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# Process safety concerns can arise when using refurbished or new-surplus equipment

This basic knowledge can help mitigate potential hazards and improve regulatory compliance issues

R. BAKER, Consultant, The Villages, Florida

An increasing number of aging, potentially noncompliant, salvaged (commonly referred to as “remanufactured” or “refurbished”) control valves and instrumentation are being used in the hydrocarbon processing industry (HPI). Depending on equipment age, repair history, application severity and other factors, these salvaged valves and instrumentation may be out of compliance with safety standards or with the original equipment manufacturer’s (OEM’s) design specifications for safe use in hazardous locations.

If using these devices does not meet the manufacturer’s technical specifications for the process application, there are possible implications with respect to the Process Safety Information and Mechanical Integrity elements of OSHA’s Process Safety Management (PSM) standard (29 CFR 1910.119)<sup>1</sup> and EPA’s Risk Management Program (RMP) rule (40 CFR 68).<sup>2</sup> Another possible implication exists with respect to OSHA’s Hazardous (Classified) Locations standard (29 CFR 1910.307).<sup>3</sup>

**Process safety.** Investigations into process plant explosions and fires can result in regulatory and investigative agencies issuing reports, fines and recommendations. As a result, plant managers may be assessing whether site programs are adequately addressing safety requirements—yet, the potential issues associated with reconditioned and new-surplus equipment may not be known and/or included in such programs. Two issues are:

1. Mechanical integrity (MI) of piping system components, such as control valves
2. Electrical/electronic equipment requiring hazardous (classified) location approvals.

Potential equipment or compliance problems may arise when purchases are made from third-party salvagers who recondition and resell used control valves and/or used and new surplus instrumentation. These third-party sellers often do not have access to OEM specifications and standards that are used dur-

ing new product design for process instrumentation and control valves. Yet some market this equipment with claims such as:

- “Meets or exceeds factory specifications”
- “Meets and even exceeds OEM testing standards”
- “Remanufactured to ‘like new’”
- “Fully reconditioned to OEM specifications”
- “Remanufactured to original manufacturers’ specifications and tolerances.”

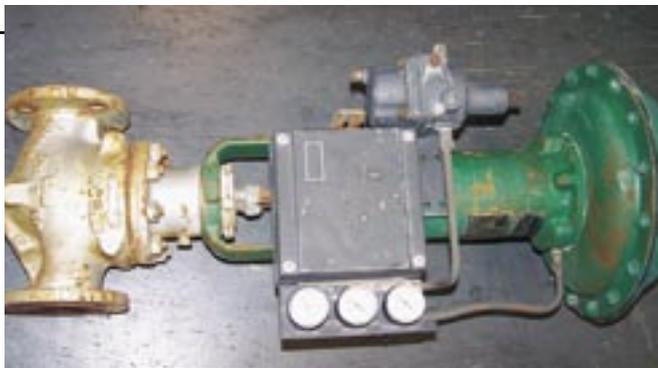
Despite these claims, most salvagers simply do not have the information needed to guarantee equipment restoration to full compliance with an OEM’s design attributes.

The question that begs answering is: “when standards and approvals are required to better ensure new equipment safety when introduced into the marketplace, why would the same requirements not be required whenever such products are salvaged, refurbished, reconditioned, remanufactured or repaired over their life cycle?”

Most process instrumentation OEMs can offer solutions to assist plants in identifying and abating potential safety-related risks and regulatory noncompliance. Additionally, implementing recommended solutions may also provide increased reliability along with potentially lower rates for property, liability and business-interruption insurance.

The information provided on used and new-surplus control valves and instrumentation should:

- Assist plant management and technicians in identifying chemical processing units’ potential regulatory noncompliance issues
- Help them recognize a potential need for more frequent implementation of management of change (MOC) work processes for equipment that may visually look like replacement-in-kind, but is not necessarily technically equivalent to be considered as an acceptable replacement-in-kind.



**FIG. 1** Salvaged valve/actuator instrument before reconditioning.



**FIG. 2** Valve/actuator instrument with old nameplate left on after reconditioning and/or repainting.

**Definitions.** Before delving into solutions and to avoid confusion, certain terminology must be identified and defined in the context of this discussion.

