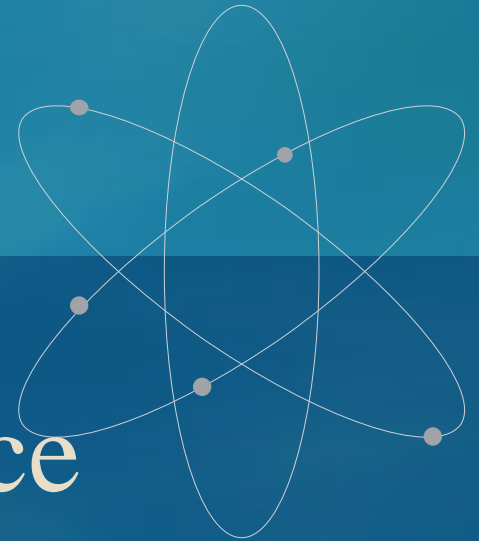


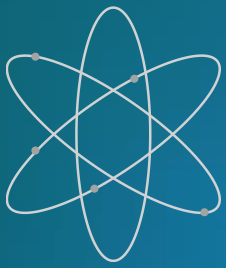
Operating Experience



Fall 2015 EQ Technical Conference
Nuclear Utility Group on Equipment Qualification
November 4-6, 2015
Clearwater, Florida

William Horin, Winston & Strawn, LLP (Counsel to NUGEQ (whorin@winston.com))

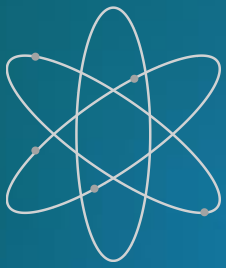
Ron Wise, NEQ Consulting (NUGEQ Technical Consultant (ronwise@aol.com))



Operating Experience

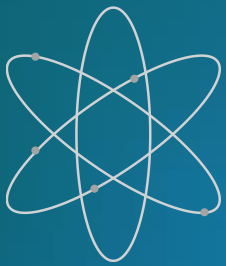
TOPICS

- **Update on INPO Operating Experience**
- **Selected EQ-related LERs**
- **Selected EQ-Related Part 21 Reports**



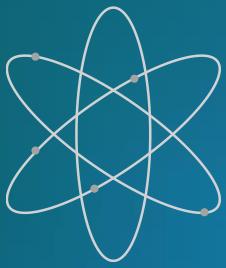
Operating Experience

- **Update on INPO Operating Experience**
 - The Compilation of INPO OE/Event Numbers with Potential Relevance to Equipment Qualification has been updated
 - Now posted on WSPLUS at: “INPO OE / Events”
 - Update covers INPO OE and Plant Events issued since June 2014



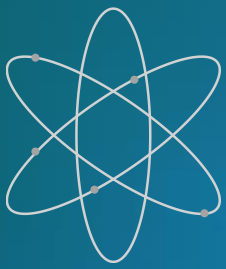
Selected EQ-related LERs

Site/ LER No.	LER Date	Description	Cause
Duane Arnold 2012-002	02/27/12	Failure of Barton Model 288 differential pressure switches during the performance of Surveillance Test Procedure 3.3.5.1-22, Recirculation Riser D/P A > B Instrument	Microswitch plunger screws were not adjusted as recommended by the vendor manual prior to the installation of new Microswitches triggered by maintenance procedure deficiencies
Davis-Besse 2011-004	03/06/12	Inadequate design of the DC System with respect to electrical separation (non-essential equipment in containment, powered by the DC System, was not environmentally qualified as required)	Lack of analysis and/or documentation to support multiple high impedance faults on safety-related components induced by harsh environments, and their impact on safety-related components
Millstone 3 2012-001	04/03/12	Twelve main steam line SG pressure transmitter's Litton-Veam connectors had not been reconnected using new gaskets as required by the EQ Record after maintenance was performed	Failure to incorporate 1998 EQ program requirement changes into the affected surveillance procedures as required by station administrative procedures
Oconee 2011-006-1	05/29/12	Temperature induced trip (due to elevated ambient temperature in the penetration room) of PZR heater panel board breakers (located in MCCs) inside containment during a LOOP event	Breakers were not evaluated for their new purpose (i.e., to function during elevated ambient temperature in a LOOP event) when plant converted to ITS
Nine-Mile 2 2013-001	03/25/13	Reactor Core Isolation Cooling System Isolation Due to a Temperature Switch Unit Failure	Cause: Age-related capacitor degradation due to insufficient use of the CAP to fully implement a replacement program for Riley temperature switches



