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**By Mail and Email Delivery (sweatt.loren.e@dol.gov)**

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The American Petroleum Institute (API) has reviewed the Occupational Safety and Health Administration (OSHA) Request for Information (RFI) "The Control of Hazardous Energy (Lockout/Tagout)" published in the Federal Register on May 20, 2019 [84 FR 22756]. API is the only national trade association representing all facets of the oil and natural gas industry, which supports 10.3 million U.S. jobs and nearly 8 percent of the U.S. economy. API's more than 600 members include large integrated companies, as well as exploration and production, refining, marketing, pipeline, and marine businesses, and service and supply firms. API member companies provide most of the nation's energy and are backed by a growing grassroots movement of more than 40 million Americans.

API wishes to thank OSHA for the opportunity to present comments (see Annex A) in this early rulemaking phase. We kindly request that, at the completion of the RFI, OSHA make available its findings, either through a published report in the Federal Register or in a meeting with stakeholders. We encourage OSHA to take into account the LOTO needs that are unique to the oil and natural gas industry. When the standard was first promulgated in 1989, it was tailored to assembly line and mechanical work, not the oil and natural gas business. Therefore, API urges OSHA to consider developing a separate methodology that recognizes how the oil and natural gas industry works. At minimum, any modifications to the standard should be done so with our industry's unique needs in mind.

Our comments are focused on Control Circuit Type Devices and the current challenges they present as a means of energy isolation and control. Because the 1910.147 exempts oil and gas drilling and servicing (1910.147(a)(1)(ii)(E)), API's comments focus on the "downstream" industry -- petroleum refining.

API hopes that OSHA will find these comments and contributions helpful. Should you have any questions about the API comments, please contact me at 202/682-8176 or by

email at Chittim@api.org. Thank you for the opportunity to provide input on these important topics.

Sincerely,

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ANNEX A

# Comments of the American Petroleum Institute (API) on Docket No. OSHA-2016-0013 Request for Information on The Control of Hazardous Energy (Lockout/Tagout)

| Control Circuit Type Devices | |
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| 1. In what work processes should OSHA consider allowing the use of control circuit type devices for hazardous energy control? | API members do not not support a full transition to the use of control circuit type devices at this time. There are issues beyond the development of control circuit type device technologies that need to be addressed/resolved. For example, the control circuit needs to be physical, and the worker must be knowledgeable of the system. There must be a certainty that disabling the control circuit would prevent the associated piece of equipment from moving or becoming energized in some way. The associated piece of equipment must be at its lowest possible level of potential energy (i.e., if it moves up and down in the down position, or if it carries a load then unloaded, etc.). |
| 2. What are the limitations to using control circuit type devices? Do they have specific weaknesses or failure points that make them unsuitable for hazardous energy control? | Complex or highly hazardous systems may introduce more opportunity for human error or increase the consequences of those errors. For example, there may be confusion between a control circuit and an interlock, where a control circuit would disable the piece of equipment while an interlock may give the appearance of isolating the equipment but may be easily overridden or "jumpered out" in software, by "flagging" other sensors, or by installing simple physical jumper wires.<br><br>If the control circuit isolation equipment is properly designed, it could very well be safer. By simplifying the isolation of hazardous energy (IHE) process, there could be a reduction in human error opportunity.<br><br>Manual isolation that can be overridden by a control circuit is problematic. If those controls are remotely operated, that complicates the system. If there is positive isolation in the field but remote energization of the circuit is possible, then workers must have a clear understanding of how to isolate that system. Most workers are not currently trained on how to accomplish this. |