**Reconditioned.** Any form of *salvaged, refurbished or remanufactured* equipment falls into this category. Unlike repairing an end users' own control valves or instruments, transfer of equipment ownership has typically taken place during a reconditioning process. There is limited or no traceability associated with the equipment's prior application, environmental conditions, handling, maintenance history, use of OEM parts during repairs, etc.

**New-surplus.** This is defined as *unused* current or obsolete equipment, which:

- May or may not still be in original packaging
- May have been in end-user, distributor or other intermediary inventory since original manufacture
- May have been previously installed, calibrated and subsequently removed and repackaged without a plant or process unit being started up
- May have had multiple ownership transfers without having actually been in service.

More traceability typically exists for new-surplus equipment than for reconditioned equipment, but it is still usually limited. More specifically, for new-surplus electrical or electronic instruments subjected to the scenarios outlined above, the opportunity exists for unknown changes or hidden damage to occur during the typically lengthy time and extensive handling between original manufacture and subsequent resale.

## MECHANICAL INTEGRITY

The equipment's ability to maintain its original design integrity over its entire life cycle, i.e., to resist any loss of containment (LOC) throughout operational and design maximum process pressures and temperatures, equates to its MI. LOC not only presents potential onsite safety issues, but also potential offsite health/safety and environmental issues, especially if a released hazardous process is carried beyond the plant site's confines.

Following salvage, reconditioned control valves were originally introduced into shallow water offshore and onshore oil and gas facilities. However, over the past few years, many onshore chemical process and refining facilities have installed a significant and growing number of reconditioned control valves.

This has occurred as numerous chemical, paper and other industrial processing facilities built during the construction heyday of the 1970s through the 1990s are being closed, and equipment is being recycled. Along with the typical worn-out valves

regularly recycled from plant bone yards, suppliers and/or service providers now often have an ample supply of salvaged control valves to recondition and resell (Fig. 1).

Declining maintenance budgets continue to be a major influence in the increased purchases of reconditioned control valves for day-to-day repair-by-replacement maintenance activities. There has also been a gradual increase in use of reconditioned control valves and instrumentation in small capital projects.

The MI element of the PSM standard<sup>1</sup> and RMP rule<sup>2</sup> may apply in several ways when using reconditioned control valves:

- 1910.119(j)(1)(ii) and 68.73(a)(2) include valves when applying MI to process equipment: "Piping systems (including piping components such as valves)"
- 1910.119(j)(4)(ii) and 68.73(d)(2) cover inspection and testing: "Inspection and testing procedures must follow recognized and generally accepted good engineering practices"
- 1910.119(j)(6)(i) and 68.73(f)(1) include quality assurance: In the construction of new plants and equipment, the employer shall assure that equipment as it is fabricated is suitable for the process application for which they will be used.

With respect to the "information pertaining to the equipment in the process," these standards apply in the following ways:

- 1910.119(d)(3)(i)(F) and 68.65(d)(1)(vi) include: "Design codes and standards employed"
- 1910.119(d)(3)(ii) and 68.65(d)(2) state that: "The employer shall document that equipment complies with recognized and generally accepted good engineering practices."

It is clear that the PSM standard and RMP rule require that equipment covered by the regulation be suitable for the existing process application and that the equipment design, operation and maintenance conform to recognized and generally accepted good engineering practices. A detailed assessment of reconditioned piping system components, such as control valves, would be beneficial any time the valves are applied in PSM and RMP-covered processes. These assessments could include:

- Verification that purchased, reconditioned control valves continue to meet all OEM design specifications as designed in accordance with the appropriate ASME pressure class standard.
- Verification that existing control valves, when repaired, continue to meet all design specifications in accordance with the appropriate ASME pressure class standard.

Developing and executing these assessments better prevents potential equipment integrity issues and resulting LOC of toxic and flammable materials.

Reconditioned control valve assemblies are often repainted to look new, typically still bearing the original nameplate applied

when manufactured new, or containing a salvager's re-applied nameplate that is marked or stamped with valve ratings that infer continued compliance with the valves' originally designed pressure class (Fig. 2).

