

General Information or Other (PAR)

Event # 43052

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Supplier: SCIENTECH LLC NUS	Event Date / Time: 12/14/2006 14:47 (EST)
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Region:	Docket #:
City:	Agreement State: No
County:	License #:
State:	
NRC Notified by: MARTIN R. BOOSKA	Notifications: RICHARD CONTE R1
HQ Ops Officer: JOHN MacKINNON	OMID TABATABAI NRR
Emergency Class: NON EMERGENCY	VERN HODGE NRR
10 CFR Section:	JAMES MOORMAN R2
21.21 UNSPECIFIED PARAGRAPH	JULIO LARA R3
	DAVID PROULX R4

PART 21 - DEFECT FOUND IN BASIC COMPONENTS (FOXBORO REPLACEMENT MODULES) SUPPLIED TO NUCLEAR POWER PLANT

Sciencetech LLC company manufactures a replacement for obsolete Foxboro 66 R Lead/Lag unit - a TMD500, the time domain module in NUSI's Series 500 line. The Fully model number is of the form TMD500-xx/xx/xx/xx-xx-xx-yy, where xx defines certain input, output, and power options, while 'yy' selects the style of faceplate.

Two shipments were made to Ginna, one of five modules and one of nine modules, were made in mid-September of 2006. Ginna performed receipt inspection and tested the modules for proper operation. The tests confirmed that NUSI had configured the modules as required and the modules worked as expected.

Ginna Station installed the NUSI TMD500 modules in the reactor protection channels as part of a modification required for an extended power uprate.

After further testing twelve modules in total were installed; 4 modules configured for OPDT setpoint calculator, and 8 modules configured as lag units. Two lag modules units were installed in each of the four reactor protection channels on the output side of the Thot R/I modules, to dampen the effects of hot leg streaming. All of these modules were bought under one purchase order and received in September 2006.

On 11/2/06, several days after installation and calibration activities were completed, computer monitoring of the OPDT setpoints indicated that Channel 1 OPDT setpoint calculator module was following Tavg as it increased from 550 degrees F. The magnitude was small - approximately 0.3 degrees F change for a 10 degree F change in Tavg. However, the output of the module should have been steady until Tavg reached 574 degrees F. Ginna Station Operations declared reactor protection channel 1 OPDT setpoint inoperable when this condition was identified. The module was replaced, the replacement calibrated, and the channel was declared operable.

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On 11/6/06, several days later, computer monitoring of the channel 2 OPDT setpoint calculator showed it was exhibiting the same anomalous behavior that has occurred previously on the channel 1 OPDT setpoint calculator. Operations declared channel 2 OPDT setpoint inoperable. Ginna requested a team from NUSI travel to site and address the problem. A team of one engineer, one assembler, and the QA Manager traveled to Ginna to inspect and hopefully correct the problem.

Troubleshooting by Ginna Station I&C personnel determined that the zero potentiometer wiper was shorted to the module case. The edge of the mounting fixture for the Lo Lim potentiometer had cut through the insulation of the wire going to the wiper of the Zero potentiometer.

The NUSI team arrived on site while Ginna personnel were making repairs, and provided advice. The team inspected the module originally found defective and removed from service; they found that the wire to the wiper of the Zero potentiometer was damaged. They reinsulated the wire with electrical tape in accordance with approved Ginna procedures and tested the module, confirming that it worked correctly. The NUSI team then returned to the Idaho Falls facility on the 11/08/06. NUSI initiated Non-Conformance Report 06N-090 and this 10CFR21 evaluation on 11/10/06.

Extent of Condition: There are four module types that use this style of faceplate:

TMD500-[options]-01 Time Domain Module, MTH500-[options]-01 Simple Math Module, CMM500-[options]-01 Complex Math Module, and HLS500-[options]-01 High/Low Select Module.

Modules in this category were sold to Ginna and Indian Point. These modules were also sold to Westinghouse for resale; the module identifiers were the same with the substitution of "9000" for "500" in the module number.



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M. R. Booska, Director, Sciencetech, LLC Quality Operations

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TELEFAX TRANSMITTAL

Date: 12/14/2006 Time: 2:15 PM

FROM: Martin R. Booska

TO: Duty Officer

Organization: NRC Operations Center

City/State: Bethesda MD

Fax No.: 21-06-03-1

- NRC Operations Center: Facsimile (301) 816-5151
- Duty Officer Telephone: Primary (301) 816-5100

Total Pages 19 (Including this page)

COMMENTS: This report is submitted to the US NRC in accordance with the provisions of 10 CFR Part 21 and Sciencetech, LLC procedure QAP 15.1. We are reporting a defect in Basic Components (Foxboro Replacement Modules) that have been supplied to a Nuclear Power Plant. Affected clients are being advised as indicated in the report.

Martin R. Booska, Director Quality Operations, Sciencetech, LLC

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Scientech, LLC NUS Instruments Division
200 South Woodruff Avenue, Idaho Falls Idaho 83401

Discussion:

The subject report is being provided to the NRC by Martin R. Booska, Scientech Director of Quality Operations, on behalf of the Scientech, LLC President, Mr. Larry Brodsky. The Part 21 report is supplemented by an eleven page evaluation report which resulted in the determination that a potential defect was reportable under the provisions of Title 10 CFR Part 21. The report involves the Scientech, LLC NUS Instruments Division in Idaho Falls, Idaho.

1. Name of Reporting Scientech LLC Individual or Organization and Address.

Martin R. Booska,
Director of Quality Operations, Scientech, LLC
2310 Potomac Camp Road
Oakland MD 21550
(301-334-2352)
mbooska@scientech.com



On behalf of:

Mr. Larry Brodsky,
President, Scientech, LLC
3706 Wedgewood Drive
New Bern, NC 28562
(252-634-2724)
lbrodsky@scientech.com

2. Identification of the facility, activity, and Basic Component supplied for such facility or activity within the United States which fails to comply or is believed to contain Deviations or potential Defects.

Facility: Ginna Nuclear Power Station

Basic Component: TMD500-08/00/00/00-08-08-01, TMD500-08/08/00/00-08-08-01 (Foxboro replacement modules).

3. Identification of the Scientech LLC Division that supplied the Basic Component.

NUS Instruments, LLC; A Division of Scientech, LLC
200 S Woodruff Ave
Idaho Falls, ID 83401

4. The nature of the suspected Defect or failure to comply, and the safety hazard which is, or could be, created by such Defect or failure to comply and the date this information was obtained.

