

Alternate Rules Path 1 Presentation

Operating Engineers Stakeholders
January 2021



Putting Public Safety First



Purpose

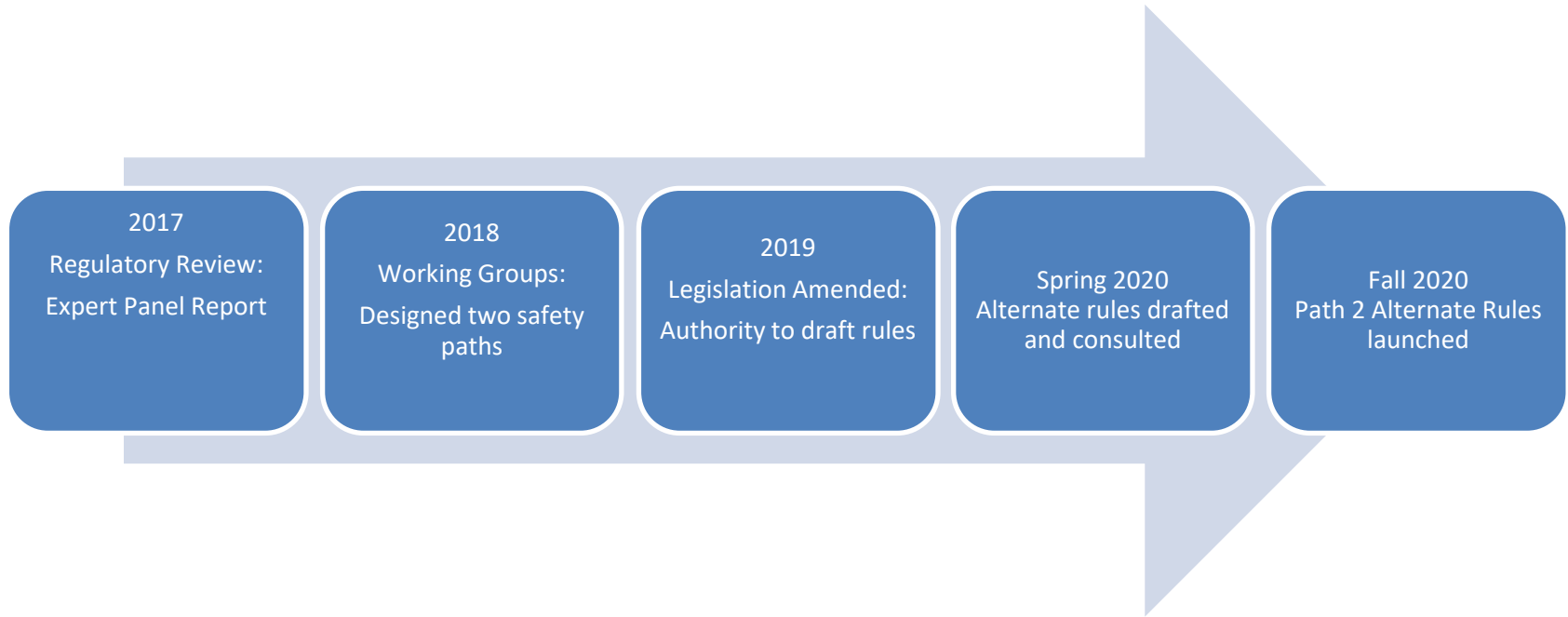
- To provide an update on Path 1 OE alternate rules prior to the Path 1 go-live date on February 22nd, 2021
- Addressing questions via Q&A

Alternate Rules Context & Overview

What are alternate rules

- Alternate rules exist in parallel to the regulation and offer different options for achieving compliance.
- A person or a business may choose to follow alternate rules, but only if permitted by the regulator.
- Pursuing a risk-based approach to plant safety
- The acceptance to follow alternate rules can be revoked by the regulator.