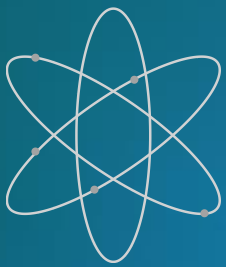
Selected EQ-related LERs

Site/ LER No.	LER Date	Description	Cause
Millstone 3 2013-001	04/15/13	Improperly Secured Enclosure Caused Inoperability of Steam Generator Pressure Transmitter (SGPT would not be adequately protected from a postulated HELB).	Lack of awareness of the purpose of the enclosure boundary combined with the lack of clear labeling identifying the HELB enclosure
Millstone 2 2013-002	05/06/13	Turbine Driven Auxiliary Feedwater Pump HELB Door Left Open During Surveillance Test	HELB requirements during operation of the TDAFW pump were not fully considered during the prejob brief
Fort Calhoun 2013-006-1	08/26/13	Use of Teflon in LPSI and CS Pump Mechanical Seals	Cause: Licensee and its consulting engineering firm failed to specify a compatible material for the pump seals in the original construction specs
Fort Calhoun 2012-014-1	09/30/13	Electrical Equipment Impacted by High Energy Line Break Outside of Containment	Insufficient engineering rigor by the preparer and reviewer of the EEQ Program Basis Document.
Fort Calhoun 2012-009-1	10/31/13	Inoperable Equipment due to Lack of Environmental Qualifications	Thermal lag analysis showed that the additional exposure time of the lower MSLB temperature did not adversely affect the EEQ analysis as originally assumed -- no reportable condition existed



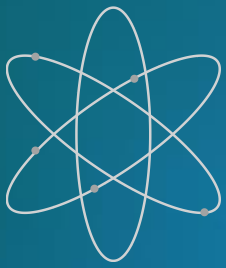
Selected EQ-related LERs

Site/ LER No.	LER Date	Description	Cause
Browns Ferry 2013-002	11/25/13	High Pressure Coolant Injection System Declared Inoperable Due to an Unqualified Electrical Splice	Lack of clear and specific procedural guidance related to: (1) direction on locating and determining the component classification relative to 50.49, and (2) guidance on changes to EQ components and associated work orders
Millstone 2012-001-1	12/19/13	Historical gaps in High Energy Line Break Barrier	Cause: Dating back to original construction, is that no construction details were developed for sealing Q-decking when the ribbing is perpendicular to the top of the wall
Fort Calhoun 2013-011	01/06/14	Inadequate Design for High Energy Line Break in Rooms 13 and 19 of the Auxiliary Building	Inaccurate responses and simplifying assumptions, w/o supporting documentation re IE Bulletin 79-01B
St Lucie 2013-004	01/13/14	Manual Trip Following Spurious Closure of Main Feedwater Isolation Valve (MFIV) and Lowering of Steam Generator Levels	Direct Cause: Corrosion of two relays located inside the relay box caused by internal water intrusion in the conduits -- Contributing Causes: degradation of control relays and failure to take appropriate action in identifying and eliminating moisture intrusion



