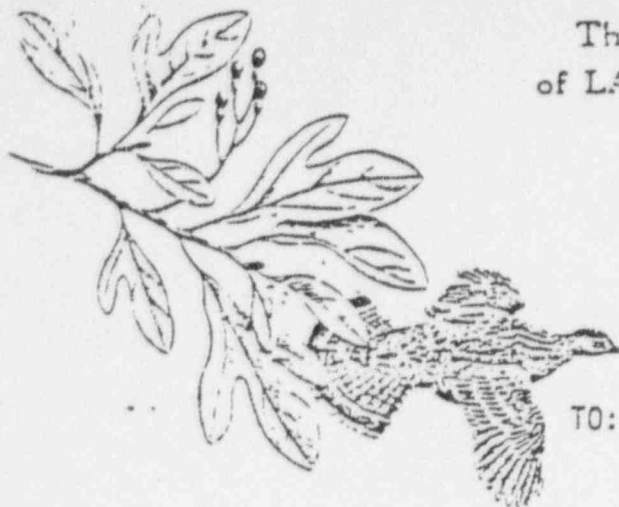


The SASSAFRAS AUDUBON SOCIETY  
of LAWRENCE - GREENE - MONROE - BROWN -  
MORGAN & OWEN COUNTIES  
INDIANA



September 1, 1979

TO: Victor Stello, Jr., Director  
Office of Inspection and Enforcement  
United States Nuclear Regulatory Commission

RE: Public Service Indiana, Inc. } Docket Nos.  
(Marble Hill Nuclear Generating } STN 50-546  
Station, Units 1 & 2) } STN 50-547

A REQUEST FOR A HEARING ON ORDER CONFIRMING SUSPENSION OF CONSTRUCTION

I

The ORDER CONFIRMING SUSPENSION OF CONSTRUCTION at Marble Hill, issued August 15, 1979, by the Office of Inspection and Enforcement (IE), U.S. Nuclear Regulatory Commission, states (page 7) that any person whose interests may be affected by this order may request a hearing within 20 days of the date of the order, and that the issues to be considered at such a hearing shall be: (1) Whether the facts set forth in Parts II and III of the Order are true; and (2) Whether the Order should be sustained.

II

- The Order 1) Confirms the stop work order on all safety-related construction issued August 7, 1979, by the licensee (Public Service Indiana) and cites in Sections II, III, and Appendix A, numerous instances of the licensee's noncompliance with Criteria of Appendix B 10 CFR Part 50 of the Commission's regulations; refers to the inspection of the National Board of Boiler and Pressure Vessel Inspectors, June 12-14, 1979, at the Marble Hill site which resulted in the Board's recommendation that the licensee's ASME Certificate of Authorization should be withdrawn and that the licensee should cease acting as a supplier of ASME Code material to its subcontractors without ASME authorization; and notes the failure of the licensee to institute a quality assurance program for the construction of Marble Hill;
- 2) Requires that the licensee submit in writing under oath to the Director of Inspection and Enforcement a description of its revised quality assurance program and the steps taken to assure that safety-related construction will be conducted in accordance with Appendix B of 10 CFR Part 50 of the Commission's regulations;

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- 3) Orders that safety-related construction shall not resume in whole or in part until the Director of Inspection and Enforcement has confirmed in writing that reasonable assurance exists that such construction activities will be conducted in accordance with construction codes for nuclear plants, and lists 9 items which the licensee must address in evaluating its past quality assurance program and revising and developing a new quality assurance program, and which the Director will consider in reaching his determination (whether and extent to which the licensee has adequately addressed the 9 items);
- 4) Notes that the filing of a request for a hearing need not stay resumption of all or part of construction if authorized by the Director in accordance with the order, nor need that the Order be stayed by the pendency of any proceeding on the order.

### III

As previously mentioned, the Order 1) lists and describes violations and non-compliances of Public Service Indiana (PSI) with provisions of their Construction Permit, and 2) documents PSI's failure to institute a quality assurance program, the basis for suspension of safety-related construction.

The main thrust of the Order, however, is toward "getting the show on the road" again at Marble Hill. To do this, PSI must "reasonably assure" the NRC that safety-related construction will be according to accepted construction codes and a quality-assured program (under oath).

The final thrust of the order emphasizes the priority the NRC places on resumption of construction. Neither a request for a hearing, nor the pendency of any proceeding, need stay resumption of all or part of construction activities.

THE PRIORITIES OF THE NRC ARE MISPLACED. The Order characterizes the problems at Marble Hill as "serious" but only in the context of inadequacies in the quality assurance program. How serious are the constructional deficiencies at Marble Hill in terms of the public health and safety? The public is concerned as to the adequacy of the NRC-PSI investigation and should be informed of its extent. If it has not been sufficient, there should be a full-scale study.

