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1

DRAFT 2  
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## INSTRUMENTATION

### EXECUTIVE SUMMARY - ~~CIVIL/STRUCTURAL~~ ISSUES

#### INTRODUCTION

Scope of Allegations: The allegations in the <sup>instrumentation</sup> ~~civil/structural~~ discipline, <sup>appear</sup> ~~arise~~ to have ~~basically~~ <sup>arise</sup> from information derived from reviews being conducted by contract personnel working for Ebass, the project manager and architect-engineer for LP&L, ~~the owners of Waterford~~. These reviewers were conducting quality assurance reviews of documentation relative to the safety-related <sup>instrumentation</sup> ~~items~~ to determine whether <sup>the instrumentation</sup> ~~such items~~ had been manufactured, purchased, ~~stored~~, maintained, installed, tested and inspected <sup>in accordance</sup> ~~as required~~ <sup>with</sup> ~~by the~~ project documents and procedures. In addition, allegations arose from the reviewers efforts concerning the functioning of the quality program, the control of design changes and field changes, the disposition of nonconformances and discrepancies, <sup>and</sup> the reportability of items to the NRC, ~~and~~ ~~information existing outside the quality program related to deficiencies.~~ Finally, as a result of information from the reviewers' effort, there were allegations of falsified records consisting of, ~~"created" data, forged~~ ~~signatures/initials, and~~ unauthorized changes to records. The information upon which most all of the allegations were based, generally reflected the results of QA record reviews completed during the period of late 1982 up through mid-1983.

The allegations <sup>include</sup> ~~touch~~ almost all aspects of construction activity in the <sup>instrumentation</sup> ~~civil/structural~~ discipline, including <sup>designs</sup> materials, procedures, <sup>and</sup> ~~work~~ <sup>documentation,</sup> execution, testing, <sup>and</sup> inspection ~~and maintenance.~~

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The concerns expressed ... can be categorized, as involving the four <sup>equipment</sup> areas related to the plants) ~~types of components used~~ ~~adequacy of basically four~~ ~~in the~~ ...

instrumentation systems. These ~~can be~~ are:

~~categorized as~~ instrumentation sensing line adapters; instrument ~~line~~ sensing line tubing; instrument sensing line tube track; and instrument and air system tube track supports and hangers.

Allegations have been made which relate to the material traceability of 1" to  $\frac{1}{2}$ " adapters in the safety-related instrumentation systems. It is alleged that since the utility purchased adapters for non-safety application

and that these "unqualified" adapters were installed in safety-related systems.

There were allegations regarding the installation of the instrument sensing line tubing, both with respect to the lack of high point vents, and inadequate slope of the lines.

Also an allegation was made that the track for the instrument tubing was

not the correct material and that the

tube had been installed <sup>with insufficient clearance from</sup> touching the track.

The largest number of allegations involved the tube line supports/hangers. These

involved the hanger inspection criteria, rework of seismic hangers and proper heat numbers

4 Finally, a  
for the supports. It related allegation involved  
the design of <sup>the</sup> instrument air system and a  
question regarding its <sup>support and its</sup> ~~seismic~~ adequacy to  
withstand an earthquake and the potential for  
<sup>resulting</sup> it to impact <sup>on</sup> safety-related equipment.

## Task Force Team

The NRC team in the instrumentation discipline was assembled based on technical expertise and capabilities, which provided a balance of individuals with <sup>in</sup>backgrounds which included engineering design experience, quality assurance and document control experience, inspection experience, construction experience, project management experience, and regulatory experience. The team included a member from the Office of Inspection and Enforcement, and a member from the Office of Nuclear Reactor Regulation and two consultants. In total, the team represented well over 50 years of <sup>instrumentation and electrical</sup> engineering experience in the nuclear <sup>power</sup> industry.

In addition, there was an independent consultant who was responsible for independently evaluating construction controls and problems and their possible effect on structural behavior and integrity. This consultant has 38 years of management, engineering and construction experience in the area of construction.

#### APPROACH TO ALLEGATIONS

In order to accumulate the necessary facts with which to evaluate the allegations, the team utilized the various project documents such as specifications, drawings, procedures and instructions as well as the actual construction records which exist for the various structural materials, construction work packages, ~~personnel records~~, inspection, surveillance and audit reports and other relevant documents. Additionally, the team discussed various issues with, and gathered information from, personnel of LP&L, Ebasco and other subcontractors when they were available. The team also conducted inspections in the plant where walkdowns and direct observation could provide factual information. Discussions were also held with some of the allegeders to clarify allegations if that was necessary and to discuss status and preliminary findings in some cases. Finally an evaluation of the facts was made to establish if the allegation was valid or invalid. The safety significance was determined and any generic implications were defined. Where licensee action was needed, the necessary action was requested.

~~Approach to Allocations~~  
Findings

The team has concluded that, although there was a possibility that unqualified adapters (ie. those with no head number identification) had been installed in safety-related systems the utility took adequate corrective action to provide ~~an~~ assurance that such adapters were replaced with the qualified adapters.

With regard to the instrument sensing line tubing, the team concluded that although the utility violated a commitment

to include high point vents in the lines, alternate provisions had been made to vent air from the lines during the hydro-testing. In addition, although violations of their slope criteria were identified, the team concluded that case-by-case analyses had been done to accept, or modify each such instances.

The team concluded that the <sup>allegation regarding the</sup> tube track material was not valid because the material which was alleged to be non-safety material was not, in fact, ~~used for~~ the tube track material. Also, the allegation regarding



8

the criteria for <sup>insufficient</sup> instrument tubing <sup>clearance from</sup> physically  
in contact with the tube tracks was  
shown to be adequately addressed by  
subsequent corrective actions.

The allegations regarding the supports/hangers  
involve a number of separate aspects.

The allegation, that documentation <sup>indicating</sup> ~~reflecting~~  
heat numbers had been modified to reflect  
the correct heat numbers in the field, was  
substantiated, however, <sup>it</sup> ~~the safety significance~~  
was determined to be of little <sup>potential</sup> safety significance.  
The allegation regarding inspection criteria  
for anchor bolts in safety related hangers

was also <sup>substantiated</sup> ~~concluded to be correct~~. As noted,

Additional reinspection, <sup>if needed</sup> will be necessary.

The allegation

Regarding the rework of a number of

seismic hangers was shown to be

groundless because the reinspection had addressed  
all the <sup>hangers of concern</sup> <sub>instrumentation</sub>

91 The other, allegation, which involved the instrument air system design and its conformance to Regulatory Guide 1.29, was concluded to require additional information and documentation.

Exhibit 10

team found that most all deficiencies found during the construction process were generally evaluated, but there were instances of items which may not have been properly classified. The team believes these situations occurred due to the overlap in the definitions of nonconformances and deficiencies etc.

Assessing the project from the view point of civil/structural activities nearly nine years after the start of the major work in this discipline, the team concluded that the quality review of records was initiated rather late in the project. If the reviews had been more closely following the work activities, it is probable that the magnitude of the current effort would have been greatly reduced.

With the exception of the items noted, the team concluded that the ~~civil~~ <sup>instrumentation</sup> structural construction activities were conducted in a controlled manner and that the allegations have been concluded to be of little and that significant safety issues have in all probability been identified safety significance. The items noted will have to be addressed by the applicants. The only source of new relevant information based on allegations currently involved would be new information arising from investigations currently underway by the NRC Office of Investigations (OI). Technical evaluation of that information cannot be completed until the OI report is issued.

The issue of instrument air system design and its conformance with RG. 1.2.9