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Administrative Judges:

Christine N. Kohl, Chairman
Dr. W. Reed Johnson
Howard A. Wilber

In the Matter of

LOUISIANA POWER & LIGHT COMPANY

Docket No. 50-382 OL

(Waterford Steam Electric Station,
Unit 3)

AMENDED AND SUPPLEMENTAL MOTION TO REOPEN CONTENTION 22
December 12, 1983

Now before this honorable Appeal Board, through undersigned counsel, comes Gary Groesch, Chairman of the Waterford 3 Joint Intervenors, who with respect moves again to reopen Contention 22 in the light of further newly discovered evidence which appeared this day in Gambit weekly newspaper, which is appended hereto and made part hereof. Because the study made by Harstead Engineering on the Waterford 3 base mat as well as that made by the Staff rely on falsified documents for their basic assumptions, it must now be shown affirmatively that this fact has no effect on the safety of Waterford 3 and its potential to give reasonably long service.

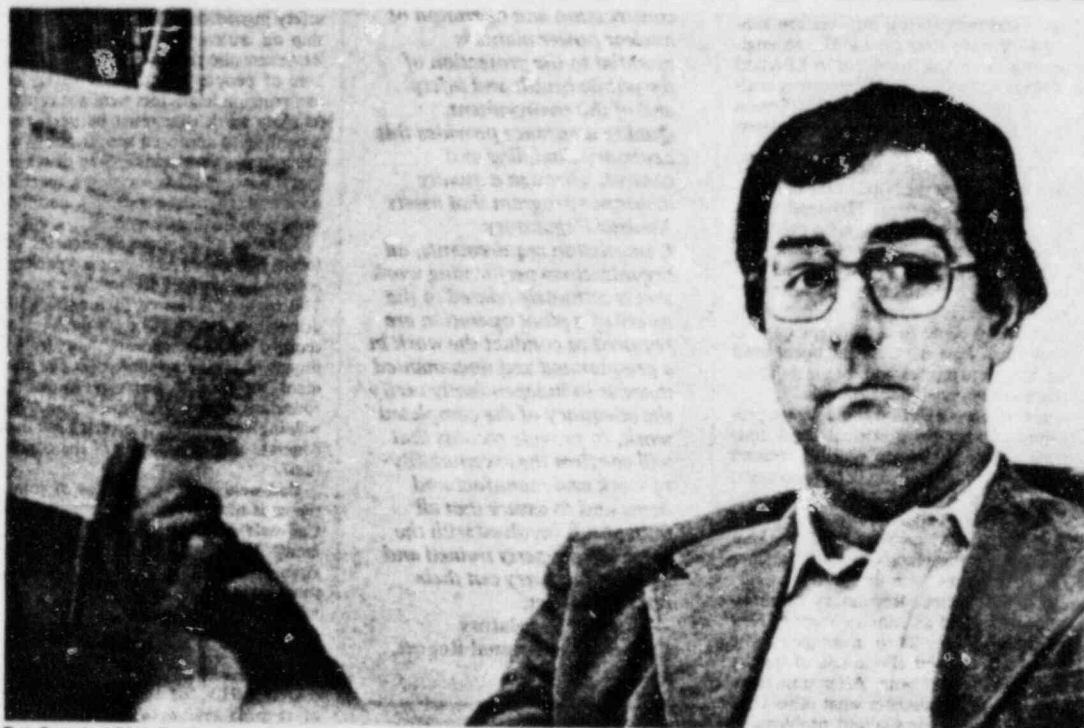
WHEREFORE mover reurges his request for a public hearing.

Carole H. Burstein

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445 Walnut Street
New Orleans, Louisiana 70118
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D503

RECORDS INSPECTIONS BLOCKED AT WATERFORD III



Tom Gerrets, LP&L's Quality Assurance Man

Gambit photo by David Richmond

By RON FIDENHOUR

When the report was made the engineers who came to the conclusion did not know about the massive deficiencies in records

Massive records deficiencies including apparently forged signatures, missing records and manufactured inspection reports point to possible flaws in the construction of the foundation at Louisiana Power and Light Company's Waterford III nuclear power plant, *Gambit* has learned. The deficiencies came to light as a result of *Gambit's* ongoing investigation of the possible reasons for cracks which have appeared in the foundation of the nuclear power plant since 1977, cracks which have led the Nuclear Regulatory Commission to call for "permanent surveillance" of the foundation in case of future problems.

The cracks were ruled no threat to the public in a report issued by a federal nuclear regulatory agency on Nov. 28, but when the report was made the engineers who came to that conclusion did not know about the massive deficiencies in records detailing potential flaws in the construction of the foundation.

Although high level management officials for Waterford's architect/engineer and prime contractor, EBASCO Services, Inc., have known about the potentially significant construction deficiencies in the plant's foundation for at least a year, the public record reflects no attempt by any responsible official of either EBASCO or LP&L to notify the Nuclear Regulatory Commission (NRC) of the problems, an apparent violation of federal regulations governing the construction and licensing of nuclear power plants. LP&L officials have known of the problems at least since

July.

Top LP&L quality assurance man Tom Gerrets says he knew nothing of the records or construction problems concerning the foundation. Gerrets specifically denies having seen memoranda from quality assurance inspectors working for LP&L's prime contractor, EBASCO, which detailed the problems and called for a comprehensive review. Other sources say Gerrets received copies of the memo. Gerrets said he could not remember whether or not he had seen non-conformance reports prepared by EBASCO staff dealing with some of the problems, though it is Gerret's legal responsibility to review all such reports and to pass on any significant deficiencies to the Nuclear Regulatory Commission. Gerrets said he was not sure whether forged documents and other records problems should have been reported to the Nuclear Regulatory Commission.

But Gerret's boss, nuclear engineer R.S. Leddick, had a different response. "We will take this very seriously," Leddick said, and he stated flatly that the NRC should have been informed if such problems exist. "We are not going to gloss over problems where safety is an issue," said Leddick, who came to LP&L's Waterford plant in July of this year after the financial collapse of Washington Public Power Services, where he held a similar position.

Structural engineers for the NRC attributed the cracks in Waterford's "floating" foundation to "flexure," unanticipated movement in the water-charged sands

beneath the nearly-completed plant that is related to seasonal fluctuations in the level of the Mississippi River, just 500 yards away. While concluding that the cracks currently present no threat to the foundation's structural integrity, they added that their conclusion could be affected "by significant changes in loads or environmental conditions over the course of time." The NRC has consequently ordered LP&L to maintain a surveillance program throughout the life of the plant to "assure the continuing structural integrity" of its foundation.

