Flood and Water Damage Repair and Risk Abatement

10 tips to minimize risks and devastation for boilers, ovens, furnaces, and thermal oxidizers.

Eclipse has personally felt the effects of the recent floods in Thailand and seen firsthand the personal and financial impact. We believe going forward that it is important to reduce the long term effects of the flood damage and get back into normal operation without delay.

Through our subsidiary CEC Combustion Safety, Eclipse has had valuable experience of flood recovery procedures from our work after the devastating effects of Hurricane Katrina in 2005. It is critical that gas combustion systems are started up and operate safely to avoid personal harm and Eclipse can help manage this.

This document provides information regarding post event recovery issues for critical fuel fired equipment in these facilities. The information that follows applies to boilers, industrial ovens and furnaces, thermal oxidizers, and most industrial heating equipment.

Dry out and inspection, testing, re-commissioning

1. Vent lines and regulators need to be checked for water incursion.
2. Refractory dry out is critical
3. Control panels and components need special attention
4. Fuel oil tanks need water removed, biocides, and cleaning.
5. All safety interlocks need to be tested
6. All valves need to be checked for leakage
7. Burners need to be removed and checked for corrosion
8. Fuel air ratios need to be reset and checked.
9. Combustion air fans need to be checked and cleaned
10. Have procedures in place for emergency response when an event may be imminent.

Discussion of Dry out and inspection, testing, re-commissioning issues

1. Vent lines and regulators/switches need to be checked for water incursion.
Regulators and pressure switches have vent openings. These are supposed to be routed outside. Having a vent line usually means water will be kept out. If there is no vent line then water easily entered the regulator diaphragm and or the pressure switch. Water and the contamination it brings can render this equipment unsafe.

Even vent lines that run outside could have been contaminated from outside and inside. Unscrew these and check them for water.

2. Refractory dry out is critical
All fired equipment has some type of refractory. Dry out of castable refractory, bricks, and mineral wool in ovens is crucial. When water goes from being a liquid to a gas (steam), it expands 1600 times. If you don't slowly and carefully release the water your refractory can literally explode into pieces. This will keep you down a long time for repairs. Proper dryout may not be possible with the units existing burner or burners. You might need to bring in rental burners or heaters and let them run for days. This is something you want to start as soon as possible after water damage.

3. Control panels and components need special attention.
Flood waters usually contain contamination that is corrosive and may be conductive. DO NOT POWER PANELS THAT HAVE BEEN WET. You can end up shorting out equipment that was not previously damaged. Make sure that panels have first been properly cleaned with contact cleaners and thoroughly dried out including all electronic components. Replace all relays and critical

components like burner management systems that have been submerged. The cost is not worth someone's life.

4. Fuel oil tanks need water removed, biocides, and cleaning.
Remember, water can get into fuel oil tanks. When it does the water makes for biological fouling since bacteria ends up growing rapidly in an oily water environment. In some cases oil can be pumped out and reconditioned with mobile equipment. If you don't clean the oil and treat it with biocides you will end up fouling all of your oil distribution, pumping systems, and burners.

5. All safety interlocks need to be tested
You will need someone experienced to test all of the safety interlocks including flame detectors, low water cut offs, high temperature limits, and about a dozen other systems. Our firm tests about 1,000 fuel trains annually in 20 different countries. We have proprietary checklists that contain over 100 items to check to validate safety. This is an annual code requirement that many people ignore.

6. All valves need to be checked for leakage
All manual and automatic fuel train valves need to be tightness tested annually. This especially needs done after a water contamination incident. Some valve designs are more susceptible to water damage than others. Our firm conducts manufacturer and code required bubble testing on hundreds of these valves annually.

7. Burners need to be removed and checked for corrosion
Some burner styles with small gas holes are susceptible to water damage and corrosion. Corrosion can occur quickly within days of an incident. These need to be cleaned and checked prior to any firing.

8. Fuel air ratios need to be reset and checked
Fuel air ratio control systems come in many types and styles. In some cases sensitive valves and controls could have been compromised. You will need to have burner flue gasses checked with a flue gas analyzer over the complete firing range of the burner. A burner that is not operating at its proper fuel air ratio can make considerable Carbon Monoxide and can become an explosion risk.

9. Combustion air fans need to be checked and cleaned
Combustion air fans are the heart of any combustion system. You will need to make sure that if filters exist they are not saturated and or clogged. Fan blades will need to be clear. Fan rotation will need to be checked. Fans will also need to be reviewed for vibration and balance.

10. Have procedures in place for emergency response when an event may be imminent.
Think through issues and abatement measures prior to events. What valves will be secured? What condition will equipment be left in? In some cases sensitive components like expensive burner management systems can be popped out of a cabinet in less than 5 minutes and removed from the site.

Eclipse can assist with the recovery process and it is our task to make sure systems are restarted safely, efficiently and compliant to recognized international safety codes. We have a team of service engineers ready to make assessments for start up and recommend any replacement parts that are needed. Eclipse is offering packages that prepare for the start up work and replacement of partial or total combustion systems.

Eclipse will be hosting a webinar in the coming weeks to assist and answer any questions regarding the topics outlined in this document or any discussion topics related to the recovery process. Please indicate by email if you wish to attend and you will be given instructions on how to join the webinar.

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