**Standards background.** As with any piping component, a control valve is a pressure-retaining device. Control valves are designed by the OEM in accordance with ASME B16.34 standard to ensure integrity for the appropriately designed pressure class and compliance with the designed piping system pressure class when installed. The ASME B16.34 standard is the recognized and generally accepted good engineering practice for new control valves.

An important, but often overlooked, element of valve design, as referenced in ASME B16.34 paragraph 6.1.7, is "Additional Metal Thickness."<sup>4</sup> Unlike cylindrical shapes, i.e., piping, additional wall thickness is designed into valve bodies and bonnets in order to handle additional stresses occurring from:

- Assembly loads
- Actuating (closing and opening) loads
- Shapes other than circular
- Stress concentrations.

Process application and age have a major impact on a control valve's life cycle and its integrity. Erosive and/or corrosive applications have a greater impact on body wall thickness than the gradual, time-based effects of surface oxidation (steel castings).

Thus, sustaining the design parameters referenced by ASME B16.34 paragraph 6.1.7 is a critical element in maintaining a control valve's pressure integrity. If a designed minimum wall thickness is required for new control valves off the assembly line, why wouldn't it continue to be required for a reconditioned control valve?

Many individuals incorrectly perceive hydrotesting as the sole indication of control valve integrity. Upon reviewing ASME B16.34, one will find that hydrotesting is required, but it is an additional element in meeting design specifications in accordance with the B16.34 standard, specifically paragraph 6.1.7.

**Equivalency claims.** These are often made by third-party reconditioners and incorrectly advance industry perceptions that their reconditioned control valves are always equivalent to new control valve specifications. But there is evidence indicating otherwise.

A major OEM maintains an actual measurements database of used valve body wall thickness (valves obtained from the plant demolition market and/or end user bone-piles). It documents the number of such valves needing to be scrapped or requiring body wall restoration. Without access to manufacturer specifications, third parties may not identify such deficiencies.

Thus, some reconditioned valves, which could potentially require de-rating of their pressure/temperature capability, may unknowingly be installed in piping systems where the valve's pressure class rating is no longer compatible. Logic would indicate that an old used control valve body would need similar wall thickness as a new valve (less a portion of the OEM's corrosion allowance designed into the valve).

With the significant retirement and demolition of plant assets, a salvaged, reconditioned valve may already be 20 years old or more. Therefore, an end user should consider including control valve body wall thickness certification as an integral part of its MI program. Implementing this could increase plant safety and demonstrate ongoing plant compliance to regulatory standards. Operational reliability would also be improved.

The obvious solution for an MI program is to have reconditioned or repaired control valves individually certified. Specifically requiring the measurement, verification and certification of wall thickness would increase confidence that control valves continue to meet OEM specifications as originally designed to the ASME B16.34 standard.

This additional requirement could easily be incorporated into a plant's maintenance and turnaround specifications for repaired or reconditioned control valves. To accomplish this, an OEM or OEM-authorized facility can measure wall thicknesses with available nondestructive testing technology, and then compare the results to the latest revision of the OEM's casting drawings.

The ability to meet such a specification already exists today with most OEMs, with minor additional time needed for measurement and documentation via a certificate of conformance (COC). This is similar to the "fitness for service" evaluation process that is used when restoring and re-certifying a pressure vessel before application in a service for which the vessel's design cannot be confirmed.

**Why is MI important?** Loss of equipment integrity presents potential safety, property and environmental issues. OSHA PSM audit results have consistently demonstrated that MI is a PSM element receiving numerous citations at most facilities and in some cases has been the last PSM element to be fully addressed. Often the MI element of PSM has been difficult for many facilities to implement.<sup>5</sup>

In a recent case, the US Chemical Safety Board raised issues about a site's MI programs for equipment, where one incident involved a valve. Reviewing other OSHA citations reveals cases addressing MI for other equipment as well. Some citations were classified as "egregious willful violations" or as "willful violations." Each citation was accompanied by a significant fine.

