

MEMORANDUM OF AGREEMENT #: 01-18

This AGREEMENT is entered on this 19 day of November, 2018, by the Alaska Energy Authority and the Alaska State Fire Marshal, Division of Fire and Life Safety, to adapt the International Fire Code 2012 Edition (IFC), which has been adopted by the State of Alaska, to the safety needs of tank farm construction in rural Alaska. This Agreement is in effect until modified or canceled by written notice by either party or until the adoption of the 2018 IFC.

In the 2012 IFC, Chapter 23 defines criteria for Motor Fuel-Dispensing Facilities and Repair Garages, including provisions that regulate the storage and dispensing of liquid motor fuels at public and private automotive, marine, aircraft and fleet vehicle dispensing facilities and repair garages. Chapter 57 defines criteria for Flammable and Combustible Liquids with the intent to reduce the likelihood of fires involving the storage and handling of flammable and combustible liquids, including, but not limited to, liquids used for fuel, lubricants, cleaners, and solvents.

INTRODUCTION/PURPOSE - Unique conditions and needs exist in rural Alaskan communities that make literal application of some portions of the IFC and referenced National Fire Protection Association (NFPA) standards difficult. In addition, the lack of significant fire-fighting capabilities makes some provisions of the code less relevant. The purpose of this policy is to provide practical solutions that provide an equivalent level of protection for public safety and the environment. The solutions proposed herein will form the basis for approval of applications for modifications where required.

- 1) **IFC 2306.2.3** - Defines separation requirements and setback criteria for aboveground dispensing tanks and dispensers.

IFC 5704.2.9.6 - Defines setback criteria for aboveground bulk storage tanks outside of buildings.

PROBLEM - Consolidation of bulk storage and dispensing tanks in the same facility makes it unclear which setback distances to apply to bulk storage tanks.

RESOLUTION - Provide a minimum of 50' separation from the dispenser for all unprotected aboveground dispensing tanks regardless of tank capacity or function. Provide clearance from dispensing tanks to important buildings, public ways, and property lines which can be built upon in accordance with the more restrictive requirements in IFC 2306.2.3. Provide standard clearances in accordance with IFC 5704.2.9.6 for all other tanks.

- 2) **IFC 5704.2.7.8** - Where a tank is located in an area where it is subject to buoyancy ... uplift protection shall be provided in accordance with NFPA 30 sections 22.14 and 23.14.

PROBLEM - The established maximum flood stage is not clearly defined for all rural communities.

RESOLUTION - Based on data from the U.S. Army Corps of Engineers, use the 100-year event flood (where available) as the maximum anticipated flood stage. Where the 100-year event has not been established, use an elevation that is a minimum of 1-foot higher than the flood of record. If site conditions, topography, anticipated climate change impacts, or historic

records indicate justification for a more conservative solution use a greater elevation based on sound engineering judgment. Elevate tanks and/or anchor to suitable foundations to prevent floating of empty tanks at the established maximum flood stage as determined above.

- 3) **IFC 5704.2.9.2.3** - Defines fire protection of supports. Supports or pilings for aboveground tanks storing Class I, II, or IIIA liquids elevated more than 12-inches above grade shall have a fire resistive rating of not less than 2-hours ...

PROBLEM - The best way to provide a stable foundation and secondary containment system in many sites with marginal permafrost is to build a liquid-tight structural steel dike on a piling foundation and install the tanks within the elevated dike, or install tanks with integral secondary containment on pile supports. Installation of 2-hour fire protection on the entire structural framework would be extremely difficult if not impossible. It is also questionable that the commonly available listed systems for 2-hour fire protection would stand up to the harsh environment in many locations.

RESOLUTION - The intent of this section is to prevent catastrophic failure of tank foundations in the event of a pool fire, Since the elevated secondary containment systems are liquid tight and designed to contain the contents of the largest tank (steel platform deck and dike, or tank with integral secondary containment), a pool fire would occur within the secondary containment system and the framework and pilings underneath would not be subject to significant heat exposure. Based on the above, define "grade" as the finished floor of the steel platform deck and install all tanks so they are within 12-inches of this level. For pile mounted tanks with integral secondary containment, delete need for 2-hour fire resistive rating.

- 4) **IFC 5704.2.10** - The IFC does not provide design requirements for secondary containment impoundment dikes and defers to NFPA 30. NFPA 30 Chapter 22 contains several requirements for the design and construction of containment dikes:

- a. Section 22.11.2.3 specifies dike setback criteria: To permit access, the outside base of the dike at ground level shall be no closer than 10-feet to any property line that is or can be built upon.

PROBLEM - Limited available property and rugged terrain in many rural sites limits flexibility in layout. Some sites with steep grades and poor soil conditions require considerable fill and the toe of the dike and pad may extend to within 10' of the property line, Most rural communities do not have the capability to fight a tank farm fire so the access clearance requirement is not applicable, In addition, the rugged terrain and/or poor soils will often prohibit vehicle access around the toe of the dike.

RESOLUTION - Where fire-fighting access is not possible due to terrain, or fire-fighting equipment is not available, allow for placement of impoundment dike fill up to the property line.

- b. Section 22.11.2.4 specifies that walls of the diked area shall be of earth, steel, concrete, or solid masonry designed to be liquid tight and...

