



April 8, 2003
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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

SUBJECT: REPLY TO A NOTICE OF NONCONFORMANCE - 99901350/2003-201

Dear Sir,

We would like to thank Mr. Joseph J. Petrosino, Mr. Amar N. Pal, and Mr. Michael E. Waterman for their valuable time and expertise during their inspection of ETAP's quality assurance program on January 6-8, 2003.

The NRC (United States Nuclear Regulatory Commission) conducted this inspection at OTI (Operation Technology, Inc.) facilities in Lake Forest, California.

On March 7, 2003, the NRC issued the inspection report 99901350/2003-201. This report states "The inspectors acknowledged OTI's effectiveness in the manner in which OTI implemented a continuous software process improvement program, and performed root cause determinations to address software and system errors in a systematic manner. The inspector concluded that OTI's software lifecycle processes and the continuous improvement of those processes are generally consistent with guidance provided in Branch Technical Position HICB-14 of NUREG 0800 and 10 CFR Part 50 Appendix B requirements."

During this inspection, Mr. Pertrosino proposed minor clarifications in Section 8 of PS-SQAP document. These clarifications are implemented at this time.

As a result of this inspection, five findings were reported (Enclosure 1). Our reply to the NRC findings is included in **Attachment A**. The items in the detailed report (Enclosure 2) that require clarification are described in **Attachment B**.

After review of the contents of this report, we strongly request a documented clarification on a number of issues described in this report. ETAP PowerStation is a high impact, analytical software that is used by over 30 nuclear plants in the United States. Our request for clarification of these issues is consistent with our concise, clear, and forthright approach in maintaining the integrity of ETAP products and the enduring trust of our customers.

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Should you have further questions or require additional information, please contact me at (949) 462-0100 or send your e-mail to qa@etap.com.

Sincerely,
OPERATION TECHNOLOGY, INC.

Nazan Roşhdieh, PE
Quality Assurance Manager

Enclosure: Attachment A - REPLY TO A NOTICE OF NONCONFORMANCE
Attachment B - CLARIFICATION FOR A NOTICE OF NONCONFORMANCE

CC: Chief, Equipment and Human Performance Branch
Division of Inspection Program Management
Office of Nuclear Reactor Regulation
Washington, D.C. 20555

Attachment A



REPLY TO A NOTICE OF NONCONFORMANCE 99901350/2003-201

In response to the Notice of Nonconformance report, please note the following:

Item 99901350/2003-201-01

A-1. NRC - "OTI has not established appropriate quality assurance program controls/procedures to ensure that original equipment manufacturer's (OEM's) technical data, that it obtained from entities other than applicable OEM data into its ETAP PowerStation (ETAP-PS) software library design bases."

OTI: The present OTI quality assurance program does require that original manufacturer data be used for library data. OTI's quality assurance program also requires an independent verification of the library data entered in the program. Evidence of these procedures is documented in the ETAP Incident Report forms.

In the case of the three libraries specified in your report, which are particular to the nuclear industry, validity of the source data were approved as early as 1994. The library data specified are as follows:

- a) 3M Firewrap®
- b) TSI Thermo-Lag®
- c) Westinghouse FH Overload Heater

The original manufacturer data for these libraries were provided to us by a nuclear utility user (TVA), and therefore Verified & Validated by their quality assurance program in accordance with 10 CFR 50, Appendix B.

For the Westinghouse FH overload heaters, OTI has obtained direct manufacturer data, which verifies the existing library data.

In the case of tens of thousands of other ETAP library data such as cables, high-voltage circuit breakers, low-voltage circuit breakers, fuses, batteries, etc., the original manufacturer data are directly obtained from the manufacturer or standards as source of the data. Only for the three libraries indicated in this report, the original manufacturer data were provided to us by a nuclear utility user.

