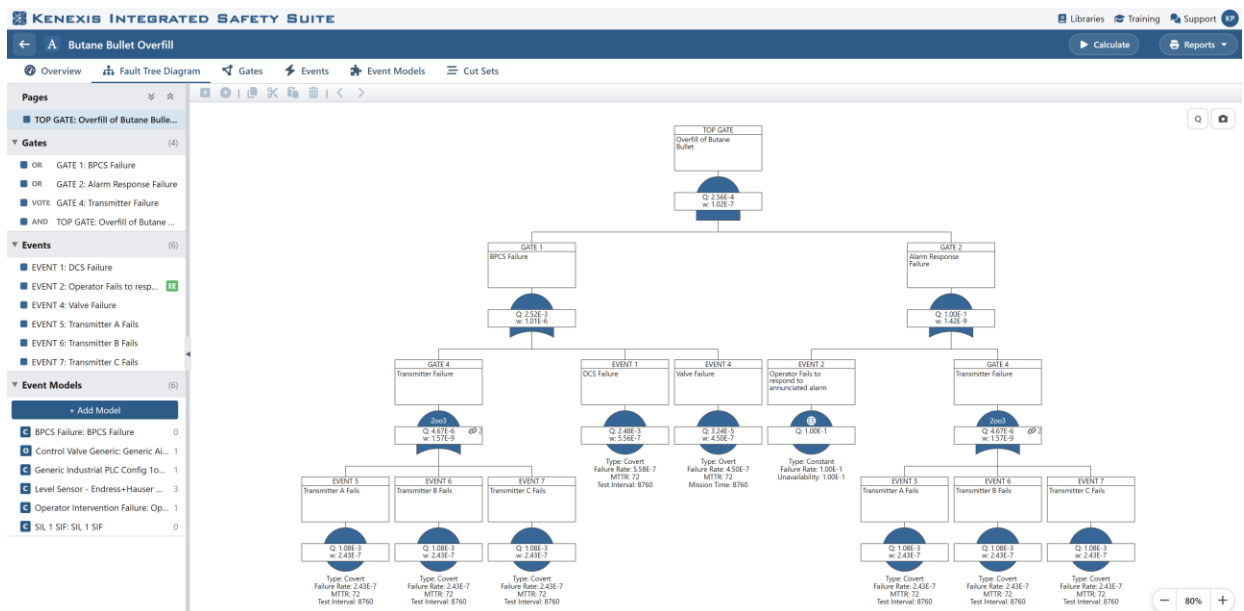


## Master Complex SIL Verification

[Kenexis® Fault Tree](#) is the fault tree analysis engine of the [Kenexis Integrated Safety Suite](#) — the next analytical step when a problem outgrows the simpler math upstream of it. Routine LOPA lives in [Kenexis® Open-PHA®](#) and routine SIL verification lives in our [Kenexis® SIS \(formerly Vertigo™\)](#) software, using the simplified equations of ISA TR84.00.02 Part 2. But when a scenario exceeds what LOPA can represent, or a SIF uses an architecture the standard equations cannot model, a fault tree is the defensible way to get the answer — and Kenexis® Fault Tree keeps that work on the same platform, sharing reliability data, SIF definitions, and LOPA scenarios with the rest of your Kenexis Integrated Safety Suite studies.

Kenexis® Fault Tree lets an SIS designer verify complex system designs quickly and easily for failure modes. Fault-tree results are easily linked to Safety Instrumented Functions in the Kenexis® SIS (formerly Vertigo™) tool.

- Quickly Identify Vulnerabilities in the System Design
- Instrumentation & Control Equipment Failure Rate Database
- SIS Lifecycle Management Integration for Complex SIL Verification Calculations
- Part of the Kenexis Integrated Safety Suite



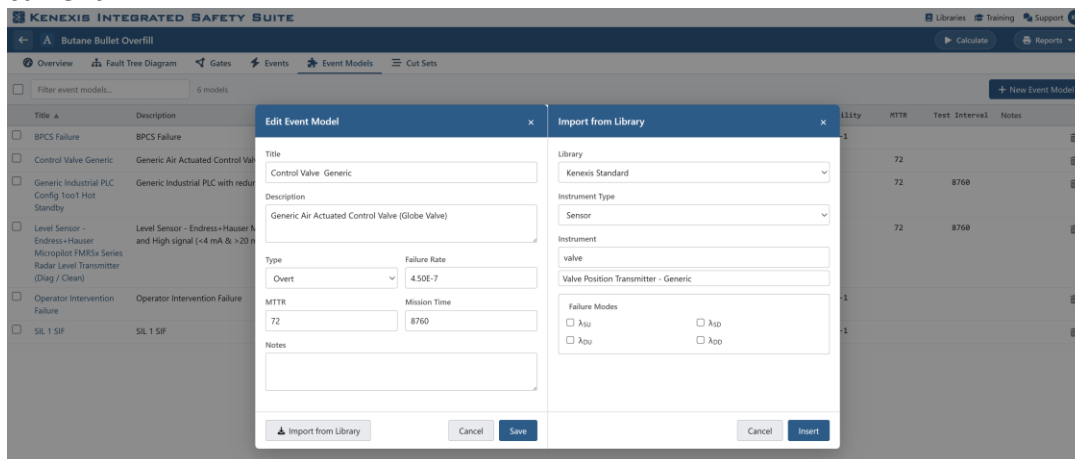
## Quickly Identify Vulnerabilities in System Design

