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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of:

PALMETTO ALLIANCE CAROLINA ENVIRONMENTAL STUDY GROUP PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW ON ISSUES OF FOREMAN OVERRIDE

(Catawba Nuclear Station, Units 1 & 2)

CONFERENCE CALL

Location: Bethesda, Md.

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Date: October 26, 1984

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

TELEPHONE CONFERENCE

In the Matter of:	:	
DUKE POWER COMPANY, et al.	:	Docket Nos.
(Catawba Nuclear Station, Units 1 & 2)	:	50-413 OL 50-414 OL ASLB No. 81-463-01

4350 East West Highway
Bethesda, Maryland

Friday, October 26, 1984

The telephone conference call in the above-entitled matter was convened at 3:00 p.m., pursuant to notice.

APPEARANCES:

On Behalf of the Intervenor, Palmetto Alliance:
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PALMETTO ALLIANCE
CAROLINA ENVIRONMENTAL STUDY GROUP
PROPOSED FINDINGS OF FACT AND
CONCLUSIONS OF LAW ON ISSUE OF
FOREMAN OVERRIDE

I. FOREMAN OVERRIDE PRACTICES REPRESENT A SIGNIFICANT COMPROMISE OF THE QUALITY ASSURANCE PROGRAM AT CATAWBA

The foreman override was defined by the Licensing Board in its June 22, 1984 Partial Initial Decision as "action by supervisor (which) resulted in defective work or a violation of QA procedures." Id. p. 238. The Applicants employ the same definition "Duke Power Company's Investigation Of The Issues Raised By The NRC Staff In Inspection Reports 50-413/84-31 AND 50-414/84-17," App. Ex. 116, (hereafter, August 3 report), p. 2. At hearing, the Licensing Board explained override as involving "situations where an employee is directed, either explicitly or implicitly, to violate established procedures." tr. 13,159. At the time the record was closed in this proceeding, the NRC staff and this board had rejected the evidence by welder Sam Nunn of "foreman override," and had concluded that "with but one exception none of the welders interviewed in the staff investigation indicated any foreman pressure to use defective materials, to fabricate welds, or to do any welds outside the procedures." June 22 PID. p. 236. The single exception

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noted was the allegation of foreman override by an individual identified as "welder B."

As reflected in the NRC staff's April 23, 1984 Inspection Report, staff exhibit 31, the welder B allegations, as cooberated by the NRC staff interviews with additional welders on his crew, revealed the most glaring example of conduct by a welding foreman subsequently identified as Arlon Moore, Dick, transcript 13,177, exemplifying the practice of foreman override. Generally, Moore was said to have pressured welders under his supervision to sacrifice quality and transgress established quality assurance procedures in order to make production. Under circumstances or the tasks at hand, such as completing a specified number of stainless steel socket welds, for example, simply could not be achieved in the the time allotted, welders related knowledge of welds performed without regard to established procedures requiring control of interpass temperatures.

> "He was working on a 3/4 or 1" stainless steel socket weld. The weld was overheated. I asked him why it was so hot. He said, "I didn't want to, but Arlon said I had to get these done tonight." There were about eight welds in this assembly and they were black like they had been heated up. The welder was Bruce McCarter."

App. Ex. 118, April 2, 1984 affidavit of no. 196. According to their capitalized results of interview, Appendix A to the April 23, 1984 Inpsection report, staff exhibit 31, welder B related the following example of

foreman override at the hands of Arlon Moore:

> "He stated that in late 1981, he was welding in the unit 1 pipe chase working two or two and a half inch schedule 180 heavy wall stainless steel sockets which he believed were either class b or c welds. He said that he had set up a small fabrication work area and that he was welding sockets with the use of a jack stand on the fabrication table. He said that his foreman told him that the job absolutely had to be completed and that he had to keep on welding. He said that the foreman had the crew lead man standing guard to watch for QC inspectors who might come in the area where he was working. He said he was welding very fast and that he had to wrap his hands to protect them from the heat. He said that he did not maintain interpass temperatures as required when welding stainless steel and when he complained to the foreman that the work was out of procedure, the foreman told him to keep welding or "hit the road."
>
> Individual B stated that while he was still working for the foreman he had a conversation with the foreman who said "that if any "son of a bitch" messed with my job I would cut his throat." He said that he recalled the foreman casually mentioning that there was a hit man in Westminster (SC) who would kill someone for $100.00." Individual B took these remarks by the foreman as a threat especially in light that the foreman had told him that he was a convicted felon who had served time in prison."

Citation is geared to Id. p. 5.

Welder B statements were confirmed by statements given the NRC staff by a number of others on his crew. Individual B-1, for example, explains his foreman override observations as follows:

> "Individual B-1 said he felt the foreman was putting a lot of pressure on the crew to get the job done and that the foreman expected the

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> crew to get completed even if it meant violating the procedure. He said the foreman never directly told him to violate procedures, but that the foreman would talk around this and infer that shortcuts should be taken. He said that the foreman would often say "you know what it takes to get the job done," or "this job has to be done tonight." Individual B-1 said that the message was always clear. He added that he felt that what the general foreman was well aware of what was going on and he condoned it but he could not provide any specific information to substantiate this. He said that he never reported these problems for fear of losing his job."

Id., Appendix B, p. 6.

These were the substance of the foreman override allegations which were identified by the NRC staff in their initial investigation and revealed to Duke Power Company in March 1984. These foreman override practices as alleged represent a significant challenge to the effect of implementation of the quality assurance program at Catawba.

Foreman override represents an especially dangerous phenomenon because of its inherent characteristics. The acts by the foreman or supervisor represent conscious efforts to circumvent the quality assurance program. Willfullness is represented by the actual or constructive knowledge that improper workmanship and quality assurance procedure violations are a consequence of the supervisor direction. Further, foreman override practices embody a conscious effort to sort detection. For example, the

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posting of a "lookout" to stand guard for quality control inspectors, by design, circumvents the effectiveness of the inspection function. Finally, the foreman override practice, particularly as highlighted by the welder B and cooberating statements is accompanied by threats of reprisal or an atmosphere of fear which produces a chilling effect on the free expression by those involved of the concerns they have of the foreman override practices and workmanship effects. Welder B himself reported concerns stretching back years only when directly asked by the NRC, since he feared his foreman and believed he would lose his job if he complained to the NRC. Staff exhibit 31, supra, p. 5. Such fear was expressed to the NRC by a number of others interviewed, as well as in subsequent interviews with Duke. tr. 13,778. Some 25 of the Duke affidavits, App. Ex. 118, acknowledged that this chilling effect interfered with their voicing concerns to supervision. The Board itself confirmed this chilling effect in its questions to those craftsmen who appeared at hearing period. Even though the board had solicited Catawba worker concerns, to be taken in camera as necessary, fear and apprehensiveness presented even those with concerns from bringing them forward. Id. No. 196, tr. 2085, 2091; perpetur, tr. 14,233. Welder B may in fact, be viewed as a "cohero" by Catawba workers whose own concerns have gone

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unvoiced. Tr. 13,875. It is clear, in any event, that a distressing aspect of the foreman override practice is the cloak of fear which has prevented its detection for so long.

