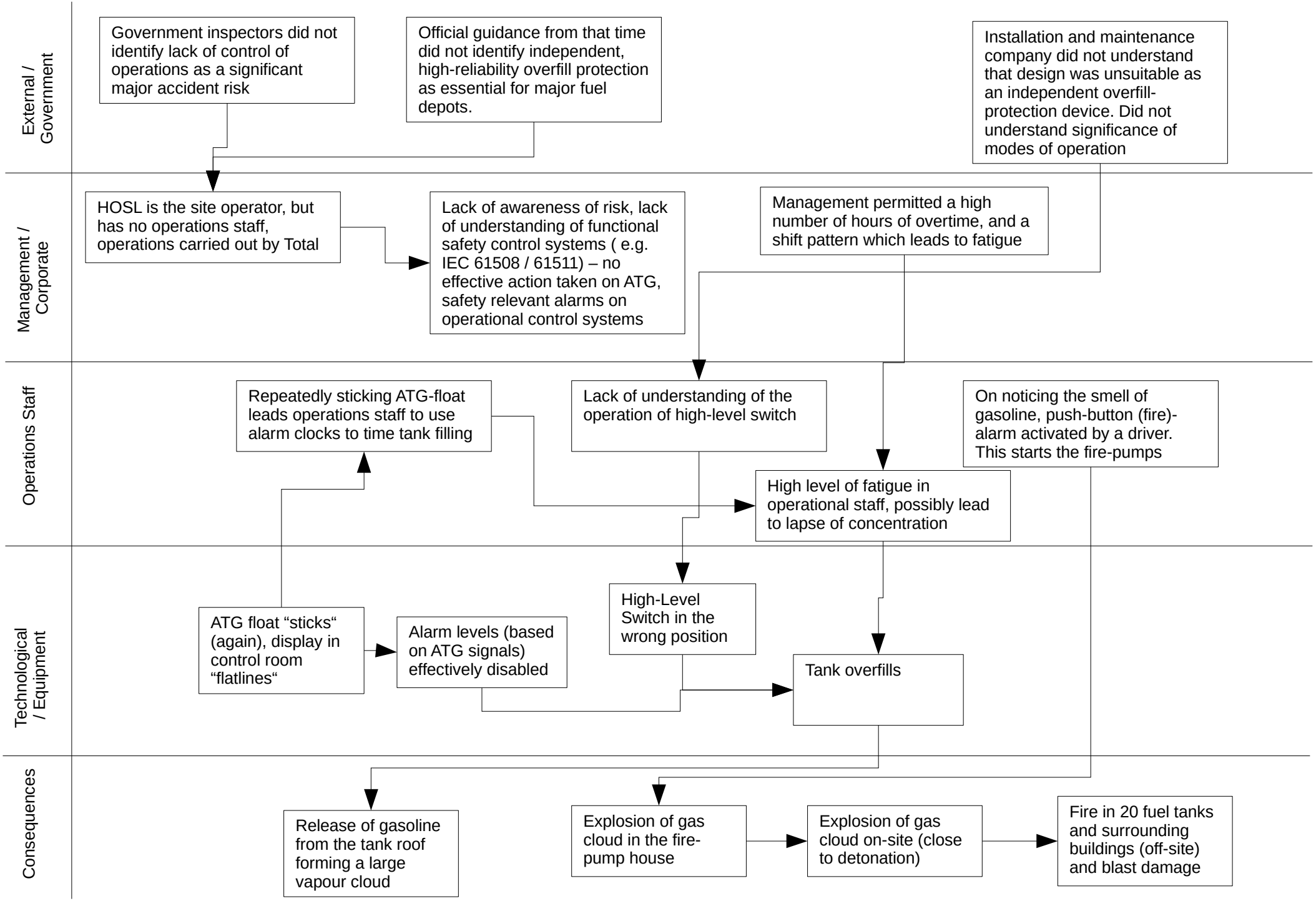
External / Government
Management / Corporate
Operations Staff
Technological / Equipment
Consequences
Government inspectors did not identify lack of control of operations as a significant major accident risk
Official guidance from that time did not identify independent, high-reliability overfill protection as essential for major fuel depots.
Installation and maintenance company did not understand that design was unsuitable as an independent overfill-protection device. Did not understand significance of modes of operation
HOSL is the site operator, but has no operations staff, operations carried out by Total
Lack of awareness of risk, lack of understanding of functional safety control systems (e.g. IEC 61508 / 61511) – no effective action taken on ATG, safety relevant alarms on operational control systems
Management permitted a high number of hours of overtime, and a shift pattern which leads to fatigue
Repeatedly sticking ATG-float leads operations staff to use alarm clocks to time tank filling
Lack of understanding of the operation of high-level switch
On noticing the smell of gasoline, push-button (fire)-alarm activated by a driver. This starts the fire-pumps
High level of fatigue in operational staff, possibly lead to lapse of concentration
ATG float “sticks“ (again), display in control room “flatlines“
Alarm levels (based on ATG signals) effectively disabled
High-Level Switch in the wrong position
Tank overfills
Release of gasoline from the tank roof forming a large vapour cloud
Explosion of gas cloud in the fire-pump house
Explosion of gas cloud on-site (close to detonation)
Fire in 20 fuel tanks and surrounding buildings (off-site) and blast damage