When EBASCO's Quality Assurance management learned that safety inspectors were uncovering wholesale irregularities in the records of all phases of the foundation's construction in early June, according to *Gambit's* sources, the inspectors were ordered to halt their review of the suspect records. The order to stop reviewing the troubled records came less than two weeks after *Gambit* reported that cracks had been appearing in the plant's massive foundation since 1977 and that small amounts of water have been seeping into the plant through them since that time. Sources close to the interrupted records review believe that the irregularities it turned up reflect construction deficiencies that are directly related to the cracks and associated water seepage in the foundation.

Many of the irregularities discovered by the muzzled inspection and earlier spot checks of the same records involve civil and perhaps criminal violations of federal

First of a Series

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safety regulations, according to documents obtained by *Gambit*. A large share of the violations were known about by EBASCO management in early December 1982, according to *Gambit*'s sources, and should have been reported to the NRC within a week of that time.

In the report issued two weeks ago, NRC engineers concluded that the cracks offer no threat to Waterford's safe operation or to the surrounding environment, although they made that assessment conditional on the assumption that the foundation was built "in accordance with approved procedures, specifications and regulations." The engineers, assigned to NRC headquarters in Bethesda, Maryland, based their analysis of the plant's structural integrity on information supplied by three sources: LP&L, an engineering consulting firm hired by LP&L to perform an independent engineering analysis of the foundation, and NRC Region IV, the NRC region charged with oversight responsibility for Waterford.

There is no indication in the public record that either the NRC or the independent engineering firm, Harstead Engineering Associates, Inc., were ever told about the records deficiencies uncovered by the various records review. Had that information been made available to either party, *Gambit*'s sources believe, they might have come to a different conclusion, or at least withheld judgment until the structural implications of the deficiencies had been examined in detail.

If true, that assertion could have a profound impact on a critical legal controversy that has been swirling around Waterford and the cracks in its foundation since late June.

Reacting to *Gambit*'s May 21st report that new cracks have been appearing sporadically in the plant's foundation since the first cracks were discovered in July 1977, the Nuclear Regulatory Commission dispatched an Inquiry Team to New Orleans on June 28 to investigate those and other *Gambit* allegations of quality assurance breakdowns. After unsuccessfully seeking to discover what other facts *Gambit* might know about problems at Waterford, the Inquiry Team visited the plant itself on June 30 to inspect the foundation. The Inquiry Team issued its findings on July 14, reporting that they had found far more extensive cracking in the plant's foundation than LP&L had previously acknowledged. Their report recommended that the NRC do a follow-up investigation into five separate areas at Waterford, including making a serious effort at determining the source of the foundation's cracking.

Eleven days later a group officially known as the Joint Intervenor filed a motion asking the NRC to withhold LP&L's license to operate Waterford. The

Joint Intervenor, a coalition of environmentalists and anti-nuclear citizens' organizations that have been fighting Waterford since 1974, filed a similar motion in 1979. In that motion they argued that defects in Waterford's workmanship and materials made the plant an unacceptable risk to public health and safety, citing "improperly

The application of disciplined engineering practices and thorough management and programmatic controls to the design, fabrication, construction and operation of nuclear power plants is essential to the protection of the public health and safety and of the environment.

Quality assurance provides this necessary discipline and control. Through a quality assurance program that meets Nuclear Regulatory

Commission requirements, all organizations performing work that is ultimately related to the safety of a plant operation are required to conduct the work in a pre-planned and documented manner to independently verify the adequacy of the completed work, to provide records that will confirm the acceptability of work and manufactured items and to assure that all individuals involved with the work are properly trained and qualified to carry out their responsibilities.

—Nuclear Regulatory Commission Annual Report, 1980

poured... concrete." But they were unable to produce hard evidence to support their contention and the NRC supported an LP&L move made in August 1981 to dismiss the Intervenor's motion.

When reports of new cracks in the foundation surfaced in May, however, and were then supported by the Inquiry Team report, the Intervenor's argument gained new life and they filed a motion to re-open their contention. The NRC staff report issued two weeks ago is a response to the Intervenor's contention, officially titled Contention 22. NRC staffers recommended that the new motion be denied, basing their assessment on the failure of

the Intervenor to satisfy two of three criteria motions to re-open must meet: that the motion address a significant safety issue and that a different result might have been reached had the newly proffered material been considered in the first place. The information contained in the documents *Gambit* has obtained would arguably have met those standards.

Irregularities outlined in the documents include wholesale instances of required safety-related construction documents that are missing outright; missing documents that have been replaced by phony documents manufactured after the fact; faulty documents that have been altered or "doctored"; and some instances involving possible forged signatures on safety inspections okaying the workmanship on critical safety-related structures. Reviewers also discovered that large numbers of people employed as safety and construction inspectors were not certified to okay work that must be performed according to approved specifications and procedures. They additionally discovered that those approved procedures, specifications and criteria for accepting completed work were frequently ignored.

Some or all of these deficiencies were found in nearly every records "package" reviewed, according to *Gambit*'s sources. The records reviewed included "soils" documents detailing the placement of the crushed shell base beneath the plant's 12-foot thick concrete foundation, the placement of the waterstops under the foundation, the placement and "cad-welding" of the steel reinforcing bar in the concrete and the pouring of the concrete itself.

Cad-welding is the process of joining the ends of the reinforcing bars together. Cad-welding is considered a critical element in ensuring the foundation's strength. The forged inspector's signatures were found primarily in the cad-welding records, raising doubts that those cad-welds — which are buried in concrete the reactor and other buildings now stand on — were ever actually done.

George Hill, the supervisor of the team of records reviewers whose work was ordered stopped last June, began a 100 percent review of all foundation-related construction records several weeks earlier without authorization from his immediate superior. Earlier spot checks of the same records convinced Hill that the 100 percent review was necessary, he has since told *Gambit*, but he feared that EBASCO's Quality Assurance Manager would veto the idea. Hill's reviewers completed inspections of all the soils and cad-welding records and were in the process of checking the records on the pouring of the concrete for the foundation when they were ordered to stop. By then Hill's group had already reviewed 70 of 1,200 concrete

"pour packages."

According to Hill, the pour packages reflected all of the problems found in the other document packages. Some contained what he described as "horror stories." Asked to assess a memorandum obtained by *Gambit* describing problems in the way concrete was poured in a placement directly beneath Waterford's reactor, Hill said that it described a pour in which "everything that could have been done wrong was done wrong."