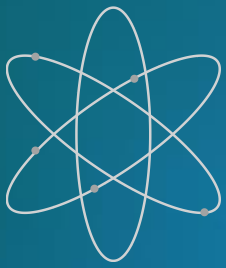
Selected EQ-related LERs

Site/ LER No.	LER Date	Description	Cause
Susquehanna 2013-008	01/26/14	Loss of Secondary Containment due to Failed Solenoid Valve in the Reactor Building Zone I Ventilation Exhaust System	ASCO used a silicon-based lubricant, which would migrate to the top of the plunger and become sticky during long periods of being energized causing solenoid plunger to get stuck in the energized position, resulting in the valve porting air -- ASCO discontinued use of silicon-based lubricant
Salem 2014-001	03/10/14	High Energy Line Break Door Blocked Open During Maintenance Activity	Organizational failure to ensure that guidance provided in plant HELB program procedures contained sufficient justification for compensatory actions used for barrier impairments
Turkey Point 2014-003	11/10/14	Emergency Containment Cooler Safety Function Impacted During MCC Breaker Replacement	Root Cause: Inadequate design integration and plant personnel did not have the detailed circuit design knowledge needed to guide proper implementation of the 4C ECC breaker cubicle replacement – Contributing Cause: WO did not have the correct plant Mode stipulations for replacement of the ECC breaker cubicle
Prairie Island 2014-002-1	01/30/15	EDGs Declared Inoperable Due to Not Meeting High Energy Line Break Requirements	Q-List Project personnel did not recognize the potential Condition Adverse to Quality that was created if newly upgraded Safety Related components were not evaluated for EQ program applicability in a timely manner



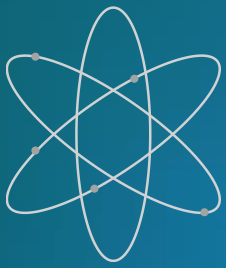
Selected EQ-related LERs

Site/ LER No.	LER Date	Description	Cause
Dresden 2014-001-1	02/06/15	Electromatic Relief Valve Failed to Actuate during Surveillance Testing	Cause: Actuator design was susceptible to vibration induced wear
Fort Calhoun 2015-005-1	03/27/15	Inadequate Design of High Energy Line Break Barriers.	Degraded jet impingement barriers were discovered as part of the extent of condition reviews for the EEQ Program Reconstitution Project – deficiencies were properly remediated prior to plant startup in December 2013
Cooper 2015-002	04/16/15	Failure of Main Steam Differential Pressure Indicating Switches (Barton ITT Model 288A) Results in a Condition Prohibited by TSs and a Common Cause Inoperability of Independent Trains or Channels	Inappropriately applied TSTF-493 requirements were not removed in a timely manner as they were viewed as administrative only (no change in setpoint and viewed as conservatively tightening the As-Left Tolerance)
Robinson 2015-002	05/15/15	Pressurizer Power Operated Relief Valve (PORV) Limit Switches' (NAMCO) Qualified Life Exceeded Due to Miscalculation	Results of the calculation were not adequately checked by utility engineering personnel that performed the calculation or the person performing the design verification -- a historical latent error
Pilgrim 2015-004	06/22/15	480 Volt Bus B6 Auto Transfer Function Degraded	Agastat relay did not change state as the relay was energized and de-energized (Agastat time delay relay was replaced, restoring the degraded voltage protection functionality)



Selected EQ-related LERs

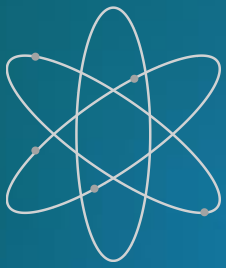
Site/ LER No.	LER Date	Description	Cause
Harris 2015-005	08/27/15	Unrecognized Impact of Opening of Barrier Doors on High Energy Line Break Analysis	Root Cause: Engineering failed to develop and implement control measures for hazard barriers credited for mitigating HELB events – Contributing Cause: Engineering failed to adequately evaluate RIS-01-09, “Control of Hazard Barrier”
Columbia 2015-005	08/29/15	Reactor Pressure Vessel Level Indication (Barton Model 288A) Switch Failures	Direct Cause: Switches were mechanically bound with the indicator off-scale high against the rubber stop – Root Cause: Procedure for calibrating the level indicating switches was not in alignment with the vendor manual – Contributing Cause: Lack of established preventative maintenance