The foreman override practice significantly compromises the Commission's regulatory requirements which are designed to ensure the integrity of the as built condition of the Catawba Nuclear station and the protection of the public's health and safety in its operation. 10 CFR part 50, Appendix A, General Design Criterion 1, "Quality Standards and Records," requires that systems important to safety shall be erected to quality standards commensurate with their importance; and that a quality assurance program be implemented to ensure that such systems will satisfactorily perform their safety functions. 10 CFR part 50, Appendix B requires a quality assurance program with interrelated responsibilities upon those who construct the facility together with those who inspect and audit to verify and ensure quality. In addition, the NRC staff through its inspection and enforcement activities expects to verify compliance with these regulatory requirements through sampling inspections on a regular basis throughout the course of construction. None of these elements identify the problem of foreman override until 1984. Blake, tr. 13,764 - 13,767. In its Inspection report of

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August 31, 1984, staff exhibit 33 the region 2 staff cited Duke for violation of criterion 2 of 10 CFR 50 Appendix B requirements that "Applicants shall regularly review the status and adequacy of the quality assurance program, and that management of other organizations participating in the qualiy assurance program shall regularly review the status and adequacy of that part of the quality assurance program which they are executing." The NRC staff cited in the notice of violation only the example of "a welding foreman and his supervisor". The staff informs us that this violation is to be understood as founded upon the actions of the other eleven supervisors investigated in Duke's own investigation. "There was one violation. There were many examples." Blake, tr. 13,746.

Thus, only years after the fact, is the existence of foreman override problems finally identified not by Duke Power Company, but by the NRC staff in response to the concerns expressed by ex-Cataba welder Sam Nunn and at the direction of this board. Uryc, tr. 13,785. The significance of foreman override as a practice is, thus, highlighted by the extended period during which it escaped detection, as well as by the means of this identification. As a conscious circumvention of the QA system coupled with the chill on its disclosure foreman override presents a significant challenge to the effectiveness of the Catawba

quality assurance program. The evidence previously considered in this proceeding of harrassment of quality control inspectors, PID. 179, and management retaliation against welding inspector supervisor Beau Ross and his crew, id. pp. 159, 161 reinforces the significance of the foreman override problem and explains, in part, why it escaped protection for so long.

The significance of the foreman override problem, however, is not established solely on the basis of the challenge which it represents to the implementation of a quality assurance system in merely a procedural or abstract fashion. Foreman override is of particular significance to the extent that it implicates known hardware deficiencies. As the Appeal Board analysis in Calloway suggests one must look first to the question of "whether all ascertained construction errors have been cured." Union Electric Company, (Calloway Plant), alab-740, 18NRC343 at 346 (1983). If we can eliminate some consideration in the existence of "ascertained" but uncorrected hardware deficiencies; we may then turn to consideration of "whether there has been a breakdown in quality assurance procedures of sufficient dimensions to raise legitimate doubt as to the overall integrity of the facility and its safety related components." id. At this juncture we turn to a careful consideration of the known

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hardware implications of the foreman override practices at Catawba.

Duke Power Company's investigation resolution of the hardware questions raised by the foreman override concerns provides us with a troubling picture of the known hardware effects of foreman production pressure. While Duke's technical investigation is demonstrably inadequate, flawed, and materially misleading as to the existence of widespread faulty work, it does provide this board with sufficient confirmation that serious workmanship consequences have resulted from foreman override practices. Duke makes little effort to determine the extent of and specific identification of hardware problems caused by foreman pressure. Principal responsibility for "proof" of the existence of "specific safety related" defects is placed on those workers who, themselves, raised the override concerns. Contrary to Duke's ascertions that they assume the truthfulness of allegations presented to them in the affidavit, August 3 report, p. 26, in fact the burden of proving the existence of specific defects is consistently placed squarely on the shoulders of the craftsmen expressing the concerns, see, August 3 report, attachment A, p. I-1. It is ironic, indeed, that procedure violations and faulty work which escaped identification by QA and QC at the time of their occurrence now must be

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identified principally by the faded recollection of these conscientious craftsmen. The degree of Duke's effort to identify the extent and detail of hardware defects beyond the interrogation of these workers is unknown. It is clear that deficiencies which should have been originally identified to direct inspection and testing techniques require use of such techniques for their full identification now. However, what is known of hardware problems at this juncture provides ample basis for looking further.

IA. FOREMAN OVERRIDE HAS CAUSED VIOLATION OF INTERPASS TEMPERATURE REQUIREMENTS

A commonly cited consequence of foreman override pressure to meet production schedules is violation of specified interpass temperature control in making stainless steel socket welds. Welder B stated to the NRC:

> "He said he was welding very fast and that he had to wrap his hands to protect them from the heat. He said he did not maintain interpass temperatures as required when welding stainless steel. When he complained to the foreman that the work was out of procedure the foreman told him to keep welding or "hit the road."

Staff exhibit 31, Appendix A, p. 3. Others on welder B's crew cooberated his statement that in order to meet Arlon Moore's production pressure interpass temperature controls were violated. e.g. individual B-1, id., Appendix B, p. 4:

> "He said when individual C pulled his pig stinger off the weld he saw that the entire weld area was glowing cherry red. He said that was

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> clearly a violation of interpass temperatures and when he asked individual C why he was heating the socket so hot, he told him that the foreman was pushing him to get the welds done."

Duke's August 3 report acknowledges that ten welders

"had concerns regarding potential violation of maximum interpass temperature requirements for welding on safety related systems." App. Ex. 116, p. I-1. After investigation Duke concludes with the following "resolution and conclusion:"

> "Further interviews and testing demonstrated that in all likelihood these allegations were not actually violations. In short, there is little evidence to confirm the allegations that interpass temperature was exceeded by craft.

Duke denies that what these welders either did or saw ever happened. In fact, Duke set out to determine on a sampling basis, the degree to which welds performed by welder B's crew - those working for Arlon Moore - were sensitized. What Duke found was that, indeed, significant levels of unacceptable sensitization were evident in the critical safety welds performed by Moore's crew. Sensitization is a factor in the occurrence of inter-granular stress corrosion cracking. The results of this test as well as its very existence was suppressed by Duke and is nowhere described in the August 3 report which Duke submitted to the Board. The results of the Moore welds

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sample analysis were contained only in hand-written working papers, produced in discovery with no identification of their source or significance. Pal. Ex. 144 and 145. In addition, a specific request by Palmetto, opposed by Applicants, was required to produce a draft of Duke's resolution of the concern regarding violation of interpass temperature. Pal. Ex. 161. This Draft by Brian Cruse disclosed as follows.

> "A number of welders in the same crew had indicated that they had been pressured by their foreman into violating interpass temperatures on stainless stell welds. Since the principal consequence of violating interpass temperature is Heat affected from (haz) sensitization, Duke construction undertook to evaluate a sample of welds made by these welders. A field portable technique was developed in employing A-262 Practice A. All the Class A, B, and C welds made by this crew were specified in detail in Appendix D. From these welds it was determined that this crew had welded on six critical systems (critical system is defined in Appedix E). It was found that 360 2" and under socket welds were made by this crew. Of these 360, 28 welds were selected for evaluation per ASTM A-262 Practice A. ...Three of the weldsmen exhibited microstructures which would not be acceptable per ASTM A-262 A.