Similar records deficiencies in quality assurance programs, as the NRC-mandated safety program is technically known, have led to large fines and even the shutdown of construction operations at other nuclear power plants. Perhaps the best known of those is the William H. Zimmer nuclear power plant located 27 miles from Cincinnati, Ohio. Zimmer's operating utility, Cincinnati Gas and Electric (CG&E), was fined \$200,000 by the NRC for similar records deficiencies in their QA program in November 1981 and given strict orders to set their records and the construction program they represented straight. When CG&E officials chose to manufacture phony records and doctor those that existed instead of taking the more time-consuming and costly route of correcting them according to NRC guidelines — and got caught in the act — the NRC ordered all safety-related work stopped, effectively closing the gates at Zimmer in November 1982.

Hill, who was working as a records reviewer at Zimmer when the NRC ordered it closed, believes that Waterford's problems are worse than those he saw there. Hill resigned his position at Waterford last July and left the nuclear power industry at the same time. He is speaking out now, he told *Gambit*, because he believes in nuclear power and wants it to survive. He is afraid however that decisions like the ones he says he saw being made on a routine basis by the management at Waterford will ultimately lead to a serious nuclear accident that will sound the death knell for the entire industry. LP&L's apparent decision not to inform the NRC of the quality assurance deficiencies in the construction records for Waterford's foundation is one example Hill uses to illustrate his point. *Gambit* has also interviewed several other current and former quality assurance personnel from Waterford, all of whom agreed to discuss their knowledge of breakdowns in the QA program there on the condition that they were not named. Even those who no longer work in the nuclear power industry (although most still do) said they were afraid of retaliation if LP&L or EBASCO officials discovered their identities.

Similar breakdowns in the quality assurance program for Waterford's instrumentation system and most of the plant's

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ing systems, including several critical systems, were reported to the NRC P&L in the spring of 1982. Those breakdowns resulted in an agreement between the NRC and LP&L to order the contractors who installed the systems to completely re-inspect all the installations, work any discovered to be below standard a 100 percent review of all quality assurance documentation and to completely re-train all their craftsmen and

quality control inspectors in quality assurance regulations, procedures and criteria. The NRC also levied a \$20,000 fine against LP&L for those QA program breakdowns. In the debate within the NRC over what action to take against LP&L, some NRC staffers compared the QA breakdowns at Waterford to the QA problems at Zimmer and several other plants that have had serious quality assurance failures.

GEORGE HILL: AN HONEST INSPECTOR

RON RIDENHOUR

George Hill is a man who believes deeply in nuclear power, a field that has provided him with a handsome income for the past several years. But the days are in the past. Gone are the days when Hill moved around the country, of a relatively small number of highly paid nuclear records specialists who ate from place to place as nuclear power plants across the country get ready to come on line. Hill left the industry and \$10,000-plus annual income when he moved away from Waterford III on July 1983. He loved the work, Hill now says, but there were too many compromises along the way for his taste. He got fed up at Waterford. "I'm out of the industry forever," Hill said in an interview six weeks after leaving

Waterford. "I'll never go back. I spent seven years in the industry. Zimmer like to got me. I was there a year. When I went to Waterford I knew it was bad, but I said it can't be any worse than Zimmer. I didn't realize that yes, there was one worse. Waterford is a lot worse."

Waterford III, Louisiana Power and Light's nearly complete nuclear power plant currently under construction at Taft, is the fifth plant Hill worked at in his seven years in the nuclear power industry. Zimmer was his fourth. Zimmer, short for the William H. Zimmer nuclear power plant, 27 miles from Cincinnati, Ohio, whose construction is now suspended, has become a buzz word throughout the nuclear power industry. It has become a synonym for the worst in nuclear construction. Cincinnati Gas and Electric, the utility company managing Zimmer's con-

struction, was fined \$200,000 two years ago by the Nuclear Regulatory Commission (NRC) for numerous construction and records irregularities. One year later the NRC ordered the plant closed down because of continuing violations of the NRC-mandated quality assurance (QA) program, the program designed to ensure that nuclear power plants are built safely and will run accident free. Most industry analysts now believe that Zimmer will eventually be cancelled.

Hill's charge that Waterford is worse than Zimmer, therefore, is very serious, especially coming from someone who worked at Zimmer during its last year of construction. His nuclear specialty is as a quality assurance records reviewer and auditor, precisely the area where Zimmer ran into its most critical problems. When Zimmer closed down Hill moved on to Waterford immediately, taking a job working with a team of quality assurance auditors reviewing construction records dealing with Waterford's steel skeleton, its foundation and the site's preparation, essentially the same job he had been doing at Zimmer.

What Hill and several of his peers say they found when they arrived at Waterford was similar to what they came from at Zimmer: serious records and construction deficiencies throughout the plant on the one hand and senior management team under increasing pressure to crank the plant up on the other. It was, Hill and other former and current Waterford employees interviewed by *Gambit* have said, a situation they found all too familiar: the combination of deep-seated construction and quality assurance records deficiencies plus growing economic pressure on the utility to bring the plant on line. That combination and the consequent decision by Zimmer's top manage-

ment to hide their problems rather than face them brought the plant down. It is a phenomenon Hill and many other nuclear workers are afraid will destroy the industry. George Hill's first assignment at Waterford, was with (EBASCO's) Quality Assurance Installations Review Group, more commonly called QAIRG. QAIRG is one of five main subdivisions of EBASCO's quality assurance organization, an outfit that has mushroomed since the spring of 1982 when the company's entire QA organization numbered less than a dozen. QAIRG is responsible for reviewing all the records packages of each contractor as the plant nears completion, a critical task in the period of transition when the prime contractor prepares to turn the facility over to its owning utility.

Nuclear Regulatory Commission regulations require the utility to maintain a complex, comprehensive set of documents designed to ensure the quality of the materials and workmanship that go into a nuclear power plant, all of which are designed to thwart an accident and the release of a cloud of radioactive steam. In the worst case scenarios for most nuclear generating stations, including Waterford, the loss of life goes into the tens of thousands. The quality assurance program is designed to prevent that. NRC Regulations hold the utility who builds and operates a plant responsible for seeing that its QA program is properly implemented, although Commission regulations allow much of that responsibility to be delegated to the prime contractor and the companies they issue sub-contracts to.