ANNEX A

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| 3. If OSHA were to allow the use of control circuit type devices or other methods to control hazardous energy, would your firm choose to use them? Why or why not? Do you anticipate that these devices would save your firm money? For example, would these devices simplify operations or maintenance? Are there fewer steps needed to implement the controls? How frequently do you employ some form of lockout/tagout system in your facility? | Currenty, the use of control circuit devices is not feasible as an alternative to traditional LOTO, and some systems would not support these devices at all. Prohibitive factors are reliability, cost, and current infrastructure. Additionally, this type of isolation would create, not resolve, operations and maintenance issues – at least in the beginning.<br><br>However, properly designed and approved control circuit isolation devices could be used if they were clearly identifiable, and personnel were properly trained on their use. If control circuit type devices were properly designed, they could save significant time or money in certain applications. Proper design would prioritize safety and the simplification of operations and maintenance. This could be the case for new installations where the equipment is designed with the control circuit incorporated. |
| 4. Are there any specific conditions under which the use of control circuit type devices would not be advisable? | Use of these types of devices would not be advisable in situations where workers are performing any intrusive work (e.g., touching circuits/wires and breaking containment). Further, if the control circuit isolation were not certain, if the control circuit were not designed or modified specifically for use in IHE, or if a risk assessment or hazard analysis of the system or work to be done determined that the consequences exceeded acceptable risk levels, then a typical IHE should be performed.<br><br>If the control type circuit devices are not listed in the energy control procedure, or are not manufactured in a way that facilitates locking them out, we would not support using them. Alternatively, if a second independent means of verification is incorporated in the design, there could be time savings. |
| 5. When the Lockout/Tagout standard was originally drafted, OSHA rejected the use of control circuit type devices for hazardous energy control due to concerns that the safety functions of these devices could fail as a result of component failure, program errors, magnetic field interference, electrical surges, or improper use or maintenance. Have new technological advances to control circuit type devices resolved these concerns? How so? | New technological advances to control circuit type devices have not yet resolved these specific concerns in the oil and natural gas industry. Workers will want/need to see physical isolations before conducting intrusive work. Manufacturers of control circuits would need to provide clear guidance on how to isolate and verify absence of energy.<br><br>The control circuit type device would need to be designed to withstand the listed potential failures. |

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| 6. Are there issues with physical feedback for control circuit type devices? | No response. |
| 7. What are the safety and health issues involving maintenance, installation, and use of control circuit type devices? Have you found that alternative safety measures themselves cause any new or unexpected hazards or safety problems? Please provide any examples if you have them. | There is always the risk of unintended consequences. There is no more risk in the installation or maintenance of a control circuit than any other job that goes on in an industrial environment.<br><br>One API member provided the following example to demonstrate the risks of unintended consequences:<br>Many years ago, at another company, an unknowledgeable worker used an EID to disable a piece of equipment. There was a deliberate attempt to operate the piece of equipment to demonstrate that it was isolated. Later in the day, someone replaced a proximity switch used in the control system for the larger process, specific to the operation of that piece of equipment. They asked a co-worker to "flag" the proximity switch to verify that it was functioning; when they did so, the equipment moved (a lot). It was later determined that the employee had operated the wrong EID, and the piece of equipment did not function due to a logical interlock in the control system. These types of human errors will still be present, possibly more so, if logical interlocks are included in control circuit interlocks. These systems will need to be properly designed, installed, and tested – just like EID's today. |
| 8. Do control circuit type devices address over-voltage or under-voltage conditions that may signal power-off, power-on, or false negatives on error checking? | API's members assume that properly designed control circuit type devices would address these areas. |
| 9. How do control circuit systems detect if a component of a control circuit device breaks, bends, or otherwise goes out of specification? How do the systems signal this to the exposed employee? Could these types of failures create a hazard while the system continues to signal that conditions are safe? | There must be a sensor that can detect the failure, and the circuit must be designed with some sort of notification feature, be it lights, horns, or other notification means. This is the case with any instrumented system. These types of hazards may be present regardless of changes to this standard and should be considered in a hazard analysis.<br><br>API members also recognize the potential for the sensor to fail, so a board operator would need to monitor the isolation, which leaves the potential for human error. |

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| 10. What level of redundancy is necessary in determining whether a control circuit type device could be used instead of an EID? | Redundancy needs should be determined in a hazard analysis when designing the system. One API member company suggested a level of redundancy, that is, 2-3 voting with automatic power disconnection, to ensure reliability of the system. API members use industry standards, such as ISA 84 or IEC 61511, for safety instrumented function reliability and safety which could potentially be adapted for the design of control circuit device to ensure an acceptable level of safety.<br><br>Redundency is necessary for safe operation. As mentioned above, a design standard should be developed/followed that certifies the level of safety which can be IEC 61511 or other. |
| 11. Lockout/tagout on EIDs ensures that machines will not restart while an employee is in a hazardous area. How do control circuit type devices similarly account for employees working in areas where they are exposed to hazardous machine energy? | Proper design and installation are the first considerations. When used, the isolated piece of equipment needs to be "tried out" to verify that it cannot be operated. There should be something in place to prevent other employees from defeating the control circuit isolation, such as a personal lock or personal password of some sort. Examples of possible appropriate preventions include a changing encryption key unique to each IHE or the requirement to activate the control circuit with an employee's "smart" badge or biometrics.<br><br>As in the example of Nucor Steel Connecticut Inc., the control circuit type device must have a keyed control, so the key can be captured, and the device can be deemed safe.<br><br>Redundancy of a disconnect is a positive safety need. To ensure redundancy, look for multiple ways to ensure a safe work condition. |
| 12. How do control circuit type devices permit an employee to maintain control over his/her own safety? | A control circuit type device would follow the same logic as an EID. A control circuit type device would need to be manufactured with a way to positively isolate it, such as a lock or a mechanical override with a lock. |
| 13. How do control circuit type devices permit employees to verify that energy has been controlled before beginning work in danger zones? How do the devices account for exposed employees before equipment is restarted? | As with traditional LOTO, zero energy checks would be necessary in this scenario. These situations must be considered in the design of the system, as they are in EIDs. This is a special circumstance that has been identified by the standard, such as testing equipment by temporarily energizing during the LOTO. |

