

## IAC Mission Success Stories

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Chemical Propulsion Information Agency

CPIA

Story 1

Story 2

### Fire and Explosion Hazards of Propellant Grade Hydrogen Peroxide

CPIA provided technical information support to a U.S. government agency inquiry concerning fire and explosion hazards of propellant grade hydrogen peroxide. The inquiry pertained to one hypothesized failure mode of the recent Russian Kursk submarine accident involving a torpedo explosion. CPIA provided data discussing the primary hazards of hydrogen peroxide, such as its reactivity with small quantities of organic liquid and combustible organic materials (particularly high surface area materials or materials contaminated with dirt/oils/grease), propensity toward self-sustained exothermic decomposition due to exposure to high temperatures (thermal runaway) or catalytic decomposition in the presence of common inorganic contaminants (such as rust), and possible detonability of the neat liquid, liquid-fuel solutions, and vapor.



[Continued on Story 1](#)

### Liquid Explosives Safety

CPIA provided technical information support to a U.S. DoD assessment of unsymmetrical dimethylhydrazine (UDMH) and nitrogen tetroxide (N<sub>2</sub>O<sub>4</sub>) propellant disposal programs being undertaken in the former Soviet Union as part of the U.S. threat reduction program. Information was provided relevant to disposal of large quantities of these propellants using industrial chemical processes for the conversion of energetic materials, including UDMH, to other commercial commodities, as well as industrial incineration processes for UDMH and N<sub>2</sub>O<sub>4</sub>. In addition, information on lessons learned regarding propellant handling and logistics from U.S. deactivation of hypergolic propellant fueled Titan II ICBMs was provided.



[Continued on Story 2](#)

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Chemical Propulsion Information Agency



## Fire and Explosion Hazards of Propellant Grade Hydrogen Peroxide (continued)



ICM Tanks

CPIA provided technical information support to a U.S. government agency inquiry concerning fire and explosion hazards of propellant grade hydrogen peroxide. The inquiry pertained to one hypothesized failure mode of the recent Russian Kursk submarine accident involving a torpedo explosion.

CPIA provided data discussing the primary hazards of hydrogen peroxide, such as its reactivity with small quantities of organic liquid fuels and combustible organic materials (particularly high surface area materials or materials contaminated with dirt/oils/grease), propensity toward self-sustained exothermic decomposition due to exposure to high temperatures (thermal runaway) or catalytic decomposition in the presence of common inorganic contaminants (such as rust), and possible detonability of the neat liquid, liquid-fuel solutions, and vapor.

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Chemical Propulsion Information Agency

CPIA

Story 1

Story 2

## Liquid Explosives Safety (continued)

The data generated in these activities formed the basis for proposed revisions to current standards. In addition, CPIA coordinated the deliberations of an interagency advisory board, the Liquid Propellants Working Group (LPWG), which provided oversight in the assessment of available information with respect to historical and operational requirements, and ultimately the formulation of final recommendations for a proposed change to DoD 6055.9-STD "DoD Ammunition and Explosives Safety Standards." The LPWG also provided expert advice to the DDESB concerning launch site planning for the highly visible Air Force Delta IV Evolved Expendable Launch Vehicle (EELV) program. Details on the rationale for the program as well as technical information developed from the accident and test review, with respect to hazards controlling quantity-distance criteria for liquid propellants and propulsion systems, have been published in a variety of CPIA publications, and JANNAF and DDESB conference proceedings.



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