The steps taken to develop alternate rules



Alternate rules summary

The alternate rules are divided into 3 major parts

1. Alternate Rules for Path 1 & Path 2:
 - Application requirements
 - Opt-in & Opt-out process
 - Obligations for plant users under alternate rules
2. Alternate Rules for Certificate Holders:
 - Alternate “Table 8” (Practical operating experience and service time requirements) of O. Reg 219/01
3. Alternate Rules for Logbooks

[Web link to Alternate Rules](#)

Status Update on Alternate Rules (Path 2)

- Since the launch of Path 2 in October 2020, TSSA has received **1 application** for P2 alternate rules. The document is currently undergoing review.
- TSSA's Safety and Risk Officer will be offering additional layer of oversight for Path 2 RSMPs. She will be providing an update to the Minister (and the OE advisory council) after first 5 applications (& after 1 full year of implementation).
- TSSA will be providing a regular update to the OE advisory council on Path 2 applications and progress.

Understanding Path 1

- TSSA has been using an estimation of a plant's safety risk to determine appropriate staffing levels.
- Under the regulation, a plant's safety risk is estimated by using a plant's total power rating as the sole determinant of plant's safety risk.
- Path 1 recognizes the complexity of modern plants and calculates safety risks differently by considering multiple variables (incl. total power rating) to measure and estimate plant's safety risk. For example, P1 looks at:
 - **Type of technology** – Boilers, refrigeration, steam prime movers and compression
 - **Plant configuration** – design, operating environment and process parameters
 - **Plant occupancy and type of exposure**

Path 1 Development

- Path 1 has been informed by a report from Operating Engineers Risk Task Group (OE RTG) consisting of 15-member panel of industry participants
- OERTG was commissioned in March 2017 and the task group for Path 1 held over 200 hours of discussions from April 2017 to March 2018.
- The main topics of discussion included the following:
 - Hazard identification
 - Review of current plant rating
 - Review of ACI (Canadian Association of Chief Inspectors) & SOPEEC (Standardization of Power Engineer Examinations Committee) plant rating
 - Topical presentations from industry experts
 - Review of international practices, standards and databases
 - Development of modification factors and appropriate weights
 - Model formulation and testing
- The final report was delivered to Chief Officer on June 28, 2018

P1 Methodology

Path 1 Methodology Summarized

- The methodology and decision criteria are designed to be applicable to all plants in Ontario of varying size and complexity.
- At the heart of P1 methodology is the plant risk rating that is determined based on the levels of risk posed by a given plant and design configurations of the plant (e.g. occupancy, materials used, fuel type) that could impact risk from likelihood and consequence stand point.
- In addition to internationally accepted risk assessment methods, the methodology incorporates industry expert advice as well as ongoing standardization initiatives such as the ACI/SOPEEC standardization of plant staffing and plant rating initiative.
- The main formula used to calculate the risk is described as follows (*see notes of the PPT)

The equation defining the aggregate individual risk of the plant and the plant risk score is described as follows:

$$Risk_{plant} = \sum(F_{cce} * P_{fd(cce)}) * M_f \quad (1)$$

$$Plant\ Score\ (P_s) = -\log(Risk_{plant}) \quad (2)$$

Risk Rating & Staffing

- The path 1 task group report recommended that for plants whose risk rating is between 3 and 5, the regulator (TSSA) should consider rating and attendance requirements.
- The plant risk rating is calculated on a logarithmic scale. To account for this, TSSA will be segmenting the staffing categories with equal divisions in the risk rating:

| Class of OE | Plant rating range |
|-----------------|--------------------|
| 1 st | < 3 |
| 2 nd | 3 – 3.66 |
| 3 rd | 3.66 – 4.33 |
| 4 th | 4.33 – 5 |
| Unattended | > 5 |

Changes since 2018 report

- TSSA has been making small adjustments to the risk formula (esp. modifiers) recommended by the experts. The changes from 2018 are as follows:

| Parameter | Old Value | New Value | Reference from P1 report | Rationale |
|--|-----------|-----------|--------------------------|--|
| Frequency modifier for boiler systems: turbine failure | 5E-4 | 5E-3 | Appendix C (page 34) | Turbine is more than just a pressure vessel. Failure rate expected to be higher. |
| Frequency modifier for refrigeration systems: pump seal failure | 5E-5 | 1E-4 | Appendix D (page 35) | Reference document (HSE) gives two failure rates: 5E-5 and 5E-4. Adopt mean value. |
| Consequence modifier for Boilers: Fuel Type: Solid | 100 | 500 | Appendix F (page 37) | Hazard of solid fuel types underestimated. |
| Consequence modifier for Boilers: Guarded Controls: None | 10 | 50 | Appendix F (page 37) | Hazard of unguarded boilers underestimated. |
| Consequence modifier for Power Rating: Boiler (12,000 > KW < 30,000) | 0.7 | 1 | Appendix F (page 38) | Hazard of high power boilers slightly underestimated. |
| Consequence modifier for Power Rating: Boiler (> 30,000 KW) | 1 | 10 | Appendix F (page 38) | Hazard of high power boilers slightly underestimated. |