EQ-related Part 21 Reports

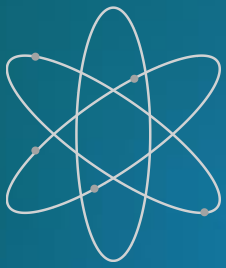
Notifier	Log No.	Date	Description
Curtiss Wright	P21-12-04-00	02/06/12	Defective Plug Insulators - Grayboot Connectors
Rosemount Nuclear	P21-12-05-02	04/03/12	Rosemount Pressure Transmitters with Nonzero Based Calibrations
Rosemount Nuclear	P21-12-12-00	03/02/12	Certain Rosemount Model 1154 Series H Pressure Transmitters with Nonzero Based Calibrations
ABB, Inc.	P21-12-23-01	04/01/13	Protective Relays May Not be Qualified for Harsh Environments
Rosemount Nuclear	P21-12-27-00	06/21/12	Rosemount Nuclear Reliability Degradation Of Resistors In Trip Units And Readout Assemblies
OPPD/ Fort Calhoun	P21-12-29-01	07/11/12	Defective General Electric CR105X300 Auxiliary Contactor
QualTech NP	P21-12-31-02	09/10/12	TYCO Model CNT-35-96 Timing Relay Will Not Trip at a Specific Setting (Revision to Notification)
OPPD/ Fort Calhoun	P21-12-39-00	08/16/12	Failure of Safety Related Breaker Control Devices Due to a Common Cause

Part 21 reports are organized by the Log No. established by the NRC's listing of Part 21 reports at: www.nrc.gov/reading-rm/doc-collections/event-status/part21/



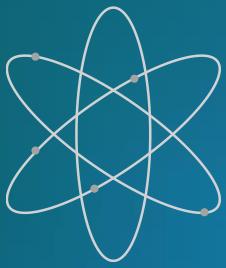
EQ-related Part 21 Reports

Notifier	Log No.	Date	Description
Amtek	P21-12-40-00	09/07/12	Notification of Potential Defect in 10 KVA Inverter Model 86VC0100-15
Entergy/ Waterford 3	P21-12-44-02	01/25/13	Defective Masoneilan I/P Transducer Model 8005N
ABB, Inc.	P21-12-49-00	11/08/12	K-Line Circuit Breaker Operating Mechanism Front Cover Fails to Comply with Specifications
GE Hitachi	P21-12-55-01	06/12/13	Adequacy of Design Change in AM Magne-Blast Circuit Breakers (Interim Report)
TVA	P21-12-59-01	01/18/13	Belden Wire used on Environmentally Qualified Form-Wound Motors Not Fully Qualified
Emerson Process	P21-13-04-00	01/11/13	Potential Part 21 Report Involving Fisher Type 546 and 546NS Transducers
Emerson Process	P21-13-05-01	03/13/13	TopWorx M8 Switches Built and Shipped with Adhesive that was Beyond its Expiration Date
Emerson Process	P21-13-09-00	02/25/13	Flowserve -- Wedge Pin Failure in Anchor Darling Motor Operated Double Disc Gate Valve



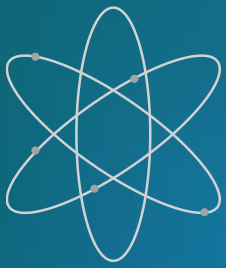
EQ-related Part 21 Reports

Notifier	Log No.	Date	Description
Emerson Process	P21-13-11-00	03/12/13	Loose Fisher Controls Proximity Switch Target Magnets (a 10 CFR 50.55(e) Report)
ASCO Valve	P21-13-13-00	03/20/13	Direct Acting Three Way Solenoid Valve Won't Shift when De-energized
Emerson Process	P21-13-15-01	04/30/13	Final Report on Incorrect Assembly Instructions for TopWorx GO Switches
Integrated Resources	P21-13-20-02	07/05/13	Foxboro Power Supply Potential Failures due to Defective Tie Wraps and Holders (Final Report and Recommendation)
Flowserve	P21-13-23-00	04/05/13	Limiterque Valves with Incorrect Motor Nameplates Installed
ITT Engineered Valves	P21-13-27-02	06/25/13	Type M1 Diaphragms May Not Be Qualified for Specific Radiation Design Conditions
Ultra Electronics	P21-13-37-02	10/08/13	Final Report - Linear Indications/Cracks in Pressure Transmitter Flange Forging
ABB, Inc.	P21-13-40-01	04/08/15	Defective HK and K-Line Circuit Breaker Tension Springs



