



# Short Interval Solution 2024 Development Roadmap

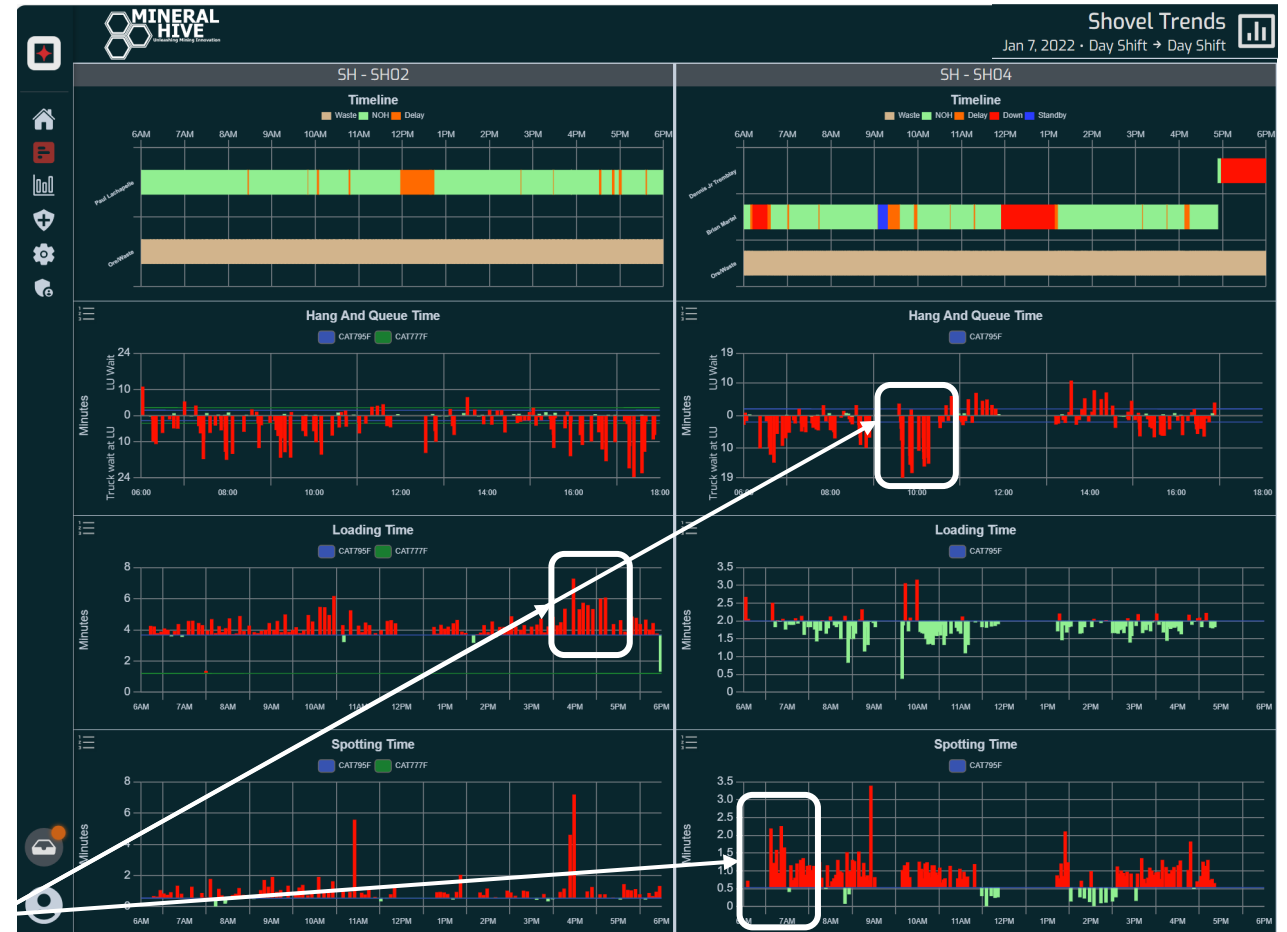
June 7th, 2024

# Short Interval TARP Functionality

# Current-State Short-Interval Management

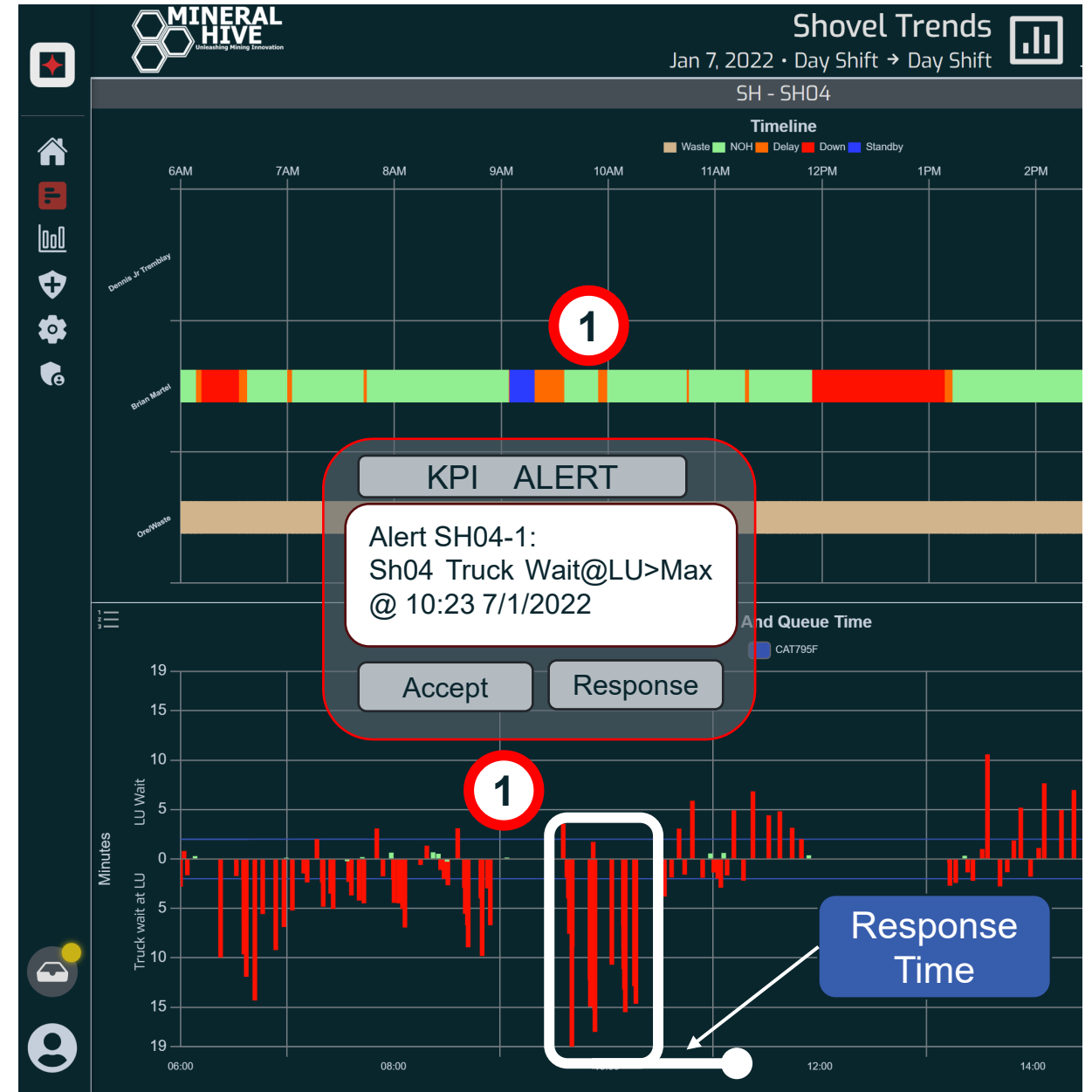
- The existing Outliers trend pages allow for real-time, granular monitoring of loss events for short-interval recognition
- Quick identification of these loss events allows for immediate intervention, addressing issues at short interval and minimizing losses
- Near-term development roadmap includes **push notification** to alert dispatchers and supervisors of production loss events
- Production-loss andon will be deployed as a part of Outliers Short Interval solution by the **end of 2024**

Production  
Loss  
events.