PROBLEM - Timber is not listed as one of the options for dike walls. Heavy timber dike walls have been used in several rural locations where local conditions made use of other systems impractical. The installations have proven to be durable, particularly in harsh environments and areas with unstable soils, but are not listed as one of the standard systems.

RESOLUTION - Use heavy timber dike walls only where unique conditions justify this application. Specific conditions include unstable soils subject to differential movement, space restrictions, lack of available earthen fill material, and corrosive environments where steel may be susceptible to premature failure. Provide an engineered solution that includes heavy timber walls (minimum 6-inch nominal thickness), structural supports designed to withstand a full hydrostatic head, a liquid tight liner, and a sheet metal covering over the entire inside surface of the dike wall and liner.

- 5) **IFC 5703.6.8** - Defines fire protection of pipe supports as follows: "Pipe supports shall be protected against exposure to fire by one of the following methods:
1. Draining liquid away from the piping system at a minimum slope of not less than 1 percent.
 2. Providing protection with a fire-resistance rating of no less than 2 hours.
 3. Other approved methods."

PROBLEM - Often the best way to support above grade piping in tundra, or other rural environments, is by providing pressure treated, heavy timber pipe supports. These supports minimize ground disturbance and can be re-leveled to relieve stress in the pipe and account for differential settlement. Most of the time, the areas around these supports do not grade to drain at a minimum of 1%. Adding fill over the tundra or grading the area to drain away from the pipe is not practical and will increase the environmental impact of the project. Installation of pipe supports with a minimum 2-hour fire-resistance rating is expensive, difficult to install, and limits the ability to re-level the supports to account for settlement.

RESOLUTION - The intent of this section is to reduce stress on the pipe from external and internal sources. Historically, properly installed and maintained heavy timber supports have adequately supported piping systems and provided sufficient stress relief in tundra and other rural environments. Pressure treated timber pipe supports are an approved method for supporting pipes in rural Alaska.

- 6) **IFC 5706.4.6** - Manual and automatic systems shall be provided to prevent overfilling during the transfer of Class I and II liquids from mainline pipelines and marine vessels in accordance with American Petroleum Institute (API) Standard 2350.

IFC 5704.2.7.5.8 - An approved means or method in accordance with Section 5704.2.9.7.6 shall be provided to prevent the overfill of all Class I, II and IIIA liquid storage tanks. Storage tanks in ... bulk plants or terminals regulated by 5706.4 or 5706.7 shall have overfill protection in accordance with API 2350 ...

PROBLEM - Consolidation of bulk storage and dispensing tanks in the same facility combined with ambiguity in the code language makes it unclear which overfill prevention systems are required for various tanks.

RESOLUTION - For bulk storage tanks installed within a secondary containment dike, provide either a liquid level gauge or a gauge hatch and tank top access to satisfy the requirement for a manual system. In addition, provide an audible high-level alarm (whistle vent or electric alarm) where practical. For double wall tanks, protected tanks, and for all dispensing tanks provide overfill protection in accordance with IFC 5704.2.9.7.6.

- 7) **IFC 2306.2.3** - Table 2306.2.3 requires 25-foot minimum separation distance between a protected tank and a dispenser, except at fleet vehicle motor fuel dispensing facilities.

PROBLEM - The IFC and NFPA have historically allowed the dispenser to be mounted directly on a protected tank in accordance with UL 2085 for all installations. Factory assembled, tank-mounted dispensing systems on UL 2085 protected aboveground tanks are an appropriate system for smaller low-volume retail sales facilities in rural locations. In addition, some facilities may not have adequate space to allow for the 25-foot minimum separation distance between the dispenser and tank. It is also advantageous to have a packaged system that can be relocated to a new site in the future as needs change.

RESOLUTION - Allow installation of tank-mounted dispensers at rural retail installations in accordance with Table 2206.2.3 requirements for fleet vehicle motor fuel dispensing facilities when the entire system is a listed assembly or is comprised of listed components installed on a UL 2085 listed tank.

- 8) **IFC 2304.4.1** - Class I, II and IIIA liquids shall not be dispensed into a portable container unless such container does not exceed 6-gallon capacity...Liquids should not be dispensed into portable or cargo tanks.

IFC 2304.4.3 - Portable containers shall not be filled while located inside the trunk, passenger compartment or truck bed of a vehicle.

IFC 2305.6 Warning signs - Requirements for Sign No. 7: No filling of portable containers in or on a motor vehicle. Place container on ground before filling.

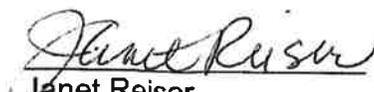
PROBLEM - Portable containers that exceed 6-gallons are commonly used in rural Alaska for gasoline and diesel. These containers may be positioned on or in a transport vehicle or trailer when being filled.

RESOLUTION - Provide ground reel / static wire that is grounded to the dispensing system. Replace Sign No. 7 to read: "ATTACH STATIC WIRE TO PORTABLE TANK PRIOR TO FILLING"

DIVISION OF FIRE PREVENTION
DEPARTMENT OF PUBLIC SAFETY

ALASKA ENERGY AUTHORITY

By: 
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Alaska State Fire Marshal

By: 
Janet Reiser
Executive Director

Date: 11/29/18

Date: 11/19/18