- (1) **Corrective Action:** ETAP nuclear users will be notified that for the two libraries specified (a & b), the original manufacturer data were provided through a nuclear facility.
- (2) **Preventive Action:** ETAP's functional audit, which is conducted prior to each release, shall include an independent verification of the library data sources. Note that the existing method of verification was implemented through Incident Report documents.
- (3) **Implementation:** The above corrective and preventive actions will be reflected in the next release of ETAP.



Item 99901350/2003-201-02

B-1. NRC – “OTI had failed to ensure that original equipment manufacturer’s (OEM’s) technical data, that it obtained from entities other than applicable OEMs, was verified in accordance with documented procedures to assure accuracy, correctness and completeness before putting the OEM data into its ETAP-PS software library design bases, and failed to ensure that sufficient QA records were maintained for objective evidence of activities affecting quality. Examples of manufacturer’s technical data that OTI obtained from other entities included:

- 3M Firewrap® Values
- TSI Thermo-Lag® Values
- Westinghouse Overload Heater Values”

OTI: Please refer to the reply to Item 99901350/2003-201-01



Item 99901350/2003-201-03

B-2. NRC – “OTI failed to ensure that ETAP-PS library ampacity derating design data for “free air” licensee applications was the same as that specified in Insulated Cable Engineers Association (ICEA) Standard P-46-426 for free air values.”

OTI: Contrary to the above statement, cable ampacities for ETAP ICEA cable libraries are in fact correct and are based on ICEA Standard P-46-426. This item was not discussed as an issue in the NRC inspection or during the exit meeting; therefore, OTI did not have an opportunity to provide clarification. To OTI’s surprise, this inquiry is documented as a non-conformance in the NRC report.

In response to this inquiry, please note the following:

The inspector did not compare the correct ETAP cable library data with the data selected from the ICEA-P-46-426 Standard. The inspector must select non-magnetic installed cables for comparison of the free air ampacities.

The comparison tables below show that the ETAP library data match the ICEA values. Screen captures of the ETAP library data are also provided for verification.

1- 600V, 3/C, 500MCM, Copper, Non-magnetic installation

	Base Ampacity for 3/C 500 MCM Copper, 600V			
	Duct Bank	Buried	Free Air	Conduit in Free Air
ETAP	429	531	487	425
ICEA-P-46-426	429	531	487	425

Screen Capture from the ETAP Library

Cable Library									
Available - y / n [yes / no]									
ICEA Rubber 0.6 kV 100% CU 3/C Non-Mag. 60 Hz Rac at 75 °C Ohms/1000ft									
	Avail	Size	Duct Bank	Buried	Free Air	Cond Air	R	X	
14	Y	500	429	531	487	425	0.0276	0.0311	



2- 600V, 3/C, #2 AWG, Copper, Non-magnetic installation

	Base Ampacity for 3/C -#2 AWG Copper, 600V			
	Duct Bank	Buried	Free Air	Conduit in Free Air
ETAP	133	178	138	123
ICEA-P-46-426	133	178	138	123

Screen Capture from the ETAP Library

Cable Library									
Available - y / n [yes / no] <input checked="" type="checkbox"/>									
ICEA Rubber 0.6 kV 100% CU 3/C Non-Mag. 60 Hz Rac at 75 °C Ohms/1000ft									
	Avail	Size	Duct Bank	Buried	Free Air	Cond Air	R	X	
4	Y	2	133	178	138	123	0.202	0.039	

3- 8kV, 1/C, #2 AWG, Copper, Non-magnetic installation

	Base Ampacity for 1/C -#2 AWG Copper, 8kV*			
	Duct Bank	Buried	Free Air	Conduit in Free Air
ETAP	178	219	195	0
ICEA-P-46-426	178	219	195	N/A

* ICEA values apply to up to 8kV cables ETAP provides 5kV ICEA cable values

Screen Capture from the ETAP Library

Cable Library									
Available - y / n [yes / no] <input checked="" type="checkbox"/>									
ICEA Rubber 2 5.0 kV 133% CU 1/C Non-Mag. 60 Hz Rac at 75 °C Ohms/1000ft									
	Avail	Size	Duct Bank	Buried	Free Air	Cond Air	R	X	
4	Y	2	178	219	195	0	0.202	0.0547	



