Incident Summary #II-1875297-2025 (#56698) (FINAL)

SUPPORTING INFORMATION	Incident Date		February 27, 2025
	Location		Prince George
	Regulated industry sector		Gas - Natural gas system
	Impact – Injury	Qty injuries	0
		Injury description	N/A
		Injury rating	None
	Impact – Damage	Damage description	Three out of four lower burner wind boxes were fire damaged, requiring partial replacement.
		Damage rating	Moderate
	Incident rating		Moderate
	Incident overview		Three out of four hearth burner wind boxes on a recovery boiler were damaged by fire. The natural gas fired hearth burners were operated in a retracted position within their respective wind boxes. Two wind box casings had holes burnt through them and a third sustained minor fire damage.
INVESTIGATION CONCLUSIONS	Site, system and components		The industrial facility utilizes the Kraft pulp manufacturing process featuring a recovery boiler, and a high-pressure steam boiler that generates heat through black liquor combustion. The boiler's furnace produces smelt by fusing inorganic compounds from the black liquor, primarily sodium carbonate and sodium sulfide. To support operations, natural gas-fired hearth burners are installed in opposing pairs on the lower furnace walls above the char bed, providing supplemental heat for start-up, bed stabilization, and process upsets. These burners operate on a slide rail system, inserting fully into the furnace during operation and retracting into protective wind boxes when inactive to prevent smelt contamination. A written operating procedure outlines the burner light-up procedure. A critical safety feature requires full burner insertion to engage a mechanical limit switch before permitting ignition, effectively preventing operation in the retracted position. The burners are subject to draft conditions from the primary boiler induced draft (ID) fan and manually adjusted secondary air dampers. Operators manually insert and retract the burners as needed and initiate starting and stopping of automatically fired burner via a local control panel. Operators normally need to adjust primary and/or secondary air flow to light the burner pilot. The local control panel provides a visual display indicating a series of green lights when all interlocks are correct, and the start button may be activated.

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Failure scenario(s)	High draft turbulence at the inserted burners made lighting the pilot flame difficult. To reduce air turbulence and achieve a stable pilot flame, Operators used metal clamps/shims to override the insertion limit switches, allowing burners to operate while partially or fully retracted. With the insert limit bypassed the main burner could be fired in the retracted position if an operator neglected to re-insert the burner. The operator assumed the burners were functioning correctly based on panel lights rather than verifying physical insertion. Three hearth burners were not fully inserted during ignition, leaving flames concentrated in the wind box instead of the furnace.
Facts and evidence	Metal shims and lockout scissors were found inserted in limit switches shortly after the incident. Fire damage patterns showed scorching/warping inside the wind box. Operator testimonials reported: • Turbulent airflow in wind box made ignition difficult; retraction was a "necessary workaround." Operators reduce airflow by closing dampers, but the ID fan cannot be lowered enough without tripping. • A standard operating procedure for starting the burners was in place but operators did not adhere to it due to difficulties lighting the burners. Some operators had not received refresher training in years. • Peer to peer mentoring was the primary form of training and included bypassing the limits. "*Everyone did this for years—we just wanted to keep running".* • On the day of the incident, the operator stated that he relied on the panel's green lights indicating proper burner function. He did not visually verify the physical insertion of the burners, assuming the system was functioning correctly.
Causes and contributing factors	The incident occurred when flames impinged on the wind boxes, leading to fire damage. Contributing factors to the incident include: • The burners were left in a partially retracted position with limit switches overridden, allowing gas to flow while the burners were not fully deployed. • Inadequate operator training. • Procedural gaps and cultural normalization of bypassing safety limits.

Image 1 - Flames exiting hearth burner wind box through melted hole.

Image 2 – Melted hole in hearth burner wind box.

Image 3 – Shims used to bypass the safety limit switches.

Image 4 – Shims removed from limit switches.

Image 5 – Limit switch without shims.