Hill is one of probably fewer than a thousand quality assurance records specialists who move from one nuclear power plant under construction to the next as they near completion and their records packages have to be reviewed. Hill and

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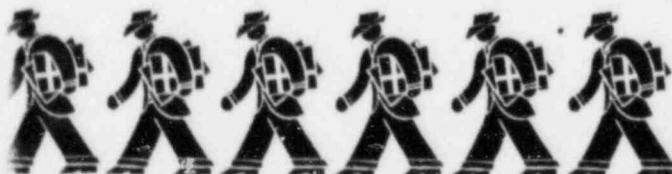
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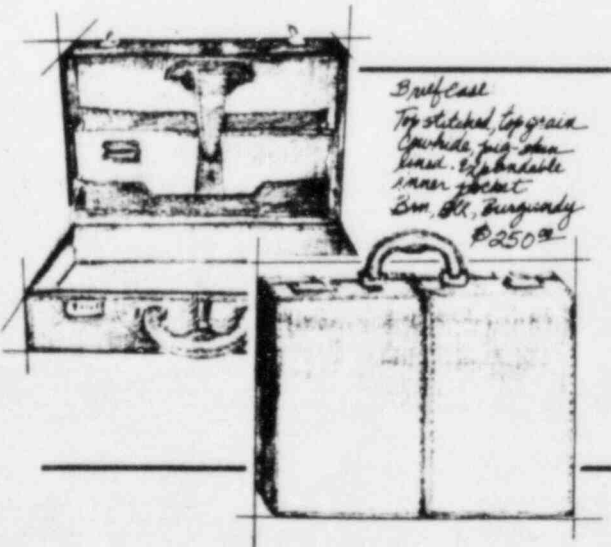
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Hot Scuttles

Babovich may run for the legislature, friends protect Livingston, and more in Scuttlebutt. Page 8.



Motwani's Empire

A look at the man behind some of the Quarter's least loved buildings. By Wendell Heddon. Page 18.



Things of Endearment

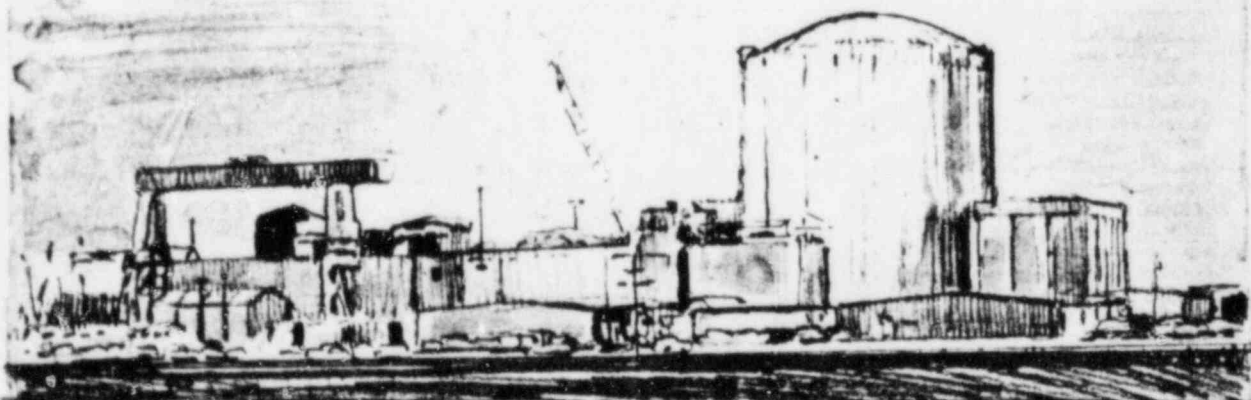
Part II of Gambit's Christmas Gift Guide. Compiled by Sue Barker. Page 33.

GAMBIT

T H E N E W S P A P E R

A Poor Foundation At Waterford III?

GAMBIT's investigation into cracks in the foundation of LP&L's nuclear power plant has led to a trail of missing records, falsified documents and a possible total breakdown of quality control. Ron Ridenhour reports. First of a series. Page 21



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men like him review the documents which reflect the actual installations in a given plant. After a while, they say, they begin to develop a feel for the difference between real problems and what they call "paper problems." records problems which are clerical errors or other minor deficiencies that can be fixed by simply "sharpening your pencil," in the phrase of one. Other problems, however, are more substantive, reflecting breakdowns in the installation quality assurance program, problems that mean that some portion of the plant has simply not been built according to NRC codes or other crucial industry standards.

When those problems are discovered, according to Hill and other QA records specialists interviewed, pencil sharpening won't resolve them, not properly anyway. One of the ways specialists like Hill begin to have a feel for deficiencies in that category is the sheer weight of numbers: when the records packages of any portion of a plant has a high ratio of what appears on the surface to be simply paper problems, people like George Hill have learned to take a very close look at not only the records but the actual installations they reflect. That kind of comparison has led to the discovery of serious, potentially critical QA breakdowns at several nuclear projects throughout the country. It is what eventually led to the shutdown of Zimmer.

George Hill's first assignment with EBASCO's QAIRG was with a team of records reviewers who were spot checking the civil/structural records for Waterford: all the records connected to the construction of the foundation, the walls and other parts of the plant's civil structure. Hill's team was concentrating on the quality assurance records associated with Waterford's foundation. What they found, the coordinator of Hill's team wrote in an

The Story In Brief

Safety records inspectors at Waterford III were ordered to halt their inspection of construction records at the plant last summer after discovering wholesale irregularities in records concerning the construction of Waterford's foundation.

The order to stop reviewing the foundation's construction records was given less than two weeks after *Gambit* reported that cracks had been appearing in Waterford's massive "floating" foundation since 1977 and that small amounts of water had been seeping into the plant through the cracks from that time.

Sources close to the interrupted records review believe that the irregularities it turned up are directly related to the cracks and water seepage in Waterford's foundation, they told

Gambit in recent interviews.

Many of the records irregularities discovered in the muzzled inspection involve possible civil and criminal violations of federal safety regulations, according to Waterford documents in *Gambit's* possession, and should have been reported to the federal agency which regulates nuclear power plant construction and operation, the U.S. Nuclear Regulatory Commission.

In a report on the safety implications of the cracks and water seepage issued two weeks ago, NRC engineers concluded that the cracks offer no threat to the plant's safe operation or the surrounding environment. That assessment, however, was made conditional on the assumption that the foundation was built "in accordance with approved procedures, specifications and regulations."

The records irregularities discovered before the review of foundation-related documents was ordered halted

last June raise serious question about that assumption, suggesting instead that the construction of Waterford III is potentially riddled with errors literally from the foundation up.