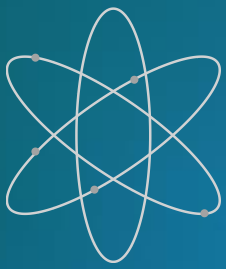
EQ-related Part 21 Reports

Notifier	Log No.	Date	Description
Mirion Tech (Conax Nuclear)	P21-13-44-02	02/05/14	Unqualified Material Used in Electrical Penetration Assemblies
Baldor Electric	P21-13-45-01	010/03/13	Motors May Have a Point of Entry for Foreign Material
Emerson Process	P21-13-48-00	09/10/13	Improper Dedication of Fisher Controls Actuator Parts
TVA/BFN	P21-13-49-01	12/18/13	SBM-Type Manual Switch Failed to Operate as Expected
Rosemount Nuclear	P21-13-50-00	09/20/13	Model 710DU Trip Units May Not Meet Established Post-Exposure Radiation Performance Criteria
TVA/BFN	P21-13-52-01	12/02/2013	Emergency Diesel Generator Relay Contact Failed to Operate as Expected
Duke/Catawba	P21-13-54-01	11/08/13	Incomplete Brazing of Contacts on Diesel Generator Control Relay
Flowserve	P21-13-57-00	11/08/13	Potential Defect in SMB Geared Limit Switch



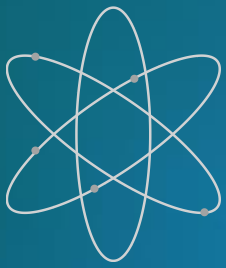
EQ-related Part 21 Reports

Notifier	Log No.	Date	Description
ABB, Inc	P21-13-60-00	11/25/13	Deficiency Related to the Primary Close Latch in K-Line Circuit Breakers
Fisher Controls	P21-13-61-00	11/26/13	Improper Dedication of Actuator Parts
GE Hitachi	P21-13-64-00	12/05/13	Energy Failure of Relay Logic Card Modules in 2 Out of 4 Voters
ABB, Inc.	P21-14-07-00	02/10/2014	Instruction Leaflet for CVX & CVX-1 Relays May be Deficient
Valcor Engineering	P21-14-10-01	08/15/14	Cracked Seat Discovered on Solenoid Operated Process Valve During AP1000 Qualification Testing (Update)
GE Hitachi	P21-14-11-01	07/23/14	Unseating of a Valve Spring on a Scram Solenoid Pilot Valve
Entergy/ Waterford 3	P21-14-12-01	04/11/14	Allen Bradley Type 700RTC Relay Spurious De-Energizing
ASCO Valve	P21-14-15-01	06/16/14	Scram Solenoid Valve Not Exhausting Properly



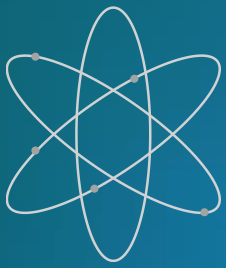
EQ-related Part 21 Reports

Notifier	Log No.	Date	Description
United Controls International	P21-14-16-00	03/19/14	Not Capable of Determining if a Defect Exists in General Electric SBM Switches
United Controls International	P21-14-22-00	04/09/14	Not Capable of Determining if a Defect Exists in General Electric SB1 Switches and HEA Relays
QualTech NP	P21-14-23-02	02/15/15	Revision to Final Notification Related to Potential Defect in General Electric Type CR120AD Control Relays
Baldor Electric	P21-14-24-01	04/15/14	Potential Defect in Motors Shipped to DTE Electric Company
Rosemount Nuclear	P21-14-25-00	04/10/14	Certain Model 1154HP Transmitters Shipped to Point Beach May Exhibit Degraded Functional Reliability
Cameron Measurement	P21-14-26-01	06/09/14	Barton Model 288A and 289A Differential Pressure Switch Defect (Supplementary Information and Closure)
QualTech NP	P21-14-27-00	04/09/15	Response to Part 21 Notification on Allen Bradley Timing Relays, Event # 49911
TVA/BFN	P21-14-34-01	07/07/14	Degraded Limitorque SMB-0 Valve Actuator Motor Operator Bearing