4- 600V, 1/C, #2 AWG, Copper, Non-magnetic installation

	Base Ampacity for 1/C -#2 AWG Copper, 600V			
	Duct Bank	Buried	Free Air	Conduit in Free Air
ETAP	176	231	192	0
ICEA-P-46-426	176	231	192	N/A

Screen Capture from the ETAP Library

Cable Library								
Available - y / n (yes / no) <input checked="" type="checkbox"/>								
ICEA Rubber 2 0.6 kV 100% CU 1/C Non-Mag. 60 Hz Rac at 75 °C Ohms/1000f								
	Avail	Size	Duct Bank	Buried	Free Air	Cond Air	R	X
4	Y	2	176	231	192	0	0.202	0.0467

Magnetically installed cables imply that there is a continuous raceway (conduit) surrounding the cables, which allows circulating currents in the raceway due to the magnetic field of the cables. This continuous raceway will generate heat due to I^2R losses of the circulating currents. For this reason, ETAP treats magnetically installed cables in free air equivalent to cables installed in conduit in air.

Future Enhancement – ETAP will provide a message to inform the user that the application of magnetically installed cables in free air (cable trays) means that the cable raceway is continuously surrounding the cable and is creating circulating currents; therefore, conduit in air ampacities are used.

No further action on this item is required.



Item 99901350/2003-201-04

B-3. "OTI could not provide adequate objective evidence which indicated their regression test verified the adequacy of ETAP-PS version 4.0.0N even though it was corrected by TCS-CAB-016."

OTI: This item was discussed and agreed upon as a non-issue in the NRC exit meeting.

Test case TCS-CAB-016 does not apply to ETAP 4.0.0N. We believe that the above statement refers to the Test Incident Report TIR-CABLE-190, which was implemented in the ETAP 4.0.4N release.

In ETAP 4.0.4N, an Ampacity Check Box in the cable editor (Sizing Page) was disabled per TIR-CABLE-190. The test engineer has attached complete evidence to show the verification of the action described. Creation of a test case was not required for this incident report. If further testing were required, then the test engineer would have added the applicable test cases. Per ETAP's V&V requirements, the developer must perform a root cause analysis and make a recommendation for further testing. In addition to the developer, the VP Engineering, Technical Test Manager, Test Manager, and Test Engineer can require new test cases to be added and/or a complete repetition of the V&V of the modules involved. In this case, no requirements for further testing were made since this modification was simple in nature and did not affect any other part of the program.

No further action on this item is required.



Item 99901350/2003-201-05

C-1. NRC – “OTI had failed to ensure that adequate records were developed and maintain specifically, test results for two test, TIR-CABLE-190 and TCS-CAB-016 (TPS-CAB-016), did not contain adequate documentation in their applicable test packages to provide evidence of satisfactory test performance to assure that test requirements had been satisfied.”

OTI: This item was discussed and agreed upon as a non-issue in the NRC exit meeting.

TIR-CABLE-190 is a Test Incident Report document and includes adequate and complete documentation and evidence of test verification. For detailed information, refer to the reply to Item 99901350/2003-201-04.

Regarding the Test Case Specification TCS-CAB-016, according to OTI’s V&V procedures, evidence of test cases are reported in forms of tables of comparisons in SVVR (Software Verification and Validation Report) and/or attachments to the TDS (Test Design Specification), TCS (Test Case Specification), TPS (Test Procedure Specification), and TCB (Test Case Benchmark).

For ETAP 4.7.0N, the TDS, TCS, TPS, and TCB documents are several thousands of pages. There are **over 100,000 of pages of supporting documents** to provide evidence of satisfactory test performance to assure that test requirements were satisfied. Due to the simplicity of some cases, less than 2% of test cases do not require supporting evidence since they are documented in the test log and can be duplicated very simply.