Nature of Suspected Defect: Zero potentiometer wiper short to the module case. The most probable cause of the short was damage caused during assembly. The potentiometer wiring is in a highly congested area. If the potentiometer mounting fixture was not held securely when tightening the faceplate nut, the mounting fixture would rotate. It was determined during the evaluation that if the Zero

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potentiometer is rotated counter-clockwise it would force the offset wiper connection into the sharp edge of the Lo Lim potentiometer mounting fixture. During assembly, the wire insulation in this area is stripped away to make the solder connection to the hook; therefore, the only insulation over the soldered wire and hook is heat-shrinkable sleeving. The sleeving was probably cut through, shorting the Zero potentiometer wire to the Lo Lim potentiometer mounting fixture, which is grounded to the chassis. NUSI was not able to examine the AS FOUND state of the modules to confirm that the potentiometer mounting fixture was rotated, but discussions with assembly personnel reveal that this is the most likely cause of the short.

Quality Control inspects each module several times during assembly and also after assembly is completed. However, the wiring in the area around the potentiometer is so congested that it is not possible to do a full visual inspection of the wiring in the second and third levels down. Therefore, the QC inspection was not a barrier to this assembly error.

Safety Hazard: The defect potentially affected modules that were installed in multiple channels of the Ginna safety system.

5. In the case of a Basic Component, the number and location of all such components of the same type which are in use at, supplied for, or being supplied for one or more facilities or activities subject to the regulations of 10 CFR 21.

The Ginna Plant, where the issues were identified, has been involved during the Part 21 evaluation and is aware of the issues. However, the modules in question were bought under approximately 30 different contracts spanning 14 years and multiple organizations at each client. NUS Instruments is pulling those 30 purchase orders from archives and compiling a list of the 10CFR21 contacts identified in each purchase order. It is anticipated that the full list of addresses and contacts will be complete within a week. When the list is complete, all individuals and organizations will be advised.

The list of potentially affected modules is provided at the end of this report.

6. A description of contributing causes, the corrective action which has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been taken or will be taken to complete the action.

Contributing Causes: A review of the relevant NUSI test procedures showed that a single short from signal wiring to the chassis would not be detected. NUSI performs a full functional test of every module built, then runs the modules for at least 24-hours (burn in), and then repeats the functional test before shipment. However, the test benches have insulating mats to prevent inadvertent shorts, and the functional tests do not test for a signal common to chassis common fault. Therefore, the test procedures as written were contributing causes to the assembly error.

Corrective Actions:

Action 1: Verify undamaged wiring on all similar modules in house.

Responsible Organization: NUS Instruments LLC

Completion Schedule: Complete 11/17/06.

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Action 2: The probable defect cause was discussed with assemblers during a training session, with emphasis placed on checking for damage to adjacent parts when assembling or reworking items; also to be included in a lessons learned session after Christmas break.

Responsible Organization: NUS Instruments LLC

Completion Schedule: To be fully complete as of 01/07.

Action 3: Verify adequate resistance between signal ground and chassis ground on all modules.

Responsible Organization: NUS Instruments LLC

Completion Schedule: Complete as of 11/29/06

Action 4: Incorporate requirements to test resistance between signal ground and chassis ground on all modules.

Responsible Organization: NUS Instruments LLC

Completion Schedule:

- Issue interim instructions to test all modules - Complete as of 11/29/06.
- Incorporate requirements in all work authorizations - To be complete 12/15/06.
- Incorporate requirements into all test procedures - At next procedure revision.

7. Any advice related to the Deviation, Defect, or failure to comply about the facility, activity, or Basic Component that has been, is being, or will be given to the purchasers or licensees.

Advice to Purchasers: Test all potentially affected modules for low resistance between signal common and chassis common. The resistance can be measured with a standard digital voltmeter, and should be 10 megohms or greater. If the resistance is lower than 10 megohms, return the modules to NUS Instruments for rework.

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200 South Woodruff Avenue, Idaho Falls Idaho 83401

(List of Potentially Affected Basic Components)

S/N	Client	DESCRIPTION
0000147	Ginna Nuclear Power Station	TMD500-08/00/00/00-08-08-01
0100311	Ginna Nuclear Power Station	CMM500-1-08/08/00-08-08-01
0100312	Ginna Nuclear Power Station	CMM500-1-08/08/00-08-08-01
0100313	Ginna Nuclear Power Station	CMM500-1-08/08/00-08-08-01
0100314	Ginna Nuclear Power Station	CMM500-1-08/08/00-08-08-01
0401382	Ginna Nuclear Power Station	TMD500-20/08/08/00-08-08-01/2
0601759	Ginna Nuclear Power Station	TMD500-08/00/00/00-08-08-01
0601760	Ginna Nuclear Power Station	TMD500-08/00/00/00-08-08-01
0601761	Ginna Nuclear Power Station	TMD500-08/00/00/00-08-08-01
0601762	Ginna Nuclear Power Station	TMD500-08/00/00/00-08-08-01
0601763	Ginna Nuclear Power Station	TMD500-08/00/00/00-08-08-01
0601764	Ginna Nuclear Power Station	TMD500-08/00/00/00-08-08-01
0601765	Ginna Nuclear Power Station	TMD500-08/00/00/00-08-08-01
0601766	Ginna Nuclear Power Station	TMD500-08/00/00/00-08-08-01
0601767	Ginna Nuclear Power Station	TMD500-08/00/00/00-08-08-01
0601786	Ginna Nuclear Power Station	TMD500-08/08/00/00-08-08-01
0601787	Ginna Nuclear Power Station	TMD500-08/08/00/00-08-08-01
0601788	Ginna Nuclear Power Station	TMD500-08/08/00/00-08-08-01
0601789	Ginna Nuclear Power Station	TMD500-08/08/00/00-08-08-01
0601790	Ginna Nuclear Power Station	TMD500-08/08/00/00-08-08-01
0601854	Ginna Nuclear Power Station	CMM500-6-08/00/00-08-08-01
0601857	Ginna Nuclear Power Station	MTH500-00/00/00/00-08-08-01
0601860	Ginna Nuclear Power Station	HLS500-08/08/08/08-08-08-01
0201944	Ginna Nuclear Power Station	TMD500-20/00/00/00-08-08-01/2
0201945	Ginna Nuclear Power Station	TMD500-20/00/00/00-08-08-01/2
0601981	Ginna Nuclear Power Station	MTH500-06/06/06/06-12-08-01
0601982	Ginna Nuclear Power Station	MTH500-08/08/00/00-08-08-01/2
9700779	Ginna Nuclear Power Station	TMD500-08/08/08/08-08-08-01/2
9700780	Ginna Nuclear Power Station	TMD500-08/08/08/08-08-08-01/2
9700785	Ginna Nuclear Power Station	TMD500-08/08/08/08-15-08-01/2
9700786	Ginna Nuclear Power Station	TMD500-08/08/08/08-15-08-01/2
9701001	Ginna Nuclear Power Station	TMD500-08/00/00/00/08/08/01
9701004	Ginna Nuclear Power Station	TMD500-08/00/00/00/08/08/01
9701007	Ginna Nuclear Power Station	CMM500-1-08/08/00-08-08-01
9701010	Ginna Nuclear Power Station	TMD500-08/00/00/00/08/08/01
9701013	Ginna Nuclear Power Station	TMD500-08/00/00/00/08/08/01
9800768	Ginna Nuclear Power Station	TMD500-08/08/08/08-08-08-01/2
9800769	Ginna Nuclear Power Station	TMD500-08/08/08/08-08-08-01/2
9800770	Ginna Nuclear Power Station	TMD500-08/08/08/08-08-08-01/2
9800771	Ginna Nuclear Power Station	TMD500-08/08/08/08-08-08-01/2
9800780	Ginna Nuclear Power Station	TMD500-08/08/08/08-08-08-01/2
9800781	Ginna Nuclear Power Station	TMD500-08/08/08/08-08-08-01/2
9800782	Ginna Nuclear Power Station	TMD500-08/08/08/08-08-08-01/2