Fine assessment should be considered but is usually expressed in purely financial terms, whereas, the potential impact from civil actions arising from a serious incident resulting in personal injury or death could potentially far exceed the investment required to meet regulatory standards.

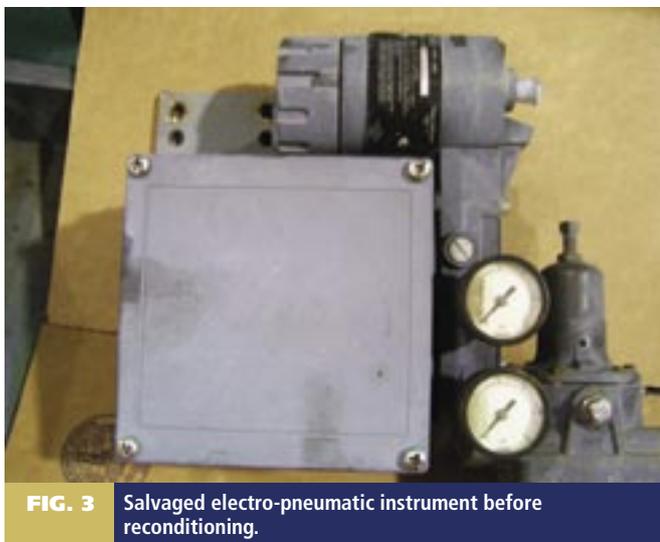
## HAZARDOUS (CLASSIFIED) LOCATIONS

Over the past several years, similar to the situation with reconditioned control valves, there has been an increasing number of reconditioned and new-surplus electronic instruments installed in process plant hazardous (classified) locations (Fig. 3).

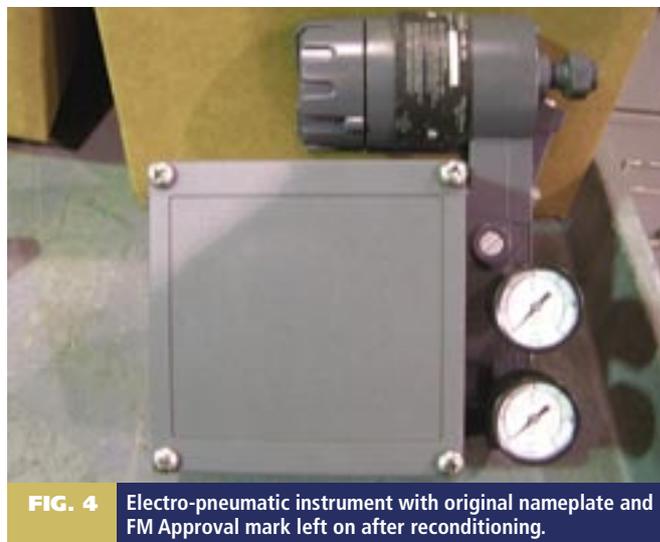
Reconditioned instruments are also usually repainted to look like new. Further, these instruments usually have the original manufacturer nameplate left on, or it is reattached following reconditioning work (Fig. 4). When done to an instrument having a nameplate with a nationally recognized testing laboratory (NRTL)-approved certification mark on it, and sold by a supplier or service provider whose facility is not NRTL-approved and audited, there is typically a misperception by both supplier and end user that the reconditioned instrument is still NRTL-approved.

In this situation, a major NRTL considers the instrument no longer compliant with the standards it originally certified the equipment to and thus would not be compliant to OSHA requirements for use in a hazardous (classified) location.

The end user bears responsibility, once in use, for an instrument's continued compliance with applicable codes and standards. It is critical that no "changes" have unknowingly been made to the equipment after it has left an NRTL-approved supplier and/or service-provider facility.<sup>6</sup>



**FIG. 3** Salvaged electro-pneumatic instrument before reconditioning.



**FIG. 4** Electro-pneumatic instrument with original nameplate and FM Approval mark left on after reconditioning.

**Regulatory background.** The NRTL program is part of OSHA's Directorate of Science, Technology and Medicine.<sup>7</sup> To meet NRTL product-approval requirements in 9 CFR Part 1910 Subpart S, OSHA only accepts equipment or products approved by one of its listed NRTLs. OSHA's Web pages can be accessed for information on each NRTL's scope of recognition at [www.OSHA.gov](http://www.OSHA.gov).