Id. at p. 3. Duke in fact identified the very condition which observance of procedures requiring interpass temperature is designed to prevent on welds performed by the crew which alleged foreman override resulting in such interpass temperature violations.

Initially some 2,000 Class A, B, and C safety grade stainless steel socket welds of 2" or less in

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diameter were identified in the plant and performed by welders under Moore's supervision from 1980 until present. Llewelleyn, tr. 14,451. With the assistance of design engineering some 361 welds were defined as "critical," meaning most important for safety consideration." Cruse, tr. 13,448. The technical reviewers sought a more manageable sample from which to generalize. Ray Hollins was advised by Duke's industrial engineer that a sample size of twenty-three would be adequate for generalizing with a 99% confidence level and 1% error rate. Hollins, tr. 13,454. The reviewers employed an informal selection technique and eliminated about a dozen inaccessible welds from the sample period. tr. 13,455. At the suggestion of the NRCs consultant from Brookhaven National Laboratories, Mr. Czajkowski, the reviewers added specific welds performed by welder no. 248, believed to be welder B, a craftsman who had specifically stated that he had violated interpass temperature control. tr. 13,456 - 14,458. In fact, the metal metallographic examination of welder B - welder no. 248's welds indicated that weld 1NM56-8 failed to meet the acceptance criteria of A-262 practice A. Ferdon, tr. 13,462. Thus, Duke's own field testing establishes that welds performed by welder who violated interpass temperatures exhibits an unacceptable sensitization for inter-granular stress corrosion cracking per

the prace A screening criteria.

Mr. Ferdon initially concluded that four of the field welds failed to meet the acceptance criteria and that additional two exhibited a borderline condition between the "dual structure and ditched structure." Ferdon, tr. 13,466, Pal. Ex. 134. Mr. Cruse, examined the same welds and identified two which failed to meet the acceptance criteria for sensitization, both on the NM or nuclear sampling system. This is a system which takes samples from the primary collant system at a designed pressure up to 2500 psi. The welds are all heavy walled small diameter pipe, general 1/2" schedule 160 stainless steel. The unacceptable welds reflected a carbon content of .068% and higher. Duke performed no further fuel examination of welds and safety systems at Catawba. Cruse, tr. 13,472. Nor did they inform Mr. Czajkowki of the results of their work, at least at the time around July 11, 1984. Ferdon, tr. 13,473, Pal. Ex. 145 includes xerox copies of the photo micrographs of the Arlon Moore sampled welds which are of sufficient quality to determine acceptance per the ASTM practice A. tr. 13,500.

Having identified unacceptably sensitized welds and critical safety piping at Catawba, the technical reviewers saw a lab test to explain away the significance of their field findings. They identified the heat numbers of

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the piping employed by stencil 248, believed to be welder B, which it failed to meet the acceptance criteria and found a piece of this piping in which an experiment was performed. Four test socket welds were performed, controlling interpass temperatures of 72°, two at 150°, 350°, and a fourt of something in excess of 700°. Duke found that all but the first which had cooled to room temperature failed to meet the acceptance criteria for sensitization. Cruse, tr. 13,502 - 504. The results of this test were reported at page I-6 of Duke's August 3 report:

> "A metallurgical evaluation was performed on the test sample to determine whether the degree of sensitization was significantly affected by the range of interpass temperatures used in the test period. The results reflected that there was no appreciable difference in the severity of sensitization for these ranges in interpass temperatures, i.e., 250F-700F. These results were confirmed by subsequent field testing."

Nowhere in the report is it disclosed that three of the four welds failed to meet the ASTM 262 Practice A sensitization acceptance criteria. Cruse tr. 13,504.

> "Whether or not it passed or failed practice A essentially did not make any difference. We used the test merely as a standard to apply consistently to all the weldings that we tested. All the welds - it was just a procedure to get to the metallurgical evaluation to determine interpass temperature."

Cruse, tr. 13,505.

Cruse explains that:

> "If it does not meet practice A it is not acceptable to practice A other tests are

> indicated. That is how it reads in the procedure. Now, you have test welds in the field. There was no way we could have performed any of the other tests that were indicated, because they tend to be destructive in nature. We didn't want to disturb the field pipes."

tr. 13,505. Duke failed to acknowledge that these welds exhibits acceptablility to inter-granular attack according to the screening criteria for acceptable criteria. No other tests were performed because to do so would require "disturbed (ing) the field pipe."

Duke's technical reviewers demonstrate an erroneous application of the classification criterion which they apply, resulting in an understatement in the number of unacceptable weld samples from Arlon Moore's crew. Mr. Cruse stated

> "We saw evidence of attack at the grain boundaries that resembled the ditched condition that they (ASTN) call unacceptable. However, if you read the practice, it says a ditched condition snows all grains completely surrounded with this ditching phenomenon."

Cruse, tr. 468. The A-262 practice A provides, however, for the following ditched structure.

> "5.3.2 dual structure (figure 2) - some ditches at grain boundaries in addition to steps, but no single grain completely surrounded by ditches. 5.3.3 ditch structure (figure 3) - one or more grains were completely surrounded by ditches...5.4 in cases which appeared to be dual structures, more extensive examination is required to determine if there are any grains completely encircled. If an encircled grain is found the steel should be evaluated as a ditched structure."

Pal. Ex. 165, "Standard Recommended Practices for Detecting Intergranular Attack in Stainless Steels, ANSI/ASTMA-262-A. Thus, a proper application of the screening criteria calls for the conclusion that a larger number of welds examined exhibited unacceptable degrees of sensitization; since a number of additional photo micrographs exhibit complete ditching of at least one grain boundary. Pal. Ex. 144 and 145. The NRC's consultant, Mr. Czajkowski confirms this reading of practice a standard tr. 13,873.

The Duke report on resolution of this interpass temperature concern failed to acknowledge the actual field testing performed on all of Moore's welds as well as the unacceptable sensitization exhibited in the test coupons examined also made of the higher carbon type found in welder B's welds. Duke's own engineer R.E. Miller, characterized the resolution as "misleading". Pal Ex. 170:

> "Test specimens welded with and without interpass temperature controls showed the same degree of sensitivity. Resolution appears misleading in saying that no evidence was found to support the contention of violation, when the results indicated that the method employed could not tell if violation had or had not occurred. Resolution states normal practice is to touch the pipe with a hand, but disregards, (unidentified) statement which said, "the interpass temperature would fry a 350° temp stick." "Black welds are not addressed."

Pal. Ex. 170.