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S/N	Client	DESCRIPTION
9800783	GINNA Nuclear Power Station	TMD500-08/08/08/08-08-01/2
9800928	GINNA Nuclear Power Station	TMD500-20/08/08/00-08-08-01/2
9800931	GINNA Nuclear Power Station	TMD500-08/08/21/22-08-08-01/2
9800932	GINNA Nuclear Power Station	TMD500-08/08/21/22-08-08-01/2
0100081	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
0600907	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
0201370	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
0201371	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
0201372	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
0201373	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
0201382	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
0201383	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
0201384	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
0201385	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
0401441	Indian Point Nuclear Power Station - Unit 2	TMD500-30/30/30/00-08-08-01/2
0201601	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
0201602	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
0201603	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
0201604	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
0201662	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
0201663	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
0201664	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
0201665	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
0201743	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
0201744	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
0201745	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
0201746	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
0201755	Indian Point Nuclear Power Station - Unit 2	TMD500-20/08/08/00-08-01/2
0201756	Indian Point Nuclear Power Station - Unit 2	TMD500-30/30/30/00-08-01/2
0201757	Indian Point Nuclear Power Station - Unit 2	TMD500-30/30/30/00-08-01/2
0201758	Indian Point Nuclear Power Station - Unit 2	TMD500-30/30/30/00-08-01/2
0202129	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
0202130	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
0202131	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
9200511	Indian Point Nuclear Power Station - Unit 2	HLS500-08/08/00/00-08-08-01/2
9200512	Indian Point Nuclear Power Station - Unit 2	HLS500-08/08/00/00-08-08-01/2
9200517	Indian Point Nuclear Power Station - Unit 2	CMM500-2-08/08/00-08-08-01/2
9200518	Indian Point Nuclear Power Station - Unit 2	CMM500-2-08/08/00-08-08-01/2
9200523	Indian Point Nuclear Power Station - Unit 2	CMM500-1-08/08/00-08-08-01/2
9200524	Indian Point Nuclear Power Station - Unit 2	CMM500-1-08/08/00-08-08-01/2
9200529	Indian Point Nuclear Power Station - Unit 2	CMM500-6-08/00/00-08-08-01/2
9200530	Indian Point Nuclear Power Station - Unit 2	CMM500-6-08/00/00-08-08-01/2
9200544	Indian Point Nuclear Power Station - Unit 2	CMM500-1-08/08/00-08-08-01/2
9200545	Indian Point Nuclear Power Station - Unit 2	CMM500-1-08/08/00-08-08-01/2
9200546	Indian Point Nuclear Power Station - Unit 2	CMM500-1-08/08/00-08-08-01/2

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S/N	Client	DESCRIPTION
9200547	Indian Point Nuclear Power Station - Unit 2	CMM500-1-08/08/00-08-08-01/2
9200548	Indian Point Nuclear Power Station - Unit 2	CMM500-6-08/00/00-08-08-01/2
9200549	Indian Point Nuclear Power Station - Unit 2	CMM500-6-08/00/00-08-08-01/2
9200550	Indian Point Nuclear Power Station - Unit 2	CMM500-6-08/00/00-08-08-01/2
9200551	Indian Point Nuclear Power Station - Unit 2	CMM500-6-08/00/00-08-08-01/2
9200552	Indian Point Nuclear Power Station - Unit 2	CMM500-6-08/00/00-08-08-01/2
9200553	Indian Point Nuclear Power Station - Unit 2	CMM500-6-08/00/00-08-08-01/2
9200554	Indian Point Nuclear Power Station - Unit 2	CMM500-6-08/00/00-08-08-01/2
9200555	Indian Point Nuclear Power Station - Unit 2	CMM500-6-08/00/00-08-08-01/2
9200556	Indian Point Nuclear Power Station - Unit 2	MTH500-06/06/06/06-08-08-01/2
9200557	Indian Point Nuclear Power Station - Unit 2	MTH500-06/06/06/06-08-08-01/2
9200558	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/08/08-08-08-01/2
9200559	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/08/08-08-08-01/2
9200560	Indian Point Nuclear Power Station - Unit 2	MTH500-20/20/20/20-08-08-01/2
9200561	Indian Point Nuclear Power Station - Unit 2	MTH500-20/20/20/20-08-08-01/2
9200562	Indian Point Nuclear Power Station - Unit 2	MTH500-20/20/20/20-08-08-01/2
9200563	Indian Point Nuclear Power Station - Unit 2	MTH500-20/20/20/20-08-08-01/2
9200766	Indian Point Nuclear Power Station - Unit 2	TMD500-06/00/00/00-06-08-01/2
9200767	Indian Point Nuclear Power Station - Unit 2	TMD500-06/00/00/00-06-08-01/2
9200768	Indian Point Nuclear Power Station - Unit 2	TMD500-06/00/00/00-06-08-01/2
9200769	Indian Point Nuclear Power Station - Unit 2	TMD500-06/00/00/00-06-08-01/2
9200770	Indian Point Nuclear Power Station - Unit 2	TMD500-19/00/00/00-08-08-01/2
9200771	Indian Point Nuclear Power Station - Unit 2	TMD500-19/00/00/00-08-08-01/2
9200772	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9200773	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9200774	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9200775	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9200776	Indian Point Nuclear Power Station - Unit 2	TMD500-08/08/08/00-08-08-01/2
9200777	Indian Point Nuclear Power Station - Unit 2	TMD500-08/08/08/00-08-08-01/2
9200778	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9200779	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9200780	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9200781	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9200782	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
9200783	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
9200784	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/21/22-08-08-01/2
9200785	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/21/22-08-08-01/2
9200786	Indian Point Nuclear Power Station - Unit 2	TDM500-08/00/00/00-08-08-01/2
9200787	Indian Point Nuclear Power Station - Unit 2	TDM500-08/00/00/00-08-08-01/2
9200788	Indian Point Nuclear Power Station - Unit 2	TMD500-20/08/08/00-08-08-01/2
9200789	Indian Point Nuclear Power Station - Unit 2	TMD500-20/08/08/00-08-08-01/2
9200790	Indian Point Nuclear Power Station - Unit 2	TDM500-08/00/00/00-08-08-01/2
9200791	Indian Point Nuclear Power Station - Unit 2	TDM500-08/00/00/00-08-08-01/2
9200792	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9200793	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2