The question of whether PSI's construction license should be revoked should be part of a thorough assessment of the situation and take precedence over other considerations.

Several independent investigations of Marble Hill's problems are under way:

Senator Birch Bayh requested in July that the Senate Committee on Environment and Public Works conduct a full and complete investigation into numerous violations concerned with improper pouring of concrete in safety areas of Marble Hill.

The American Society of Mechanical Engineers (ASME) will

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conduct their own investigation in September based on the report of the National Board of Boiler and Pressure Vessel Inspectors investigation of June 12-14, 1979.

The Indianapolis office of the FBI is investigating construction practices at Marble Hill as an outgrowth of the NRC's investigation of worker allegations of "cover ups" of faulty concrete.

It would be arrogantly presumptuous to even consider resumption of safety-related construction at Marble Hill before the results of all of the investigations are in, a definite analysis is made of the quality of the structural concrete, and the seriousness of the violations and charges have been assessed. PSI did not delegate responsibility to its contractors but exercised full responsibility and control over all aspects of the Marble Hill Project. As the responsible party, it must wait for the results of the investigations.

With these considerations in mind:

THE SASSAFRAS AUDUBON SOCIETY REQUESTS A HEARING ON THE ORDER FOR SUSPENSION BECAUSE OF OBJECTIONS TO AND QUESTIONS ON THE ORDER, AS WELL AS THE FIRM BELIEF THAT OUR INTEREST WOULD BE AFFECTED WERE CERTAIN PARTS OF THE ORDER TO BE SUSTAINED.

Whether the facts set forth in Parts II and III of the Order are true is not as pertinent nor as important as whether they give a fair and accurate account of the situation as it developed. By themselves, they are remarkably incomplete (another valid reason for a hearing: to present other facts and other viewpoints).

WE FURTHER REQUEST THAT THE SUSPENSION OF CONSTRUCTION BE SUSTAINED BY THE NRC UNTIL INVESTIGATIONS IN PROGRESS ARE COMPLETED, AS WELL AS ANY WHICH MIGHT BE DEEMED NECESSARY AS A CONSEQUENCE, AND THE SERIOUSNESS OF THE SITUATION IS PROPERLY ASSESSED.

#### IV

The following discussion of many points concerning 1) construction, 2) inspection of construction, and 3) other regulatory aspects preceding plant operation relative to Marble Hill and other nuclear plants, is designed to further establish our right to a Hearing under the Order of Suspension.

#### V

How important is "meticulous engineering, construction, and quality assurance" in the construction of a nuclear plant to the safe operation of that plant?

The Risk Assessment Review Group on Reactor Safety asserted in their Report (NUREG/CR-0400 September 1978) that "safety with respect to normal accident sequences would lie in redundancy, defense-in-depth, and meticulous engineering,

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construction, and quality assurance." 10 CFR Part 50.34 and Appendix B of the Nuclear Regulatory Commission Code and the ASME Nuclear Code were adopted to insure, as far as they could, "meticulous engineering, construction, and quality assurance" of nuclear generating stations. The oft-used term, "safety-related", implies that there should be strict and conscientious adherence to the codes to assure the public's health and safety.

Appendix A of the Order of Suspension is an impressive account of noncompliance of PSI personnel and personnel under contract with PSI with 10 CFR Part 50 Appendix B:

- .....personnel assigned to quality assurance responsibilities did not have appropriate experience in placement of concrete for nuclear reactors and did not follow acceptable standards and procedures in the placement of concrete at Marble Hill, e.g. in specific instances, preplacement inspection did not identify improper horizontal and vertical preparation of construction joints, inadequate cleanliness of reinforcement steel, and inadequate clearance of reinforcement steel; placement inspection did not identify improper use of concrete vibrators, improper concrete lift thickness, and excessive lateral movement of concrete using vibrators.
- .....even given recognition of improper placement of concrete, PSI inspection personnel had insufficient authority to immediately stop or prevent nonconforming in-process work and there was no detailed procedure for evaluating repetitive nonconformances.
- .....in the matter of repair of defective concrete, PSI 1) did not assure that the accepted procedure for identification and tagging of defective concrete was followed; 2) did not assure adequate training of craft personnel in repairing defective concrete, as instanced by improper materials used in repairs, improper storage of cement used for dry-pack materials, and lack of a procedure for repair of defective concrete using dry-pack materials, and did not identify or take corrective action with respect to approximately 170 unacceptable concrete patches.

