EVALUATION OF SHELTER-IN-PLACE BUILDINGS

Many facilities with significant toxic hazards mitigate risks by use of shelter-in-place (SIP) buildings. However, in most cases the effectiveness of SIPs has not been quantitatively evaluated and designs have not been optimized, while practical improvements are readily available. BakerRisk can assist with development of optimal SIP designs, quantifying mitigation reliability and timing, testing SIP leak tightness, evaluating fallback plan effectiveness, and recommending cost-effective means of improving toxic safety.

AIR TIGHTNESS TESTING

BakerRisk uses industry accepted test methods, including blower door and tracer gas tests, and proprietary analysis methods to determine the air change rate of buildings at various wind and temperature conditions. Blower door tests measure forced airflow rate and resulting differential pressure to estimate total leak path area and characterize building leak tightness.

Tracer gas testing uses a measurable tracer gas and concentration decay method to provide the air change rate of a SIP room or building for the wind speed and temperature conditions under which the test was conducted.

1 ASTM E779-99
2 ASTM E741-00
PROTECTING PERSONNEL FROM TOXIC RELEASES

Our test technicians also conduct a thorough survey of the building envelope and mechanical systems, using digital and infrared cameras. This survey can find the most significant leak paths and provide advice on methods of reducing them.

EVALUATION OF HVAC SYSTEMS

BakerRisk can assess the timeliness and reliability of the HVAC systems, including control operation, and location, and the use of gas detection equipment and reliability of interlock controls. The air tightness testing is conducted using the HVAC operational modes that correspond to gas detection and interlock control schemes. HVAC isolation timing is an important input to calculations of indoor toxic concentration vs. time, and HVAC isolation reliability is an important input to toxic risk calculations.

MITIGATION RECOMMENDATIONS

BakerRisk identifies ways to reduce SIP leaks such as improving SIP layout utilizing a “room in a building” approach, adding a vestibule to reduce leakage through doors and to mitigate impacts of “late comer” arrival, implementing expedient sheltering, and using clean air supply to the SIP or to respirators.