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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of:	)	
	)	
Consolidated Edison Company	)	Docket No. 50–247
of New York, Inc.	)	
(Indian Point Nuclear Station,	)	
Unit No. 2)	)	

AFFIDAVIT OF JON J. FUNANICH

I, JON J. FUNANICH , being duly sworn, state as follows:

1. I am an Eddy Current Level III-QDA employed by MoreTech, Inc. located at 406 Military East, Benicia, California.

2. I was recently asked to examine elements of a nondestructive examination (NDE) of the steam generators, at the Indian Point 2 Nuclear Power Plant, conducted in the spring of 1997, utilizing a technique referred to as eddy current testing. Indian Point 2 is owned and operated by the Consolidated Edison Company of New York, Inc. The purpose of this affidavit is to provide my assessment of the adequacy of the 1997 IP2 steam generator inspection program, the application of that program to the 1997 examination of the IP2 steam generators, and to evaluate issues surrounding the 1997 IP2 steam generator nondestructive examination (NDE) reviewed by the Nuclear Regulatory Commission in a November 20, 2000 document entitled, "Final Significance Determination for a Red Finding and Notice of Violation at Indian Point 2 – Report No. 0500247/2000-010.

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3. I have had no previous involvement with the Consolidated Edison Company or Indian Point 2 regarding steam generator issues, including those issues associated with steam generator inspections occurring in 1997 and 2000.

4. My professional qualifications and experience are set forth in Exhibit 1 hereto. I have also been involved with over 200 eddy current campaigns and approximately 80 of those as the Lead Analyst.

5. Prior to preparing this affidavit, I reviewed Westinghouse Data Analysis Technique Procedure DAT-IP2-001 Rev.0, Analysis Technique Specification (ANTS) Sheets IP2-97-E; "Mag Plus Point U-Bend"; Specification NO. NPE-72217 "Eddy Current Examination of Nuclear Steam Generator Tubes Indian Point 2"; "PWR Steam Generator Guidelines, Revision 4 Volume 1, dated June 1996"; and "Examination Technique Specification Sheet, ETSS # 96511" which is part of the Performance Demonstration Data Base Appendix, A.

6. Low row U-Bends have had a long history of problems. Leakage events in Westinghouse Steam generators were common during examinations in the 1970's and early 1980's when eddy current bobbin coil was the only exam technique available. Operators of several plants, including IP2, opted to plug all the row 1 tubes in their steam generators to prevent forced outages or steam generator leakage during operation. With the development of rotating probe technology the detection of low row U-Bend degradation was significantly improved. Plus point technology which was developed in the mid 1990's improved again on rotating technology enabling detection of smaller degradation.

7. Eddy current analysis of low row U-Bends, in my experience, has had an enhanced level of awareness and requires unique attention during data analysis.

8. The 1997 IP2 initial plan to examine 100% of rows 2 and 3 with a plus point probe for this model steam generator met the industry standard and practice that existed at that time.

9. The PWR Steam Generator Examination Guidelines: Revision 4 dated June 1996 (further referenced as Rev 4.) states, in part, the following requirements for EDM notch standards utilized in 1997 for rotation probe technology including plus point probes:

> "Electro-discharge machining (EDM) and laser-machined notch standards are typically used to establish setup conditions for rotating probe technology. The notches should be of:
>
> Both axial and circumferential orientation, and
>
> Standard length and depths on the OD and ID."

Rev. 4 did not have a requirement for specific depths, lengths, or widths to be utilized. The EDM notch requirement for a specific examination would be determined by the applicable qualified technique.

10. The qualified technique, ETSS-96511 requires the use of a 40% ID axial and circumferential notch for the plus point probe calibration.

11. The calibration standards used by IP2 for the U-bend examination contained both ID and OD circumferential and axial notches. Missing, however, was the 40% ID axial notch which is stated in the approved technique for U-Bend examinations, ETSS-96511. This states that the 40% ID notch is set to a rotation value of between 10

and 15 degrees. This requirement can be met without the inclusion of a 40% ID notch if another notch on the standard is set to a phase setting which would position the 40% ID notch in the required range.

12. I reviewed the raw data sets from the qualified technique, ETSS-96511, which has the required indication on the standard to determine if the phase setting resulted in positioning the 40% ID notch in the required range. When the 100% axial EDM notch is set to 30 degrees in both the 400 kHz and 300 kHz channels, the 40% ID axial notch's phase angles are 11 and 13 degrees respectively. Therefore, the calibration was within the qualified technique's required range. Based on this evaluation, I have concluded that the IP2 calibration met the requirements of ETSS-96511.

