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Regional Director

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Via email to psmcomments@lni.wa.gov

Ms. Tari Enos
Administrative Regulations Analyst
Washington State Department of Labor & Industries
P.O. Box 44620
Olympia, WA 98504

Re: Cost-Benefit Analysis that is required to support the Process Safety Management Amended Rulemaking (Chapter 296-67 WAC, Safety Standards for Process Safety Management of Highly Hazardous Chemicals)

Dear Ms. Enos:

The Western States Petroleum Association (WSPA) appreciates the opportunity to provide the Washington State Department of Labor & Industries (L&I) with comments on L&I's rulemaking to revise the Process Safety Management (PSM) requirements for petroleum refineries. WSPA is a non-profit trade association that represents companies that account for the bulk of petroleum exploration, production, refining, transportation and marketing in the five western states, including Washington.

This letter provides additional comments on how L&I can best meet its requirements under the Revised Code of Washington (RCW) Section 34.05.328 to provide an analysis of the costs and benefits of the potential revisions to the PSM regulations for petroleum refineries. Specifically, this letter follows up on our letter of December 31, 2018 on cost-benefit issues by providing additional comments on three topics that we raised in our earlier letter and indicated we would discuss further, including:

1. The provisions in the second discussion draft that we believe will require incremental actions of the Washington refineries and will entail compliance costs;
2. Examples of facility modifications that could result from PSM element recommendations; and
3. L&I must analyze less burdensome alternatives.

1. Provisions in the second discussion draft that will entail compliance costs

Most of the proposed provisions in the second discussion draft will require the Washington refineries to take incremental actions beyond what is required of them by currently applicable regulations, and in the cost portion of the analysis, L&I should estimate the costs of these additional actions attributable to each provision. L&I should estimate these costs comprehensively -- first identifying each regulatory provision that imposes costs, and then estimating for each provision all of the types of costs that will arise. Costs will be of two broad types:

- Costs to perform data gathering, investigations, analysis, discussion, consultation, review, planning, documentation and other procedural activities as required by new or expanded PSM elements (e.g., time and personnel resources to do assessment work); and
- Costs to implement the safety-enhancing measures that are developed pursuant to recommendations adopted as a result of the new or expanded PSM elements. These can involve people or equipment or both. These measures might range from additional training to revised operating, maintenance and inspection procedures to safety instrumentation and process controls to capital investments for inherently safer equipment. L&I should estimate the full life cycle costs for these types of measures that will be adopted pursuant to the new or expanded PSM elements, including both initial costs and ongoing costs for inspection, maintenance, audits, routine duties, refresher training, refurbishment as needed, etc. These costs can be very substantial.

There are so many provisions of the second discussion draft that will require incremental actions and impose incremental costs on the Washington refineries that we will not attempt to list them here. Instead, we believe there are three general categories of provisions that will impose costs, and we will discuss as examples one provision in each of the three categories and how these example provisions will impose costs that L&I should analyze. The three categories of provisions are:

- 1) *Provisions that require new PSM elements.* Costs will be incurred to implement new PSM program elements that were not previously required, such as hierarchy of hazard controls analyses (HCAs), damage mechanism reviews (DMR), safeguard protection analyses (SPAs), process safety culture assessments (PSCAs), and more.
- 2) *Provisions that change applicability definitions in a way that extends PSM program element requirements* to a larger number of refinery processes, equipment, materials, events, activities or incidents. When a definition is changed to make a requirement more broadly or frequently applicable, the costs to meet that requirement will increase.
- 3) *Provisions that expand an existing required PSM element*, either requiring it to be performed more frequently under more circumstances, and/or increasing the specific activities required to be included when performing it.

Our examples follow; one example in each of these three categories of provisions.

1) Provisions that require new PSM elements. Example: hierarchy of hazard controls analysis (HCA)

There is no requirement under current Washington law or regulations that HCA be included in a refinery's PSM program. In contrast, the second discussion draft includes provisions that would require performance of an HCA under each of five different circumstances:

- HCA required as a stand-alone analysis within five years for all existing processes, with subsequent update/revalidation at least every five years;
- HCA required for all recommendations made by a PHA team for each scenario that identifies the potential for a process safety incident;
- HCA required for all recommendations that result from the investigation of a process safety incident;
- HCA required as part of managing changes, whenever a major change is proposed; and
- HCA required during the design and review of new processes, new units and new facilities.

Performing an HCA requires a team of employees familiar with the technology, operations, controls, and hazards of a process, plus specialists or consultants experienced in the HCA methodology, often 3 - 5 individuals. The team will meet together for periods ranging typically from several hours to analyze a single recommendation or modification to several days for a standalone analysis of a process unit. Team members will also have responsibilities individually to assemble and prepare information for the team and then to document, keep records and follow up in various ways after the meeting or meetings. Recommendations that result in approved action items (with implementation costs, life cycle costs, etc.) can greatly increase the costs of a single HCA beyond those for the HCA proceeding itself. Thus the total cost of performing a single HCA can be substantial.