The Order of Suspension mentions that the first Notice of Violation with regard to poor control of the quality of concrete placement was issued to PSI on May 4, 1979, with a second Notice of Violation on May 29, 1979 (which included a citation on improper curing of concrete in the containment wall). The Order does not mention, however, that NRC inspectors met with site staff representatives at the conclusion of the April 3-6, 1979 inspection and summarized the scope and findings which included noncompliances in concrete work. Region III personnel also met with PSI Management on May 15, 1979, to request that PSI evaluate in-place Auxiliary Building concrete and discussed the need of quality control inspection of concrete activities. Nevertheless, despite these early notifications and discussions with PSI, the many noncompliances listed in Appendix A (and repeated above) were identified in NRC investigations covering the period from June 21-July 27, 1979.

VI

The public first learned of the faulty concrete construction at Marble Hill

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(as well as the faulty repair of that concrete) on June 12, 1979, through allegations contained in an affidavit of Mr. Charles Cutshall who had worked as a concrete finisher's helper at Marble Hill. Mr. Cutshall is referred to in the Order as "a former construction worker at the Marble Hill site who alleged that several honeycombed areas in the concrete had been improperly repaired."

Both the NRC and PSI identified honeycombed areas that had been defectively repaired subsequent to Mr. Cutshall's allegations, but no mention is made in the Order of his references to the directions of supervisor personnel "to fill in certain holes or honeycomb in the side of a wall before the inspector can see it." As Mr. Cutshall describes it:

.....the defective repairs made at the supervisor's direction consisted of slapping a patch on the honeycomb of an inch or so, just to make it look good from the outside.

No mention is made in the Order of Mr. Jewel Rogers, Mr. Stanley Mortenson, and Mr. Michael Walston, also concrete workers at Marble Hill, who signed affidavits, July 10, 1979, charging serious flaws in the concrete work at Marble Hill, including "heavy faults" in the base of the reactor containment building. The affidavits contain the names of personnel who allegedly ordered cover-ups of concrete flaws.

A former cement inspector at Marble Hill, an employee of U.S. Testing (who has remained unidentified by the press) has stated in a sworn transcript that one of his inspection reports was falsified. He alleges that his initial report indicated a failure of the cement batch, but was changed to show that it had passed. He came across the falsified report while going through the files on the site.

The same cement inspector alleges that cement was poured in driving rains, curing temperatures for concrete were recorded on days when no one was present, and that he was instructed by U.S. Testing to wait for a "good batch" of cement before sampling it. He further alleges that PSI was informed of many of the construction problems as early as August 1978 but took only minimum corrective measures, and did not tear out the work in the core containment building where specifications were not met.

PSI has also delayed reporting as well as failed to report structural damage at Marble Hill, although NRC Regulations require reports within 24 hours of a "significant deficiency".

On February 13, 1979, concrete was poured at a rate 3X faster than recommended in the NRC Regulatory Guide, rupturing a form and deforming the steel liner. The construction company reported the "incident" immediately to PSI but it was felt that it was not serious enough to be reported to the NRC. NRC inspectors learned of the damage on their own on April 30, 1979, and received no formal notification until June 1, 1979.

A May 9, 1979 Report from PSI to the NRC (found in the Marble Hill File at the Madison-Jefferson County Library) was concerned with an April 9, 1979 accident in which two construction cranes collided, with the 4100 crane falling and striking the containment liner with considerable damage to stiffeners and reinforcing bars. A complete

report of the significance of the damage was promised by PSI when evaluation was complete, but there was no follow-up Report in the file in mid-June, 1979.

## VII

The Order notes in Appendix A (5) that contrary to 10 CFR Part 50, Appendix B, Criterion XVI (Corrective Action), PSI did not take action to resolve noncompliance with ASME requirements related to their activities as a supplier of materials to its site contractors, even though these noncompliances were identified approximately two years ago. (emphasis added)

The failure of PSI to comply with the ASME Code within a "reasonable period of time" prompted an investigation of the Marble Hill Project by the National Board of Boiler and Pressure Vessel Inspectors, June 12-14, 1979, resulting in the citing of PSI for numerous violations of the ASME Code (1.7 of the National Board Report, July 10, 1979) and recommending that the owner's ASME Certificate of Authorization should be withdrawn until such time as PSI has obtained a valid Certificate of Authorization to use the ASME "N" symbol and has corrected the apparent Code violations.

The American Society of Mechanical Engineers (ASME) plan to conduct their own investigation in September on the findings of the National Board of Inspectors. In the meantime, we seek answers to a number of obvious questions raised by the National Board Report:

- .....Since PSI advised the National Board team that they, as owner, had overall responsibility for the design and construction of the Marble Hill Nuclear Generating Plant, and did not propose to delegate that responsibility to others, why had they not applied "in good time" to ASME for a Certificate of Authorization to use the "N" symbol as required by NCA-3510?
- .....Why didn't PSI and its contractors have the most recent Code editions and addendas for information concerning purchase of materials and for design specifications?
- .....Why was the only authorized Hartford Nuclear Inspector at the Marble Hill site (Cherne Contracting Corporation) instructed not to provide inspection and auditing services to PSI?
- .....1.3.1 of the National Board Report says that "The Concrete portion of the containment (and other concrete work) preceded the mandatory date of Section III, Division 2, and therefore was not designed to ASME Code Requirements." In what respects do the present ASME Code Requirements for containment construction differ from those followed by PSI for Marble Hill?
- .....Why did PSI not provide purchase orders and information on designated impact testing per NCA-3252 as requested by the National Board?
- .....Why did PSI not provide material documentation such as Certified Test Reports to their subcontractors as requested?

