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NOTIFICATIONS

INCREASING THE ENVIRONMENTAL SAFETY LEVEL OF STORAGE TANKS OPERATION UNDER SEISMIC LOADS

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ABSTRACT

Factors of ecological danger in the seismic loads conditions on liquid hydrocarbon storage tanks are large and small breathing tanks, sloshing and spilling of liquid with its subsequent release into the environment, fires and explosions on tanks. The ingress of liquid hydrocarbons into the environment leads to soil cover degradation, underground and surface water pollution, atmospheric air pollution, and the ecosystems death [1-3].

Methods have been developed to ensure the operational reliability of the structure of the liquid hydrocarbon storage tank as an environmental safety factor of this technogenic object are follow:

1. method of a systematic approach to reduce the technogenic impact on the environment of the reservoirs under seismic loads, which includes engineering and management measures;

2. algorithm of actions in case of damage, destruction and tightness violation of tanks for the poisonous and flammable liquids preservation under the influence of technogenic and natural factors. Unlike others, this algorithm allows taking into account, in addition to contaminated territories that require liquidation of the consequences of liquid hydrocarbon contamination, also territories with the contamination risk during seismic loads on the reservoir, which significantly increases the environmental safety level of the liquid hydrocarbon storage process;

3. model of influencing factors on reservoir operating conditions, taking into account natural and technogenic influences. The practical application of the Model is the possibility of a better understanding of the factors affecting the storage tank stability, the opportunity to more objectively assess the risks and develop measures to increase the tank stability, it is also important to train and inform the personnel who operate the tanks;

4. block diagram of the environmental safety level increasing of storage process in tanks under seismic loads, which allows to control factors that increase seismic loads;

5. legal regulation: development and implementation of regulatory documents regulating the storage tanks environmental safety under seismic loads. Taking into account in the construction regulatory documents the requirements for the design, construction and operation of liquid hydrocarbon storage tanks during the activation of seismic events in non-seismic territories, as well as their strengthening factors, establishing requirements for the elimination of the consequences of accidents at tanks from seismic influences of various origins [4-6].

The implementation of these approaches will improve the environmental safety state of tanks operation under seismic loads, reduce the tank accidents risk, prevent environmental pollution with liquid hydrocarbons, and reduce the economic and social consequences of liquid hydrocarbon storage tank accidents.

Keywords: environmental safety, hazardous liquid, seismic loads, storage tanks, petroleum products, sloshing, liquid hydrocarbon reservoirs.

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