Robust minimum cut set analysis reporting makes it easy for users to quickly identify vulnerabilities in the system design by viewing details of the minimum cut set analysis through a clear and interactive interface. Provides valuable statistical analysis of the system highlighting the details of most significant combinations of events which could result in system failure which streamlines the process of sensitivity analysis and evaluation of alternative designs.

| KENEXIS INTEGRATED SAFETY SUITE                                                                                                               |                                                |                                                      |                        |                |           |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|------------------------------------------------------|------------------------|----------------|-----------|----------|
| A Butane Bullet Overfill                                                                                                                      |                                                |                                                      |                        |                |           |          |
| <div> <div>Overview</div> <div>Fault Tree Diagram</div> <div>Gates</div> <div>Events</div> <div>Event Models</div> <div>Cut Sets</div> </div> |                                                |                                                      |                        |                |           |          |
| Select Gate                                                                                                                                   | TOP GATE                                       | Gate Unavailability: 2.56E-4 Gate Frequency: 1.02E-7 |                        |                |           |          |
| Cut Set                                                                                                                                       | Number of Events                               | Unavailability Contribution                          | Frequency Contribution | Unavailability | Frequency |          |
| 1                                                                                                                                             | 2                                              | 96.91%                                               | 54.43%                 | 2.48E-4        | 5.56E-8   |          |
| Event Title                                                                                                                                   | Event Description                              | Event Model                                          |                        | Unavailability | Frequency |          |
| EVENT 2                                                                                                                                       | Operator Fails to respond to annunciated alarm | Operator Intervention Failure                        |                        | 1.00E-1        |           |          |
| EVENT 1                                                                                                                                       | DCS Failure                                    | Generic Industrial PLC Config 1001 Hot Standby       |                        | 2.48E-3        | 5.56E-7   |          |
| >                                                                                                                                             | 2                                              | 2                                                    | 1.27%                  | 44.03%         | 3.24E-6   | 4.50E-8  |
| >                                                                                                                                             | 3                                              | 2                                                    | 0.61%                  | 0.51%          | 1.56E-6   | 5.24E-10 |
| >                                                                                                                                             | 4                                              | 2                                                    | 0.61%                  | 0.51%          | 1.56E-6   | 5.24E-10 |
| >                                                                                                                                             | 5                                              | 2                                                    | 0.61%                  | 0.51%          | 1.56E-6   | 5.24E-10 |

## Access I&C Equipment Failure Rate Data

Kenexis extensive database of failure rate data for instrumentation and controls equipment comes with Kenexis® Fault Tree at no additional cost. Failure data is quickly found, processed, and applied in fault tree analysis, eliminating the time-consuming task of developing failure rate models for your fault trees. Our engineers use this data every day to perform a variety of process safety studies so you can be sure that the data has been well vetted and is always current.




## What can you use Kenexis® Fault Tree for?

The same fault tree engine answers four kinds of high-consequence questions that the simpler methods cannot. Risk analysis beyond LOPA: when independent-protection-layer assumptions break down, protection layers share components, or a scenario has dependencies LOPA's one-credit-per-layer structure cannot capture, a fault tree models the real reliability topology. Resolving unworkable LOPA recommendations: LOPA's conservatism often forces an over-specified SIF or a costly extra protection layer — a fault tree can replace that with a defensible quantitative argument an auditor or FSA reviewer can validate. SIL verification beyond standard equations: non-standard voting, equipment diversity inside a voted arrangement, or shared components across SIFs need a fault tree rather than the simplified equations. Quantitative Risk Assessment and reliability: fault trees quantify the frequency side of QRA for capital projects and Seveso facilities, and support reliability/RAM modeling — sizing redundancy, comparing architectures, and informing inspection and maintenance strategy.

## Enterprise-grade and secure

Kenexis® Fault Tree runs on the Kenexis Integrated Safety Suite cloud platform, built to conform with ISO/IEC 27001 and hosted on Microsoft Azure (US East primary, US West failover), with encryption in transit and at rest, role-based access controls, per-tenant data isolation, comprehensive audit logging, and tested backup and recovery. Cloud delivery also means every practitioner is on the current version — so a model built today still opens cleanly years later when it is reopened for revalidation, an FSA, or a post-incident review.

## About Kenexis

Kenexis, an independent consulting engineering firm that provides technical safety services for process industries, and other industries that manage risks related to chemicals or stored energy. Kenexis is helping change the way that safety and security are incorporated into industrial business practices by providing best-in-class software tools, associated training, and comprehensive technical support.