VIII

The NRC inspection of Marble Hill, April 3-6, 1979, found that the requirements for welded joints as stated in the specifications for Examination of Welded Joints (Sargent and Lundy Specification NO. Y-2725) were relaxed from a minimum density for single viewing of 1.5 to a 1.3 minimum density. A Notice of Violation was filed with PSI on May 3, 1979.

At the same time, a Notice of Deviation was filed with PSI for failure to comply with Appendix X to Section III and Section V of the ASME B & PV Code in radiographic examination of primary containment liner welds and for noncompliance with 10 CFR 50 Appendix B Criterion III.

In the Order, the NRC cited PSI for noncompliance with 10 CFR Part 50, Appendix B, Criterion IX in that the licensee's procedures for welding only provided for performance of vertical and overhead welding techniques.

IX

How has PSI responded to the public being informed of PSI's problems? PSI has run two full-page advertisements about Marble Hill's construction in the newspapers in PSI's service area addressing many of the concerns but exhibiting a basic unwillingness to admit that SAFETY-----THE PUBLIC SAFETY-----is what the notices of violations are basically about.

In the Friday, July 20, 1979 advertisement STRAIGHT TALK ABOUT MARBLE HILL, under the first caption "how serious IS the problem at Marble Hill", PSI notes:

"In today's climate, any flaw in construction or inspection procedures at a nuclear power plant is serious because of its effect on public confidence. Thus, in this context, are our Marble Hill problems serious. Yet none of the concrete honeycombing--even if unrepaired--poses any serious concern to the safe operation of the plant. Many of the 550 or so honeycombs or voids identified by the Company to date are small--less than a foot in diameter--and are mere blemishes on the surface of a three-foot-thick concrete structure. None of the voids creates a serious weakness or increases the possibility of radiation leakage or structural failure. (underlining used to designate bold-faced type in the advertisement)

In the Wednesday, August 8, 1979 advertisement, PSI President Hugh A. Barker pledged "we will not be satisfied with less than 100% compliance with all performance standards in every phase of the project--construction, inspection, quality assurance and quality control" which sounds good in itself.

Actually, the second advertisement was a public confession of the depth and scope of PSI's mismanagement as revealed in the depth and scope of the evaluation of total project management and organizational changes taking place to "assure the public that all safety and work standards will be met."

At the same time, PSI continued to cast doubt on the seriousness of the problems that forced suspension of safety-related work by stating in their advertisement:

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"The problems were real but they did not affect the safety of the project."

and used the age-old scapegoat technique of blaming the nuclear critics, the media, and editorial cartoonists for some of their problems by blowing them "far out of any reasonable proportion."

Should we let PSI's public pronouncement that none of the honeycombing, even if unrepaired, poses any serious concern to the safe operation of the plant go unchallenged?

In the NRC Inspectors Report on the April 3-6, 1979 inspection of Marble Hill, reference is made to numerous areas of defective concrete (i.e. honeycomb) in the Auxiliary Building, and to at least three honeycomb areas in both the Auxiliary Building and the Reactor Building Unit 1 which were not properly tagged for status and repair, and two repaired areas which were not being cured properly.

On May 15, 1979, the licensee was requested to evaluate selected areas of in-place Auxiliary Building concrete, to provide confidence that no internal voids or honeycomb were present in the completed structure. The request was based on the fact that PSI was experiencing a higher than normal frequency and severity of honeycomb occurrence in the Auxiliary Building. On the basis of these results, PSI was to determine whether further investigation of honeycombing in other buildings was warranted.

Did PSI make an evaluation of internal voids of the Auxiliary Building as requested by the NRC? If so, did they find further investigation warranted in other buildings? Was their study done before Mr. Cutshall's allegations?

How complete was the testing program of the NRC-PSI for honeycombing, etc. (prompted by Mr. Cutshall's allegations) in safety-related areas? Are the results of the testing program available? We are assuming that internal voids were part of the investigation.

PSI speaks of many of the voids as small, mere blemishes on the surface. One void has been reported 20' x 8' x nearly 3', while Mr. Cutshall mentions having seen honeycombs four to five feet square. How big were some of the internal voids?