Records irregularities outlined in the documents in *Gambit's* possession that have apparently not been reported to the NRC include wholesale instances of missing, manufactured and doctored documents and some instances of apparently forged safety inspector signatures on critical safety-related structures. Records reviewers also discovered that large numbers of the people employed as safety and construction inspectors were not certified. They additionally found that specifications and procedures were often ignored in work involving the crushed shell base that was placed beneath the 12-foot thick concrete foundation, the placement and "cadwelding" of the steel reinforcing bar in the concrete and the pouring of the concrete itself.

interoffice memorandum dated December 9, 1982, was a broad range of deficiencies in virtually every records package examined. The situation demanded a complete review of all the civil/structural records packages in EBASCO's QA records vault, according to Hill. "This evaluation," the coordinator, J.M. "Joe" Davis, wrote, "indicates that a comprehensive review of civil structural documentation be performed to assure compliance with established program requirements at time of installation/inspection."

Davis' memo contained a synopsis of records deficiencies found in four categories of records: concrete pour packages,

cadwelding activities, waterstop splicing and tensile strength test of welded PVC waterstop. In the concrete pour packages, Davis wrote, "all packages have required documents missing from their folders." Missing documents covered "installation, inspection and acceptance of safety-related items, activities and testing." Documents that are in the packages, Davis said, show the "failure of implementation of specification and procedure requirements and acceptance of items outside of the criteria" established in the quality assurance program. Davis noted similar deficiencies in the other three categories

of records inspected by his team, concluding his memo with a recommended plan of action to facilitate the comprehensive review he was calling for. He would need, he said, complete access to all appropriate documentation, adequate space and files and more personnel.

No comprehensive review of the foundation construction records was ordered nor, to hear Hill and others tell it, permitted. Roughly six weeks later, according to *Gambit's* sources, Joe Davis was transferred to other, less sensitive duties within EBASCO's QA organization; the result, at least in part, of the position he took in the December 9 memo and his attempt to

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Nuclear Engineer R.S. Laddick

Gambit photo by David Richmond

push the point. Ironically, George Hill was tapped to take Davis' place. As far as Hill was concerned, the information in Davis' memo demanded a comprehensive review of all Waterford civil/structural records. It also suggested a serious breakdown in the construction QA programs of LP&L, EBASCO and the subcontractor who did most of the suspect foundation work, J.A. Jones Construction Company, a situation that should have been reported to the NRC within 24 hours of its discovery, according to federal quality assurance regulations. That did not happen.

Hill, meanwhile, was in the process of making two fateful decisions. First: Waterford was going to be his last nuclear power plant. He was getting out. Secondly, he told himself, he was going to do this job right. "I said for once," Hill told *Gambit*, "I'm going to do one of these things right." He was not the only quality assurance specialist at Waterford eager to do his job the way federal regulations said it should be done. By February Hill and a handful of like-minded QA specialists at Waterford gathered together and entered into an extraordinary pact. "We decided," one of the participants has since told *Gambit*, "that we were going to do the job that we were supposed to do for the client, whether the client wanted us to or not."

Hill and the others operated on one basic premise: the top management at Waterford, both for LP&L and EBASCO, did not want to know what was wrong, either with the quality assurance

records or the installed systems they were supposed to track. They did not know if Waterford was built to the federal safety specifications LP&L originally agreed to meet or not. More importantly, Hill and company were convinced, they didn't want to know, especially if the news was bad. The more they found out, the less they wanted to hear. What top management understood better than anything else, according to Hill and several others interviewed by *Gambit*, was that Waterford was 97 percent complete, years behind schedule, nearly \$2 billion over its original cost projections and the date for preliminary testing and fuel loading was fast approaching.

In early February 1983 Hill's QAIRG team received its first assignment under his supervision: review the QA records of a contractor whose work had supposedly been completed two years earlier, the American Bridge Company. Other QA auditors raised questions about the status of American Bridge's QA records the previous summer, but their complaints fell on deaf ears then. By the time Hill got the job, however, the American Bridge QA deficiencies could no longer be ignored.

While Hill took on the American Bridge assignment determined to do the job the way he thought it should be done, he also promised himself that before he left Waterford he would make sure the troubled foundation records were thoroughly reviewed. He was afraid that EBASCO's QA Manager would order his

reviewers to stay away from any records that might prove problematic, however, so he devised a plan to deal with that possibility. He put his people to work in the QA records vault and simply avoided telling his supervisors exactly what they were up to. His plan was basic and he devised it with both American Bridge and the foundation records of J.A. Jones in mind.

"We decided that we were going to do the job we were supposed to for the client, whether the client wanted us to or not."

Review the documents first. Determine their status, particularly the number and nature of any potential safety-related deficiencies. Then generate your paperwork, all of your findings, in one burst.

Once paperwork is generated in a

nuclear power plant under construction, it takes on a life of its own. Reports, letters, memos and a long line of other records produced during the building of a nuclear unit are assigned numbers and have to be handled in a certain way. The problems found become a part of the plant's official history once committed to paper. Technically, at least, once reported every problem has to be resolved: someone has to either fix it or say that it was never really a problem, say why and then sign it.

At Zimmer, Hill learned that there are an infinite number of places for a problem to get lost in the paperwork blizzard of a nuclear power plant. Despite that, he also knew that the system was a lot like an old mule: it could be made to work, but sometimes you had to trick it first. So Hill's plan included an arrangement to trick the system. After writing up their reports and sending them through channels, Hill's men used their own underground postal system to take reports over the heads of those who might not send the bad news on.

They made it work, after a fashion, for about four months. But then in June, when Hill's reviewers were about to go through the document packages dealing with the way Waterford's massive concrete foundation was poured, they were ordered out of the QA records vault. Hill's fight effectively ended with that order, although he fought at least one more skirmish before he left the plant at the end of July.

WHAT HILL'S INSPECTORS FOUND

By RON RIDENHOUR

Roughly three weeks after George Hill and his allies began their quiet campaign, other events on which their efforts could have a dramatic impact were beginning to develop. In late February *Gambit* came into possession of a number of internal documents from Waterford related to construction and management problems there, particularly in the area of quality assurance. Those documents sparked three news articles detailing breakdowns in LP&L and EBASCO's QA programs and raising important questions about the plant's safety.

—March 19, 1983: "Quality Control Failure at LP&L" reported serious construction and quality assurance records deficiencies in four major safety systems management of Waterford's QA program from the NRC and one of LP&L's own management consulting firms and a \$20,000 NRC fine.