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Duke Power Company has committed to compliance with Regulatory Guide 1.44, "Control of the Use of Sensitized steel," Pal. Ex. 164. The Regulatory guide is founded upon general design criteria 1 and 4 and the Appendix B quality assurance requirements for the control of special processes such as welding period. The Reg. observes

> "Control of the application and processing of stainless steel to avoid severe sensitization is needed to diminish the numerous occurrences of stress corrosion cracking in sensitized stainless stell components in nuclear reactors. Test data demonstrates that sensitized stainless steel is significantly more susceptible to stress corrosion cracking than non-sensitized (solution heat treated) stainless steel. Id. at p.1... controls to prevent sensitization of the material during welding may include: (1) avoiding welding practices that result in the generation of high heat, (2) maintaining low heat input by controlling current, voltage, and travels, (3) limiting interpass temperature, (4) using stringer bead techniques and avoiding excessive weaving, (5) limiting the carbon level of the material where thickness makes the material more prone to sensitization."

Id. at p. 2.

As Duke appears to acknowledge in Mr. Ferdons memo "Potential for Intergranular Stress Corrosion Cracking at Catawba," July 16, 1984, staff exhibit 30, Intergranular Stress Corrosion Cracking is a product of three interacting conditions: susceptable material, tensile stress, and aggressive environment. At Catawba, evidence indicates that Duke has failed to adequately control for the

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susceptibility of welds such as these sensitized stainless stell socket welded without proper interpass temperature control. Tensile stresses similarly have not been controlled for a period thus, having failed to meet their committment to comply with regulatory guide 1.44 and the requirements of general design criteria 1 and 4 and Appendix B criterion 9, Duke is compelled to rely upon its ascertions that the Catawba fluid chemistry was sure an absence of sufficiently corodant environment to protect against intergranular corrosion cracking.

A growing number of Pressurized Water Reactor IGSCC events has been documented, particularly in intermittently stagnant lines where corrodants may collect. see, table 1, "Summary of Reported Pwr IGSCC events," staff exhibit 33. There is simply no assurance that in such critical systems as the nuclear material sampling (NM) system where unacceptable sensitization has been identified, IGSCC will not occur during the operating life of the Catawba facility. As the staff consultant Mr. Czajkowski acknowledges "if there was sufficient tensile stress in the weldman, if there was a corrodant and it was a significantly -- a sensitized microstructure the potential was there (for IGSCC). tr. 13,892.

Based upon the evidence that welders violated interpass temperature requirements because of foreman

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pressure to sacrifice quality for production, together with the suppressed field test results indicating significant levels of unacceptable sensitization, Duke's committment to Reg. Guide 1.44 and associated general design criteria and Appendix B requirements, the ASTM standard and prudence dictate that further inspection and testing be conducted to determine the extent of unacceptable sensitization in safety related welds at Catawba. The ASTM practice so dictates and the principal of the sense in depth supports replacement of these unacceptably sensitized welds. Note: The Duke reviewers failed to inform those with interpass temperature concerns that they had, in fact, identified welds performed by Arlon Moore's crew that failed to meet the sensitization standards. When a welder with this concern has signed off as satisfied with the Duke resolution and told of these findings?

> "Well, if I had been made aware of the fact that some may not have been acceptable, I would have wanted to maybe view some more of the facts or see exactly why these were not acceptable..... I had no knowledge that there were any that were not acceptable."

Id. 196, tr. 2055.

IB. FOREMAN OVERRIDE HAS CAUSED IMPROPER REPAIR OF ARC STRIKE DAMAGE

The second technical issue raised by the NRC staff reflecting the consequences of foreman override practices on Arlon Moore's crew is the improper removal of

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arc strike damage without process control documentation. The concern was raised to the NRC staff by Individual B-2:

> "Individual B-2 said on one occassion he was assigned to complete some socket welds left over from the first shift. He said there were two welds, one on either side of a valve. He said that as he prepared his work he examined the valve he saw several arc strikes on the valve. He said he went and got the foreman to look at the valve so that the foreman would know that the arc strikes were on the valve before he started welding. He said the foreman looked at the arc strikes and asked him if he had a metal file. He said he handed his file to the foreman who filed the arc strikes off the valve. He stated that the forman told him to file off arc strikes if they were not too bad because it would "save the company a bunch of time and money, and a bunch of paper work."

Staff Exhibit 31, Appendix C, p. 4.

In Duke's investigation of foreman override it identified twelve individuals who expressed concerns regarding the removal of arc strikes without proper process control: individuals 109, 196, 5, 186, 176, 102, 168, 131, 191, 37, 194, and 208. Duke's investigation in resolution of the arc strike concern is reflected at Attachment B, "Technical Issues Not Involving Foreman Override," at pp. I-1-5. In addition, the August 3 report neglected to explain individual 148's concern regarding removal of arc strikes without proper approval. Duke's Mr. Llewelleyn simply observes that "arc strikes caused during welding are almost always in the weld zone which does not require proper approval to remove." Pal. Ex. 166.

Duke resolved the concern regarding removal of arc strikes in a fashion analogous to the treatment of individual 148's concern. Duke simply ignores the concern and defines the problem out of existence. Almost by magic the technical reviewers conclude that all arc strikes are either (1) properly repaired without process controls within the weld zone; (2) protected by QA if outside the weld zone and repaired without proper approval; (3) otherwise detected by QC during final visual inspection. By definition, there simply are no improper removal of arc strikes that are not detected by the QA system. August 3 report, SUPRA.

Arc strikes generall occur accidentally either in the process of completing a weld pass or by the accidental contact of the welding rig with a nearby pipe or valve or structural component such as when welding in a cramped space or on a scaffold that is bumped, for example. In such instances where the arc strike damage occurs outside of the weld zone - within an inch or so of the weld joint - proper process control is required to document the arc strike repair. Grier, tr. 13,594 - 595. "The concern is if there is a possibility of a small crack in the piping a possibility of deposition of some other material other than what you want in the pipe." Dan Malssen, tr. 13,585. A severe arc strike would require grinding

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and the addition of further weld metal for repair. Llewelleyn, tr. 13,595. When grinding to make such a repair process control is required to assure that minimum wall thickness is being maintained for the pipe and proper procedures are being employed when weld metal is added. Llewelleyn, tr. 13,595 - 596. Ironically, the NRC staff's Mr. Czajkowski of Brookhaven Labs identified damage caused by an accidental arc strike on one of the socket welds test coupons he was examining for IGSCC sensitization:

> "One area of cracking was found on socket weld specimen no. 7 (figure 11). This are appeared to be associated with arc strikes which appeared to have cracked on cooling. The cracking was found on the pipe portion of the weld; outside the socket weld heat effect zone."

Catawba socket weld evaluation, p. 5. Staff Exhibit 34.

Czajkowski concludes: "Care should be taken to prevent arc strike on these stainless steels." id.

Only by the most strange logic can Duke explain away the concerns expressed by individuals 109 and 196 who essentially repeat and verify, respectively, the observations of individual B-2 aid to the NRC staff: that foreman Arlon Moore had himself filed arc strikes found by 109 on a valve body upon which he was prepared to work. Duke reasoned that such arc strikes were confined to the weld zone, and were thus properly removed without additional process control by the welder responsible for the welds

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in question. No matter that the welds and arc strikes were made by others in a previous shift. However, as is reflected in the testimony of individual 196, "I seen what appeared to be file marks on the body of the valve." tr. 2040. He had been told by individual 109 that "Arlon Moore had improperly repaired this arc strike because it was outside the weld zone, on the valve body." id. However, Duke simply declares that such file marks which individual 109 witnessed Moore make on the valve body in which individual 196 confirmed by his own inspection shortly thereafter or, instead, the results of earlier grinding by the manufacturer performed years before to remove surface irregularities. August 3 report, Attachment B, p. I-1.