Mr. Cutshall reported in his affidavit of having had a conversation with an NRC inspector on honeycombing:

"The information I have is through an NRC inspector, where he was telling me that radiation will leak through seams and honeycomb patches at a lot larger rate than if it was solid concrete and done right."

Region III is reported to have told the press that if air bubbles are large (and undetected) they will affect the structural stability of the plant, and the consequence of not properly repairing surficial honeycombs will be difficulties in cleaning up after radioactive spills, leakages, etc. Would neutron movement, and therefore uptake by materials in the structural concrete containment wall, be accelerated by honeycombing?

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The question is: How thorough has been the identification of honeycombing in the safety-related structural concrete, external and internal? How thorough will be the repairs?

PSI, in the first advertisement, called the extensive repairs they would be doing "admittedly overkill".

X

The Nuclear Regulatory Commission has asked the U.S. Justice Department to look into possible criminal violations which have occurred in the construction of the Marble Hill plant. The request is an outgrowth of the NRC's investigation of charges by workers of deliberate cover-up of faulty concrete by improper repair methods.

Mr. Joel Deckard, Congressman from the 8th District, Indiana, who has been independently investigating worker allegations, has turned his materials and information over to the Justice Department.

Senator Birch Bayh of Indiana, after asking the Senate Environment and Public Works Committee to undertake a full-scale congressional investigation of construction practices at Marble Hill, inserted a lengthy statement: NUCLEAR SAFETY: A MUST, in the Congressional Record of the Senate, July 31, 1979.

He mentions in that statement that, thinking long and hard about the question of nuclear safety, it seemed to him "that the one thing which might do more to assure strict compliance with safety standards than any other option was the extension of personal liability to those who knowingly and willfully violate safety standards."

When S.562 was on the Senate floor, Senator Bayh offered an amendment, which was passed, which extends criminal penalties of up to \$25,000/day, and up to 2 years in jail, to anyone who knowingly violates Federal safety standards for nuclear plants. His rationale for the amendment:

"When somebody intentionally sets out to do bodily harm to another person, our system of justice holds that individual responsible by setting strict criminal penalties for such behaviour. The Congress has adopted this principal in a number of safety statutes currently on the books--such as those dealing with toxic substances, or drugs, or air and water quality--by insisting on criminal penalties for those who knowingly violate public health and safety standards designed to prevent the poisoning of our industrial society. Given these precedents, in statutes which deal with less dangerous risks than those intrinsic to nuclear power, I felt it made good common-sense to extend similar penalties to those who knowingly violate safety standards established to protect the public from risks associated with nuclear power." (emphasis added)

S.562 would increase civil penalties for violations of safety standards from \$5,000 to \$100,000 per violation and removes the ceiling on penalties for violations repeated over time.

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XI

The quality of the construction itself, as well as the quality of the materials used to construct a nuclear plant, enter into the "risk" which the public is asked to accept when they live near a nuclear plant (50 mile radius or so). The public has the right to expect construction in compliance with the highest standards, and with the NRC, the regulatory agency, assuring quality construction in the interest of the public health and safety. The public also has the right to know when serious constructional deficiencies occur, such as happened at Marble Hill, and when questions are raised as to whether and to what extent the deficiencies can be repaired.

Why did it take worker affidavits on faulty concrete construction and repair, and release of findings of an investigative report of the National Board of Boiler and Pressure Vessel Inspectors fortuitously via the news media for the public to learn that PSI had never really instituted a quality assurance/quality control program?

The fact that the NRC knew of PSI's failure to develop a Quality Assurance Program, knew of constructional deficiencies (although not in depth), yet seemed to be unable to get PSI to conform to provisions in their construction permit, standards and codes of construction, to respond to violations, etc., demonstrates basic deficiencies in the regulatory process.

"Friendly persuasion" did not work with PSI in the month of May, 1979, for even as the NRC was meeting with PSI Management on such timely topics as a) QC Inspection of Concrete Work Activities, b) Need for Prompt and Adequate Corrective Action, c) Construction Deficiency Reporting Requirements, d) Communications Between NRC and PSI (on the need for openness and candor between the licensee and the NRC), e) Housekeeping, and f) Document Control, PSI's priorities were elsewhere, with preparations for submission of their Final Safety Analysis Report (FSAR) and Application for an Operator's License for Marble Hill, so that their CONSTRUCTION MILESTONES SCHEDULE would be met.

The submission of the FSAR for Marble Hill on June 1, 1979, to the NRC is indicative of the general recalcitrance of PSI toward NRC regulatory authority. The NRC Caseload Forecast Panel, after their February 27-28 site visit to Marble Hill, had "advised the applicant not to submit the Final Safety Analysis Report until after they set the reactor pressure vessel in place." (emphasis added) Dr. James Coughlin, Vice-President, Nuclear, PSI, instead wrote a letter to Mr. Boyd (May 4, 1979), NRC, disputing the Caseload Forecast Panel's estimated date of July, 1983, for fuel load, and submitted the FSAR on schedule (PSI's) to the NRC.