In the case of TCS-CAB-016, the test procedure is very simple and the pass/fail criterion is very clear. The test engineer passed the test case and logged it as “Passed”. Since duplication of this test case is simple, no attachments were included. This procedure was considered acceptable for the purpose of further review and quality assurance.

- (1) **Corrective Action:** Test engineers are required to provide evidence of test case results for all test cases in the form of tables of comparisons or appropriate attachments, regardless of how simple the test case maybe.
- (2) **Preventive Action:** The following item will be added to the functional audit list, which is conducted prior to each release.
 - Verify that each test case is furnished with evidence of test results.
- (3) **Implementation:** The above corrective and preventive action will be reflected in the next release of ETAP.

Attachment B



CLARIFICATION FOR A NOTICE OF NONCONFORMANCE

99901350/2003-201

The following items described in the detailed NRC report require clarification.

1- Enclosure 2, page 5, item 3.2.1 b.

NRC - "Although it was determined that overload heater resistance values in the ETAP-PS library are within the maximum and minimum values provided by the manufacturer, it was determined that, for voltage drop calculations, slightly non-conservative results will be obtained using ETAP-PS library data."

OTI: The voltage drop due to overload heaters is usually a fraction of the overall load voltage drop, which is mostly due to cable impedance. Use of a maximum value instead of an average value for the overload heater resistance will increase the voltage drop of overload heater by a small factor. On average, this can increase the overall voltage drop by a negligible factor, especially considering that the length of the cable is usually approximated.

However, we have added an option to include a tolerance for the overload heater resistance to our wish list for the ETAP 5.0.0 release.

2- Enclosure 2, page 10, item 3.2.4.1 b.

NRC - "... The inspectors revealed that OTI engineers could accept up to 13% deviation between the vendor information data in the ETAP-PS library. The inspectors considered this to be an excessive amount of deviation but did not review the appropriateness of the 13% deviation not the circumstances surrounding the acceptability during this inspection..."

OTI: The above statement regarding ETAP libraries is incorrect. The Verification & Validation procedures for ETAP engineering libraries allow for 0% error in the library data entries based on published manufacturer data.

For the case of TCC (Time Current Characteristics) curves in the PowerPlot program, deviation of no more than 10% from the manufacturer curves are permitted. In the case of solid-state trip device curves, the deviation of less than 13% is allowed. In most cases, the average deviation observed is less than 4%.

The above inherent deviations for the TCC curves are well within acceptable engineering application and practice considering the process of generation and extrapolation/interpolation of the TCC curves. This process involves:

1. Generation of the manufacturer TCC curve data through digitization of the points from the enlarged manufacturer TCC curves.
2. Logarithmic scale of the TCC curves.
3. Extrapolation/interpolation of the missing points and use of curve-fitting algorithms to generate the curves.
4. The validation of the TCC curves requires enlargement of the manufacturer curves and reading of the points for each TCC curve from a log-log scale.



3- Enclosure 2, page 14, item 3.2.6 b.

NRC - "... The Battpro results were found to be generally equivalent to the ETAP-PS results for Fixed ampere-hour (fixed amp = 0) method. However, the inspectors noted that calculated voltage using ETAP-PS may vary considerably when using the other method, fixed current (fixed amp = 1)."

OTI: The ETAP program provides two methods of interpolation/extrapolation for battery discharge calculations:

- a) Fixed AH (Ampere-Hour)
- b) Fixed Ampere

The Battpro program uses Fixed AH method of interpolation for battery discharge calculations only. If you intend to compare the results of the two programs, you must select Fixed AH interpolation method in ETAP.

Both methods give almost the same results when the program interpolates between the manufacturer's battery characteristic curves. However, when the battery loading is light and extrapolation is required, depending on the shape of the battery curves, the results of the two methods may be different. This is an inherent characteristic of the two methods. In general, under the above condition, the Fixed Ampere method provides more accurate results than the Fixed AH method. That is why the Fixed Ampere method is set as the default option. Note that ETAP's battery discharge program is completely Verified & Validated against hand calculations for both Fixed AH and Fixed Ampere methods.