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S/N	Client	DESCRIPTION
9200822	Indian Point Nuclear Power Station - Unit 2	CMM500-6-08/00/00-08-08-01/2
9200823	Indian Point Nuclear Power Station - Unit 2	CMM500-6-08/00/00-08-08-01/2
9200824	Indian Point Nuclear Power Station - Unit 2	CMM500-6-08/00/00-08-08-01/2
9200825	Indian Point Nuclear Power Station - Unit 2	CMM500-6-08/00/00-08-08-01/2
9200826	Indian Point Nuclear Power Station - Unit 2	CMM500-6-08/00/00-08-08-01/2
9200837	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
9200838	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
9200839	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
9200846	Indian Point Nuclear Power Station - Unit 2	FINAL ASSEMBLY
9200847	Indian Point Nuclear Power Station - Unit 2	FINAL ASSEMBLY
9200867	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9200868	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9200869	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9200870	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9200871	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9200872	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9400182	Indian Point Nuclear Power Station - Unit 2	TMD500-20/08/08/00-08-08-01/2
9400183	Indian Point Nuclear Power Station - Unit 2	TMD500-20/08/08/00-08-08-01/2
9800677	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9800678	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9800679	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9800686	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
9800687	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
9800688	Indian Point Nuclear Power Station - Unit 2	MTH500-08/08/00/00-08-08-01/2
9900503	Indian Point Nuclear Power Station - Unit 2	TMD500-08/00/00/00-08-08-01/2
9200034	Westinghouse	CMM9000-1-07/07/00-08-08-01/2
9200035	Westinghouse	CMM9000-1-07/07/00-08-08-01/2
9200036	Westinghouse	CMM9000-1-07/07/00-08-08-01/2
9200037	Westinghouse	CMM9000-1-07/07/00-08-08-01/2
9200038	Westinghouse	CMM9000-1-07/07/00-08-08-01/2
9200072	Westinghouse	CMM9000-6-07/00/00-08-08-01/2
9200078	Westinghouse	TMD9000-20/07/08/00-08-08-01/2
9200079	Westinghouse	TMD9000-20/07/08/00-08-08-01/2
9200080	Westinghouse	TMD9000-20/07/08/00-08-08-01/2
9200081	Westinghouse	TMD9000-20/07/08/00-08-08-01/2
9200098	Westinghouse	MTH9000-08/08/00/00-08-08-01/2
9200099	Westinghouse	MTH9000-08/08/00/00-08-08-01/2
9200100	Westinghouse	MTH9000-08/08/00/00-08-08-01/2
9200101	Westinghouse	MTH9000-08/08/00/00-08-08-01/2
9200102	Westinghouse	MTH9000-08/08/00/00-08-08-01/2
9400006	Westinghouse	TMD9000-08/08/21/22-08-08-01/2
9400015	Westinghouse	TMD9000-20/08/08/00-08-08-01/2
9400691	Westinghouse	TMD9000-20/08/08/00-08-08-01/2

End of 10 CFR Part 21 Report 21-06-03

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Background

NUS Instruments LLC (NUSI), a Scientech LLC company, manufactures a replacement for an obsolete Foxboro 66R Lead/Lag unit - a TMD500, the time domain module in NUSI's Series 500 line. The full model number is of the form:

TMD500-xx/xx/xx/xx-xx-xx-yy

where xx defines certain input, output, and power options, while 'yy' selects the style of faceplate. There are three faceplates in the Series 500 line, duplicating three versions of Foxboro modules. On the "01" version, four potentiometers are mounted in very close proximity. As shown at right, the Zero, Span, Lo Lim, and Hi Lim potentiometers are mounted at the left top corner of the faceplate. They are designed to be adjusted with a small screwdriver and do not include knobs.

Ginna Purchase Order 6600538 was received at NUS Instruments on 3/27/06. It ordered (among other things) fourteen TMD500 for safety-related use, all with the "01" style faceplate. Five were TMD500-08/00/00/00-08-08-01 modules (one per channel and one spare). The other nine were TMD500-08/08/00/00-08-08-01 modules (two per channel and one spare). The purchase order stated that the modules were intended for safety-related use, and required NUSI to accept responsibility for reporting defects in accordance with the Code of Federal Regulations, Section 10, Part 21 (10CFR21).



NUSI manufactured and successfully tested these modules at their Idaho Falls facility as Job Number 26386 and shipped them to Ginna. Two shipments, one of five modules and one of nine modules, were made in mid-September of 2006. Ginna performed receipt inspection and tested the modules for proper operation. The tests confirmed that NUSI had configured the modules as required and that the modules worked as expected.

Description of Problem

Ginna Station installed the NUSI TMD500 modules in the reactor protection channels as part of a modification required for an extended power uprate. NUSI set up the modules to the Ginna required configuration and calibration values, then tested the modules satisfactorily. After receipt at Ginna Station, the modules were pre-tested satisfactorily by Ginna I&C on the bench, and then calibrated satisfactorily after installation in the associated reactor protection rack. Twelve modules in total were installed; 4 modules configured for OPDT setpoint calculator, and 8 modules configured as lag units. Two lag units were installed in each of the four reactor protection channels on the output side of the Thot R/I modules, to dampen the effects of hot leg streaming. All of these modules were bought under one purchase order and received in September 2006.

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On 11/2/06, several days after installation and calibration activities were completed, computer monitoring of the OPDT setpoints indicated that Channel 1 OPDT setpoint calculator module was following Tavg as it increased from 550°F. The magnitude was small – approximately 0.3°F change for a 10°F change in Tavg. However, the output of the module should have been steady until Tavg reached 574°F. Ginna Station Operations declared reactor protection channel 1 OPDT setpoint inoperable when this condition was identified. The module was replaced, the replacement calibrated, and the channel was declared operable.