The technical resolution of individual 196 arc strike concerns had not been explained to him at the time of his August 17 affidavit reflecting satisfaction with the resolution of his concern. tr. 2056. Individual 196 met with various counsel for Duke a total of eight occassions prior to his testimony in this proceeding. tr. 2058, 2059, 2062. Only two weeks before his testimony did counsel explain to individual 196 that the file marks he observed on the valves were in fact determined to be grinding marks made by the manufacturer, and not evidence of improper arc strikes by Arlon Moore. tr. 2061.

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Individual 196 explains his August 17 affidavit statement, "I have no unresolved concerns either technical or otherwise," as follows:

> "That could be misunderstood in that I had full confidence that the company would handle this in a valid and equitable manner and in signing the affidavit I believe that. I do believe that, too, today."

tr. 2063.

Among those others expressing concerns about improper repair of arc strikes is individual 131, who states in his affidavit:

> "I have seen many arc strikes outside the weld zone, removed without paperwork. The arc strikes I am talking about usually occured when a welder was dragging his rig from place to place. The strikes would normally just be filed off. I haven't seen this lately. The welders are taking great care in preventing this problem."

Duke's resolution of the arc strike concerns which fall into the category of individual 131's description are explained away as follows:

> "As to this last category, we note that any questionable areas on a weld would be detected during the final system inspection required by QA. Accordingly, none of these single incidents raised safety concerns, and none would have affected the overall quality of the plant."

Duke August 3 report, Attachment B, p. I-4,5.

Duke's resolution simply represents a leap of fate that fails to even acknowledge the existence of the problem. As individual 131 notes the arc strikes occured

outside the weld zone and were removed without paperwork. Thus, no quality control inspector would observe the repair or its adequacy nor whether the repair was not in the weld zone but even inspected by quality control. Thus, gain, procedural violations with hardware consequences that are caused by pressure from foreman to "save the company a bunch of time and money and a bunch of paperwork," are not identified or corrected by the quality assurance program at the time of their occurrence. Today, Duke improperly places the burden upon the collective memories of the workers who raised these concerns to identify the extent and specific instances of this problem. The burden clearly must be upon Duke to employ whatever direct inspection and testing techniques are available to finally identify and correct the hardware deficiencies represented by improper removal of arc strike damage.

IC. FOREMAN OVERRIDE HAS CAUSED IMPROPER COLD SPRINGING OF PIPE

In the course of conducting their initial interviews Duke's investigators identified a welder, individual 33, tr. 13568, who raised a concern regarding cold springing of a pipe in order to make a fit.

> "One time on 560, a fitter was cold springing a fit for me. Five come-alongs and one chain fall were attached to either an eighteen or twenty-four inch carbon pipe to make the fit. The fitter was scared to get near it and so was I. Both of our foremen told us to make it. I

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> can point it out if necessary. The weld right beside this one had to be cut out. (I feel there was pressure to do this) I do not know if the fit was done to relieve pressure or not. I worked for Galladen and Boyd McCall (fitter) worked for Johnson. I have asked since then if cold springing was a violation. I have not received a straight-forward answer. This was around 1980 or 1981."

Duke interviewed others on the crude question, individuals 127, 131, and 163. Nills, tr. 13,568. The pipe in question was unbolted; the connection strung apart; the dynomometer measurements established at excessive force had been applied to make the fit; and the pipe was cut out and reworked. Llewelleyn, Hollins, and Mills, tr. 13,574-575. NCI 18,304 was issued since the cold springing had not been performed to proper control and documentation. tr. 13,581-582. Boyd McCall, individual 131, was a powerhouse mechanic - fitter on foreman Jim Johnson's crew. His general foreman was Jack Hollin. Mr. McCall testified regarding the cold spring fit up of the pipe that was ultimately reworked and NCI'd. He explained that he was unable to fit up the pipe using moderate hand pressure and that he called his foreman Mr. Johnson to come look at it. Mr. Johnson said for me to go ahead and pull it over.

> "Okay. Mr. Johnson said for me to go ahead and pull it over. Okay. At that time I said I am not so sure about this so I went down and checked with the inspectors. The inspector, he went down and talked to his supervisor and come back to me and said okay you can do it."

McCall, tr. 14,104. A welding lug was fit to the shell

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wall of the reactor building and two or three one and one half chain falls were used to pull the joint about one and one half inches. McCall tr. 14,109.

The incident clearly reflects an example of foreman override with hardware consequences and quality assurance procedure violations. The foreman clearly directed an improper cold spring fit in violation of procedure. The fitter, Mr. McCall had enough doubt about the correctness of the instructions to seek out the advise of the QC inspector. The fact that the inspector acquiesced in the procedure or violation hardly excuses the conduct of the foreman in the results of the violation. In point of fact the failure by the QC inspector to identify the violation is itself a violation of the Quality Assurnace program.

Other cold springing concerns were raised by individual 62,198, 68, and 131. Mills, tr. 13,568-569. The reviewers determine that these instances had been previously documented on NCIs. August 3 report, Attachment B, p. III-1. In addition the reviewers acknowledge that individual 191, a welder, raised the following concerns:

> "When I first came to work at Catawba, I saw pipe fitters pulling pipe with come-alongs but the practice was stopped."

Duke's Mr. Llewelleyn acknowledged that he performed a follow-up interview with individual 191 where he

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questioned him regarding other concerns but since he did not interpret the statement as reflecting a cold springing concern he asked for no follow-up questions regarding the matter. Llewellyn, tr. 13,572 - 573.

Duke's Mr. Mills acknowledges that cold springing of a pipe has potential safety significance and that design considerations are involved in determining stress limits which are permissable. tr. 13,585 - 586. A cold sprung pipe may have an adverse effect on the alignment of a piece of mechanical equipment, id. Stresses imparted from cold springing to pipe welds might also contribute to development of inter-granular stress corrosion cracking.

Duke's investigation of the cold springing problem was limited to the interviews of craftsmen on the particular crew identified by individual 33 who initially raised the cold span concern. These were less than a dozen individuals. Hollins, tr. 13,586. Clearly, with Duke's limited investigation beyond the welding discipline and with its reliance upon the memory of those craftsmen who raised the cold springing concern, no definitive conclusions can be reached as to the extent of the cold springing problem or the identification of specific instances yet undocumented. The Licensing Board has previously heard concerns of cold springing raised by an in-camera witness. On the basis of Duke's investigation of

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these concerns the board determined that there was no basis for such cold springing concerns. PID pp. 214-215. These additional cold springing concerns raised in the Duke investigation must cast into doubt the earlier resolution of the cold springing question.

