Evaluation of Nitrogen Systems for Fire Suppression in Northern British Columbia Wood Pellet Plants

WPAC's Safety Commitee

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WOOD PELLET
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Background

- After multiple severe fire incidents in Northern BC wood pellet plants, and long delivery time for Nitrogen, WorkSafeBC met with WPAC safety committee and evaluation of a Nitrogen suppression system became a priority.
- Access to large amount of nitrogen may take days should a silo smoldering/fire occur in some areas.
- The closest nitrogen storage for wood pellet plants located in northern BC is 10-15 hours away, in Edmonton and thus it may take hours to receive nitrogen. Or it might also be in use at the time it is requested and thus it may take days to get access to sufficient nitrogen.
- The needs for quick access and application of nitrogen for wood pellet storages in a silo fire emergency was discussed and evaluated with four vendors. The discussion included identifying the required flowrate and infrastructure needed on-site for each option, evaluating mobile nitrogen vaporizer units as well as on-site nitrogen generation units through separation from air.

Evaluated System Alternatives

	Atlas Copco	Compressed Gas Technologies	Linde Group	Praxair
Technology/ Equipment Used	Membrane and Pressure Swing Adsorption (separation of N_2 from air on site)	pressure swing adsorption (PSA) (separation of N_2 from air on site)	pressure swing adsorption (PSA) (separation of N_2 from air on site)	liquid N_2 pressure tank, vaporizer and steam bath vaporizer
Price	In the range of 1 million dollar (exact quote not received yet)	$750,000 USD per plant	In the range of 1 million dollar (exact quote not received yet)	$850,000 CAD Option #1 – Purchase (~$8,765/month) Option #2 – Long term lease (~$7,265/month for minimum 180-month lease)
Advantages	On site N_2 generation and thus no need for liquid N_2 storage	On site N_2 generation and thus no need for liquid N_2 storage	On site N_2 generation and thus no need for liquid N_2 storage	Can be shared between several plants
Disadvantages	Need to be set up at every plant, should be installed indoors	Need to be set up at every plant, should be installed indoors	Need to be set up at every plant	Continuously need N_2 refill, Third party needed to drive the trailer, continuous maintenance is needed
Mobile Unit?	No	No	No	Yes

Recommended Next Steps

- After evaluation of possible nitrogen systems and technologies available, due to very high cost of all three PSA systems and the need to set it up for each plant, the only viable economic option is the one offered by Praxair. The mobile nitrogen system can be shared between multiple plants to be used in fire incidents.
- The practical details for the proposed solution needs to be worked out including a location (parking spot) for the trailer, hauler with certifications needed to drive the trailer, operation training and maintenance, necessary fittings in the plant to hook up the nitrogen system, identify cost of maintenance and other associated monthly costs
- Identify all costs associated with operation of the unit in case of any fire incident
- Identify which plants want to contribute to it and how the cost share formula looks like
- Identify and evaluate any source of external funding if any