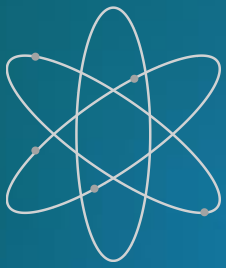
EQ-related Part 21 Reports

Notifier	Log No.	Date	Description
Energy/ Waterford 3	P21-14-42-01	07/09/14	Masoneilan Actuators Discovered to Fail-Closed Instead of the Required Fail-Open Configuration
Kinectrics, Inc	P21-14-44-00	07/09/14	Potential Part 21 Issue on Irradiations Performed by Steris Isomedix Services (Steris)
Preferred Metal Technologies	P21-14-45-01	07/30/14	Incorrect Industrial Irradiator Dose (Steris Isomedix Services)
ITT Engineered Valves, LLC	P21-14-51-03	04/07/14	Improper Irradiation of Samples for Ball Valve Seats and Diaphragms (Steris Isomedix Services)
Fisher Controls	P21-14-52-00	07/21/14	Non-Conforming Solenoid Valves Sent to Progress Energy - Brunswick
SOR, Inc.	P21-14-53-01	04/02/15	Potentially Defective Pressure and Temperature Switches
Nutherm International	P21-14-56-01	08/31/15	Potential Part 21 Issue Regarding Incorrect Industrial Irradiation Dose
ABB, Inc.	P21-14-58-01	09/12/14	Notice of Deviation Regarding K-Line Circuit Breaker Secondary Close Latch



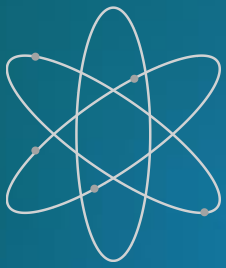
EQ-related Part 21 Reports

Notifier	Log No.	Date	Description
Schulz Electric	P21-14-60-01	09/30/14	Potential Part 21 Issue on Motor Dedications Performed Prior to June 2002 (Final Evaluation)
Underwater Construction	P21-14-61-00	09/08/14	Failure to Meet Specified Irradiation During Testing of Coated Test Panels
Cameron Measurement	P21-14-62-00	06/09/14	Defective Barton Differential Pressure Switches
Okonite	P21-14-65-00	08/27/14	Notice Concerning Irradiations of Class 1E Cables Performed by Steris Isomedix
QualTech NP	P21-14-68-01	12/30/14	Discrepancy Between Generation 3 Quick Disconnect Connector Qualification Reports and Installation Instructions
Exelon/ Oyster Creek	P21-14-70-01	10/08/14	Electromatic Relief Valve Excessive Wear
Electroswitch	P21-14-72-00	10/03/14	Orientation of Series 20 Internal Wire may Allow the Side Cover Screw to Touch the Wire Insulation
Entergy/ Waterford 3	P21-14-74-01	11/12/14	Notification of Defective Allen Bradley Type 700RTC Relay



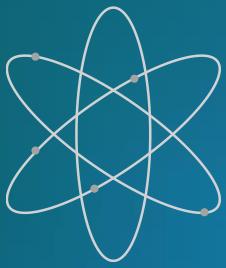
EQ-related Part 21 Reports

Notifier	Log No.	Date	Description
Emerson Process	P21-14-82-00	11/19/14	Improper Dedication of Fisher Controls Type 67 AFR Regulator Diaphragm Assembly Parts
Nat'l Technical Systems	P21-14-83-00	05/21/14	Potential Part 21 Issue on Irradiations performed by Steris Isomedix Services
AREVA	P21-14-84-01	12/16/14	Defect in LOCA Analysis for B&W Plants
ASCO Valve	P21-14-89-01	08/19/15	Potential Part 21 Notification (Steris Isomedix)
ABB, Inc.	P21-14-90-01	03/05/15	Part 21 Notification of Potential Defect Regarding KF Relay ZPA Rating
Baldor Electric	P21-14-91-01	01/23/15	Baldor AC Motors with Potential Bearing End Cap Alignment Issues
AZZ/Nuclear Logistics Inc.	P21-15-01-00	01/08/15	Report of Potential Failure of GE Hitachi (GEH) SBM Type Switches
Thermo Gamma-Metrics LLC	P21-15-05-00	02/06/15	Shutdown Margin Monitor EQ Noncompliance



