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**Question 1: What independent protection layers (IPLs) are you using in cyclic reformers during regeneration to prevent hydrocarbon and oxygen mixing through isolation valves? What IPLs are you employing to prevent improper valve switching?**

**Ka Lok (UOP)**

Protection of over-pressuring of upstream equipment is complicated. UOP takes multiple approaches to reduce this risk. Use of two check valves with dissimilar design in series reduces the reverse flow rates. This ensures the size of the pressure relief in upstream equipment meeting the required relief flow. Inspection of these two valves during every turnaround improves the availability on demand. Automatic shutoff valve interlock is commonly used to provide added safety for isolation in a timely manner.

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