On 11/6/06, several days later, computer monitoring of the channel 2 OPDT setpoint calculator showed it was exhibiting the same anomalous behavior that has occurred previously on the channel 1 OPDT setpoint calculator. Operations declared the channel 2 OPDT setpoint inoperable. Ginna requested a team from NUSI travel to site and address the problem. A team of one engineer, one assembler, and the QA Manager traveled to Ginna to inspect and hopefully correct the problem.

Troubleshooting by Ginna Station I&C personnel determined that the zero potentiometer wiper was shorted to the module case. The edge of the mounting fixture for the Lo Lim potentiometer had cut through the insulation of the wire going to the wiper of the Zero potentiometer.

NUSI modules are typically operated with signal ground and chassis ground unconnected; the short would constitute a low resistance path between the two. Without a second connection from signal to chassis ground, no current would flow and there would be no effect on the signal. However, plant grounding practices vary widely, and some plants choose to connect signal ground and chassis ground. Evidently at Ginna there is some existing low resistance connection in this loop between signal ground and chassis ground, allowing the fault in the module wiring to complete a ground loop and affect the output of the module. Later determinations showed that the impact on the signal was sufficient to exceed the allowable margin in the safety analysis, so the short was classified as a Maintenance Rule functional failure.

Prior to the NUSI team arriving on site, Ginna removed and inspected all suspect modules. The results of the examinations are shown below. In some cases, Ginna did not record exactly which module had damaged wiring. Repairs were made [as required] in accordance with applicable plant procedures and guidelines. The modules were retested satisfactorily and returned to service.

S/N	EIN	Condition Found
0601786	TM-402V	Damaged insulation on wires to zero and span potentiometers caused shorts to chassis.
0601787	TM-401V	Damaged insulation on wires to zero and span potentiometers caused shorts to chassis.
0601788	TM-403V	Damaged insulation on wires to zero and span potentiometers; no shorts.
0601789	Spare	No damage identified.
0601790	TM-404V	Damaged insulation on wires to zero and span potentiometers; no shorts.



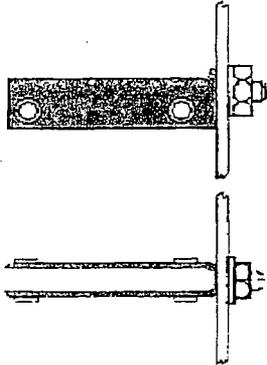
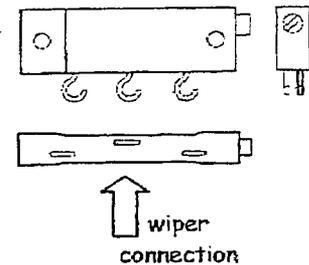
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S/N	EIN	Condition Found
0601762 0601761	TT-401A-1 TT-405A	Damaged insulation on wires to zero and span potentiometers found on one of the two modules, no shorts.
0601763 0601759	TT-403A-1 TT-407A-1	Damaged insulation on wires to zero and span potentiometers found on one of the two modules, no shorts.
0601764 0601767	TT-402A-1 TT-406A-1	No damage identified on either module.
0601766 0601760	TT-404A-1 TT-408A-1	Damaged insulation on wires to zero and span potentiometers found on one of the two modules, no shorts.
0701765	Spare	No damage identified.

The NUSI team arrived on site while Ginna personnel were making repairs, and provided advice. The team inspected the module originally found defective and removed from service; they found that the wire to the wiper of the Zero potentiometer was damaged. They reinsulated the wire with electrical tape in accordance with approved Ginna procedures and tested the module, confirming that it worked correctly. The NUSI team then returned to the Idaho Falls facility on the 11/08/06. NUSI initiated Non-Conformance Report 06N-090 and this 10CFR21 evaluation on 11/10/06.

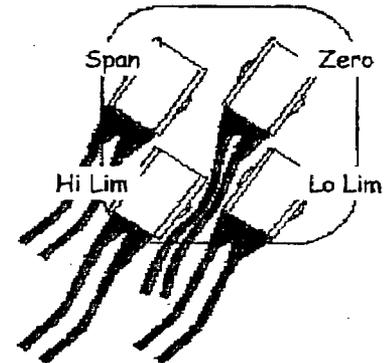
Investigation

The TMD500 Zero, Span, Lo Lim, and Hi Lim potentiometers are Bourns 3059J potentiometers, and are installed with Bourns RJ12 mounting hardware. As shown at right, the potentiometer is a small rectangular package with two through holes for mounting and three hooks to make the high, low, and wiper connections. NUSI solders AWG #22 insulated wire to the hooks and covers the hook and solder joint with heat-shrink tubing.



The RJ12 panel mounting fixture provided by Bourns consists of a 'U' shaped metal bracket that covers the sides and front of the potentiometer. The front of the bracket includes a threaded shaft that protrudes through the front plate. A nut is tightened down on the collar to secure the potentiometer in place. The shaft is hollow, allowing access to the potentiometer screw adjustment. The factory uses two small rivets to secure the sides of the bracket to the potentiometer. The mounting fixture is electrically part of the chassis, and has sharp edges along the top, back, and bottom of the potentiometer.

The NUSI TMD500 faceplate was designed in 1992. The four potentiometers are mounted in very close proximity. There is a one-inch cut-out to adjust the thickness of the faceplate to match that required by the potentiometer mounting hardware, and the four potentiometers are mounted in the cut out. The scale picture at right shows two rear views of the one-inch cutout and the four potentiometers. This is a congested area with little clearance, proper installation of the potentiometers is considered a "skill of the craft". The requirement is that the wire sleeving that insulates the connection is not damaged.



As shown, the wiring from the Zero and Span potentiometers – the wiring found damaged – is routed past the Hi Lim and Lo Lim potentiometers. The wiper is the center connection, closest to the lower potentiometers. The potentiometer wires are soldered, inspected, and then sleeved. Finally, the wired potentiometer is inserted into the faceplate and the lock washer and nut on the front of the module are tightened.

The most probable cause of the short is a assembly error during assembly. The potentiometer wiring is in a highly congested area. If the potentiometer mounting fixture was not held securely when tightening the faceplate nut, the mounting fixture would rotate. In the picture above, the Zero potentiometer would rotate counter-clockwise, forcing the offset wiper connection into the sharp edge of the Lo Lim potentiometer mounting fixture. During assembly, the wire insulation in this area is stripped away to make the solder connection to the hook; the only insulation over the soldered wire and hook is heat-shrinkable sleeving. The sleeving was probably cut through,

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shorting the Zero potentiometer wire to the Lo Lim potentiometer mounting fixture, which is grounded to the chassis. NUSI was not able to examine the AS FOUND state of the modules to confirm that the potentiometer mounting fixture was rotated, but discussions with assembly personnel reveal that this is the most likely cause of the short.