—April 16, 1983: "Quality Assurance in Doubt" reported a long running contract dispute between LP&L and the manufacturer of Waterford's reactor, a dispute that apparently left Waterford's most sensitive reactor systems without their federally-mandated quality assurance programs for more than five years.

—May 21, 1983: "Cracking Foundations at Waterford" revealed that Waterford's massive concrete foundation, a structure LP&L's engineering specifications said would be watertight, is cracking and that water is seeping in.

Those articles in turn led to the formation of an NRC Inquiry Team that first visited *Gambit* on June 28 and then went to Waterford on June 30. The Inquiry Team's Report, issued on July 14, recommended that the NRC further investigate five separate issues raised by *Gambit*'s news stories. Eleven days later, July 25, a coalition of anti-nuclear organizations who have been trying to stop Waterford since 1974 filed a motion asking the NRC to deny LP&L an operating license for Waterford, saying that the cracks in its foundation presented an unacceptable risk to the public's health and safety. Just ten days after that, on August 4, the NRC informed LP&L that Waterford's license to operate would be withheld until the

company responded satisfactorily to the Inquiry Team Report. After a late August meeting with NRC officials in Bethesda, Maryland, LP&L answered the Inquiry Team Report in writing on September 29. While LP&L's written response relies heavily in one section on George Hill's work on American Bridge, it fails to mention any of the serious deficiencies in the QA records of the plant's foundation discovered by Hill's team. Two months later, on November 28, NRC staff engineers, relying heavily on information provided by LP&L that made no mention of the QA deficiencies in the foundation, recommended that the NRC deny the intervenor's motion to hold up the plant's licensing because of the cracks in the foundation.

Nuclear Plant Records: The Only Guarantee of Safety

The rules for record-keeping in a nuclear power plant are rigid, and for a good reason: safety. Because a nuclear-plant accident could cost thousands of lives and millions of dollars, the entire construction process is monitored and records are kept of all materials and installations. Every critical piece of material which goes into a nuclear power plant must, by federal regulation, be traceable to its source. Every time concrete is poured, steel is welded, or any other action is taken, a record is kept. Every inspection is recorded. If a deficiency is found, that too is recorded, and when it is cor-

Unknown to any of the parties to these developments outside of LP&L and EBASCO's QA organizations, Hill's campaign to smoke out the QA breakdowns in the construction of Waterford's foundation worked, at least for a while. Using the combination of collecting all the information before putting the results to paper

and then employing his underground mail system to outmaneuver points of bureaucratic or managerial resistance, Hill managed to push EBASCO and LP&L into an agreement to completely reinspect all American Bridge installations by early May. His review of American Bridge's QA documentation, according to documents in *Gambit*'s possession, showed that American Bridge failed to provide any documentation for over 30 percent of their work. Of the work that was documented, according to Hill, roughly 30 percent of the documentation did not reflect the true status of the actual in-plant installation.

Sometime during that period Hill assigned a few reviewers to begin a quiet 100 percent review of all the QA documentation associated with Waterford's foundation. His plan, Hill has since said, was to start literally at the ground and work up. The first documents packages they reviewed, accordingly, traced the "soils" QA documentation, including the way the one-foot-thick layer of crushed shells which form the foundation's bed was put down. Next Hill's reviewers went completely through the cad-welding records. Cad-welding is the process of joining the steel reinforcing bars together,

the soils and cad-welding records packages before forging ahead to review documents tracing the way the concrete was poured. Hill's reviewers wrote massive non-conformance reports on both areas, reports that are the first formal step toward reporting a breakdown in the quality assurance program to the NRC. The non-conformance report for the soils packages is over 200 pages long, according to *Gambit*'s sources, and the report on cad-welding numbers more than 60 pages. The problems they found mirrored those written up by Joe Davis six months earlier, except that they were longer, more detailed, and in the case of cad-welding, much more serious.

A high percentage of the document packages had required records missing. Of the records that were present, many had been manufactured sometime after the work was actually done. The people working as quality control inspectors were frequently not certified and sometimes not qualified to be QC/QA inspectors. Accepted work was frequently not measured against the required procedures, criteria or regulations. In the area of cad-welding, the problems equalled and exceeded those outlined by the December Davis memo. In addition to all of the

rected, the correction is recorded.

The result is a literal mountain of documents, so complex that it requires a computer to access and locate particular parts of the records system. These documents, together, tell the story of the construction of the nuclear power plant: every guarantee of quality and every problem should be revealed by the paper trail. Some of the documents are on public record; some are in the hands of the Nuclear Regulatory Commission; most are kept in vaults at the plant itself or in the offices of the company building the plant.

These records are so important that without them a nuclear power plant may never be allowed to go on line. One plant in Ohio, at Zimmer, is now in a state of limbo and may never open because the records were not properly kept. Records in a nuclear power plant are the heart of the entire system of quality control and quality assurance, by which safety is established.

Partly because there are so many records, and partly because many of the records are closely guarded against the eyes of outsiders, it is a difficult matter to research the quality of construction at a nuclear power plant. Over the years a number of reporters have looked at the Waterford III plant, but until recently little information has been available.

That has begun to change. *Gambit* has obtained access to a small part of the enormous record-system from the Waterford III plant, and the questions we raised as a result of looking over those records, and talking with people knowledgeable about the construction of the Waterford plant, have led us to more information. Now, for the first time, it is possible to see a small part of the story of the Waterford III nuclear power plant, as that story appears in the documentary record and as it is perceived by key people who saw Waterford from the inside.

a process considered absolutely critical to guarantee the integrity of a nuclear power plant's foundation, particularly in a foundation like Waterford's, which was designed and built without pilings.

Those reviews were completed by mid-May. At that point, Hill ordered his reviewers to write up their findings from

problems just mentioned, the cad-welding records contained what seemed to Hill to be several instances of forgery. Records supposedly guaranteeing that cad-welds had been completed and inspected according to code were signed with the names of safety inspectors, apparently by someone else. "It was just flat falsification," Hill

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Gambit photo by David Richmond

told Gambit. "That's serious. That's big time. They closed Zimmer down for less than that."

After writing the non-conformance reports on cad-welding and soils, Hill told his reviewers to start working on the concrete pour documents packages. On June 3, after his reviewers had looked at only 70 of 1200 concrete pour packages from the foundation, Hill says he was ordered by the head of QAIRG, a woman named, as he recalls, Peggy Burgard, to pull his people off the concrete packages for good.