13. The IP2 Data Analysis Technique Procedure met the requirements of the PWR Steam Generator Examination Guidelines: Revision 4, Volume 1 Section 5 regarding eddy current analysis; including scope, responsibilities, personnel qualifications, calibration, flaw identification, criteria, reporting requirements, evaluation, recording and resolution.

14. The screening requirements in Data Analysis Technique Procedure, Para. 10.3.2 states, "Scroll the entire test extent with all frequencies as necessary to confirm any possible indications and to locate the largest amplitude signal with respect to the applicable steam generator structure. C-Scan, Lissajous and strip chart displays shall be monitored during this process".

15. Data Analysis Technique Procedure, Para. 11.4, third paragraph, third sentence also states, "The analyst shall scroll through the region of interest while

reviewing the Lissajous (X-Y) display for possible indications". This approach met the requirements of the qualified technique, ETSS-96511.

16. Data Analysis Technique Procedure, Para. 11.3.2, states "Where probe motion (lift-off) is evident set it to be horizontal on the pancake coils. The rotation of **all** channels should be adjusted such that the ID EDM notches on the standard provide a positive vertical response. This may make the 100% EDM lie at an angle somewhat greater than 20 degrees channels (e.g. the plus point channels will most likely rotate such that the 100% defect is 30 – 35 degrees off of the horizontal)."(emphasis included) I have concluded that the Data Analysis Technique Procedure provided the necessary instructions to the data analysts which met the requirements of ETSS-96511.

17. Data Analysis Technique Procedure, Table 7, "Set-Up For +Point", specifies a phase setting for Plus-Point Axial Flaws be set with probe motion horizontal and with the axial notch between 30 – 35 degrees.

18. When the 100% axial indication is set between 30 – 35 degrees, the phase angle of the 40% axial notch would therefore had met the requirements of ETSS-96511 (10-15 degrees). This was verified by reviewing the ETSS-96511 qualification data set.

19. Data Analysis Technique Procedure, Table 7, "Set-Up For +Point", states that the 40% OD notch be set to 50% full screen height.

20. When the 40% OD axial notch is set to 50% full screen height, the 40% ID notch equals 10 divisions. Therefore this exceeds the requirements of ETSS-96511 (2 divisions on the 40% ID notch). This was verified by reviewing the ETSS-96511 qualification data set. Therefore, I conclude that the phase and span settings requirements of ETSS-96511 were met.

21. The Analysis Technique Specification (ANTS) Sheets IP2-97-E "Mag Plus Point U-Bend", met the requirements of ETSS-96511 in all but one area. It does not state that the 100% axial notch lie between 30 – 35 degrees as stated in the Data Analysis Technique Procedure or that the 40% ID axial notch be set between 10 - 15 degrees as stated in ETSS-96511.

22. The following table summarized my review of the analyst's setups:

				Primary Setup		Secondary Setup	
SG	Row	Col	Cal#	100% Phase 400/300	40%OD Ax Span 400/300	100% Phase 400/300	40%OD Ax Span 400/300
21	2	87	H191	22°/21°	2.5/3.0	20°/21°	1.6/0.1
23	2	85	C14	32°/31°	4.0/4.5	32°/30°	2.4/3.4
24	2	4	H13	18°/18°	1.4/2.5	18°/18°	1.2/2.3
24	2	5	C58	29°/27°	1.1/1.0	29°/27°	1.1/1.0
24	2	67	C60	26°/25°	1.0/1.2	27°/25°	1.2/1.6
24	2	69	C60	26°/25°	1.0/1.2	27°/25°	1.2/1.6
24	2	71	C60	26°/25°	1.0/1.2	27°/25°	1.2/1.6
24	2	72	H21	40°/40°	0.8/1.2	21°/22°	1.4/2.4
24	2	74	H21	40°/40°	0.8/1.2	21°/22°	1.4/2.4

23. The Analysis Technique Procedure and U-Bend ANTS, IP2-97-E, state that the 40% OD axial notch be set at 50% full screen height which is approximately 2.5 divisions. As the table shows, very few of the setups met these requirements. The Data Analysis Technique Procedure states that the 100% Axial EDM notch be set between 30 – 35 degrees. Again, very few of these setups met that requirement. As stated earlier, the U-Bend ANTS, IP2-97-E, does not state the phase angle requirement but states probe motion horizontal. This may account for the phase angles below 30 degrees by the analyst attempting to set "probe motion horizontal".