Quality Control inspects each module several times during assembly and also after assembly is completed. However, as shown at right in the blown up photograph, the wiring in the area around the potentiometer is so congested that it is not possible to do a full visual inspection of the wiring in the second and third levels down.

Therefore, the QC inspection was not a barrier to this assembly error.

Review of the relevant NUSI test procedures showed that a single short from signal wiring to the chassis would not be detected. NUSI performs a full functional test of every module built, then runs the modules for at least 24-hours (burn in), and then repeats the functional test before shipment. However, the test benches have insulating mats to prevent inadvertent shorts, and the functional tests do not test for a signal common to chassis common fault. Therefore, the test procedures as written were not a barrier to this assembly error.



Conclusions

The cause of the defect is an assembly error while building the TMD500s for Ginna. The contributors include inadequate test procedures.

The relevant portions of 10CFR21, "Reporting Of Defects And Noncompliance", January 1, 2006 revision, requires that the Commission be notified when there is "...information reasonably indicating ... that the ... basic component supplied ... contains defects, which could create a substantial safety hazard...."

The TMD500s supplied by NUS Instruments to Ginna Nuclear Plant:

- are considered basic components
- did contain defects, in that some wiring insulation was damaged and the damage affected at least one module's performance
- could have created a substantial safety hazard, in that the modules were installed in all four protection channels

Therefore, this defect is reportable under 10CFR21.

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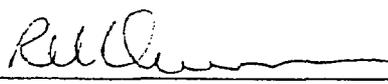
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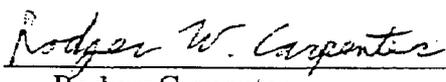
Extent of Condition

There are four module types that use this style of faceplate:

TMD500-[options]-01	Time Domain Module
MTH500-[options]-01	Simple Math Module
CMM500-[options]-01	Complex Math Module
HLS500-[options]-01	High/Low Select Module

Modules in this category were sold to Ginna and Indian Point. These modules were also sold to Westinghouse for resale; the module identifiers were the same with the substitution of "9000" for "500" in the model number. See the attachment for a complete list of potentially affected modules.

Prepared:  Date: 12/12/06
Bob Queenan

Reviewed:  Date: 12/12/2006
Rodger Carpenter

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MODULES SUPPLIED TO GINNA

	S/N	PLANT	CLIENT PO	DESCRIPTION
1	0000147	GINNA	4500006820	G3596 TMD500-08/00/00/00-08-08-01
2	0100311	GINNA	4500013878	CMM500-1-08/08/00-08-08-01
3	0100312	GINNA	4500013878	CMM500-1-08/08/00-08-08-01
4	0100313	GINNA	4500013878	CMM500-1-08/08/00-08-08-01
5	0100314	GINNA	4500013878	CMM500-1-08/08/00-08-08-01
6	0401382	GINNA	04-00217	G3623 TMD500-20/08/08/00-08-08-01/2
7	0601759	GINNA	6600538	TMD500-08/00/00/00-08-08-01
8	0601760	GINNA	6600538	TMD500-08/00/00/00-08-08-01
9	0601761	GINNA	6600538	TMD500-08/00/00/00-08-08-01
10	0601762	GINNA	6600538	TMD500-08/00/00/00-08-08-01
11	0601763	GINNA	6600538	TMD500-08/00/00/00-08-08-01
12	0601764	GINNA	6600538	TMD500-08/00/00/00-08-08-01
13	0601765	GINNA	6600538	TMD500-08/00/00/00-08-08-01
14	0601766	GINNA	6600538	TMD500-08/00/00/00-08-08-01
15	0601767	GINNA	6600538	TMD500-08/00/00/00-08-08-01
16	0601786	GINNA	6600538	TMD500-08/08/00/00-08-08-01
17	0601787	GINNA	6600538	TMD500-08/08/00/00-08-08-01
18	0601788	GINNA	6600538	TMD500-08/08/00/00-08-08-01
19	0601789	GINNA	6600538	TMD500-08/08/00/00-08-08-01
20	0601790	GINNA	6600538	TMD500-08/08/00/00-08-08-01
21	0601854	GINNA	6600860	CMM500-6-08/00/00-08-08-01
22	0601857	GINNA	6600860	MTH500-00/00/00/00-08-08-01
23	0601860	GINNA	6600860	HLS500-08/08/08/08-08-08-01
24	0201944	GINNA	4500023035	G3611 TMD500-20/00/00/00-08-08-01/2
25	0201945	GINNA	4500023035	G3611 TMD500-20/00/00/00-08-08-01/2
26	0601981	GINNA	6600865	MTH500-06/06/06/06-12-08-01
27	0601982	GINNA	6600865	MTH500-08/08/00/00-08-08-01/2
28	9700779	GINNA	NQ-15550-A-JW	TMD500-08/08/08/08-08-08-01/2
29	9700780	GINNA	NQ-15550-A-JW	TMD500-08/08/08/08-08-08-01/2
30	9700785	GINNA	NQ-15550-A-JW	TMD500-08/08/08/08-15-08-01/2
31	9700786	GINNA	NQ-15550-A-JW	TMD500-08/08/08/08-15-08-01/2
32	9701001	GINNA	NQ-15550-A-JW	TMD500-08/00/00/00/08/08/01
33	9701004	GINNA	NQ-15550-A-JW	TMD500-08/00/00/00/08/08/01
34	9701007	GINNA	NQ-15550-A-JW	CMM500-1-08/08/00-08-08-01
35	9701010	GINNA	NQ-15550-A-JW	TMD500-08/00/00/00/08/08/01
36	9701013	GINNA	NQ-15550-A-JW	TMD500-08/00/00/00/08/08/01
37	9800768	GINNA		TMD500-08/08/08/08-08-08-01/2
38	9800769	GINNA		TMD500-08/08/08/08-08-08-01/2
39	9800770	GINNA		TMD500-08/08/08/08-08-08-01/2
40	9800771	GINNA		TMD500-08/08/08/08-08-08-01/2
41	9800780	GINNA		TMD500-08/08/08/08-08-08-01/2
42	9800781	GINNA		TMD500-08/08/08/08-08-08-01/2
43	9800782	GINNA		TMD500-08/08/08/08-08-08-01/2
44	9800783	GINNA		TMD500-08/08/08/08-08-08-01/2