OSHA's NRTL program recognizes private sector organizations as NRTLs, and OSHA accreditation signifies that an organization has met the necessary qualifications specified in the program's regulations. The NRTL determines that specific equipment and materials ("products") meet consensus-based safety standards, providing assurance, required by OSHA, that these products are safe for use in the US workplace.

The hazardous locations standard, 29 CFR (OSHA) 1910.307, regulates using electrical equipment and wiring in hazardous (classified) locations. Classification depends on the properties of the flammable vapors, liquids or gases, or combustible dusts or fibers which may be present therein, and the likelihood that combustible concentrations or quantities are present.<sup>3</sup>

Pursuant to 29 CFR 1910.307(b): "Electrical installations: Equipment, wiring methods and installations of equipment in hazardous (classified) locations shall be either:"<sup>3</sup>

- "Intrinsically safe"
- "Approved for the hazardous location"
- "Safe for the hazardous location."

Using NRTL-approved instrumentation is the most common and efficient method for an employer to reliably demonstrate that electrical instrumentation used in hazardous (classified) locations meets 29 CFR 1910.307 requirements. As stated in 29 CFR 1910.307(b)(i): "Equipment shall be approved not only for the class of location but also for the ignitable or combustible properties of the specific gas, vapor, dust or fiber that will be present."<sup>3</sup> This corresponds with the first two bullets above. The NRTL must first perform the appropriate equipment testing and certification, audits and approves manufacturing and repair facilities, and then authorizes approved facilities to apply the NRTL's approval mark. Electrical classification is also included within the PSM standard<sup>1</sup> and RMP rule,<sup>2</sup> as noted in paragraphs 1910.119(d)(3)(i)(C) and 68.65(d)(1)(iii): "Electrical classification."

Published OSHA interpretations note that the employer must be able to demonstrate that the equipment will provide protection

from the hazards arising from the combustibility and flammability of vapors, liquids, gases, dusts or fibers. The National Electrical Code, NFPA 70, contains guidelines for determining the type and design of equipment and installations that will meet this requirement. One method for an employer to demonstrate that equipment used in hazardous (classified) locations meets OSHA requirements is to use equipment that is certified as intrinsically safe and approved for the hazardous (classified) location [29 CFR 1910.307(b)].<sup>8</sup>

**Distinguishing instrument compliance and non-compliance.** A purchaser may have an erroneous perception of whether a reconditioned or new-surplus instrument is still NRTL-approved (i.e., is still compliant to the standards which the NRTL certified it to, and free from "changes" unknowingly made to the equipment after it has left an NRTL-approved supplier and/or service-provider facility).

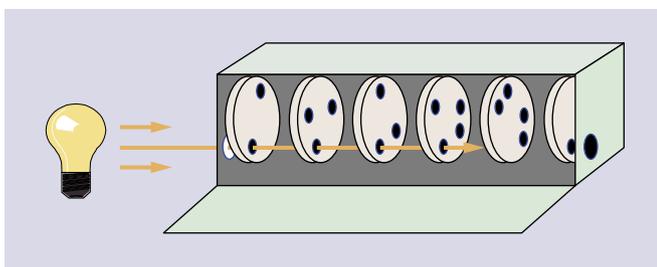
FM Approvals, LLC, an OSHA accredited third-party testing and certification company, recently communicated that such "change" can include equipment that is repaired, where repair also includes refurbished, remanufactured, reconditioned, salvaged and new surplus. It defines repair as "work performed to the unit that would bring it back to its original condition approved by FM Approvals," i.e., reconfirming product compliance with appropriate standards as FM Approvals originally certified it to.<sup>6</sup>

Earlier, FM Approvals had specifically communicated its position regarding reconditioned and new-surplus instruments that were originally approved for use in hazardous (classified) locations at the time of OEM manufacture:

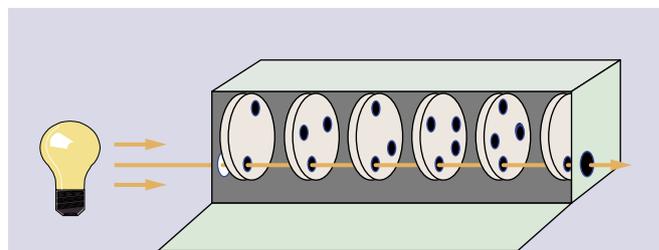
"It is FM Approvals' position that only the original manufacturer of the Approved product or an FM-Approved remanufacturer whose facilities are part of the FM Approvals follow-up audit program, can remanufacture a product and reissue the FM Approvals certification mark. Any suggestion, practice or inference to the contrary is wrong and must cease.

Further: "Any salvaged, remanufactured or new surplus electrical instrument cannot be labeled or relabeled as FM Approved for use in a classified hazardous location unless the refurbishing/new-surplus supplier entity is audited and approved by FM Approvals, LLC, for that specific type of instrument.

"Absent the above being met, the device can carry the



**FIG. 5** Layers of protection (discs) providing protection from an incident.



**FIG. 6** Layers of protection (discs) align in an abnormal situation leading to an incident.

FM Approvals certification ONLY if the product has been resubmitted and approval granted by FM Approvals. Failure to follow these guidelines will invalidate the FM Approvals certifications. In such instances the FM Approvals certification mark shall be permanently removed from the product (including the nameplate).<sup>9</sup>

As noted, the certification mark and nameplate should be removed unless the supplier/service-provider is an FM-approved facility, i.e., has been approved and audited by FM Approvals. For third-party and end-user facilities, such approval and auditing is to FM Class Standard 3606 for specific product brands and models.<sup>6</sup> The FM Approval mark is 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 that have been approved and audited (Fig. 4).<sup>6</sup>

*Safety and regulatory compliance may be jeopardized if end users cannot distinguish between compliant and potentially non-compliant devices.*<sup>6</sup> Thus, the recommendation that end users who have responsibility for continued compliance with applicable codes and standards need to fully qualify suppliers/service-providers.

Using a reconditioned or new-surplus instrument purchased from a nonqualified supplier would require a MOC for installation and use in a hazardous (classified) location. This is because product compliance would not be reconfirmed with the appropriate original certification standards. This raises a question about the probability that such a MOC process would be pursued for a noncompliant instrument. An alternate solution may be to have the process unit reclassified; however, this may or may not be possible.

One may question inclusion of new-surplus devices that were originally labeled with an FM Approved mark by the OEM. The issue is traceability since the typical origins of new-surplus instruments range from aged or obsolete unused inventory to instruments removed from units that may have been constructed but never started up. During the possible multiple transfers (resale) of new-surplus equipment, there is limited, if any, knowledge and traceability of problems a device may have encountered that would unknowingly result in a “change,” due to possible exposure to:

- Damage during prior installation and removal
- Overpowering during calibration and/or performance checks
- Inadequate repackaging or damage during repacking
- Inadequate storage conditions
- Any other hidden handling or shipping damage.

### Why is compliance vs. noncompliance important?

Currently, the presence of erroneously marked NRTL-approved

products in the marketplace is resulting in potentially significant numbers of noncompliant instruments being unknowingly installed annually into hazardous (classified) locations. The issue appears to be exacerbated by industry’s lack of awareness. As such, education, trade journal articles, published safety alerts and symposium presentations are increasingly important.

Noncompliant instruments are potential ignition sources creating additional potential exposure to safety risks and regulatory citations. Even though there is no confirmation that incidents have directly resulted from using noncompliant instruments, the combination of situations required to cause an incident could very well occur. In a recent investigation, OSHA issued citations for using nonapproved electrical equipment with each violation considered “willful” and accompanied by a fine. The aggregate penalties totaled several million dollars.