# Production-Loss Andon

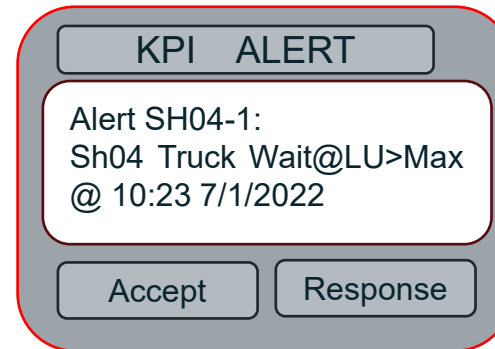
- These notifications will log alert the user to loss events and require **acceptance and response** from the accountable user
- By flagging these events and requiring acknowledgement, it will ensure loss events are recognized quickly and actioned during the shift and no major loss events are missed
- Logging the resulting intervention response, including response time, will reinforce accountability and generate insight into repeat scenarios.
- Historical records will provide traceability and ability to analyze crew performance
- Consistent, timely application of the correct trigger-action response will reduce the duration of production losses, improving mining fleet performance



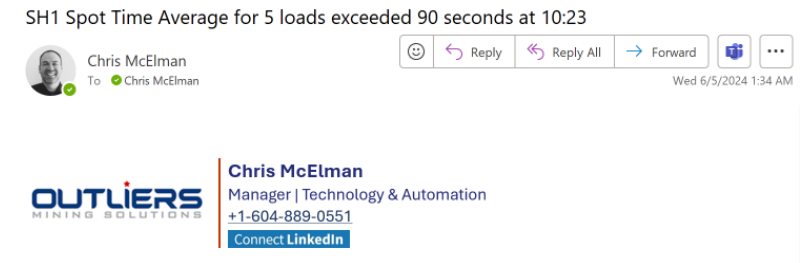
# Andon Notification & Escalation

- Notifications occur first in-app, where they must be acknowledged and a response logged
- Escalation notifications can be configured based on triggers for non-response or severity of loss-event
  - Email notification
  - MS Teams notification
  - Other notifications based on available APIs
- Escalation trigger, communication method and distribution list are configurable and owned by the site
- All loss-events and responses are logged for end-of-shift reporting