	S/N	PLANT	CLIENT PO	DESCRIPTION
45	9800928	Ginna	NQ-15821-A-JW	G362B TMD500-20/08/08/00-08-08-01/2
46	9800931	Ginna	NQ-15821-A-JW	G3059 TMD500-08/08/21/22-08-08-01/2
47	9800932	Ginna	NQ-15821-A-JW	G3059 TMD500-08/08/21/22-08-08-01/2

MODULES SUPPLIED TO INDIAN POINT 2

	S/N	PLANT	CLIENT PO	DESCRIPTION
1	0100081	Indian Point 2	1503754	MTH500-08/08/00/00-08-08-01/2
2	0600907	Indian Point 2	4500545658	TMD500-08/00/00/00-08-08-01/2
3	0201370	Indian Point 2	4500514993	MTH500-08/08/00/00-08-08-01/2
4	0201371	Indian Point 2	4500514993	MTH500-08/08/00/00-08-08-01/2
5	0201372	Indian Point 2	4500514993	MTH500-08/08/00/00-08-08-01/2
6	0201373	Indian Point 2	4500514993	MTH500-08/08/00/00-08-08-01/2
7	0201382	Indian Point 2	4500514993	TMD500-08/00/00/00-08-08-01/2
8	0201383	Indian Point 2	4500514993	TMD500-08/00/00/00-08-08-01/2
9	0201384	Indian Point 2	4500514993	TMD500-08/00/00/00-08-08-01/2
10	0201385	Indian Point 2	4500514993	TMD500-08/00/00/00-08-08-01/2
11	0401441	Indian Point 2	4500533701	TMD500-30/30/30/00-08-08-01/2
12	0201601	Indian Point 2	4500514993	TMD500-08/00/00/00-08-08-01/2
13	0201602	Indian Point 2	4500514993	TMD500-08/00/00/00-08-08-01/2
14	0201603	Indian Point 2	4500514993	TMD500-08/00/00/00-08-08-01/2
15	0201604	Indian Point 2	4500514993	TMD500-08/00/00/00-08-08-01/2
16	0201662	Indian Point 2	4500514993	TMD500-08/00/00/00-08-08-01/2
17	0201663	Indian Point 2	4500514993	TMD500-08/00/00/00-08-08-01/2
18	0201664	Indian Point 2	4500514993	TMD500-08/00/00/00-08-08-01/2
19	0201665	Indian Point 2	4500514993	TMD500-08/00/00/00-08-08-01/2
20	0201743	Indian Point 2	4500516433	MTH500-08/08/00/00-08-08-01/2
21	0201744	Indian Point 2	4500516433	MTH500-08/08/00/00-08-08-01/2
22	0201745	Indian Point 2	4500516433	MTH500-08/08/00/00-08-08-01/2
23	0201746	Indian Point 2	4500516433	MTH500-08/08/00/00-08-08-01/2
24	0201755	Indian Point 2	4500516433	TMD500-20/08/08/00-08-01/2
25	0201756	Indian Point 2	4500516433	TMD500-30/30/30/00-08-01/2
26	0201757	Indian Point 2	4500516433	TMD500-30/30/30/00-08-01/2
27	0201758	Indian Point 2	4500516433	TMD500-30/30/30/00-08-01/2
28	0202129	Indian Point 2	4500519589	MTH500-08/08/00/00-08-08-01/2
29	0202130	Indian Point 2	4500519589	MTH500-08/08/00/00-08-08-01/2
30	0202131	Indian Point 2	4500519589	MTH500-08/08/00/00-08-08-01/2
31	9200511	Indian Point 2	2519478	HLS500-08/08/00/00-08-08-01/2
32	9200512	Indian Point 2	2519478	HLS500-08/08/00/00-08-08-01/2
33	9200517	Indian Point 2	2519478	CMM500-2-08/08/00-08-08-01/2
34	9200518	Indian Point 2	2519478	CMM500-2-08/08/00-08-08-01/2
35	9200523	Indian Point 2	2519478	CMM500-1-08/08/00-08-08-01/2
36	9200524	Indian Point 2	2519478	CMM500-1-08/08/00-08-08-01/2
37	9200529	Indian Point 2	2519478	CMM500-6-08/00/00-08-08-01/2

	S/N	PLANT	CLIENT PO	DESCRIPTION
38	9200530	Indian Point 2	2519478	CMM500-6-08/00/00-08-08-01/2
39	9200544	Indian Point 2	2523561	CMM500-1-08/08/00-08-08-01/2
40	9200545	Indian Point 2	2523561	CMM500-1-08/08/00-08-08-01/2
41	9200546	Indian Point 2	2523561	CMM500-1-08/08/00-08-08-01/2
42	9200547	Indian Point 2	2523561	CMM500-1-08/08/00-08-08-01/2
43	9200548	Indian Point 2	2523561	CMM500-6-08/00/00-08-08-01/2
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45	9200550	Indian Point 2	2523561	CMM500-6-08/00/00-08-08-01/2
46	9200551	Indian Point 2	2523561	CMM500-6-08/00/00-08-08-01/2
47	9200552	Indian Point 2	2523561	CMM500-6-08/00/00-08-08-01/2
48	9200553	Indian Point 2	2523561	CMM500-6-08/00/00-08-08-01/2
49	9200554	Indian Point 2	2523561	CMM500-6-08/00/00-08-08-01/2
50	9200555	Indian Point 2	2523561	CMM500-6-08/00/00-08-08-01/2
51	9200556	Indian Point 2	2523561	MTH500-06/06/06/06-08-08-01/2
52	9200557	Indian Point 2	2523561	MTH500-06/06/06/06-08-08-01/2
53	9200558	Indian Point 2	2523561	MTH500-08/08/08/08-08-08-01/2
54	9200559	Indian Point 2	2523561	MTH500-08/08/08/08-08-08-01/2
55	9200560	Indian Point 2	2523561	MTH500-20/20/20/20-08-08-01/2
56	9200561	Indian Point 2	2523561	MTH500-20/20/20/20-08-08-01/2
57	9200562	Indian Point 2	2523561	MTH500-20/20/20/20-08-08-01/2
58	9200563	Indian Point 2	2523561	MTH500-20/20/20/20-08-08-01/2
59	9200766	Indian Point 2	2523561	TMD500-06/00/00/00-06-08-01/2
60	9200767	Indian Point 2	2523561	TMD500-06/00/00/00-06-08-01/2
61	9200768	Indian Point 2	2523561	TMD500-06/00/00/00-06-08-01/2
62	9200769	Indian Point 2	2523561	TMD500-06/00/00/00-06-08-01/2
63	9200770	Indian Point 2	2523561	TMD500-19/00/00/00-08-08-01/2
64	9200771	Indian Point 2	2523561	TMD500-19/00/00/00-08-08-01/2
65	9200772	Indian Point 2	2523561	TMD500-08/00/00/00-08-08-01/2
66	9200773	Indian Point 2	2523561	TMD500-08/00/00/00-08-08-01/2
67	9200774	Indian Point 2	2523561	TMD500-08/00/00/00-08-08-01/2
68	9200775	Indian Point 2	2523561	TMD500-08/00/00/00-08-08-01/2
69	9200776	Indian Point 2	2523561	TMD500-08/08/08/00-08-08-01/2
70	9200777	Indian Point 2	2523561	TMD500-08/08/08/00-08-08-01/2
71	9200778	Indian Point 2	2523561	TMD500-08/00/00/00-08-08-01/2
72	9200779	Indian Point 2	2523561	TMD500-08/00/00/00-08-08-01/2
73	9200780	Indian Point 2	2523561	TMD500-08/00/00/00-08-08-01/2
74	9200781	Indian Point 2	2523561	TMD500-08/00/00/00-08-08-01/2
75	9200782	Indian Point 2	2523561	MTH500-08/08/00/00-08-08-01/2
76	9200783	Indian Point 2	2523561	MTH500-08/08/00/00-08-08-01/2
77	9200784	Indian Point 2	2523561	MTH500-08/08/21/22-08-08-01/2
78	9200785	Indian Point 2	2523561	MTH500-08/08/21/22-08-08-01/2
79	9200786	Indian Point 2	2523561	TDM500-08/00/00/00-08-08-01/2
80	9200787	Indian Point 2	2523561	TDM500-08/00/00/00-08-08-01/2
81	9200788	Indian Point 2	2523561	TMD500-20/08/08/00-08-08-01/2
82	9200789	Indian Point 2	2523561	TMD500-20/08/08/00-08-08-01/2
83	9200790	Indian Point 2	2523561	TDM500-08/00/00/00-08-08-01/2



