Maintaining Certification Compliance Of Equipment Used in Hazardous (Classified) Locations

Mary Kay O’Connor Process Safety Center 2006 International Symposium
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Presentation Objective

From the product certification side:

(C. Gagliardi, FM Approvals)

• Answer the following questions:
  – What is a Hazardous (Classified) Location?
  – What are protection techniques and NRTL certifications?
  – How are NRTL certifications affected?

• Review common terminology

• Explain the requirements for FM Approvals’ certification of equipment used in hazardous (classified) locations
Presentation Objective

From the industry side:

(B. Baker, Safety Consultant to Emerson Process Management)

• Recommend potential end user actions for continued certification, reducing process safety risks and meeting regulatory requirements
Hazardous (Classified) Location

• A location where fire or explosive hazards may exist due to:
  – Flammable gases or vapors
  – Flammable liquids
  – Combustible dust
  – Easily ignitable fibers or flyings
Hazardous Locations: Defined by 4 Elements

- Class
- Division or Zone
- Group
- Temperature Class
Some Protection Techniques Used in the US:

- Explosionproof
- Intrinsic Safety
- Nonincendive
- Increased Safety
Regulatory References to Classes, Divisions and Zones

- **NEC Articles 500 – 506:**
  NEC: National Electrical Code®
  - Specify Installation Requirements in Hazardous (Classified) Locations

- **OSHA Subpart S; 1910.307:** “Hazardous (Classified) Locations”;
  OSHA: Occupational Safety and Health Administration
  - Requirements for Electric Equipment and Wiring

- **OSHA Subpart S; 1910.399:** Definitions Applicable to Subpart S
NRTL: Nationally Recognized Testing Laboratory

- **Recognized by OSHA in 29 CFR 1910.7**
- **Qualified to perform safety testing and product certification**
  - Each NRTL has specific “scope of recognition” from OSHA
  - OSHA requires NRTLs to perform facility audits

- **For Subpart S of 29 CFR 1910.307, OSHA accepts equipment or products approved by one of its listed NRTLs**
NRTL: Nationally Recognized Testing Laboratory

- **NRTL product safety testing and certifications are to appropriate product safety standards**
  - OSHA lists standards approved under the NRTL Program
  - NRTL’s registered certification mark to be applied to each tested and approved unit
Identified Equipment

• **NEC Articles 500, 505 & 506 require equipment be identified for use in hazardous locations, which includes**
  – Listing by an NRTL
  – Evidence of testing or evaluation by a testing laboratory (e.g. NRTL)
  – Self Declaration (Proven Safe) when acceptable to jurisdiction

• **OSHA 1910.307(b) has similar requirements for electrical equipment for use in hazardous locations**
  – Intrinsically Safe (NRTL)
  – Approved for the classified hazardous location (NRTL)
  – Safe for the classified hazardous location (Proven Safe)
FM Approval Mark

- A statement of conformity that a product is in compliance with defined standards at the time the product leaves the manufacturing and/or repair facilities audited and approved by FM Approvals
  - Hereinafter referred to as FM Approved facility
  - Manufacturer can have multiple facilities audited by FM Approvals, allowing them to mark product with the FM Approval certification mark.
    - Including manufacturer’s audited repair facilities
FM Approval Mark

- Once in use, continued compliance with applicable codes and standards becomes the responsibility of the end user

- Changes made to equipment after it has left an FM Approved facility may unknowingly affect the equipment’s continued compliance to the standards which it was certified to
A “change” can include equipment that is:

- Refurbished
- Remanufactured
- Reconditioned
- Salvaged
- New Surplus
- Repaired
Defining the Terminology:

- **Repair**: “Work performed to the unit that would bring it back to its original condition approved by FM Approvals.”
  - Product compliance with applicable standards has been reconfirmed

- **Definition taken from the following FM Approvals Standards:**
  - Class 3606:1998 - Repair Service for Process Control Equipment Used in Hazardous (Classified) Locations
  - Class 3605:1994 - Repair Service for Communication Equipment Used in Hazardous (Classified) Locations
Defining the Terminology:

• “Repair” may also include:
  – Refurbished
  – Remanufactured
  – Reconditioned
  – Salvaged
  – New Surplus

• When the Work performed to the unit would bring it back to its original condition approved by FM Approvals. Product compliance with applicable standards has been reconfirmed
Options for Repairing FM Approved Equipment:

• **Option 1: Repaired by Manufacturer**

• **Option 2: Repaired by Third-Party**

• **Option 3: Repaired by End User**
Guidelines for Repairing FM Approved Equipment

- *Equipment returned to the original manufacturer (Including manufacturer’s audited repair facilities)*
  - Facilities are approved and audited by FM Approvals for specific product brands and models
  - Manufacturer has the design control and knowledge of the FM Approvals certification requirements
  - Can return to originally certified condition and mark with the FM Approvals certification mark. **Product compliance with applicable standards has been reconfirmed.**
Guidelines for Repairing FM Approved Equipment

• *Equipment repaired by a third-party*
  – With facility approved and audited by FM Approvals to FM Class Standard 3606 for specific product brands and models
    • Meeting FM Approvals Class Standard 3606 requires cooperation of the original manufacturer.
    • Device considered restored to its originally certified condition and marked with the FM Approvals certification mark. *Product compliance with applicable standards has been reconfirmed.*
  – This is an FM Approved Repair Facility
Guidelines for Repairing FM Approved Equipment

