Deliberate Risk Analysis – AFI Q400 AT Hot Loading

Task:	Change Management: Conduct a risk analysis of loading retardant onto a Q400 airtanker while one engine is still running on the airtanker opposite of the retardant loading side ("hot loading"). Our primary objective is to identify the potential hazards and risks associated with this type of operation for the Q400 AT, as well as how those risks will be mitigated. The "hot loading" of retardant may help facilitate delivering retardant to the fire incident in a safe and timely manner, thus reducing costs and enhancing fire crew safety.
Health hazards:	Static electricity generated when fluids are loaded onto the aircraft may lead to shock and/or possible fire or explosion. Retardant spill may come into contact with bare skin or clothing which could lead to adverse skin reaction. Potential for increased fatigue of the flight crew with fewer opportunities to be out of the cockpit during "hot loading."
Safety Hazards:	Loading retardant onto a Q400 airtanker while one engine is still running on the opposite side of the retardant loading side may present safety hazards associated with ramp congestion, communication and coordination challenges, and fatigue of flight crew. The severity factor for "hot loading" retardant on the Q400 is assessed as moderate. The probability factor, however, should remain remote/low, provided we adhere to the conditions and provisions of our risk mitigation plan.
Risk Assessment:	Probability: 2 Remote (possible, but unlikely) Severity: B Moderate (deviation from standard practice) Risk Factor: 2B Tolerable (Acceptable based on risk mitigation. It will require Captain/PIC decision on whether to pursue based on myriad factors)
Risk Control:	Upon determining at a Captain (PIC) level that appropriate risk mitigation measures and engineering controls are in place, the "hot loading" of Q400 may proceed. This will require planning and coordination with ground support team to conduct safely and effectively. *Risk acceptance is required at the Captain/PIC level* after considering multitude of factors.
Risk:	The "hot loading" of retardant onto airtankers has been a fairly common practice for the last two decades. The procedure of hot loading the Q400 involves loading retardant onto the airtanker on the side opposite of the engine that is running. The risks include potential for: increased ramp congestion, increased communication and coordination challenges, increased crew fatigue, increased need for proper choreography of ground parties and requirement for delineation of duties to account for dynamic nature of the operation. The Q400 can have retardant loaded on either side of the aircraft, so parking placement and orientation will dictate which engine needs to be shutdown to safely accommodate hot loading procedure. Additionally, the retardant loading valve cam-lock levers that protrude external to the body of the aircraft need to be properly secured to prevent inadvertent opening in flight. Lastly, loaders must be cognizant of the landing gear doors as they may create an overhead contact hazard when transiting through the area.

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Mitigation:

The airtanker should be shut down for the first loading at an airtanker base from which this airtanker has not previously operated in the current season. At the discretion of the Base Manager, airtankers may be required to shut down to train personnel unfamiliar with the aircraft or procedure of Hot Loading. Flight crews will review procedures and equipment specific to that aircraft with the retardant ramp personnel including the ramp manager. All Aero-Flite, Inc. flight crews and base personnel will be briefed and trained on Hot Loading the Q400 before any operations may proceed. The flight crew and associated AFI ground crew(s) will be briefed on this assessment before starting any Hot Loading operations. AFI flight crews will not proceed with any loading of retardant (Hot load or with engines shut down) if there isn't a ramp manager present for the operation. Each airtanker crew will carry copies of written procedures and risk assessments for training purposes. *No personnel are to be involved in activities on the side of the aircraft adjacent to the operating engine. This may require preplanning at bases with wing tip to wing tip loading pits.* The flight crew will request an agency ramp manager supervise the entire operation. The ramp manager has full authority to stop the operation at any time because of safety/training or insufficient personnel concerns. Prior to the airtanker entering the loading area(s), the pilot will contact the Parking Tender/Ramp Manager on the appropriate airtanker ramp frequency for loading pit assignment. If at any time, any personnel are unwilling to perform Hot Loading of retardant onto the Q400, that operation will stop immediately. Minimum personnel should be in the Hot Loading area to minimize congestion and have better situational awareness of the operation. There needs to be a communication link set between the ramp manager, flight crew and loading personnel. This can be visual and/or via radio. There may be hot-loading situations where radio communications between the Pilot and Parking Tender cannot be established. Hot loading can be accomplished by the Parking Tender establishing eye contact with the Pilot and utilizing standardized hand signals. If the communication between the flight crew and the ramp manager/parking tender reverts to hand signals, a risk assessment must be made as to continue with this procedure if the situation proceeds. With the airtanker positioned in the loading pit, the pilot places the turbo-prop engines in idle and/or in the feather position and still running, then shuts down the engine on the side from which the aircraft is being loaded. Because the retardant loading and the engine running are on opposite sides of the aircraft, there should be no crossing of the centerline of the aircraft with any personnel. This procedure will eliminate congestion and keep situational awareness at a maximum. Radio communications or eye-to-eye contact and hand signals between the pilot and Parking Tender/Ramp Manager will be maintained throughout the retardant loading operations. *Communication is key to this procedure for loading*. The Parking Tender/Ramp Manager must establish that the area is clear and receive a positive signal from the pilot to begin loading. The Ramp Manager/Parking Tender obtains permission from the pilot to load when the aircraft is ready.

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Mitigation (cont.): The Parking Tender/Ramp Manager will notify the pilot by radio or hand signal when the hose and loading crew are clear of the aircraft. Once the operation is completed safely, all personnel loading the aircraft must remain on their side of the aircraft where retardant is being loaded. It is a must, that no personnel cross the centerline of the aircraft (forward or aft of engine on the running side). Per established base procedures, once personnel loading the retardant are clear and the ramp manger ensures the ramp is clear, then and only then will flight crew start remaining engine per the ramp manager's instructions.