The risk of being a potential ignition source is one reason there are OSHA requirements for using electrical and electronic equipment in hazardous locations. An important reminder is that a simultaneous combination of events can create an incident even though never experienced before. At times, users cite their experience with salvaged instruments as having never given them a problem. However, safety experts typically concur that, as the number of installed nonapproved instruments increases, there is increased opportunity for such a combination of events occurring.

Industry is familiar with the “Swiss cheese” or “light and disc” models illustrating this, where appropriate instrument electrical classification is an element of protection. Situational risk can be shown by using discs with holes, representing layers of protection methods.<sup>10</sup> Any single disc (protection method) can keep the light source from penetrating through the entire box (Fig. 5). If all the holes in the discs become aligned, representing a combination of abnormal situations and failures occurring simultaneously, the light will shine through, representing an “incident” (Fig. 6).

Incident investigations have confirmed this situational concept, such as reports where prior startups had experienced similar abnormal situations and failures, but never the exact combination that resulted in an incident, until it finally occurred.

**Mitigating risk.** The potential safety and regulatory compliance risks associated with using reconditioned equipment include:

- Control valve LOC (pressure integrity)
- Noncompliant instrumentation used in hazardous (classified) locations (not NRTL-approved).

So what can chemical processors do to help mitigate these risks?

Vendor qualification and technical awareness are critical. All plant

personnel associated with the specification, purchase, inspection or repair of reconditioned and new-surplus equipment must be educated. Further, ever-changing organizational structure and personnel require continuous education, with ongoing emphasis at safety meetings. End-user issuance of specific corporate policy and guidance could be an effective method to appropriately emphasize and establish requirements for purchasing reconditioned equipment.

### Supplier and/or service-provider qualification requirements.

Implementation and strict enforcement of three critical supplier qualification requirements can increase confidence in meeting safety and regulatory requirements when purchasing reconditioned control valves and instrumentation, or new-surplus instrumentation. Further, appropriate documentation can be valuable in discussions with insurance carriers or trade and regulatory organization safety audits.

Presented are generalized guidelines end users can consider when evaluating reconditioned/new-surplus equipment suppliers and/or service-providers. Per prior definition, "reconditioned" includes salvaged, refurbished and remanufactured.

1. For reconditioned or new-surplus electrical/electronic instrumentation required to be compliant to OSHA 1910.307 per your plant's hazardous-area classifications require:

- Signed NRTL-authored documentation from supplier and/or service providers of reconditioned and new-surplus instrumentation to include:
  - a. Certification that a supplier and/or service provider facility is approved and audited by the NRTL for the specific brands and models
  - b. Scheduled dates for the NRTL's facility follow-up audits
  - c. Results and status pursuant to the follow-up audits.
- Written commitment from suppliers and/or service-providers whose facilities are NOT approved and audited by the NRTL for the specific brands and models, to remove any OEM nameplate containing an NRTL certification mark or at a minimum, completely remove the NRTL certification mark from the nameplate.
  - a. Commitment, in writing, to remove any OEM nameplate containing an NRTL certification mark or, at a minimum, completely remove the NRTL certification mark from the nameplate.

2. For better evidence of control valve pressure integrity addressing plant safety (preventing LOC), including PSM and RMP Rule regulatory requirements, require:

- Signed documentation from your supplier and/or service providers of reconditioned or repaired control valves to include:
  - a. Certification of their ability to fully conform to an OEM's original specifications as designed to ASME B16.34, specifically including conformance to design requirements for additional metal thickness, as referenced by paragraph 6.1.7.
  - b. COC documents for each control valve, upon request, certifying that a supplier's and/or service provider's reconditioned or repaired control valves meet all OEM specifications, with specific reference that body walls meet thickness specifications as designed to ASME B16.34 including paragraph 6.1.7.

3. For any supplier and/or service provider incapable of complying with any of the above, require:

- Notation of noncompliance on all correspondence, including:
  - a. Specification documents
  - b. Quotations submitted
  - c. Packing lists
  - d. Invoices.
- In this way, any anticipated application of noncompliant control valves or instrumentation should be readily visible.
  - a. Objective is to trigger the appropriate MOC evaluation before installing the equipment.