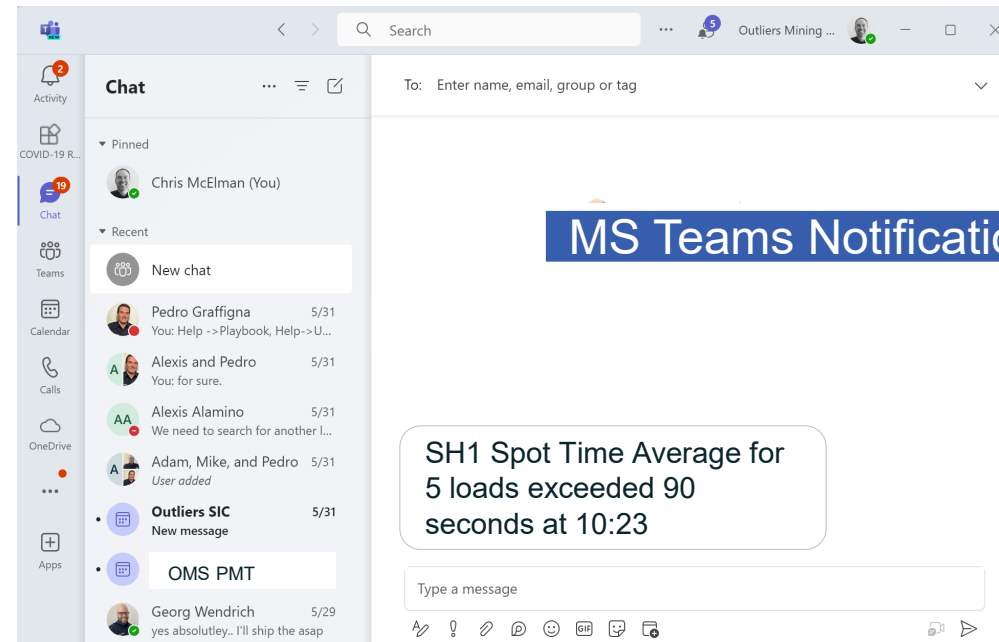
## In-App Notification



## Email Notification

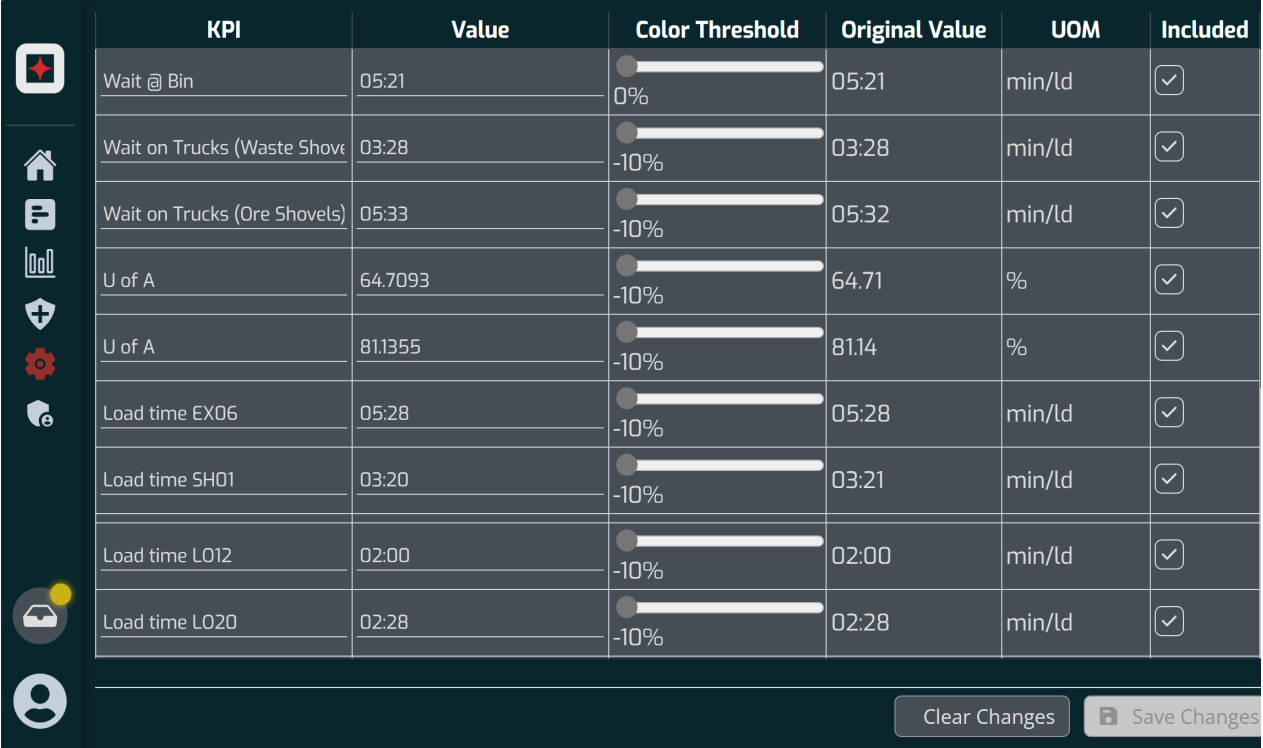


## MS Teams Notification



# Configurable KPI Alarm Target Framework

- Andon response configuration can be fully owned by the site
- Trigger Conditions
  - KPI tracked
  - KPI threshold and duration required for alarm trigger
  - Alert & escalation process
  - Users & distribution lists
- This allows each site to ensure alarms are appropriate and don't become 'noise' that is ignored



