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Institutionalizing Your Facility's Inspection, Testing and Repair Deferral Program

Crucial elements of an effective deferral system and steps companies should take to increase transparency and accountability

Background

Many companies expended a significant amount of resources developing and implementing preventive maintenance and protection systems. These systems include both Physical Hardware (i.e. Safety Instrumented System (SIS), Burner Management System (BMS), etc.) and Program Management Systems (i.e. soft systems, inspection and testing programs, etc.). Nevertheless, despite this investment, losses continue to occur where the root cause can be attributed to a failure to properly maintain these systems. These protection systems will fail to protect as intended if not maintained. Furthermore post incident investigations often reveal that company leaders within some organizations may have been unaware these systems are out of service, defective or not in conformance with their own company policies. Typically, the real reason is a lack of discipline and accountability to maintain the systems once they have been installed or implemented. One major contributor to this problem is a weak or missing deferral program. An ineffective deferral program allows critical maintenance and/or inspection programs to be inappropriately postponed or perhaps not be completed at all. However, this can easily be corrected. In this bulletin we will discuss key characteristics and elements required to develop and implement an effective deferral program.

The need for a formal deferral program is so important that a number of organizations include it within some of their codes and standards, such as:

- API – American Petroleum Institute
- IEC – International Electrotechnical Commission
- ISA - International Society of Automation
- NFPA – National Fire Protection Association

Various Types and Purpose of the Inspection and Protection Systems

Most of the activities associated with the verification of the protection systems will fall into two basic categories:

1. Fixed equipment inspection activities (visual and Non-Destructive Testing -NDE)

2. Proof and verification testing activities associated with a protection system

The following is a list of commonly seen verification activities within the process industries (not an exhaustive list):

- Safety Instrumented System (SIS) – Function Testing
- Fixed Equipment Mechanical Integrity (FEMI) - Inspection
- Pressure Relief Device (PRD) Inspection and Testing
- Emergency Shut Down System and Interlock Testing
- Sight Glass Inspections
- Check Valve Testing
- Instrument Calibration

Key Characteristics and Elements of an Effective Deferral Program

An effective deferral program will have a variety of critical characteristics which will make it systematic and reproducible. This bulletin, details some generally accepted requirements for a comprehensive and effective program. (Note that elements are not listed in any order of priority).

- The deferral program should include predetermined situations for which a deferral will not be approved. These would include situations where it is obvious that the risk is well outside the company's safety risk criteria (i.e. vessel or piping

close to end of life with historical issues with localized corrosion in the circuit).

- The program should include a list of any Safety Critical Equipment (SCE) for which a deferral will not be approved. These assets can be identified through a structured qualitative analysis, which incorporates your company's internal safety risk criteria (risk matrix).
- The requester should demonstrate the deferral will not elevate the risk beyond Recognized and General Accepted Good Engineering Practice (RAGAGEP) levels of risk.
- There should be a formal procedure for auditing the inspection and testing program to ensure all inspections and testing have been completed per the program requirements. Deficiencies should only be approved by the appropriate authorized personnel through the formal deferral program.
- The program should ensure the deferral will not create a non-compliance issue with governmental or regulatory standards. Typically, a deferral should not be issued if the inspection requirement was issued by a governmental or regulatory agency. In some jurisdictions Local Authorities may have to approve the deferral.
- There should be a formal process for documenting the increase in risk when a deferral is issued and for categorizing each deferral so that higher-risk items become clearly visible and receive priority.
- The deferral evaluation team should be comprised of both stakeholders and individuals who are independent from the plant or process for which the deferral is being considered. The process should be systematic and reproducible. Possible stakeholders include: site manager and his staff, qualified inspectors, Process Equipment SME, Piping System SME, Materials SME, etc.
- Inspection and testing deferrals should be formally communicated to all stakeholders including operators and appropriate contract personnel when the risk exposure is elevated due to the deferral.
- The duration of the deferral extension should be determined based on the specific needs of the situation and not be arbitrary.
- Deferrals should be issued for a specific time period with a formal auditing function that verifies approved deferrals do not expire before the inspection or testing has been completed.
- A deferral should not change the inspection interval. Only corrosion rates and risk based inspection calculations should be used to change the actual inspection interval. For Safety Instrumented Systems (SIS), changing the test interval could violate the overall integrity of the SIS as an Independent Protection Layer (IPL).
- The processing of a deferral should be integrated with the Management of Change (MOC) process. The integration should also document any required operational changes, communications and training (i.e. Integrity Operating Window (IOW) changes, additional operator rounds, daily communications log, etc.).
- Additional mitigation should be considered to help reduce the risk during the deferral period. (i.e. increased on-line testing or inspection, additional NDE, alarm monitoring, training, reduced operating limits, etc.).
- There should be a special requirement for approving an extension of an existing deferral (i.e. a request to delay same inspection or test a second time should require approval by a corporate representative).
- The program should have requirements for various levels of approval based on the amount of increased risk.
- The site manager should be required to sign-off on deferrals related to critical assets and or safety critical equipment.
- There should be a requirement to formally investigate the root causes that created the need for a deferral and corrective