II. SERIOUS METHODOLOGICAL FLAWS PREVENT GENERALIZATION REGARDING THE EXTENT OF FOREMAN OVERRIDE PROBLEMS AT CATAWBA

On the basis of concerns expressed to them by Catawba welders the NRC staff identified specific technical concerns in their April 23, 1984 inspection report. These concerns involved issues raised in connection with Unresolved Action Items (fabrication of socket welds) and (unauthorized removal of arc strike). These concerns were identified as relating to welding foreman Arlon Moore and his supervisor welding general foreman Billy Smith. At the request of the NRC staff Duke set out to investigate the significance and extent of these problems.

The results of its investigation are reflected in its August 3, 1984 report, App. Ex. 116. That report reflects two principal findings: (1) quality construction standards at Catawba are being met, (2) foreman override is not a problem at the Catawba site. The report further concludes that there is no evidence of a "pattern of supervisory pressure on craftsmen to violate procedures, to

perform less than adquate work, or to sacrifice quality of work in order to meet production schedules." The report states that foreman override was "extremely isolated, ... and did not fit any pattern," nor was it "pervasive." Duke August 3 report, App. Ex. 116, p. 2.

Duke Vice President for construction, R.L. Dick elaborated that the investigation confirmed "that the problem was limited to Mr. Moore's crew and during times when he was working for Mr. Smith." and that "we had isolated events under other foremen, other crafts, other shifts..." Dick, tr. 13,182. No imperical definition of terms such as "pervasive" or "isolated" is intended by such terms as used in the report, but simply the judgement of the Duke authors and reviewers. Dick, 13,183 - 184. In addition to foreman Arlon Moore and general foreman Billy Smith some eleven other supervisors including non-welding supervisors and powerhouse mechanic disciplines of instrumentation and hangars were indicated and were subject to counseling. Dick, tr. 13,218; Pal. Ex. 154.

Investigation director Ray Hollins, an engineer, designed the interview sampling methodology which was employed in Dukes investigation. Mr. Hollins simply relied upon his own personal judgement in establishing sample methodology and did not consult any persons with professional training in research techniques. Hollins, tr. 13,246. Mr. Hollins was unable to establish a level

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of confidence or accuracy associated with the generalizations which the investigation report draws from the interview results. Hollins, tr. 13,250. In his initial sample of craftsmen Mr. Hollins interviewers selected 103 welders out of 439 in the welding craft or 23%; nineteen powerhouse mechanics of 889 or 2.1%; eight electricians of 327 or 2.4%; and, six steel works of 185 or 3.9%. From this sample Mr. Hollin believes he can generalize to the 80% of persons in those crafts who work in safety related or critical areas. Hollins, tr. 13,247. The investigation approach is reflected in the attachments to the testimony of R.L. Dick, App. Ex. 113. The product of the interviews with the selected craftsmen and supervisors are the affidavits themselves which are admitted into evidence as App. Ex. 118. In order to evaluate the investigation results for determining the instances of foreman override concerns, the "base source" is a review of the affidavits themselves. Hollins, tr. 13,271.

Palmetto and CEST presented the expert testimony of Dr. Raymond Michalowski, professor of sociology at the University of North Carolina at Charlotte. Dr. Michalowski volunteered to perform an analysis of the Duke investigation methodology to assess the "adequacy of the study and therefore the degree to which its findings could be relied upon as an accurate depiction of the presence or absence of QA problems at the Catawba facility in the

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areas in question." He concluded that because of serious methodological flaws with respect to the validity and reliability of the study, the study concluded should not be relied upon as a basis for policy decisions by either the Duke Power Company or the Nuclear Regulatory Commission. Michalowski summary en vita, Pal. Ex. 147.

Applicants asked no cross examination questions of Dr. Michalowski. tr. 13,957. However, over the objections of Palmetto they presented in rebuttal testimony the opinion evidence of Dr. John E. Hunter, Professor of Psychology at Michigan State University. Testimony of Dr. John E. Hunter and resume, App. Ex. 120. Dr. Hunter was retained for a daily fee of $1,000.00. Hunter, tr. 14,289, to evaluate Duke's interview research and critique Dr. Michalowski's testimony. Dr. Hunter, of course, had no role in designing or conducting the Duke investigation. Hunter, tr. 14,283, 284. While Dr. Hunter characterized Duke's report as an investigation in the nature of a "police investigation," he had no experience in performing such investigations himself. Hunter, tr. 14,190 - 191.

Dr. Michalowski identifies serious flaws in Duke's study methodology which involves, first, problems of validity, meaning the ability of a specific research methodology to arrive at an answer which is responsive to the question posed; and, second, the problem of reliability

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meaning the degree of confidence we can have with similar studies would produce similar findings.

With regard to problems of validity, Dr. Michalowski identifies a failure to specify exact parameters of the defendant variables under study; failure to operationalize key variables and concepts; and the lack of systematic and statistically adequate sampling procedures for selection of individuals to be interviewed outside the crew and craft of welder B.

With regard to problems of reliability, Dr. Michalowski describes flaws in the interview schedule or essential questions such as the absence of behavioral specificity in the questions asked; reliance on highly subjective concepts and phrasiology; and problems with contingent ordering of questions. Interview environment problems include power differential between the Duke Power interviewers and the subjects; the character of the "high risk" information sought to be revealed; and the possible contamination of the work place requirement by the interview process. Michalowski summary, Pal. Ex. 147. Dr. Michalowski rejects the ascertian that scientific methods of inquiry are inapplicable to such a study in favor of the "common sense" approach employed by Duke:

> "The notion of doing a common sense study, I think, is a very dangerous notion. The reason is that scientific inquiry, methods of scientific inquiry were developed specifically because

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> common sense does not necessarily provide good answers."

Michalowski, tr. 13,932. Dr. Michalowski rejects the ascertion that the number 217, reflecting persons interviewed by Duke is large enough to establish a certain level of confidence and reliability for Duke study.

> "The statement that 217 is a large number in the context of sampling is a meaningless statement without a lot of additional information. Two hundred seventeen might be an adequate number, it might be wholly inadequate number. Without a sampling procedure and a justified sampling procedure...217 is just a number; it is neither a large nor a small number."

Michalowski, tr. 13,953 - 954. Fundamentally Dr. Michalowski ascerts that "there are specific rules and procedures that you would follow to arrive at an answer that you can trust," not adhered to in Duke power's "common sense" study. Much like compliance with quality assurance rules and procedures is required to assure a nuclear plant is built and operated safely, in compliance with generally accepted rules for scientific inquiry are necessary to assure that a valid and reliable answer be produced by studying.

By contrast Duke's rebuttal witness Dr. John E. Hunter presents a confused, uninformed "seat of the pants effort to bolster the Duke study methodology; and presents totally irrational endorsement of its conclusion. Dr. Hunter, who considers himself a scientist, tr. 14,291,

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simply comes too late with too little to boot strap the Duke methodology which had been formulated and implemented without any such expert contribution.