For the specific provision in the second discussion draft that would require HCA "as a stand-alone analysis for all existing processes"¹ (the first bullet in the above list of HCA triggers), the regulatory cost analysis might very roughly estimate costs for performing these HCAs as the cost to perform a single HCA multiplied by the total number of Washington refinery process units for which PHAs are required, increased as necessary to reflect the number of updates/revalidations

¹ As the experience in Northern California has shown and as WSPA has commented previously, HCAs for existing processes in which risks have already been identified and mitigated have shown little scope for reducing risk further. For existing processes, HCAs have proven to be time-consuming, but yield little to no benefit. And, we believe refinery employers should have the option to perform any required HCA efficiently as a part of a PHA rather than on a stand-alone basis.

projected within the time period for the analysis.² The five Washington refineries may each have dozens of processes requiring PHAs and HCAs.

The number of additional HCAs incrementally required by the other four circumstances listed above should also be estimated and their costs also attributed to the new HCA PSM element included in the second discussion draft. Note that the second discussion draft's new or revised definitions (as we will discuss in the next example) will very sharply increase the number of HCAs that would need to be done because more recommendations, changes and processes will trigger a requirement for conducting an HCA.

2) Provisions that change applicability definitions to expand PSM program element requirements to more processes, equipment, facility modifications, materials, incidents and other scenarios. Example: proposed change from "catastrophic release" to "process safety incident."

Costs will be incurred when PSM activities or analyses required by the existing regulation must be performed under a potential new regulation for a larger number of refinery processes, activities, materials or incidents. In this example, we refer to several requirements in the second discussion draft prescribing what refinery employers must do when they recognize that a scenario involving a covered process has the potential for a release of a hazardous material, and what they must do when they have had a release or an incident that could reasonably have resulted in a release of a hazardous material. We contrast these duties associated with "process safety incidents" with employers' duties under the current regulation associated with more narrowly defined and much more rarely occurring "catastrophic releases":

- Under the current regulation, employer duties are triggered when a release incident defined as a "catastrophic release of highly hazardous chemicals" has occurred or could have the potential to occur. A catastrophic release must involve one of the highly reactive chemicals listed in the PSM regulation appendix present in a quantity exceeding the specified minimums, and this chemical must be released in a "major uncontrolled" manner or cause fire or explosion "that presents serious danger to employees."
- In contrast, in the second discussion draft, a "process safety incident" is defined as one that involves any "hazardous chemical or material", defined further as any "substance possessing toxic, reactive, flammable or explosive qualities."³ Additionally, a process

² But process units vary widely in their complexity and the cost to perform an HCA for a unit will vary similarly. Also, the nature of the HCA recommendations will tend to vary across different types of process units. Instead of assuming a single typical cost for all HCAs, it might be appropriate to reflect these sources of variability and to estimate costs to meet the stand-alone HCA requirement that differ for different processes.

³ A further definition provided in the second discussion draft for "toxic" provides no clarification. It references a section of the Washington code that addresses toxicity, but provides no guidance about which substances present at or released from a refinery should be considered toxic -- and hence falling within the definition of "hazardous chemical or material" -- and which should not. This leaves us uncertain whether such events as the release of a small quantity of what is generally considered to be a toxic substance -- such as CO or PM_{2.5} air emissions or contaminated stormwater runoff or treated benzene wastewater -- fit within the definition of a process safety incident.

safety incident is defined as “a near miss, unplanned release, process equipment failure, or **other event** (emphasis added) within or affecting a process that could cause a fire, explosion or **release** (emphasis added) of a hazardous chemical or material.”

In our view, then, combining these portions of several definitions in the second discussion draft, a process safety incident appears to be defined so broadly as to include any “event” that results in a “release” of any quantity of a “toxic” material. To qualify as a “process safety incident”, it does not therefore appear that the event needs to be unplanned, nor does it need to be catastrophic, nor does it need to exceed any *de minimus* quantity, nor does it need to involve anything more than a substance that is “toxic”. An interpretation of this definition would thus include such releases as small fugitive hydrocarbon leaks from pipes, flanges and valves that are recognized and covered by leak detection and repair (LDAR) programs, the permitted emissions of CO, NO_x, PM_{2.5} and other “toxic” combustion products from refinery heaters, boilers and engines, and the likewise “toxic” permitted effluents from refinery wastewater treatment systems. This definition represents a very low threshold, not supported by threat to employees’ health or safety. If read in this manner, the potential change from “catastrophic release” to “process safety incident” in defining the events that trigger many refinery employer PSM duties would lead to an extremely large, probably several orders of magnitude, increase in the frequency with which such duties will need to be performed.⁴