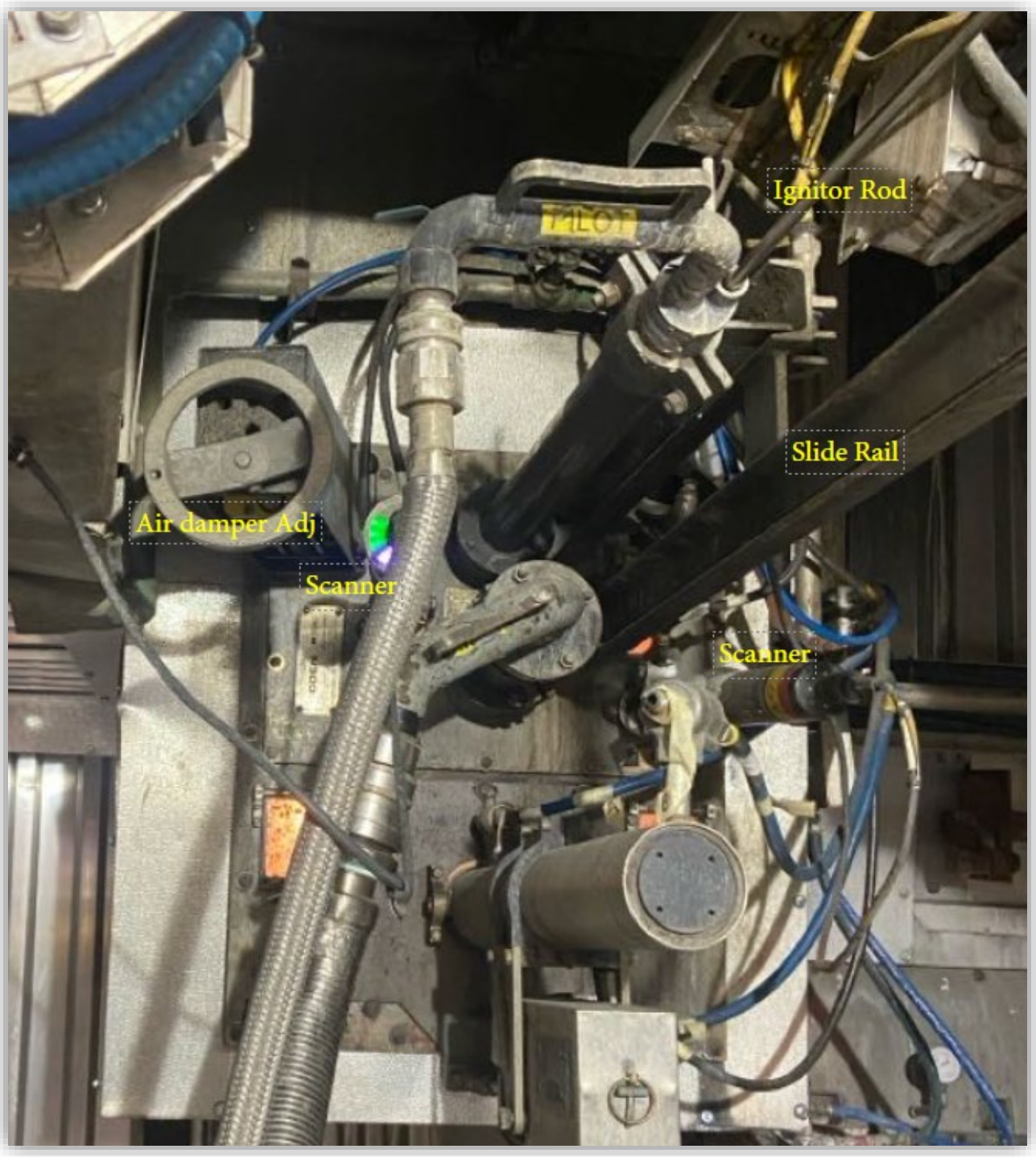

Image 6 – Burner assembly.

Image 7 – Burner and port rodder.