Dr. Hunter was evasive and confused with regard to the dependent variables studies by Duke. He states first that "the report could have looked at hundreds of different variables." Hunter, tr. 14,292. Then, states that "It would have been at least three. They certainly looked at foreman override. They looked at the extent of inter-personal problems...they looked at allegations." Id. Dr. Hunter did not know the total instances of foreman override identified, tr. 14,303, yet expresses the conclusion of foreman override is a rare event at the Catawba plant." Hunter, testimony, p. 10, App. Ex. 120. In a simply incredible leap of fantasy, Dr. Hunter defines "rare" as less than one in a thousand and estimates the number of potential instances of foreman override as 272,000:

> "Oh, okay. Well, as I see it, there is a potential for foreman override on essentially any task that the foreman directs a worker to carry out. Now, the worker, the typical worker has been there for over four years, so if we take four years as a starting point, I estimated 200 working days in each year...although they tell me there is considerable overtime...and on each day I estimated there would be a minimum of five tasks."

Hunter, tr. 14,304. This figure of five tasks was arrived at "by the seat of the pants" method. tr. 14,305.

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Dr. Hunter states in his testimony that the key variables of foreman override and pressure were "well defined by the questions" Duke employed, Hunter is confused and less confident when actual questions themselves:

> "Answer: I didn't say that the question operationalized the concept, it doesn't. That question elicits information from subjects which can then be looked at by the investigators to see whether that subject is or is not alleging in instance of foreman override. The operationalization process is the total process which consists of first eliciting the information and second evaluating and coding the information.
> Q: Well sir, I thought I understood your answer to say that the questions clearly defined the term "foreman override"?
> A: My answer said that I think that -- well, alright. The word "defined" there is probably poorly chosen."

Hunter tr. 14,313. Indeed, Dr. Hunter does not even understand which definition of foreman override was employed in Duke study. Hunter, tr. 14,316.

Dr. Hunter claims to have assessed the Duke power questions with clarity and to have determined that "the essential questions asked were all clear." Hunter testimony, p. 2, App. Ex. 120.

> "Q: Now what is mean by the term "directed to violate" as employed in this essential question?
> A: I "directed to violate" means that the person was asked, that is ordered by -- presumably by a foreman --
> Q: Is ordered and asked and ordered, sir, I'm sorry?
> A: Well, the term "directed" would mean ordered. Although it is given -- the foreman frequently asks would you please do such and such, and, its still, it is still an order.

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> Q: So it ask and ordered?
> A: When a foreman asks it is the same thing as ordered or directed. I see those in that context as being synonomous."

Hunter transcript, 13,327.

Dr. Michalowski's criticisms that such questions are "behaviorally unspecific" and rely on "highly subjective concepts and phrasiology" is obviously well taken. Hunter's confusion reinforces the correctness about Dr. Michalowski's observation. While Hunter's prefiled testimony suggests that disclosure of foreman override concerns by craftsmen was not "high risk information," Hunter testimony, p. 4, App. Ex. 120, he acknowledges that the respondent's perception of a threat from the foreman would transform the information into "high risk." Hunter tr. 14,337.

Finally, Dr. Hunter clarifies his meaning of "rare" by explaining that even the occurrence of ten instances of foreman override among the thirty three non-welders "randomly" sampled still constitutes "a rare" occurrence relative to the opportunities for occurrence of 33 x 4,000. Hunter, tr. 14,347. Yet by such characterization of frequency as "rare" he clearly avoided the conclusion that such frequency is "insignificant" since, I don't know, personally, the importance of this event." Hunter, tr. 14,343. While this board may not have established a definition of "rare" for purposes of weighing the

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pervasiveness of foreman override at Catawba, we can with some confidence exclude the definition employed by Dr. Hunter as having any meaningful utility in this proceeding."

IA. AFFIDAVITS REFLECT BROAD EXTENT OF OVERRIDE CONCERNS

As Mr. Hollins acknowledges, the affidavits formed a "underlined basis" for the Duke report, tr. 13,145. Given that there are severe problems with the nature of the selection process, the interview setting, and other "contaminating" influences, the information contained with the affidavits must be weighed with an objectively critical eye. Nevertheless, the interviews do contain relevent information. Unfortunately, the collecting of the information contained within the affidavit was systematic only with respect to the use of the "essential questions." Dick, Att. C, App. Ex. 113. Beyond this requirement, interviewers were simply encouraged to "get as much specific information as possible, identify people and hardware involved." Duke August 3 report, App. Ex. 116. Information about the safety significance or the direct versus indirect knowledge of instances of override were not systematically recorded in the affidavits. Nor do the affidavits make it clear in some cases whether an override concern reflects an actual

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incident or a concern that an incident may or could have occurred. See, for example, individual 192's affidavit, dated 4/2, where it is stated "I have seen times where production pressure by foreman may have caused welders to violate interpass temperature requirements or (sic) socket welds," and, in a second affidavit dated that same day, "Robert Baker told employees to make passes on welds that had cooled because of Martin." Yet the interviewers failed to follow up on this information to get the details necessary to make a determination regarding whether there were specific incidents of procedure violation and if so, how many, etc. Indeed, this individual is listed as one of the tne individuals with specific override instance concerns, yet not for the concerns raised above but instead for bad welds on vertical stiffners. August 3 report, attachment A, VIII-1,2. Apparently this interpass override concern was one of the many concerns labeled as a general-not specific-concern in which, according to Mr. Hollins, was omitted from all tabulations expressed in their report. Hollins, tr. 13,260. Consequently, the affidavits are more useful for determining override concerns than actual instances of override. In order to determine the nature of override concerns expressed within the affidavits a comprehensive review was performed:

TABLE I

Table I identifies 39 separate types of override events. The most common override concerns are interpass temperature violations, no process control, supervisor pressure resulting in "bad welds", cold spring fit up violations, arc strikes, look out for QC. A total of 45 individuals expressed override concerns which is more than 20% of the total number of interviews. Of these 45, thirty are welders, ten are powerhouse mechanics, one is an electrician, and four are QC inspectors.

TABLE II

Table II provides a summary list of instances of override concerns by craft. No attempt was made by Duke to provide such a tabulation. Hollins, tr. 13,260, 13,271.

TABLE III

Duke concluded in their August 3 report that a total of six supervisors received sanctions in connection with inappropriate performance. App. Ex. 116, p. 27. Indeed, it was argued that one foreman, J. A. Moore, is responsible for the majority of inappropriate supervisor actions. App. Ex. 116, p. 14. The attempt to limit the issue of override to one crew or, at most, one general foreman had little basis. Table III presents a list of all supervisors who have been named in association with override concerns, as compiled from the affidavits themselves.

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As can be seen from the table, the scope of supervisors implicated in override concerns is well beyond Arlon Moore and his crew. A total of twenty-three supervisors were identified in the affidavits.

The atmosphere at Catawba was clearly repressive, as evidenced by statements expressed in the affidavits about sharing concerns to supervisors - or to anyone. In analysis of the affidavits reveals that at least twenty-five employees complained about not being able to communicate their concerns appropriately (see affidavits 220, 18, 28, 36, 52, 76, 81, 83, 92, 94, 99, 109, 114, 148, 160, 168, 173, 180, 181, 189, 192, 196, 172, 163, 118).