XII

The failure of the regulatory process to assure "quality-assured" construction of Marble Hill raised the question of HOW COMMON WAS THIS FAILURE in the construction of nuclear plants?

WE FOUND IT VERY COMMON, SO MUCH SO THAT THE FEDERAL NUCLEAR POWER PLANT INSPECTION AND ENFORCEMENT PROGRAM HAS BEEN THE SUBJECT OF DEEP CONCERN AND INTENSE INVESTIGATION BY THE COMPTROLLER OF THE UNITED STATES (GAO), THE UNION OF CONCERNED SCIENTISTS, AND OTHER

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## CITIZEN GROUPS, LONG BEFORE THREE MILE ISLAND.

The "adequacy" of concrete placement, characterized by extensive honeycombs and voids, a "serious" problem at Marble Hill, has been indicative of a basic quality assurance problem at many other plants as well. The following resume is not exhaustive but illustrates the point:

### MIDLAND, MICHIGAN

NRC inspectors identified serious deficiencies with concrete pouring, welding of reinforcement bars, and overall quality control at Midland nuclear plant in 1973. The Atomic Safety and Licensing Appeal Board lambasted the utility for a "pattern of repeated, flagrant and significant quality assurance violations of a non-routine character, coupled with an unredeemed promise of reformation." A public hearing was held, and the utility revamped its quality assurance program, and construction resumed after a six-week shutdown.

### TURKEY POINT, FLORIDA

Honeycombing was found in the reactor building near the end of construction. It took the utility about nine months to make the repairs in the early 1970's.

### CRYSTAL RIVER, FLORIDA

Honeycombing was discovered in the reactor building when construction was nearly finished in 1974. It took the utility about four months to chip out the defective concrete and patch it up.

### PERRY, OHIO

✓ NRC inspectors found that concrete wasn't meeting stress requirements and shut down concrete construction in safety-related areas for about three months in early 1978. Cleveland Electric hired a new executive to oversee construction and work was allowed to resume.

### WOLF CREEK, KANSAS

The Base Mat Concrete in the Reactor Containment Building showed evidence of weakening rather than hardening with age. Approximately 57% of the 132 cylinders of the 90-day break test failed to reach 5000 psi. Builders, owners, and Federal regulators of Wolf Creek learned of the concrete problems in the base mat between March 13-15, 1978, the public on December 13, 1978, when an internal NRC memo was "leaked" to the Kansas City Star.

Work continued on the reactor containment structure which sits atop the base mat until December 18, 1978, five days after the public was informed of the concrete problems.

In addition to the base mat problem, a large void was discovered in the reactor containment wall under the equipment hatch, and reported to Region IV NRC, December 14, 1978. The void was reported to reach through the wall and extended several feet on each side of the hatch. The void disclosure prompted additional inspection of concrete construction. As a result, a Notice of Violation was issued to Kansas Gas & Electric (KG&E) for 6 instances of failure to comply with conditions of their construction permit regarding concrete

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construction and 14 additional items were listed as requiring further investigation.

KG&E have been repeatedly cited for noncompliance with standards and for the general failure of their quality assurance program. The NRC instructed KG&E to fill in the voids, revamp its quality assurance program, and allowed construction to proceed as of July, 1979. Was the base mat strengthened, or criteria lowered?

#### SOUTH TEXAS, TEXAS

Honeycombing in the reactor containment building of the South Texas Nuclear Plant near Bay City, Texas, was found to be sufficiently severe to cause the NRC to halt concrete work in safety-related areas in June, 1979.

### XIII

The GAO (General Accounting Office) was drawn into the matter of nuclear power plant construction and inspection as the result of worker allegations of poor construction practices on the North Anna Nuclear Power Plants in northeastern Virginia, about 40 miles north of Richmond. Mr. John D. Dingell, Chairman, Subcommittee on Energy and Power, requested on August 25, 1976, that GAO review the Nuclear Regulatory Commission's investigation of the workers' allegations. GAO published their Report: ALLEGATIONS OF POOR CONSTRUCTION PRACTICES ON THE NORTH ANNA NUCLEAR POWER PLANTS on June 2, 1977.

The NRC investigation found 32 instances in which Virginia Electric Power Company (VEPCO) and its contractors failed to meet acceptable construction criteria or specifications. Many of the allegations referred to piping systems and one serious problem centered around the quality of the welds of a major pipe supplier.

The NRC concluded that the items investigated had no direct safety significance but, collectively, were indicative of poor management control over the construction and quality assurance programs. The NRC fined the utility \$31,000, required corrective action on the items of poor construction, and required the utility to strengthen its management and quality assurance efforts to preclude further deficiencies.

