivalents have asserted their public role by refusing to place unneeded, overbuilt, facilities in the rate base; some have refused to reward management mistakes.

A Solution to OUR Problem.

And Now, Apply Reason - To reach a just solution each of us must pay according to assessed responsibility which has been neglected or ignored.

But then, there would seem to be some fixed points to help us navigate this turbulent problem: questions that must be asked, and answers about which there would rationally seem to be a consensus.

Q: Is the plant needed?

A: No. The overwhelming evidence at this time, building up since 1977, tells us that Marble Hill is not needed and may never be needed.

Q: Is it advantageous in any respect to continue construction of Marble Hill?

A: No. This would throw good money after wasted money, and serve only to increase utility rates.

Q: Then what must be done?

A: The Marble Hill Project must be stopped immediately.

Q: But then, who pays?

A: All must pay, for it is OUR problem, and in any event all will pay, for we are in a NO-WIN situation.

Who Will Pay, and How Much - We return to a consideration of the Protagonist and the Actors in this tragic, misbegotten enterprise.

PSI - Protagonist, leading actor, must bear the greatest burden because (1) PSI initiated the enterprise (p. 10), (2) ignored expert opinion (p. 11), (3) did not heed repeated warnings of a slide toward disaster, (4) did not exercise prudence in management.

Shareholders in PSI - These rely upon Management and the Board of Directors, but have a say in policy if they wish, for the management should function under control of the stockholders (p. 23). Perhaps the most telling statement is that of the 1980 decision of the Iowa State Commerce Commission, that there is "no justification for allowing common stockholders to profit equally from successful and unsuccessful investments" (p. 23).

Ratepayers - These will have to pay, in a rate increase, for their apathy.

NRC - The Nuclear Regulatory Commission should pay for ignoring the advice of expert intervenors who know more about the local (and perhaps the national) facts than they do. The NRC also should pay for negligence. They did not properly regulate and oversee the safety-related construction of the plant, even after one of their members of

the ASLB had brought out the need for caution (p. 25f). They also ignored violations of their rules (42).

The Intervenors - They have already paid in effort, nearly always financially uncompensated, in taxes that support NRC, PSC, and in rates that support PSI. They will also pay as part of OUR problem in the form of higher rates.

The Proposed Solution.

1. Shut down Marble Hill forthwith.

2. Try to sell Marble Hill facilities for another use. Its location and structures suggest an amusement park.

3. Treat the cost of Marble Hill to date, determined fairly by objective auditors, as part of OUR problem and allocate the costs somewhat as follows:

Put one-sixth of the cost into the rate base, to allow for the very first decisions of PSI in which PSI felt that there legitimately was a need for more capacity (i.e., in 1970).

Require NRC to pay one-sixth of the cost as a penalty for negligence and a failure adequately to regulate.

Require the shareholders of PSI to shoulder two-thirds of the cost of this debacle for the reasons given in the previous section.

PSC can pay by informing PSI that they will not permit Marble Hill, since it is unneeded, to be put into the rate base if it should be continued.

This action may cause PSI, because of the extent of financial imprudence, to declare bankruptcy.

In such case, a holding company or consortium of the cities, towns and rural cooperatives could form to take over management of PSI, excluding Marble Hill. Although, because of the Gibson unit #5,

the company would be more than 60% overcapacity, yet the burden of the incubus Marble Hill would be cast off, and the small ratepayer share readily amortized.

Harold G. Cassidy

Fred Hauck

September 1982

NOTES AND REFERENCES.

(1) Statement of Hugh A. Barker, President of Public Service Company of Indiana, Inc., 1000 East Main Street, Plainfield, Indiana 46168 to the Subcommittee on Environment, Energy and Natural Resources of the Committee on Government Operations, House of Representatives. Dated November 28, 1979.

(2) NRC Final Environmental Statement (FES), p. 8-35.

(3) Testimony of the hearing before the NRC Atomic Safety and Licensing Board in the matter of Marble Hill Nuclear Generating Station, 1977 (ASLB-Testimony). See Transcript following, p. 4704.

(4) Fred and Dan Hauck, "Electric Utility Growth Forecasts. . . An Assessment." From a letter to NRC ASLB, 08/12/77.

(5) STV "Proposed Findings of Fact. . . " 07/12/77, p. 11.

(6) Business Week, 05/09/77, p. 44L.

(7) From the study "Economic and Environmental Implications of a U. S. Nuclear Moratorium." Institute for Energy Analysis, Oak Ridge Associated Universities.

(8) Personal communication from Fred Hauck.