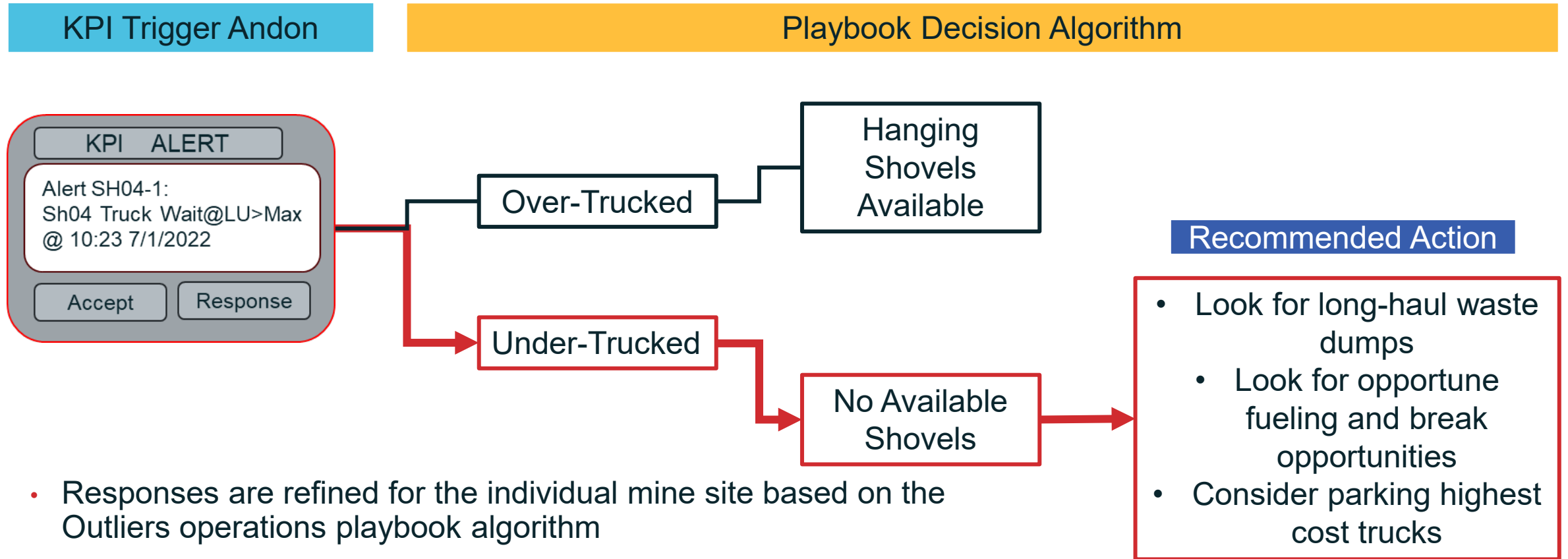
KPI	Value	Color Threshold	Original Value	UOM	Included
Wait @ Bin	05:21	0%	05:21	min/Ld	<input checked="" type="checkbox"/>
Wait on Trucks (Waste Shovel)	03:28	-10%	03:28	min/Ld	<input checked="" type="checkbox"/>
Wait on Trucks (Ore Shovels)	05:33	-10%	05:32	min/Ld	<input checked="" type="checkbox"/>
U of A	64.7093	-10%	64.71	%	<input checked="" type="checkbox"/>
U of A	81.1355	-10%	81.14	%	<input checked="" type="checkbox"/>
Load time EX06	05:28	-10%	05:28	min/Ld	<input checked="" type="checkbox"/>
Load time SH01	03:20	-10%	03:21	min/Ld	<input checked="" type="checkbox"/>
Load time L012	02:00	-10%	02:00	min/Ld	<input checked="" type="checkbox"/>
Load time L020	02:28	-10%	02:28	min/Ld	<input checked="" type="checkbox"/>

# Alarm/Response Tracked & Reported

Alarm Tag	Alarm Detail	Trigger Start Time	Trigger End Time	Duration	Impact to Tonnes	Response	Response Time
SH04-Wait@LU	SH04 Wait@LU > 5:00 for 5 Truck Cycles	10:23 7/1/2022	11:13 7/1/2022	53:01	-1295 tonnes	John Doe: Re-allocated trucks to Shovel 6	9 minutes
SH02- Payload	SH02 793 Payload <95% for 20 Minutes	11:59 7/1/2022	12:05 7/1/2022	06:01	-12 Tonnes	John Doe: Radio to SH02 Operator	2 minutes
SH02 - Shovel Hang	SH02 Shovel Hanging for >15 Minutes	13:41 7/1/2022	15:17 7/1/2022	1:36:01	-4855 Tonnes	John Doe: No trucks available	5 minutes

- All alarm trigger and response events are captured and logged
- Automatically generate end-of-shift handover reports
- Effective tool for feedback and coaching on the correct response based on the operating scenario

# Integration of Playbook Algorithm to Suggest Best Response



- Responses are refined for the individual mine site based on the Outliers operations playbook algorithm
- Prompts provide recommendations to ensure consistent response steps between dispatchers and supervisors across multiple crews.