- **Equipment repaired by an end user**
  - With facility approved and audited by FM Approvals to Class Standard 3606 for specific product brands and models
    - Meeting FM Approvals Class Standard 3606 requires cooperation of the original manufacturer.
    - Device considered restored to its originally certified condition and marked with the FM Approvals certification mark. **Product compliance with applicable standards has been reconfirmed.**
  - This is an FM Approved Repair Facility
ISSUE: Inability to distinguish between Compliant and potentially Noncompliant equipment

- **Potential safety and regulatory compliance risk**
- **Existing nameplates, with FM Approvals certification marks, left on repaired devices**
  - FM Approvals certification marks that were originally applied by an FM Approved manufacturing facility when new
  - FM Approvals certification marks that were subsequently applied by an FM Approved repair facility
  - FM Approvals certification mark should be removed when repair is done by a facility not FM Approved
Safety & Compliance Issue: Maintaining Compliance of Repaired Equipment

**EXAMPLE**

Salvaged Instrument sold to meet end user’s hazardous approval specification; Remanufacturing facility is **NOT** audited and approved by FM Approvals; The original factory nameplate was left on the device with FM Approval mark; **COMPLIANCE NOT RECONFIRMED**

Salvaged Instrument sold to meet end user’s hazardous approval specification; Remanufacturing facility **IS** audited and approved by FM Approvals; New, re-serialized nameplate with FM Approval mark (w/ issuing facility’s name); **COMPLIANCE IS RECONFIRMED**
Example (cont)

Compliance **NOT** reconfirmed    Compliance **IS** reconfirmed

Use device Serial Number to determine any prior ownership transfer
Importance: Accidents Typically Result from a Combination of Events

A simultaneous combination of events can Create an Incident even though Never Experienced Previously

Graphic Source: Christopher Hart, Asst Administrator for System Safety, FAA
OSHA Incident Investigations
May Result in Citations Not Directly Associated with Causing the Incident

- 2005 Gulf Coast Explosion – OSHA citation regarding electrical equipment not approved for the hazardous (classified) location
OSHA Incident Investigations
May Result in Citations Not Directly Associated with Causing the Incident

• Citation: “The employer does not ensure the equipment is approved for the class of location and for the ignitable or combustible properties of the specific gas, vapor, dust, or fiber that will be present”
  – 167 individual items
  – Classification of each item: “Willful”
  – Fine: $70,000 per item
  – Total fine: $11,690,000

• Un-quantified impact: Company reputation, future regulatory scrutiny

1U.S. Dept. of Labor, OSHA: Citation and Notification of Penalty, 9/21/05
OSHA National News Release, 9/22/05
Recommendations:  
*From an Industry Perspective*  

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Potential methods to ensure compliance to applicable standards:

- Specify and Purchase repaired equipment from NRTL listed facilities

- Require proof that facilities are NRTL listed
  - Original report or certificate as signed by NRTL
  - List of the specific product brands and models
  - Follow-up audits
Potential methods for visibility to potentially noncompliant equipment:

- Require facilities not NRTL listed to indicate such on all documentation (must be product specific):
  - Specification documents
  - Quotations
  - Packing lists
  - Invoices
- Remove the NRTL certification mark
- Using these methods, any anticipated application of potentially noncompliant equipment should be known
  - Appropriate MOC evaluations can be undertaken before installation of non-approved devices
Identification: Existing, Potentially Noncompliant Devices

• Focus:
  – Start with a manageable cross-section of equipment types such as instrumentation

• Scope of identification
  – Installed equipment
  – Stores equipment

• Methodology
  – Identify plant areas classified as hazardous locations
  – Identify equipment purchased from facilities not NRTL listed
  – Cross-reference purchases to plant areas (Tag #)
  – Identify suspect equipment and verify via walk-down
Abatement Options: Replacement of Potentially Noncompliant Devices

• Execute in full during Turnarounds or opportunistically during normal MRO operations

• MRO:
  – Replace a small number of suspect devices with devices from an NRTL listed facility
  – Send removed devices to an NRTL listed facility for repair
  – Use these repaired devices as replacements for other suspect devices
  – Continue rotational replacement until all suspect devices have been abated
Sustaining Awareness: Training on NRTL Listed Equipment

- Ensure training provided to all personnel involved with specification and/or purchase of electrical devices
  - Hazardous (classified) Locations
    - Definitions
    - Electrical Device Listed Requirements
  - Compliance requirements: OSHA / NEC
    - Electrical Devices
  - Vendor Qualification Requirements
    - Equipment should be traceable to NRTL listed facility
    - Documented proof that facility is NRTL listed
Factors challenging end user management of devices

- Nameplates with NRTL certification marks left on devices by facilities not NRTL listed
- Inadequate or incomplete supplier qualification
- Lack of compliance / non-compliance notation by suppliers on submitted documentation
- Lack of documented NRTL listed facility certification
- Organizational awareness of the requirements for NRTL listed facilities
SUMMARY:
FM Approval Mark

- A statement of conformity that a product is in compliance with defined standards at the time the product leaves the manufacturing and/or repair facilities audited and approved by FM Approvals.

- Once in use, continued compliance with applicable codes and standards becomes the responsibility of the end user:
  - All types of repair including refurbished, remanufactured, reconditioned, salvaged & new surplus.

Safety and Regulatory Compliance may be jeopardized if end users cannot distinguish between compliant and potentially noncompliant devices.
Safety Exposure

*Its Simply Statistics:*

The chance of an incident occurring increases as the installed base of non-conforming devices increases.
QUESTIONS ?
Where To Get More Information

- **FM Approvals:** [www.fmapprovals.com](http://www.fmapprovals.com)
- **U.S. Department of Labor – Occupational Safety & Health Administration:** [www.osha.gov](http://www.osha.gov)
- **National Electrical Code**
Contact Us For More Information

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Thank you for your attention