In addition to the existing parameters, there were two additional conditions added:

- If total boiler power across all boilers > 60,000 kW, then automatically 1st class/path 2
- If total number of pieces of equipment > 40, then minimum 4th class

P1

Application Process

Purpose

- Stakeholders have expressed an interest in seeing the front-to-end application process.
- Purpose of this section is to walk through the application experience.

Application review (compared to P2)

Path 1



Path 2



Application process (Admin Review)

- Plant users interested in P1 or P2 alternate rules must submit:
 - Application for Registration of a Plant (ARP)
 - Plant Equipment List (PEL)
 - Completed RSMP (P2 only)
- TSSA's intake agent first reviews the ARP form for completeness and update account information.
- TSSA's OE administrative staff then reviews and uploads the PEL document for completeness.
- The admin staff may reach out to the applicant for any missing information.

Application process (P1)

- After admin staff complete their check, the document is sent to TSSA's OE inspector for a physical validation of assets.
- For all new P1 applications, a this initial validation step is mandatory.
- Depending on the outcome of the inspection, P1 risk calculations may be updated.
- After inspections are complete, the inspector forwards the application and any observations to the Chief Officer.

Application process (Chief Officer's Decision)

- TSSA's chief officer (CO) reviews the application package (including applicable equipment list, risk rating, & recommendation from inspectors):
 - The CO may request additional information from operators
 - Any applicable restrictions, limitations or conditions are applied here
- Once the CO is satisfied with the review, an acceptance letter is created and sent to the applicant.

Application process (Acceptance)

- The applicant reviews TSSA's determinations and any applicable restrictions in the acceptance letter.
- The applicant then has to respond back to TSSA within a time window indicating the following:
 - Accept the CO's decision & pursue P1
 - Reject CO's decision & continue under the current regulation
- Alternatively, the applicant could re-apply under different path or re-apply after making alterations.

Path 1 Examples

Path 1 changes: 2nd class to 4th class

- Food process
- High pressure water tube low water volume power plant
- 3 x 3000 kW low volume gas boilers
- 1 Reciprocating compressor, 4 screw compressors, all with non-flammable/non-toxic working fluid, running at 100 – 800 HP
- 8 Refrigeration units, all indirect units with low HP
- All with guarded controls

Path 1 changes: 3rd class to unattended

- Food process
- Refrigeration plant
- 2 indirect refrigeration units with guarded controls, roughly 1800 lbs of refrigerant

Path 1 changes: 4th class to 1st class

- Secondary school
- Low pressure steam plant
- 3 x 1300 kW fire tube gas boilers
- 1 small compressor unit (exempt from regulation/low consequence)

- All with guarded controls

Path 1 changes: Unattended to 2nd class

- Petro/Chemical manufacturing
- Low pressure steam plant
- 2 x 1000 kW fire tube gas boilers
- 5 small screw compressor units

- All with guarded controls

P1 & P2 Regulatory Oversight

Purpose

- Purpose of this section is to explain the oversight practices for Path 1 plants

Alternate Rules Authorizations

- All alternate rules authorizations may have conditions. During the review stage, TSSA can impose conditions or restrictions based on our assessment.
- If TSSA discovers conditions are not being met, TSSA can suspend or revoke P1 and P2 status of a plant and revert the plant back to original requirements in the regulation.
- Furthermore, plant users on Path 1 who have misrepresented or made knowingly false disclosure of information to TSSA may be subject to enforcement actions

P1 & P2 Plant Oversight

- OE plants under all three paths (default, P1 & P2) will be placed under risk-based scheduling for TSSA inspections
- The inspections for P1 or P0 (i.e. no alternate rules) will be more or less identical
 - For P1 plants, it is worth noting that revocation of P1 acceptance is a possibility if TSSA observes serious safety issues during inspections.

Discussion

**if you prefer to send a text question feel free to type in the chat
or send email to jban@tssa.org**