The second discussion draft, in addition to greatly expanding the types and number of releases that must be addressed in the PSM program, will establish several new refinery employer responsibilities when a release event occurs or has the potential to occur. For example, as specified in the second discussion draft:

- If the refinery employer while conducting a PHA identifies a scenario with the potential for a “process safety incident”, the employer must perform a safeguard protection analysis.
- For any recommendations made by a PHA team for any scenario that identifies the potential for a process safety incident, the employer must conduct an HCA.
- When a process safety incident occurs or could reasonably have occurred, the employer must perform a root cause analysis while investigating the incident.
- For any recommendations that result from the investigation of a process safety incident, an HCA must be conducted.

While the effort and cost to perform these additional duties would be substantial if these new duties applied only for “catastrophic releases”, this burden will increase greatly if the duties apply instead for the much, much larger number of releases that would appear to fit within the second discussion draft’s extremely broad definition of “process safety incidents”. WSPA predicts that this will lead to a misallocation of refiners’ efforts to prevent potential incidents. By treating all incidents the same and by requiring large commitments of limited refinery staff

⁴ If such a broad interpretation is not intended by L&I, then the agency should clarify this in the next version of the potential new rule.

and dollars to PSM activities for lower risk events or releases that are already effectively managed in other ways (e.g., pursuant to air and water permits), the second discussion draft loses the PSM program's longstanding focus on preventing the high consequence or catastrophic events that could seriously threaten worker health and safety.

3) Provisions that expand an existing required PSM element. Example: management of change (MOC)

Existing regulations require refinery employers to include a management of change element in their PSM program. The second discussion draft would both expand the set of requirements comprising this management of change element (thus increasing the cost of each MOC) and increase the number of the changes that occur within a refinery to which the MOC requirements would apply. Costs should be estimated to reflect both of these impacts of a potential new regulation.

The provisions of the second discussion draft that will expand the MOC requirements include:

- Requirements to perform an HCA and to review or conduct a damage mechanism review (DMR) prior to implementing a *major* change, and to reflect the conclusions of these analyses in the MOC documentation. (These requirements could also be regarded as new requirements for HCAs and DMRs.)
- A requirement to expand the MOC documentation to address each of five topics that must be considered in the MOC proceedings: technical basis for the proposed change, potential process safety impacts, modifications to O&M procedures, timing, and authorization requirements.

The second discussion draft will also expand the set of changes at a refinery to which the MOC requirements would apply:

- The set of covered changes is expanded to include any *organizational* change that could affect a covered process. A new section is added to the regulation specifying requirements for managing organizational change.
- The second discussion draft extends the MOC requirements to apply to any change to a refinery activity that involves a "hazardous chemical or material." (Note the draft's expansive definition of "hazardous chemical or material.") The requirements would thus be extended well beyond the refinery processes currently covered by PSM.

In the cost portion of the cost-benefit analysis, L&I should estimate the additional costs for the Washington refineries to meet these incremental new requirements, including the requirements that:

1. Sharply increase the cost of MOC for "major changes";
2. Also increase the cost of MOC for changes that are not major; and

3. Apply new MOC requirements to organizational changes and to changes involving process units not presently covered under PSM.

Most MOC activities will be accomplished by workgroups in a manner similar to what we discussed earlier for HCA, and sometimes even larger workgroups are required.

2. Sample facility modifications that could result from PSM element recommendations

The second discussion draft will require the Washington refineries to perform studies such as DMRs, SPAs and HCAs, and the refineries' owners will then need to implement facility modifications in response to the recommendations resulting from these studies. In the cost portion of the analysis L&I should estimate the costs of these facility modifications attributable to each provision.⁵ L&I should estimate these costs comprehensively. Costs will be of two broad sorts, and can be very substantial in total:

- Costs to perform conceptual and detailed design, and to plan and perform field installation and construction. These costs may encompass work by multiple crafts, including both portions of the work requiring the facility to be shut-down (including lost production) and portions of the work that can be completed with the facility on-line. Costs should reflect oversight and support including field operations, engineering and management; and
- Other related costs and lifecycle costs to operate and maintain new or modified equipment installed pursuant to the recommendations resulting from the required studies. These include training; revised operating, maintenance and inspection procedures; modifications to control logic and monitoring systems; inspection; maintenance; audits; routine duties; refurbishment as needed, etc.