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| | The associated equipment needs to be "tried out." Light curtains are used extensively in the oil and natural gas industry. The industry generally trusts these control circuit types of protective equipment to protect employees from becoming exposed.<br><br>The standard should be very specific on when and how this isolation should and should not be used. The transition to new technology would be similar to the period before LOTO technologies were in place when workers verified energy status with tags instead of locks. As with any transition to new technology, misuse must be prevented. |
| 14. Control circuit type devices have a number of claimed benefits compared to energy isolating devices, including workers' greater willingness to use such devices, better efficiency, less downtime, and the lack of a requirement to clear programming on computer controlled devices. Are there any other benefits to using control circuit type devices? Are there certain situations where these devices are especially advantageous? For example, where machine tasks require frequent repetitive access is the process faster and/or less physically demanding than applying mechanical lock(s)? | A properly designed system will allow for ease of use and consider maintenance and operational needs. The easier a system is to use, the more likely employees are to use it. By streamlining IHE, and building simple-to-use devices that can disable equipment quickly and safely, employees would be less likely to take other shortcuts in IHE. Well-intentioned employees have been known to bypass time-consuming, complex, or cumbersome processes to get their jobs done. This may be an opportunity to reduce the likelihood of that. |
| 15. What other methods or devices, if any, are being used with control circuit type devices to control the release of hazardous energy, especially in cases where the control circuit devices are only used to prevent machine start-up? Are there control circuit type devices that require additional methods or devices to fully control the release of hazardous energy? What improvements to safety or health does the use of these devices or methods provide? | Automated startup systems for large and complex facilities have been in use for decades. Caution should be used in fully automating systems so that employees do not lose the knowledge and skill needed to operate the systems in the event of a failure or emergencies. Automating certain sequences requires operators to follow startup and shutdown procedures. The more advanced the technology becomes, the more additional training will be required for workers. There must be readily available resources for that training and it must be completed prior to installation.<br><br>Some companies employ control circuit type devices as an additional precaution beyond physical isolation. |

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| 16. What are the unit costs for installing and using control circuit type devices or other alternative methods of hazardous energy control? Are the costs of installing and using control circuit type devices or other alternative methods of controlling hazardous energy dependent on the capacity or efficiency of the devices? If so, please include details on the effects of capacity on these unit costs including the capacity of any equipment you use in your facility. Are these devices generally integrated into newly purchased machinery, or are they purchased and installed separately? What steps need to be taken, and how long do those steps take, for these systems to be engaged in a manner that fully protects workers from the release of hazardous energy? | No response. |
| 17. What additional actions is your firm taking to protect workers when they are servicing machinery with control circuit type devices in order to meet OSHA's Lockout/Tagout standard requirements? For example, does your firm purchase and use physical devices that you feel do not enhance worker protections but nonetheless are required by the OSHA standard? What are these items and how much do they cost? Please explain why you feel these items do not enhance worker protections. | No response. |
| 18. The American National Standards Institute (ANSI), the International Organization for Standardization (ISO), and the International Electrotechnical Commission (IEC) all have standards that may be applicable to control | API member companies follow all applicable federal and state regulations as well as industry and corporate standards. ANSI standards development bodies are especially well-equipped to stay up-to-date with the industry as technology evolves. By basing regulations on industry standards, the continuous review of the standard allows the regulation to stay "evergreen" and allows the |