(9) "Review of 1975 forecast reports," The Ohio Power Siting Commission Office of the Ten YearForecast, January, 1976.

(10) A White Paper VII. The Danger of Marble Hill. An Open Letter to Mr. Hugh A. Barker, President and Chief Executive Office of Public Service Company of Indiana, Inc., p. 10.

(11) ORBES (Ohio River Basin Energy Study), p. II-B-2-4.

(12) Fred Hauck, "The Marble Hill Nuclear Generating Station. A Critique," August 16, 1976. Distributed by Save The Valley.

(13) Barrons, September 21, 1981.

(14) Fred Hauck and Harold G. Cassidy, Growth of the Electric Utility Industry: The Epitaph? Privately printed, ©1982.

(15) ASLB - Testimony (see ref. 3, pp. 912ff.

(16) Figures from a letter of 07/02/80 to Congressman Hamilton, from FERC, and from a past PSI Annual Report.

(17) U.S.A. Nuclear Regulatory Commission, Order Confirming Suspension of Construction in the Matter of Public Service Company of Indiana (Marble Hill Nuclear Generating Station, Units 1 and 2.)

(18) Subcommittee of the Committee on Government Operations, House of Representatives, Ninety-sixth Congress, Construction Problems at Marble Hill Nuclear Facility: Nuclear Regulatory Commission Oversight, November 27 and 28, 1979.

(19) 02/20/80 Dean Witter Reynolds, Inc., has downgraded PSI common stock from "buy/hold" to "hold," says it is not as attractive as it has been. White Paper XVI.

(20) See reference 14.

(21) "Power Generation: Conservation, Health and Fuel Supply," Federal Power Commission, March, 1975.

(22) Berlin, Edward, C. J. Cicchetti, and W. J. Gillen, Perspectives on Power. A Study of the Regulation and Pricing of Electric Power. Cambridge, Mass., Ballinger Publishing Company, 1974, Table A-2, p. 122.

(23) Letter to Mr. Fred Hauck from David Freeman.

(24) OBERS is not to be confused with ORBES (ref. 11). It is the Office of Business Economics (OBE) and the Economic Research Service (ERS), published every few years. 1977.

(25) Brown, Lester R., "The Growth of Population is Slowing Down." New York Times, November 21, 1976, p. E8.

(26) Wall Street Journal, October 16, 1978.

(27) Wall Street Journal, July 21, 1980.

(28) Sheldon Novick, "How To Pay More For Less," Environment 18 (No. 8, October) 1976, pp. 7ff.

(29) Quoted from an Associated Press release of January 8, 1982.

(30) Shireman, Robert, Power Line 8 (Nos. 1 and 2, August/Sept.) 1982, see pp. 1, 6, 7.

(31) Indianapolis Star, 07/22/79, reported:

Thomas M. Dattilo, the Madison Attorney who represents Save The Valley, which opposes the plant, charged that the breakdown in quality control at Marble Hill "shows that PSI is not capable of construction a nuclear power plant.

"Either PSI knew about Newberg's lack of quality control, or they aren't capable of supervising the construction. In either case, I believe their construction permit should be revoked," Dattilo said.

(32) See ref. 3, at p. 237, statement by Mr. Barker.

(33) STV has filed suit to this effect.

(34) By The Indiana Sassafras Audubon Society, through Mrs. Elizabeth Frey, letter of September 1, 1982.

(35) Plants with Steam Generator Problems: source, Nuclear Regulatory Commission, March, 1982.

(36) "Reactor Pressure Vessel is put in place at Marble Hill," Madison Courier 08/30/82.

(37) Reference to the hearings is made in ref. 3. Our contention dealt with our claim that in the Final Environmental Statement inadequate consideration had been given to the impacts of radioactive releases on plants and animals in the cost/benefit balance. We tried to bring out the problems that had been experienced with holding tanks which leaked, but this was not permitted.

(38) See also Bob Pollard, Union of Concerned Scientists, Summer, 1982, pp. 7, 8.

(39) "Radiation Making Shells of Reactors Brittle, U. S. says," Louisville Courier-Journal 09/27/81.

(40) "14 Nuclear Reactors Facing New Threat," Dallas Times Herald, 08/08/82.

(41) Transcript of ref. 3, pp. 935, 936.

(42) E.g. in the case of the Bower-Marble Hill road. Here the Staff lawyer considered that since the road had been built--in violation of the regulations--" . . . that whole point is moot because the road has already been built. . . ." (P. 951 in ref. 3. See also pp. 940, 5690.)