An example of a facility modification resulting from a study is the implementation of a new Safety Instrumented System (SIS) resulting from a SPA. SPA studies may result in recommendations that existing process safeguards should be modified to increase the independence or reliability of the safeguards. They may also result in recommendations that additional safeguards be installed to address lower risk scenarios that are currently managed by other means appropriate to the risk. The costs for design and implementation of a Safety Instrumented System may include:

- Analysis of the SIS by a SIS engineer that evaluates the independence of the initiating event to the safeguard;

⁵ Likewise in the benefits portion of the analysis, L&I should estimate the benefits that are likely to accrue from these facility modifications. Note that we believe in some instances that benefits will be minimal from some facility modifications. For example, with Inherently Safer Solutions, the initial design may already be safe and the recommended design from the analysis may be no safer and may be more costly if, for example, it has higher maintenance costs. Also, some potential facility modifications might have no impact on worker safety at all, like measures to reduce small VOC leaks following incident investigations if such leaks remain within the scope of "process safety incidents" as defined in the second discussion draft.

- Analysis by a SIS engineer of any other scenarios that may draw on the same SIS;
- Detailed engineering for the SIS, consulting with other subject matter experts (SMEs) as necessary considering the complexities and failure modes of the SIS and operations and maintenance implications;
- Detailed engineering by an engineer for pipe modifications for valve and sensing elements, such as new vessel connections, including associated stress analysis and support modifications;
- Time and expense for purchasing final control elements (such as a leak-tight high pressure shut-down valve), sensing and control loop equipment, an independent logic solver, pipe and supports;
- Time for employees to plan for construction work to be completed on-line and/or during a shut-down as applicable;
- Field work to prepare for the modification, including plant clean up, isolation, staging and other safety precautions;
- Field construction work including pipe modifications, valve installation, instrumentation and controls installation;
- Process control modifications to existing controls if necessary, and install and integrate SIS logic into existing systems such as control board operator interface and systems that monitor the health and demands on the SIS;
- Pre-start-up and ongoing testing of the SIS, including testing all logic and hardware elements;
- Pre-start-up review of the modification by a team;
- Development and implementation of ongoing operator and maintenance tasks associated with SIS; field inspection and maintenance of SIS including clean-up, isolation, field maintenance and parts;
- Modification of facility drawings and records, operator and maintenance manuals, and other materials or records.
- Additional operational staff to monitor and respond to potential alarms.

3. L&I must analyze less burdensome alternatives

L&I must meet the RCW 34.05.328 requirement to consider alternatives and choose the least burdensome way to achieve the program's goals and objectives. We believe that L&I should meet this requirement to consider alternatives and choose the least burdensome among them with respect both to the regulation as a whole and to its individual provisions. We note the Washington code's emphasis here on cost-effectiveness -- if an alternative exists either for the regulation as a whole or for an individual provision that reduces risks to worker safety and health and at less cost than what has been proposed, then that alternative should be chosen.

In our December 31, 2018 letter on cost-benefit analysis, we suggested a few regulatory alternatives for L&I's consideration that we believe might be more effective and less burdensome than the requirements of the second discussion draft. In the several other comment letters we have provided throughout the regulatory development process we have suggested many more improvements, changes and alternatives for your consideration. In our most recent, March 30, 2019 letter, we provided our overall feedback on the rulemaking effort to date and on the general directions for alternatives. We refer you to all of these materials as providing some less burdensome alternatives that L&I might choose among for analysis in the cost-benefit study.

Below is a list of alternatives that should be considered:

1. Enforcement:
 - a. Implement a State Emphasis Program for refineries if it can be shown that Washington State refiners perform worse than other high-hazard industries;
 - b. Implement a severe violator enforcement program (SVEP) for employers that demonstrate indifference to their WAC obligations by committing willful, repeated, or failure-to-abate violations;
2. Maintain existing definitions (i.e., risk thresholds) for:
 - a. highly hazardous material;
 - b. major change;
 - c. process safety incident;
 - d. covered process;
3. WSPA alternatives offered in previously submitted comments (some examples):
 - a. Incorporate human factors only into those PSM elements for which they are relevant;
 - b. Require root cause analyses only for major incidents;
 - c. Do not require HCA for existing process units;
4. Maintain the existing performance-based regulatory regime because refiners can demonstrate continuous improvement in their process safety performance under the WAC.

Conclusion

A good cost-benefit analysis will be critically important toward informing a protective, effective and less burdensome regulation. In this letter, we describe the types of costs that L&I must

consider in the analysis and we provide a few examples. We emphasize that the second discussion draft, if it were to be adopted and implemented, would result in many examples of increased costs of the types we describe, far more than these few examples we present in this letter.

Thank you for your consideration of WSPA's comments. We welcome any questions or comments you might have. Please contact me at (360) 352-4512 or by email at Jessica@wspa.org.

Sincerely,

A handwritten signature in blue ink, appearing to read "J. S. S.", is positioned below the word "Sincerely,".

cc: Tom Umenhofer, WSPA
Liz Smith, L&I,
Alan Lundeen, L&I