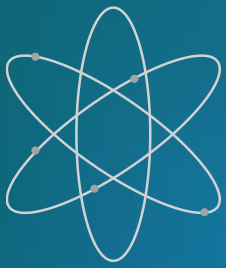
EQ-related Part 21 Reports

Notifier	Log No.	Date	Description
Valcor Engineering	P21-15-07-00	02/09/15	Possible NEMA 4 Enclosure Assembly Error In Some Solenoid Valve Models
QualTech NP	P21-15-13-00	02/23/15	Potential Defect in a Socket Used Separately on in a Connector Kit
Dominion/ Millstone 3	P21-15-14-01	03/13/15	Binding in ABB K-Line Secondary Closing Latches (Part Number 716610K01)
Curtiss Wright	P21-15-18-02	06/30/15	Notification of a Potential Test Induced Defect in a 0867F Series Main Steam Safety Relief Valve
Emerson Process	P21-15-19-00	03/30/15	Fisher Type 461 Valve Plug Machining Defect
AZZ/Nuclear Logistics Inc.	P21-15-26-00	05/01/15	Potentially Unqualified Component in Certain Allen Bradley Model 700RTC Timing Relays
QualTech NP	P21-15-27-00	05/07/15	Potential Part 21 Involving Struthers Dunn Relays With Contact Resistance Greater Than One Ohm
Duke/ Brunswick	P21-15-33-01	06/25/15	Notification Related to Allen Bradley 700RTC Relay Configuration



EQ-related Part 21 Reports

Notifier	Log No.	Date	Description
ABB, Inc.	P21-15-35-00	06/01/15	Notification of Deviation Regarding K-Line Circuit Breaker Secondary Close Latch
Nutherm International	P21-15-36-00	06/04/15	Potential Part 21 Related to Allen Bradley Time Relay Model 700RTC
Engine Systems	P21-15-38-00	06/05/15	Incorrect Part Number Relay Shipped to and Installed in EDG Governor Control Panel at Brunswick
GE Hitachi	P21-15-41-00	09/10/15	Potential Failure of Electromatic Relief Valve Cutout Switch
ABB, Inc.	P21-15-45-00	06/29/15	Notification of Deviation Regarding COM-5 Protective Relay - Defective Frame Assembly
United Controls International	P21-15-49-00	07/20/15	Report of Potential Part 21 on Allen Bradley Time Delay Relay 700-RT
Flowserve	P21-15-51-00	07/24/15	Replacement Actuator Shafts for Anchor/Darling 6-900 Swing Check Valves Do Not Meet Dimensional Requirements
Rotork Controls	P21-15-54-01	09/10/15	Updated Interim Report Related to a Safety Related Micro Switch



EQ-related Part 21 Reports

Notifier	Log No.	Date	Description
Namco Controls	P21-15-55-01	07/31/15	Notification of Product Anomaly Related to Namco EA180 & EA170 Limit Switches Manufactured in a Specific Date Range
ABB, Inc.	P21-15-58-00	08/06/15	Notification of Deviation Regarding HK Circuit Breaker Pivot Pin
SOR, Inc.	P21-15-64-01	09/21/15	Notification of Potential Issue - Irradiation Qualification Testing
Emerson Process	P21-15-65-00	09/14/15	Actuator Fail Mode Deviation and Potential Non-Conservative Actuator
Westinghouse	P21-15-66-00	09/15/15	Potentially Affected Coils Used in Freedom Size 1 and Size 2 Starters and Contactors 09/15/2015