GAO found that the NRC investigators assigned to North Anna were thorough and aggressive in their work but disagreed with the NRC Headquarters decision that there was no direct safety significance involved.

GAO discussed the investigation Report with NRC investigators with several of them not knowing the technical basis for NRC Headquarters conclusion that the investigation had no direct safety significance. Two of them disagreed with the conclusion, and several were surprised that a more harsh enforcement action wasn't taken in view of the number and types of noncompliances found at North Anna.

NRC's basis for concluding that there was no direct safety significance associated with the items of noncompliance is based upon the premise that, if the defects had gone undetected and led to equipment failures, independent back-up equipment or systems would protect against a nuclear accident (redundancy and



defense-in-depth philosophy).

GAO believes that the public should have been informed that if some of the items had not been found and corrected, there could have been a decrease in reliability in certain secondary, back-up, or supporting components or systems.

GAO noted in its Report that achievement of an "effective" redundancy is also dependent on a high level of quality construction and a highly motivated work force. It requires that the criteria or standards established by the NRC and nuclear industry be closely adhered to during the plant's construction.

The NRC concluded from an internal analysis of the deficiencies at North Anna that, if some of the items had not been found and corrected, there could have been a decrease in reliability in certain secondary, back-up, or supporting components or systems. This could have prevented these systems from responding as anticipated in certain emergency situations and might have removed one layer of safety that is designed into a commercial nuclear power plant. This information, however, was not presented in the NRC investigation report or its attachments.

At the time of the North Anna investigation, Unit 1 of North Anna was 94% complete (and Unit 2 about 75% complete, although Unit 2 was not part of the investigation!). GAO emphasized in their Report that, since Unit 1 was nearly complete, and the quality assurance management weak (NRC inspectors found that the deficiencies at North Anna placed it at the lower end of the spectrum with regard to quality of construction work), the situation offered very little assurance that other problems--possibly more serious than those uncovered--did not exist at North Anna.

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#### XIV

GAO continued to study and evaluate the Nuclear Regulatory Commission's program for inspecting the construction of nuclear plants and inspecting firms that supply safety-related components for nuclear plants. The GAO study Report: THE NUCLEAR REGULATORY COMMISSION NEEDS TO AGGRESSIVELY MONITOR AND INDEPENDENTLY EVALUATE NUCLEAR POWER PLANT CONSTRUCTION (September 7, 1978) has as its principal conclusion (page ii):

THE COMMISSION SHOULD IMPROVE ITS BASIS FOR JUDGING THE QUALITY OF NUCLEAR POWER PLANT CONSTRUCTION

Commission inspectors should know about the day-to-day activities at a construction site and determine for themselves the quality of construction work, but GAO's review revealed that the Commission inspectors

...do little independent testing of construction work, and rely heavily upon the utility company self-evaluation;

...spend little time observing ongoing construction work; and

...do not communicate routinely with people who do the actual

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construction work.

GAO pointed out that the Commission does not have the equipment necessary to perform most types of testing and that much of the inspector's time is spent reviewing the mass of documentation maintained at a construction site as a basis for judging the adequacy of the utility's programs for insuring quality construction.

GAO found that Commission inspectors are not required to maintain any type of documentation or support for their inspection reports, which means that the Commission has little evidence to support the extent and quality of the inspection effort.

GAO criticized the Commission for not developing a regulation to protect construction workers from reprisals when workers bring construction problems to the attention of the Commission.

GAO also noted that THE COMMISSION'S VENDOR INSPECTION PROGRAM NEEDS TO BE IMPROVED:

The Commission began a vendor inspection program in 1974 when it realized that about 63% of all nuclear power plant construction and operation problems were traceable to vendor errors, and that utility companies were not properly inspecting vendors to make sure that they were producing quality components.

GAO found that NRC vending inspector reporting practices needed improvement with more attention to details and documentation of inspection work, and investigations. In addition, the Commission was largely neglecting manufacturers of electrical components and other instruments that control critical operations of safety systems, and had insufficient personnel in terms of the number of firms involved.

#### XV

Item (9), page 6, of the ORDER OF INSPECTION asks the licensee to describe their system (for the NEW ORDER) "to train all levels of construction personnel in the need and importance of satisfying quality requirements and to encourage all personnel to communicate, without recrimination on the part of the licensee or its contractors, their concerns or knowledge of improper construction practices to proper levels of management for evaluation and resolution."

We look with complete scepticism on "encouragement" of personnel to communicate knowledge of improper construction practices to proper levels of management (without recrimination) as an effective way of improving the quality of construction! Perhaps, if an NRC inspector were present at the moment of worker communication of such to management, its potential might increase, but to what extent is also questionable.