June 3, 1983, was a Friday. On the following Monday, June 6, Hill wrote a strongly worded memorandum to his immediate supervisor, John Czyrko, protesting the order to stop his review of the concrete packages. He had been given "verbal instructions to cancel the review," Hill wrote, "because the . . . documentation had been reviewed by Qualified Reviewers under a Qualified QA Program." Disputing that assessment, Hill warned of the potential consequences of the decision to pull his people off, saying

that previous reviews of the records were "cursory." To punctuate that, he pointed out that his staff had already written seven non-conformance reports on QA deficiencies that had gone undetected in previous reviews. "These NCR's are each broad in scope and identify multiple deficiencies," Hill's memo said.

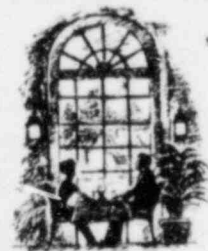
Reminding his supervisors that this was the second attempt to review the foundation records, Hill's memo referred to the Joe Davis memo written in December, saying that his review discovered the "same generic conditions" identified in the Davis memo and "in addition documented frequent cases of unauthorized changes and additions to records by unknown personnel." Those problems, the memo goes on, are in addition to the forged inspector's signatures already mentioned. Hill finally warns that "the widespread occurrence and frequency" of the specified deficiencies "renders the validity of these records indeterminate" and in violation of federal safety regulations. The problem of the unauthorized changes

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and the forged inspectors' signatures, Hill further warned, could be violations of federal criminal statutes.

It is strong stuff. Hill sent it up through EBASCO's channels but heard nothing in return. After two weeks of silence on the issue Hill's underground mailman dropped a copy of his memo and some back-up documentation on the desk of LP&L's Quality Assurance Manager, Tom Gerrets, and again he waited for a reaction. There was none, he says.

Hill gave notice that he was leaving the plant at the end of the month in early July, but this was a matter he was not willing to leave hanging. During the first week in July he went to EBASCO's chief Quality Assurance Engineer, Brian Grant, a person he trusted. He showed Grant his memos, discussed the situation with him and Grant agreed to accompany Hill to talk to LP&L's QA Manager Tom Gerrets, a meeting that took place on July 7.

That meeting lasted one and one half hours and during it, according to a memo Gerrets wrote for the record four days later, Hill explained his concerns, emphasizing the problems with the documentation for cad-welding, soils and concrete. It was written on July 11, four days after the meeting between Hill, Grant, Gerrets and LP&L's chief Quality Assurance Engineer, L.L. "Lon" Bass. July 11 was the same day that Gerrets held a meeting with all the top EBASCO and LP&L managers located at the Waterford job site. Gerrets, Bass and LP&L's Site Director, G.B. "George" Rogers, were all there. So was EBASCO's Project Director for Waterford, R.J. "Bob" Milhiser, and EBASCO's Quality Assurance Manager, L.A. "Larry" Stinson. According to Hill, the order pulling his review team off the concrete packages had come from Milhiser and Stinson in the first place.

On the day those five met, however, according to a memo Milhiser wrote for the record, they agreed on a plan to follow up Hill's complaints: Stinson, Grant, Czirko and Hill would all work together, according to the memo, to draw up a plan "for the review of the remaining J.A. Jones' concrete records." That plan was supposed to be presented to LP&L on July 18. One week later, according to Milhiser's memo, Stinson was supposed to present another plan. The second plan was supposed to outline a procedure for reviewing all remaining contractors.

Hill says that he did indeed help put together a plan to review the Jones concrete records, but that it was never implemented to his knowledge. Hill finally left Waterford on July 29. When he did, all of the questions he raised concerning the deficiencies in the quality assurance records for the plant's foundation were still unresolved and unreported to the NRC.

LP&L's contribution to the information in the NRC staff's November 28 report recommending that the intervenor's attempts to re-open the safety and environmental questions be denied expresses confidence in the company's quality assurance program at Waterford. Earlier in the same document, the staff's recounting of the history of the soundness of the foundation quotes an affidavit signed by QA supervisor Tom Gerrets in August of 1981.

In that affidavit, according to the NRC staff report, Gerrets swears that he "reviewed the history of concrete placements" and QA/QC efforts at Waterford III, and concluded that "(1) no significant defects in safety-related concrete had gone undetected by Applicant's QA/QC program, as demonstrated by the Staff's independent inspections; (2) all known defects in

safety-related concrete had been properly documented, evaluated and corrected as necessary; and (3) the Applicant had fully complied with NRC regulations in reporting deficiencies to the NRC."

Hill's comments and information notwithstanding, Gerrets' 1981 affidavit is used in the NRC staff report as a statement that remains valid. Nowhere in the public record examined by *Gambit* is there

any evidence of LP&L ever having said anything to the contrary. There is particularly no mention of any contrary information present at any time during the last year, a period of time during which, according to George Hill and others interviewed by *Gambit*, LP&L should have reported all the deficiencies noted in the December 9, 1982, Joe Davis memorandum and Hill's June 6 memo.

TIME LINE

12-3-75 First concrete placement for Waterford's foundation completed.

12-15-75 Quality Assurance Engineer F.L. Phearson writes memorandum for the record describing serious problems in pouring concrete in the placement directly beneath where Waterford's reactor now stands.

12-16-75 Stop Work Order Number One issued at Waterford, halting the pouring of concrete because, according to the official record, heavy rains dilute the concrete mixture.

7-26-77 First report of cracks in Waterford's foundation made.

9-15-77 NRC inspection report okays LP&L's "repair" of cracks in foundation.

4-11-79 Joint Intervenor's file Contention 22, asserting that LP&L failed to discover defects in materials, construction and workmanship in concrete work on Waterford in attempt to prevent NRC licensing of plant.

8-19-81 LP&L Quality Assurance Manager for Waterford Tom Gerrets files affidavit saying that he reviewed Waterford

QA/QC documentation for concrete work in foundation and found no deficiencies.

8-21-81 LP&L files motion asking NRC for summary dismissal of Intervenor's Contention on concrete defects.

9-15-81 NRC files motion in support of LP&L request for summary disposition of Intervenor's Contention 22.

10-20-81 Atomic Safety and Licensing Board grants LP&L's request for summary disposition of Intervenor's Contention 22.

12-9-82 EBASCO QAIRG team coordinator Joe Davis writes memo recommending "comprehensive review" of all Waterford civil/structural documentation dealing with construction of plant's foundation, specifying wholesale instances of missing, manufactured, and doctored records plus uncertified inspectors and the acceptance of safety-related work that did not meet established criteria in nearly all the document packages randomly checked in EBASCO QA records vault.

mid-January, '83 Joe Davis transferred, George Hill named his replacement as coordinator of civil/structural records

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review team for EBASCO QAIRG.