# Short Interval Control Solution

## Summary & Key Differentiators

- Fit-for-purpose solution was designed for short-interval management at mining operations
- Proven solution has been deployed at over 15 operating sites worldwide
- Proprietary ETL that normalized data from all major FMS systems (MineStar, Wenco, Modular, Hexagon & MS4M)
- Real-time *quantification* of production gains & losses based on KPI performance
- Outliers Mine Operations playbook algorithm to inform trigger-response actions
- Short software deployment time – typically 1 week per site
- Training and implementation by experience mine operations professionals- essential to deliver value from short interval control solution.
- Ability to integrate solution with PI or other data sources to integrate upstream or downstream processes into SIC solution (e.g. Crusher/Mill data)

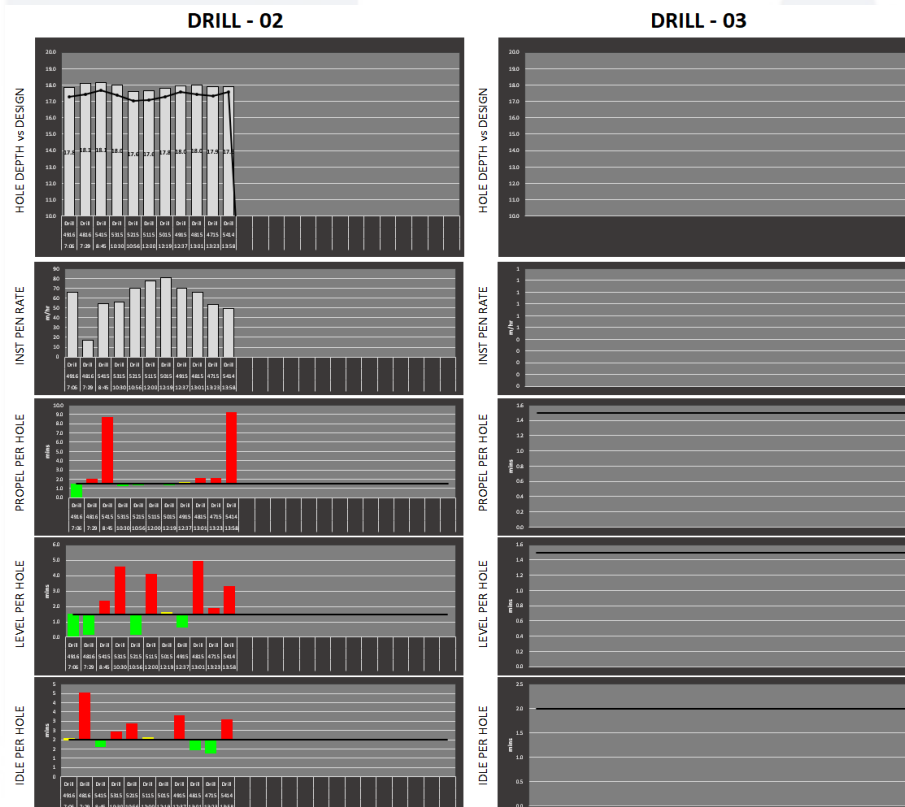
# Drill Short Interval Control Tool

# Drill SIC - Content

## SIC Dashboard

KPI	All		86%	D-02		86%
	TARGET	ACTUAL	+/-meters	TARGET	ACTUAL	+/-meters
METERS	232	200	-38	232	200	-38
USE of AVAILABLE (%)	87.4%	28.5%	-47	87.3%	70.2%	-47
PEN RATE (m/hr)	26.8	28.7		34.7	37.3	
HOLE DEPTH (m)	17.4	17.9		17.4	17.9	
DRILLING (mins)	25.0	21.3	26	25.0	21.3	26
IDLE (mins)	2.0	2.5	-4	2.0	2.5	-4
STEEL (mins)	0.0	0.0	0.0	0.0	0.0	0.0
LEVEL (mins)	1.5	2.2	-5	1.5	2.2	-5
PROPEL (mins)	1.5	2.8	-9	1.5	2.8	-9
UNDER DRILL (m)	0.10	0.00		0.10	0.00	
OVER DRILL (m)	0.30	0.53	-3	0.30	0.53	-3
% RE-DRILL	2%		4	2%		4
START DRILLING	7:10	7:06		7:10	7:06	
END DRILLING	17:50	14:20		17:50	14:20	
TOP DELAYS (mins)						

## SIC Trends Tables



- Outliers has developed several Drill SIC tools for clients in the past in older platforms.
- The Drill SIC content will be integrated into Outliers' performance management toolkit for haulage.
- The Drill SIC dashboard will include all production and time tracking data as well as impact of each element on total meters drilled for the shift.
- 2 deployments planned for August 2024