actions to prevent future deferrals of the same nature.

- There should be a standardized list of deferral related KPI's that are reviewed at the plant and corporate level on a monthly basis. (i.e. trending of number of deferrals, percent of approved verses unapproved deferrals, number of deferrals investigated, etc.). This information should be used to help manage inspection, testing, repair and preventive maintenance backlog.

- The deferral process should consider the history of the vessel, piping circuit or protection system during the evaluation. (i.e. – piping circuit with unpredictable localized corrosion, SIS with multiple test failures and no root cause identified, etc.)

- If available, the Integrity Operating Window (IOW) should be considered as part of the review. (i.e. – for a process circuit where the unit has experienced an excursion and there is no known inspection data history since the excursion, this would have a higher risk due to the unknown corrosion rate).

- The program needs a formal process for "*forward review*" of upcoming inspection dates to detect inspections that are coming due before the next available scheduled turn around so that a risk assessment can be performed and a deferral request completed before the due date. This needs to occur within the required time frame that would provide an opportunity to shut the process down in the event a deferral request is denied.

- The program should not allow for deferrals strictly based on the lack of resources to conduct the inspection or test.

- Typically, a Fitness for Service (FFS) study is required for any situation requesting a deferral of a FEMI repair.

- All approved deferrals should be entered into the Maintenance Management System (MMS) so that the deferred testing or inspection can be completed during unscheduled opportunity downtimes if possible. Care should be taken not to rush these activities.

Conclusion

A company's Inspection, Testing and Preventive Maintenance (ITPM) program is designed to detect asset integrity deficiencies. These deficiencies could cause the company to experience a large loss if not addressed before the asset fails. A company's deferral program is designed to manage situations when the inspection and testing cannot be performed according to the original plan and evaluate if the equipment can continue to operate safely. Every request for a deferral should be thoroughly evaluated to determine the increased risk imposed by continuing to operate without performing the planned inspection and testing. In summary, the management team should create a culture where requesting a deferral has a great deal of significance and does not become the normal mode of operations for the site. A facility can help prevent this from occurring by implementing some or all of the recommended practices discussed in this bulletin.

References:

API 510 Pressure Vessel Inspection Code: In-service Inspection, Rating, Repair, and Alteration, May 2014

API-570 Piping Inspection Code: In-service Inspection, Rating, Repair, and Alteration of Piping Systems - FOURTH EDITION, 2016

API RP 579-1/ASME FFS-1, Fitness for Service, SECOND EDITION, JUNE 5, 2007

API RP 584 Integrity Operating Windows, FIRST EDITION, May 2014

ISA-TR84.00.03-2012 - Mechanical Integrity of Safety Instrumented Systems (SIS)

For more Information

For further information, contact your local AIG Global Property insurance engineer. Questions can also be directed to Terry A. Waldrop at terry.waldrop@aig.com or Steve Benton at steve.benton@aig.com

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