5-10-83 *Gambit* interviews LP&L and EBASCO QA personnel regarding the cracks in Waterford's foundation dating back to 1977. Both men deny that any new cracks have appeared since then.

5-11-83 Non-conformance Report 6212 written, reporting new cracks and accompanying water seepage have appeared in plant's foundation.

mid-May, '83 George Hill's QAIRG records review team writes several non-conformance reports detailing multiple deficiencies in several areas of quality assurance records dealing with the construction of Waterford's foundation. Included are a 200-page NCR on soils preparation beneath the foundation and a 60-page NCR detailing flaws in the cad-welding records, including several instances involving the forging of signatures of five QA inspectors for cad-welding.

5-21-83 *Gambit* story reporting cracks in Waterford's foundation appears.

6-3-83 George Hill's QAIRG records reviewers ordered to halt their inspection of concrete pour package documents that are showing problems similar to those that led to May NCRs.

6-6-83 George Hill writes memo to his supervisor, John Czyrko, protesting order to halt QAIRG inspection of concrete pour package documents, warning that deficiencies being discovered include violations of federal safety regulations and possibly of federal criminal laws. Hill's memo refers to 12-9-82 Joe Davis memo and says that his reviewers turned up so many similar problems that the status of all involved documentation and the installations it reflected were rendered "indeterminate" — meaning that there was no way to tell if the work was done properly or not, raising safety concerns.

6-9-83 John Czyrko, George Hill's supervisor, writes memo to EBASCO Quality Assurance Manager Larry Stinson, forwarding softened version of Hill's complaint and request to continue review of QA records for foundation.

6-20-83 Copy of George Hill's 6-6-83 memo placed on desk of LP&L QA Manager Tom Gerrets.

6-28-83 NRC Inquiry Team comes to New Orleans to begin investigation of *Gambit* allegations about concrete cracking and other breakdowns in LP&L QA program at Waterford.

6-30-83 NRC Inquiry Team visits Waterford, finding many more cracks in its foundation than previously reported or acknowledge by LP&L.

7-7-83 George Hill, Brian Grant, Tom Gerrets and Lon Bass meet in Gerrets' office at Waterford to discuss contents of Hill's 6-6-83 memo. Hill urges a complete review of the concrete packages, Hill emphasizes cad-welding and soils problems.

7-11-83 Tom Gerrets writes memo for the record, detailing his version of 7-7-83 meeting with Hill, Grant and Bass.

7-11-83 Tom Gerrets meets with top management at LP&L for LP&L and EBASCO to discuss Hill memo. Included at the meeting besides Gerrets are EBASCO QA Manager Larry Stinson, EBASCO Project Manager Bob Milhiser, LP&L Site Director George Rogers and LP&L Chief Quality Assurance Engineer Lon Bass. They agree on a plan to deal with Hill's complaints. According to their plan Stinson was to develop and present a plan for conducting a comprehensive review of civil/structural records of foundation by 7-18-83. Stinson was also to develop a plan for a comprehensive and on-going QA document review for all contractors by 7-25-83.

7-14-83 NRC Inquiry Team Report issued, recommending investigation by NRC into five separate issues raised by

Gambit news articles.

7-19-83 Brian Grant writes memo to Larry Stinson reiterating problems raised by George Hill.

7-25-83 R.S. Mike Leddick arrives at Waterford to assume position as Vice President in charge of Nuclear Operations and highest level LP&L executive at Waterford site.

7-25-83 Joint Intervenor's file motion with NRC seeking to reopen Contention 22, basing their claims on *Gambit* news stories and NRC Inquiry Team Report.

7-29-83 George Hill leaves Waterford, quits nuclear power industry.

8-4-83 NRC orders LP&L to meet head of NRC Office of Inspections and Enforcement at NRC headquarters in Bethesda, Maryland, to discuss Inquiry Team Report and LP&L's response to it. NRC informs LP&L that operating license for Waterford will be withheld until company provides an appropriate response.

8-27-83 LP&L CEO James M. Cain, Leddick, Gerrets, and one other LP&L QA executive meet with NRC I&E officials. LP&L agrees to answer Inquiry Team Report in writing by the end of September.

9-19-83 Harstead Engineering Associates, Inc., an independent engineering firm hired by LP&L to do structural analysis of Waterford's foundation, files the first of two engineering studies on the question. Harstead says the foundation's engineering design is sound.

9-27-83 EBASCO engineers file affidavits with NRC answering Intervenor's motion to reopen Contention 22. Affidavits swear that plant's foundation is properly designed and constructed.

9-29-83 LP&L files written response to Inquiry Team Report saying that foundation and other QA problems reported by *Gambit* have been adequately responded to by LP&L and its prime contractor.

10-14-83 Harstead Engineering files second report saying that Waterford's foundation design and construction are both adequate and offer no threat to the public health and safety. Harstead report gives no hint that they were informed of construction deficiencies reported by Davis and Hill memos.

10-17-83 NRC staff engineers ask LP&L to answer a series of questions dealing with Waterford foundation design and construction.

11-28-83 NRC staff files answer to Joint Intervenor's motion to reopen Contention 22, recommending that it be denied. Based on information supplied by LP&L and NRC Region IV, the office with oversight responsibility for Waterford, the staff engineers conclude that the foundation's design and construction are sound and present no threat to the public. Their conclusion comes with one caveat: it relies on the word of Region IV and LP&L that the plant has been constructed according to established NRC procedures, requirements and regulations. There is no hint in the document that the NRC engineers who wrote it have been informed of the construction deficiencies listed in the Davis and Hill memo.

12-8-83 *Gambit* interviews LP&L's Leddick and Gerrets, confronting them with Hill and Davis memos. Leddick says that forged cad-weld inspections and other construction deficiencies reported by Hill and Davis are required by federal regulations to be reported to the NRC within 24 hours of their discovery. Gerrets says he does not remember ever having seen Hill and Davis memos before, although he does recall talking with Hill about the need to review the concrete pour packages. Gerrets says that none of the construction deficiencies listed in the Hill and Davis memos have been reported to the NRC.



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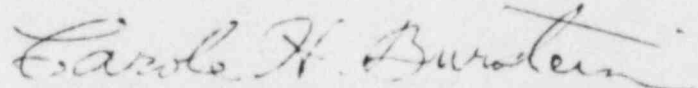
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