



A Rockwell Automation Company

Alyeska Pipeline Services Company TAPS Strategic Reconfiguration - Arc Flash

The Client:

Alyeska Pipeline Services Company (APSC) owns and operates the Trans Alaska Pipeline, a 48-inch sweet crude line that stretches from Prudhoe Bay to the terminal facility at Valdez, over 800 miles in all. The Trans Alaska Pipeline has operated since 1979 and has shipped over 15 billion barrels of oil to-date.

The Alyeska Pipeline Service Company is owned by five major oil companies and operates under a federal and state regulatory collective called the JPO (Joint

Pipeline Office) which provides daily oversight and regulatory project approval.

In 2003 the Alyeska Pipeline Services Company started the process of redesigning the Trans Alaska Pipeline to handle reduced flow rates more efficiently. This has been dubbed the “Strategic Reconfiguration Project” and included the renewal of four pumping facilities and a pressure relief station.

The Requirement:

Among the deliverables of the project electrical studies, Alyeska requested an arc flash analysis. Arc flash can result in severe injuries to individuals exposed to arcing faults who are not adequately protected. An arcing fault occurs when an arc is drawn through air causing ionization of the air from plasma (dictionary: a gas of positive ions and free electrons with an approximately equal positive and negative charge) created from the extreme heating at the electrical fault. Weakened stabs of old equipment, dirty conditions leading to tracking, silver or tin whiskers and human error are among some of the causes of arcing faults.

Personal protective equipment (PPE) is commonly worn by maintenance or service personnel in industrial installations. In some cases these workers are overdressed for the task and are needlessly hampered in the execution of their work. In other cases workers are not adequately protected and run the risk of serious injury. Electrical system hazard and the level of protection required is not outwardly apparent or obvious. The same electrical equipment installed in one system will require more PPE than in another system because of the system’s characteristics, including protection settings.

The Design Solution:

One solution to guarantee safety is to always use the maximum PPE, but this is not very practical. A more practical solution is to analyze the system and equipment to determine the level of PPE required. Most electrical system software now includes modules to evaluate arc flash in conjunction with short circuit analysis.

These study modules provide labels that are attached to the electrical equipment to provide the level of PPE required, the flash protection boundary, and the incident energy. The labels also have the *working distance*, the *limited approach*, the *restricted approach*, the *prohibited approach*, and the shock





hazard voltage as called out in the NEC. While performing the arc flash study in conjunction with a protection coordination study, experienced protection engineers can adjust the protection to reduce the incident energy which may reduce the PPE required.

Article 110.16 in the 2002 NEC now requires that: “Switchboards, panel boards, industrial control panels, and motor control centers that are in other than dwelling occupancies and are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked to warn qualified persons of potential electric arc flash hazards.”



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 DANGER 		
	Arc Flash and Shock Hazard Flash Protection Boundary: 4.8 ft Incident Energy: 12.2 Cal/cm² Working Distance: 18 in Required PPE Level: 3 Shock Hazard Voltage: 208 VAC Limited Approach: 10.0 ft Restricted Approach: 1.0 ft Prohibited Approach: 0.1 ft Equip. ID: BUS 31PDP4802R	
		01-24-2006

System Specifications:

- Electrical studies conducted on five station sites using ETAP.
- Example facility: Buses = 341
Transformers = 58
Motors = 78
Lumped loads = 59
- Label sample above prepared for switchboards, panel boards, industrial control panels, and motor control centers

For further information or to contact a Hinz office near you, please check our website at:

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