

# Fire in an ABSL-3 Autoclave

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## INTRODUCTION

Autoclaves play a crucial role in the successful operation of high-level containment facilities. When an autoclave is not operational it can cause an immediate impact on research.

- A fire ignited in the ABSL-3 autoclave. The autoclave had successfully completed a run in the gravity cycle two days prior to the fire. The morning of day 3 the animal care technician (ACT) opened the door to empty the contents when a fire ignited. The ACT extinguished the fire with the ABC fire extinguisher only to have the fire reignite two additional times.
- The facility was active at the time of the fire. Researchers were working with rodents infected with *Mycobacterium tuberculosis* and the West Nile virus.
- Once the fire was extinguished and the immediate human and animal health concerns were assessed, the team began the risk assessment/mitigation process to address the loss of the autoclave and continuation of research.
- Initial and long term challenges, see Figure 1.

Was there a breach in containment?

- Were the animals exposed to smoke?
- Were agents released into the environment?

Autoclave is down, now what?

- Identify cause
- Develop procedures without autoclave
- Repair and restoration of autoclave






Figure 1. Challenges to to be addressed

- Timeline, see Figure 2.



Figure 2. Timeline of events

## METHODS

Breach in containment	<ul style="list-style-type: none"> <li>▪ Animal care technician confirmed no smoke entered animal area</li> <li>▪ No loss of directional airflow</li> <li>▪ All safety measures were operational</li> <li>▪ Facility smoke tested to ensure containment integrity</li> </ul>	 
Cause	<ul style="list-style-type: none"> <li>▪ Inspected melted items</li> <li>▪ Interviewed all users</li> <li>▪ DeKalb Arson Investigator assisted in determining cause</li> </ul>	
Back up plans	<ul style="list-style-type: none"> <li>▪ Collaborate with all users to determine policies and procedures to keep facility operating safely</li> <li>▪ Store materials to be autoclaved in empty room</li> <li>▪ Utilize other available autoclaves at Center</li> </ul>	
Repairs and Restoration	<ul style="list-style-type: none"> <li>▪ Autoclave repairs</li> <li>▪ Autoclave restoration</li> <li>▪ Autoclave supplies ordered</li> </ul>	

## RESULTS

- Minimum impact on research and no impact on animal or human health.
- Work continued in the ABSL-3 with modified procedures.
- ABSL-3 team worked collaboratively to modify ABSL-3 procedures and to assist with fire investigation.
- Autoclave repairs/restoration completed, see Figure 3.



Figure 3. Autoclave before and after repairs/restoration

## CONCLUSIONS

The investigation for the cause of the fire was inconclusive.

- Two potential theories:
  - Something with low ignition point was placed in the autoclave. The fire ignited when the door was opened and oxygen was introduced (e.g., empty isoflurane bottle or used F-air canister).
  - A possible autoclave malfunction that caused ignition of combustible material.

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