24. The impact of shallower than required phase angle setups would effect the vertical component of the C-scan display which could result in a shallow PWSCC

indication not being detected. Additional screening requirements listed in the Data Analysis Technique Procedure, paragraph 10.3.2, "Scroll the entire test extent with all frequencies as necessary to confirm any possible indications and to locate the largest amplitude signal with respect to the applicable steam generator structure", should have overcome this deficiency. Therefore, I conclude that except for this minor deficiency the analyst should have been able to detect any significant degradation.

25. There are two U-Bend plus point training data sets; DISK_TRN_097A_02H1 cals 12 and 20 and three testing data sets; DISK_TST_097A_02H1 cals 7, 12, and 22. These data sets included axial PWSCC cracking at the tangent points and apex circumferential PWSCC. Therefore, I conclude that this training and testing of analysts at IP2 was representative of industry practice in 1997.

26. The data that was provided to me on the tubes listed in paragraph 27 of this affidavit, seemed typical of U-bend examinations in other plants. There did not appear to be excessive deposits, noise, or lift off signals.

27. The plus point probe did have a signal that I attribute to the ovality of the U-bends. This signal was present throughout the U-Bend area of several tubes. Those tubes were:

SG	Row	Col	Cal#	Ovality
21	2	87	H191	Yes
23	2	85	C14	Yes
24	2	4	H13	No
24	2	5	C58	Yes
24	2	67	C60	No
24	2	69	C60	No
24	2	71	C60	No
24	2	72	H21	Yes
24	2	74	H21	Yes

28. This "ovality" signal could mask small ID PWSCC indications if the analyst relied on the c-scan display only. However, the Data Analysis Technique Procedure, para. 10.3.2 states; "Scroll the entire test extent with all frequencies as necessary to confirm any possible indications and to locate the largest amplitude signal with respect to the applicable steam generator structure. C-Scan, Lissajous and strip chart display shall all be monitored during this process." I conclude that the ovalization signal should not have masked any indications of significant depth.

29. In conclusion, the Indian Point #2 Data Analysis Technique Procedure was in compliance PWR Steam Generator Guidelines, Revision 4, Volume 1, dated June 1996. The training of the IP2 analysts in regards to U-Bend plus point was similar to other plant's training programs during 1997 and met the requirements of the PWR Steam Generator Guidelines: Revision 4, Volume 1 dated June 1996 Section 6. I believe that the production analyst's actual setup files utilized during the evaluation of the Row 2 U-Bends were adequate for the detection of PWSCC in the tangent points and apex of the tubing.

34. The foregoing statements are true and correct to the best of my knowledge and belief.

Jon J. Eunanich

Sworn and subscribed to before me on this 18th day of January, 2001.

Notary Public

My Commission expires:

MoreTech

EXHIBIT #1

RESUMÉ

Jon J. Funanich

Residence:

EX 6

Business:
MoreTech, Inc.
406 Military East
Benicia, CA 94510

Relevant Skills and Experience

Mr. Funanich has applied the last 21 years to becoming a force in the eddy current industry that has become a standard many peers try to live up to. His dedication to constantly improve his skills has given him the ability to become a Level III that is highly regarded for his acumen and integrity. He is currently the assistant QA Manager at MoreTech, Inc.

His experience is comprised of eddy current data analysis, development and execution of technological advances, industry procedures, guidelines, training and testing programs, coordination of eddy current analysis projects, generating, maintaining, and approving evaluation summaries and technical documents, pc and unix system setup, administration, networking.

Mr. Funanich brings an abundance of experience, knowledge, technical abilities, and facilitation skills to help Utility power companies accomplish eddy current projects of nuclear components that are strictly regulated by national and government agencies.

Education

Vanden High School	Diploma, General Education	1993
Solano College	.Associates Degree, Electronics	
Conam Nuclear, Inc.	Supervisor Awareness Program	
Conam/Rockridge Tech.	Eddy Current Training Levels I,II,III	3/78-1999

EX 6

Employment Summary

MoreTech, Inc.	Eddy Current Level III, QDA	2/99-Present
Conam/Rockridge Tech.	Eddy Current Level III, QDA	6/94-1/99
Conam Nuclear, Inc.	Eddy Current Level III	4/93-6/94
Conam Nuclear, Inc.	Eddy Current Level III	10/89-4/93
Conam Inspection	Eddy Current Level III	8/83-10/89
Conam Inspection	Eddy Current Level IIA	8/79-8/83
Conam Inspection	Eddy Current Level II	2/79-8/79
Conam Inspection	Eddy Current Level I	5/78-5/79
Conam Inspection	Eddy Current, trainee	3/78-5/78