At Marble Hill, former worker affidavits was the only way to go to make known improper construction practices and deficiencies since PSI repeatedly refused to act on NRC requests to monitor themselves, and evaluate various aspects (honeycombing, for example) of the construction.

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XVI

The CALLOWAY SAGA (as unfolding near Fulton, Missouri), in the telling of Mrs. Leo A. Drey of University City, Missouri, in letters to: the Senators from Missouri, Eagleton and Danforth, December 6, 1977; Mr. James G. Keppler, Director, Region III NRC; Glen Ellyn, Illinois, January 12, 1978 and July 17, 1978; Dr. Ernst Volgenau, Director, Office of Inspection and Enforcement, NRC, Washington, D.C., April 20, 1978; and Mr. Victor Stello, Jr., Director, Office of Inspection and Enforcement, NRC, Washington, D.C., June 28, 1978; etc., will be a momentous chapter in the history of Inspection (and Enforcement) of "Quality-Assured" Construction of Nuclear Power Plants, filled as it is with wholesale violations of criteria, standards, and construction codes, even in its early history, and containing an account of the failure of the NRC to protect a worker who did first report his concerns and knowledge of improper construction practices to proper levels of management (to no avail) prior to telling and showing NRC inspectors.

As with many other nuclear plants, Calloway had concrete void problems (indicative of basic quality assurance problem). Mrs. Drey notified Region III by phone on June 17, 1977, of concrete voids in the reactor building base mat, a significant deficiency in construction which could, were it to remain uncorrected, adversely affect the safe operation of the plant (10 CFR 50.55(e)). In the letter to Senators Eagleton and Danforth, Mrs. Drey noted that only about 5% of the undersurface of the concrete mat was accessible for viewing.

Union Electric informed the NRC in a letter dated July 15, 1979: "In order to assess the significance of this condition, we have chipped away the areas containing voids and have found that the honeycombing extended into the lower layers of the reinforcing steel matrix ... . If the defects in the concrete are limited to those which can be visually observed at this time (emphasis added), we believe that the structural integrity of the base mat is not impaired and that repairs can be made so that tendons may be properly installed."

Mrs. Drey observed: "If reports of inadequate vibrating (to distribute and settle the concrete) during the pour are accurate, it would seem highly probable that voids in the concrete exist not only in the ceiling of the tendon gallery, but throughout the rest of the base mat, as well."

The extent of the voids in the base mat and the matter of the faulty embeds remain unresolved at Calloway.

XVII

The Union of Concerned Scientists (UCS) has closely monitored government regulation of the U.S. Commercial Nuclear Power Program in the past few years, and the publication LOOKING BUT NOT SEEING by Lawrence S. Tye, December, 1978, is an outgrowth of their concern.

UCS believes that the task of monitoring construction of a nuclear plant is made extremely difficult by:

- 1) the lack of detail in design information in construction permit

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- applications even for vital safety systems;
- 2) standards which are supposed to govern construction are themselves vague;
  - 3) utilities' commitment to adhere to the standards is "equivocal";
  - 4) utilities have been typically permitted to change plant design "in the field" and as they go along without notice to the NRC;
  - 5) even when NRC inspectors try to prove significant licensee non-conformance, enforcement is difficult, because many regulatory criteria are voluntary and thus unenforceable.

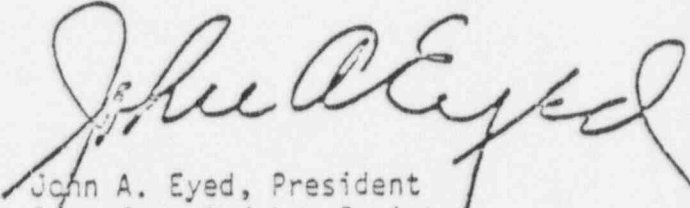
The UCS charges that NRC Headquarters Personnel typically understate the safety significance of inspection findings, opting for mild enforcement sanctions. They assert that many of the widespread and frequent safety problems of the nuclear industry would not have occurred if adequate regulatory measures had been imposed on the nuclear industry.

How has the NRC responded to criticism concerning the failure of the NRC regulatory process to assure quality construction of nuclear plants? According to the UCS, by suggesting that the licensees police their own activities more vigorously, even though the utilities' record demonstrates their inability or unwillingness to do so!

#### XVIII

The Office of Inspection and Enforcement of the Nuclear Regulatory Commission, in its ORDER OF SUSPENSION, is following an historic pattern with Public Service Indiana, offering them the opportunity "to police themselves more vigorously" (to a "fail-safe" quality assured program under oath), even though the utility's record demonstrates their inability and even unwillingness, under strong pressure, to do so.

Will the public, in turn, be expected by the NRC to accept that "A LEOPARD CAN CHANGE HIS SPOTS" (UNDER OATH), and, perhaps, an on-site NRC inspector can perform miracles?

  
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