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	S/N	PLANT	CLIENT PO	DESCRIPTION
84	9200791	Indian Point 2	2523561	TDM500-08/00/00/00-08-08-01/2
85	9200792	Indian Point 2	2523561	TMD500-08/00/00/00-08-08-01/2
86	9200793	Indian Point 2	2523561	TMD500-08/00/00/00-08-08-01/2
87	9200822	Indian Point 2	217014	CMM500-6-08/00/00-08-08-01/2
88	9200823	Indian Point 2	217014	CMM500-6-08/00/00-08-08-01/2
89	9200824	Indian Point 2	217014	CMM500-6-08/00/00-08-08-01/2
90	9200825	Indian Point 2	217014	CMM500-6-08/00/00-08-08-01/2
91	9200826	Indian Point 2	217014	CMM500-6-08/00/00-08-08-01/2
92	9200837	Indian Point 2	2562924	MTH500-08/08/00/00-08-08-01/2
93	9200838	Indian Point 2	2562924	MTH500-08/08/00/00-08-08-01/2
94	9200839	Indian Point 2	2562924	MTH500-08/08/00/00-08-08-01/2
95	9200846	Indian Point 2	190038	FINAL ASSEMBLY
96	9200847	Indian Point 2	190038	FINAL ASSEMBLY
97	9200867	Indian Point 2	2523561	TMD500-08/00/00/00-08-08-01/2
98	9200868	Indian Point 2	2523561	TMD500-08/00/00/00-08-08-01/2
99	9200869	Indian Point 2	2523561	TMD500-08/00/00/00-08-08-01/2
100	9200870	Indian Point 2	2523561	TMD500-08/00/00/00-08-08-01/2
101	9200871	Indian Point 2	2523561	TMD500-08/00/00/00-08-08-01/2
102	9200872	Indian Point 2	2523561	TMD500-08/00/00/00-08-08-01/2
103	9400182	Indian Point 2	490066	TMD500-20/08/08/00-08-08-01/2
104	9400183	Indian Point 2	490066	TMD500-20/08/08/00-08-08-01/2
105	9800677	Indian Point 2	8525875	TMD500-08/00/00/00-08-08-01/2 MB
106	9800678	Indian Point 2	8525875	TMD500-08/00/00/00-08-08-01/2 MB
107	9800679	Indian Point 2	8525875	TMD500-08/00/00/00-08-08-01/2 MB
108	9800686	Indian Point 2	8525875	MTH500-08/08/00/00-08-08-01/2 MB
109	9800687	Indian Point 2	8525875	MTH500-08/08/00/00-08-08-01/2 MB
110	9800688	Indian Point 2	8525875	MTH500-08/08/00/00-08-08-01/2 MB
111	9900503	Indian Point 2	9521931	TMD500-08/00/00/00-08-08-01/2

MODULES SUPPLIED TO WESTINGHOUSE

	S/N	PLANT	CLIENT PO	DESCRIPTION
1	9200034		MA-48810-M	CMM9000-1-07/07/00-08-08-01/2
2	9200035		MA-48810-M	CMM9000-1-07/07/00-08-08-01/2
3	9200036		MA-48810-M	CMM9000-1-07/07/00-08-08-01/2
4	9200037		MA-48810-M	CMM9000-1-07/07/00-08-08-01/2
5	9200038		MA-48810-M	CMM9000-1-07/07/00-08-08-01/2
6	9200072		MA-48810-M	CMM9000-6-07/00/00-08-08-01/2
7	9200078		MA-48810-M	TMD9000-20/07/08/00-08-08-01/2
8	9200079		MA-48810-M	TMD9000-20/07/08/00-08-08-01/2
9	9200080		MA-48810-M	TMD9000-20/07/08/00-08-08-01/2
10	9200081		MA-48810-M	TMD9000-20/07/08/00-08-08-01/2
11	9200098		MA-48810-M	MTH9000-08/08/00/00-08-08-01/2
12	9200099		MA-48810-M	MTH9000-08/08/00/00-08-08-01/2
13	9200100		MA-48810-M	MTH9000-08/08/00/00-08-08-01/2
14	9200101		MA-48810-M	MTH9000-08/08/00/00-08-08-01/2



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	S/N	PLANT	CLIENT PO	DESCRIPTION
15	9200102		MA-48810-M	MTH9000-08/08/00/00-08-08-01/2
16	9400006		MA-53921-M	TMD9000-08/08/21/22-08-08-01/2
17	9400015		MA-53923-M	TMD9000-20/08/08/00-08-08-01/2
18	9400691		MA-57718-M	TMD9000-20/08/08/00-08-08-01/2