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| circuit type devices.12 Should OSHA consider adopting portions of any ANSI, ISO, or IEC standard that specifies requirements for control circuit devices as part of an updated OSHA standard? Are there recommendations in the consensus standards that you choose not to follow? If so, please explain why. Are there any requirements in these standards that would impose significant cost burdens if OSHA were to include those requirements in a revised Logout/Tagout standard? Are there provisions of one consensus standard when compared to the others that you perceive as having lower costs to implement and use on a day-to-day basis while providing protection to workers that is equal to or greater than that provided by the other standards? If so, please explain. | industry to work together with industry partners and government to set and maintain realistic expectations that evolve at the pace of the industry (not faster or slower).<br><br>Currently, workers in the oil and natural gas industry are not fully comfortable with the use of control circuit type devices as an alternative to traditional isolations, but industry views control circuit type devices as an opportunity for increased redundancy and an additional safeguard. |
| 19. ISO categorizes ‘‘the ability of safety-related parts of control systems to perform a safety function under foreseeable conditions’’ into one of five levels, called performance levels.13 These performance levels ‘‘are defined in terms of probability of dangerous failures per hour.’’ Should OSHA consider requiring a specific performance level in determining whether a control circuit type device could be a safe alternative to an EID? | API members are generally supportive of this direction. Members recommend OSHA also consider ISA 84 or IEC 61511 as additional resources for determining performance levels of safety instrumented systems. |
| 20. Can System Isolation Equipment, as discussed in the UL consensus standard UL6420 Standard for Equipment Used for System Isolation and Rated as a Single Unit, provide protection equal to that obtained through lockout/tagout? | API members generally are not familiar with this standard. Further, UL documents are often not included in oil and natural gas company standards subscriptions. It is likely that similar standards exist by ISA, IEC, or ISO. |

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| 21. The ANSI/ASSE Z244.1 consensus standard encourages the use of risk assessment and hazard control hierarchy as alternative methods of hazardous energy control. Should OSHA consider incorporating these methods in any new standard with respect to the use of control circuit type devices? | API members are not aligned on this issue. Generally, members view risk assessment and hazard control hierarchy as good approaches to managing functional safety, but some companies believe that they should be considered a safety precaution of "last resort." |
| 22. Do you currently utilize the services of a specialized safety engineer or employment safety administrator to test for competency and/or ensure that the hazardous energy control system is operational? If so, how many hours does this individual spend on these tasks? Do you anticipate you would need to make use of these services if OSHA revised the Lockout/Tagout requirements to align with the consensus standards? Based on data from the Bureau of Labor Statistics, OSHA estimates that an occupational health and safety specialist makes $33.14 an hour or $68,930 annually plus benefits. If you have used the services of such specialists, how does this compare with your experience? | One API member company provided cost estimates for specialized safety engineers that indicate that OSHA is underestimating the cost of such specialists. This company employs full-time contractor assessors at a rate of about $100/hour without benefits. |
| 23. How much training do you currently provide on Lockout/Tagout requirements? How long does training on this subject take and how often do employees receive training on the subject? If OSHA were to revise the Lockout/Tagout standard to permit use of control circuit type devices in some circumstances, would newly hired workers require more training or less than under the current standard? What format do you use to provide training on the Lockout/Tagout standard at your facility (i.e., small | Field employees of API member companies receive LOTO awareness and qualification-related training generally through the company's HES training and Operator Qualification programs. One company indicated that training frequencies for both programs include initial and 3-year refresher training.<br><br>Another company provided additional details:<br>Employees receive about 40 hours of training total with classroom and e-learning (8 hours classroom and 32 hours e-learning) to apply LOTO. The addition of control circuits would add much more training to this as the workers would need to know how to apply the new standards. Lockout/tagout subject matter experts (SMEs) deliver the |

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| group classroom session, self-guided computer modules, etc.)? If you have used third-party training vendors to provide similar training, what are the costs? If training is provided in-house, what sort of employee provides the training (i.e., a first-line supervisor, a safety and health specialist, etc.)? | classroom training. E-Learning training is already built and delivered globally through an online learning system.<br><br>Most companies require contractors to have training equal to or greater than their own employees. Most regional safety consortiums (e.g., Houston Area Safety Council) provide LOTO in their Basic Orientation Plus training and require more if LOTO is expected to be a regular/recurring task performed by an employee or contractor.<br><br>API members are not aware of any regional safety consortiums that provide specific guidance or training on control circuit type devices. They believe it would likely be difficult to do generic training since these types of devices are likely unique and specific for the make/model/application employed. |

Other notes –

1. On the use of robotics – there is support for robotic racking of switchgear and circuit breakers
2. OSHA should address the need to properly isolate the control circuit when maintenance is required on control circuits themselves.