The twenty-five affidavits listed above reveal an even more distressing finding: most of the concerns are expressed against General Foremen - particularly Billy Smith, but also D. Mills and P. Spearman (see affidavits 36, 81, 92, 94, 8, 99, 109, 181, 189, 192, 196, 163, 172).

While repression may account for why some craftmen may go to the NRC (see affidavit 194), it appears that many craftsmen learn to see the NRC in negative terms. A craftsman who goes to the NRC to express a concern may be labeled a "troublemaker." See affidavits 46, 53, 56, 134, 239, and 214. Thus, it is no surprise that quality concerns have only recently been discovered and in many

craftsmen there simply isn't an outlet for expressing concerns to their foreman, management, employee relations, or to the NRC.

CONCLUSION

From the evidence available it is clear that foreman override practices represent a significant breakdown in the quality assurance program at Catawba. Foreman override challenges the very underpinnings of the quality assurance system this element of willfull circumvention of quality requirements cloaked in an atmosphere of threat and intimidation against those who might disclose its existence. While we do know that the identified instances of foreman override practices present significant implications for the quality of hardware in the Catawba plant, the true extent and seriousness of the foreman override practices and the result of hardware deficiencies remain yet unknown. Duke's investigative technique placed undue burden upon the concerned craftsmen to prove the existence of hardware deficiencies. Effective identification of such hardware deficiencies must be dependent upon the comprehensive inspection and testing program.

As to the extent of the foreman override practices in other crews and other crafts not effectively sampled; and even among those actually questioned (but in an unreliable and ineffective matter) the answer must

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await the conduct of an objective and methodologically sound investigation of the problem. Flawed of the methodology is, though, an independent evaluation of the data identified in the Duke affidavits discloses a problem far more extensive in its scope, in the supervisors implicated, and to the hardware questions which it raises. The data that is known simply does not support Duke's conclusions that the foreman override practices at Catawba are insignificant or isolated.

Why were these foreman override probelms not detected earlier? Duke vice president R. L. Dick does not know. tr. 13,599 and he has identified nothing wrong with the system that did not identify these concerns. Dick, tr. 13,640. The company appears to have learned little from the experience. No changes are contemplated in the Catawba quality assurance program. Grier, tr. 13,645.

As for the NRC, why didn't they identify the problem when back in 1980 they conducted their inspection and enforcement activities? Mr. Blake could not answer that question. tr., 13,772.

> "When you do a sampling inspection, there is a possibility that you won't find anything."

Blake, tr., 13,774.

> "Duke Power Company, as the licensee, is obliged to provide an atmosphere for quality work. It comes down to the basic premise that a quality program that depended upon quality

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> workers. The best QC program is not going to find all the problems; the only thing that is going to keep problems from happening is having workers who are quality conscious. There were some instances where this did not happen, where workers were given a perception through their supervisors where quality was secondary to the foreman's wishes to get the job done. That was a breakdown in the quality program at that site."

Blake, tr. 13,751.

We submit that the evidence of foreman override practices have haunted this record from our first inquiry into quality assurance deficiencies at Catawba. What is the significance of the actions of pipe fitter foreman Ed MacKenzie who admitted he deserved the reputation of being a bully on the job, tr. 8719, and who this board found responsible for actions "designed to intimidate, ridicule and denigrate the inspector." PID, p. 165. What about fitter foreman Tom Mullinax threatening to whip or knock the teeth out of inspector Lindsay Harris? PID, p. 173. What of the foreman identified in the concerns of welding inspector Bob Ryant including Mr. Grazzel and Mr. Ellenberg? This board attributed their conduct in part to a "lack of clarity about company policies concerning quality versus production." PID, p. 178. "If these attitudes had continued, they had the potential for reducing the motivation as QA inspectors and thereby affecting the QA program and ultimately the quality of construction." Id.

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Consider in light of the recent evidence of foreman override practices on the second shift by Arlon Moore and Billy Smith, the significance of the evidence regarding welding inspector Bill Burr as told by his supervisor to "ease off" on the craft. PID, p. 146, 147. The evidence of undetected procedural and hardware violations on the second shift highlights the questions of the effectiveness of the QC inspection program in that regard. Finally, we urge the board to consider its prior findings with regard to management, discrimination, and retaliation against welding inspector supervisor Beau Ross and his crew for raising safety concerns. This board found senior quality assurance managers George Greer and Larry Davidson responsible for the discriminatory treatment of Mr. Ross. You concluded as follows with regard to his conduct.

> "There appears to have been an unsuccessful attempt on the part of some mid-level supervisory personnel to bring about an informal relaxation of inspection procedures. This is a serious matter. Had it been successful, it might have undermined the QA program at Catawba by diminishing the efforts of the effects."

PID, p. 161.

What has Catawba Quality Assurance Manager Larry Davis learned from foreman override investigation and results? Apparently nothing. Faced with the evidence of foreman override practices and the evidence of limited

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random inspection opportunity to permit detection of such practices as interpass temperature violations, Miss Davidson refuses to even acknowledge the problem: "Since random inspections are just that, random, this variation is not a problem. Inspections necessary to be performed are documented as full points and those are completed regardless of the numbers of inspectors available." Davidson memo, Pal. Ex. 151. When asked why his quality assurance program failed to detect these foreman override problems, Mr. Davis simply passed the buck and placed the blame on a construction department manager. He acknowledged no responsibility for the QA breaking in and allowing the foreman override practices of such supervisors as Arlon Moore and Billy Smith to go uncorrected. Davison, tr. 14,240 - 241.

Former Catawba welder Sam Nunn originally brought this issue before the board in response to an invitation to Catawba workers to express their safety concerns. Mr. Nunn has done all he can to assist the NRC staff and this board in identifying the problem. In his testimony in this hearing session he identified the evidence from welder Mike McKeldy of the illegal weld repairs; information he passed on to staff investigator Bruno Uryc. Nunn, tr. 14,263. His efforts to point the way appeared to have been rebuffed. We urge this board to heed Mr. Nunn's admonition

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that the practices of foreman override are more extensive than acknowledged by Duke and the NRC staff. Nunn, tr. 14,265.

The evidence of foreman override in this record- its significance and its extent - simply prevents a conclusion that the quality assurance program has operated effectively. Identifying a full extent of the foreman override practice and the quality assurance hardware effects requires the conduct of a thorough independent investigation. We urge this board to require of Applicants, as a condition for reaching the reasonable assurance determination necessary for operation that an appropriate organization be identified and, based upon submissions of the parties, a program be developed to effectively investigate foreman override and its effects at Catawba.

Respectfully submitted,

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Carolina Environmental Study Group

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CERTIFICATE OF PROCEEDINGS

This is to certify that the attached proceedings before the NRC

In the matter of: Palmetto Alliance Carolina Environmental Study Group Proposed Findings of Fact and Conclusions of Law on Issues of Foreman Override

Date of Proceeding: Friday, October 26, 1984

Place of Proceeding: Bethesda, MD

where held as herein appears, and that this is the original transcript for the file of the Commission. The Proceedings ended at 5:00 P.M.

GEORGIA PINKARD
Official Reporter

Georgia Pinkard
GEORGIA PINKARD

Beverly Hook
BEVERLY HOOK
Official Transcriber