Beyond these first steps, some manufacturers, in collaboration with end users, have developed programs addressing these pressure-integrity and NRTL-approval issues without significantly impacting an end user's personnel requirements.

Resulting work processes typically involve initially assessing and identifying existing, potentially noncompliant devices, developing appropriate abatement processes and sustaining compliance awareness through training. The following guidelines are presented in general terms without detailing specific execution steps since this is often dependent upon site maintenance practices, equipment criticality and access, management appetite for risk, etc.

Work processes may include:

- Assessment and identification
  - a. Existence of potentially noncompliant instrumentation installed in hazardous (classified) locations
  - b. Existence of reconditioned control valves not having certified pressure integrity via body wall measurements.
- Abatement
  - a. Instrument recertification performed by an NRTL-approved and audited facility
  - b. Abatement executed via day-to-day or turnaround maintenance work processes
  - c. Control valve pressure integrity inspection and restoration (when required) that is compliant to all OEM specifications with individual control valve certification documentation via a COC.
- Sustaining
  - a. Implementing and enforcing vendor qualification requirements to better prevent introduction or re-introduction of noncompliant equipment
  - b. Initial and ongoing communication and training for all potential safety and regulatory compliance issues and site prevention policies
  - c. Communication and training to include employees having any degree of involvement in the engineering, specification, purchase or inspection of reconditioned or new-surplus control valves and instrumentation.

OEM facilities producing both new and remanufactured instruments are typically audited and approved by the major NRTLs. Also, OEMs typically have authorized service centers with the technology, training, work processes and access to intellectual property necessary to appropriately assess and certify reconditioned and repaired control valves' compliance to original OEM design specifications.

**Moving forward.** Over the past few years there have been an increasing number of potentially noncompliant reconditioned control valves and instrumentation, as well as non-compliant new-surplus instrumentation, being introduced

into the HPI. Depending on variables such as equipment age, repair history, application risk, etc., this reconditioned or new-surplus equipment may no longer be compliant with safety standards or to an OEM's original design specifications with respect to pressure-retaining capability or safe use in hazardous locations.

Industry awareness of the technical and/or safety compliance issues associated with this equipment should provide the impetus for the HPI to develop appropriate corporate policies and guidance directing inspection, engineering, operations, maintenance and procurement assessment of potential safety and regulatory issues.

Stringent supplier qualification can be a straightforward and efficient preventive solution. For suspect equipment that is already installed, identification and appropriate abatement processes may be needed. Such actions assist in creating a safe workplace and can demonstrate a proactive safety culture by reducing the probability of deficient reconditioned or new-surplus equipment being the focal point of a future, potentially significant incident. **HP**

#### LITERATURE CITED

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- <sup>2</sup> Code of Federal Regulations 40 CFR Part 68.73, *Chemical accident prevention provisions; mechanical integrity*, US Environmental Protection Agency.
- <sup>3</sup> Regulations (Standards – 29 CFR) – 1910.307, *Hazardous (classified) locations*, US Department of Labor, Occupational Safety and Health Administration.
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- <sup>7</sup> Directive # CPL 01-00-003 – CPL 1-0-3, *NRTL program policies, procedures and guidelines*, US Department of Labor, Occupational Safety & Health Administration.
- <sup>8</sup> OSHA Standard Interpretations: 9/21/05, *Use of explosion proof certified equipment inside of pipes and manholes*, US Department of Labor, Occupational Safety & Health Administration.
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#### AUTHOR'S NOTE

The views and opinions expressed herein are those of the author himself. The author is not speaking and does not purport to be speaking on behalf of any other company or organization.



**Robert (Bob) Baker** is the retired vice president of John H. Carter Co., Baton Rouge, Louisiana, and is currently a consultant to Emerson Process Management. He specializes in process safety management issues. Mr. Baker received his BS degree in aerospace engineering from Iowa State University in 1970. He gained process industry experience with Fisher Controls International, Rosemount, Inc., and John H. Carter Co. Prior to joining John H. Carter Co., his management responsibilities with Fisher Controls International included North American sales director, chemical industry business manager, power industry business manager and control valve product manager.

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