



# IDAHO STATE FIRE MARSHAL'S OFFICE

## FIRE INVESTIGATION REPORT

FIRE INVESTIGATION  
700 W. State Street  
3<sup>rd</sup> Floor  
Boise, ID 83720

### ACCIDENTAL

**Case Name:** 68 Highland High School

**Case Number:** 04212368

**Date of Fire:** April 21, 2023



### SCOPE OF ASSIGNMENT:

On April 21, 2023 at approximately 0630 hours, I was advised of a fire that occurred involving a structure located at 1800 Bench Rd., Pocatello, Idaho. Instructions were provided to respond to that location and conduct an origin and cause investigation involving a one-story, high school structure. At the time of the assignment, the following information was provided involving the circumstances of the fire:

I was contacted by Fire Marshal Dean Bullock of the Pocatello Fire Department regarding a structure fire at Highland High School. At the time of contact, the fire was still being actively combated. The chief was going to keep crews on scene working hot spots until I arrived to assist with an origin and cause investigation. It was reported that the school was unoccupied at the time of the fire. However, upon my arrival, the building was not



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secure. Students, teachers, and others were in areas of the school unaffected by the fire, but still at risk. I immediately took action to have these individuals removed and the building secured. I was informed a firefighter's injury was reported.

#### SUMMARY OF FINDINGS:

This summary of the investigation, evidence and information revealed is not intended to provide the details and documentation necessary for legal action(s). After the production of this report, additional evidence and/or information may have been revealed. Documentation of the evidence and information revealed during the investigative efforts conducted will be maintained in the fire investigation case file.

#### RESPONSE:

**Investigator:** Joe Schimanski, Deputy State Fire Marshal, IAAI-FIT, CFEI  
**Supervising Investigator:** Knute Sandahl, State Fire Marshal  
**Fire Department/District:** Pocatello Fire Department

#### ADDITIONAL AID:

The following provided assistance during the investigation:

##### State Fire Marshal Personnel:

Knute Sandahl, State Fire Marshal  
Tom Mroz, Chief Deputy State Fire Marshal  
Brian Owens, Deputy State Fire Marshal, IAAI-FIT

**Law Enforcement Officer:** E. Miller, Detective, Pocatello Police Department, Report #: 23-P07196

**Other Agencies:** Joel Miller, Special Agent, Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF), Report #: 787015-23-0038

#### INVESTIGATION:

I responded to 1800 Bench Rd., Pocatello, Idaho and began the examination of the fire scene. The investigation was conducted while employing a scientific methodology. Specifically; *The Basic Methodology of Fire Investigation and a Systematic Approach* as discussed in the 2021 edition of NFPA 921; "A Guide for Fire and Explosion Investigations" and the 2022 edition of NFPA 1033; "Standard for Professional Qualifications for Fire Investigator".

My opinions and conclusions contained in this report have been determined to a reasonable degree of certainty within the fire investigation profession. Each is based on the examinations conducted, the evidence and information known as of the production of this report, and the analysis of the same. Any new or discovered evidence or information may require the conclusions and opinions to be re-evaluated.

#### CONCLUSION:

Based on the physical examination of the fire scene, witness statements, in combination with an analysis of the evidence and information supports that this fire was the result of accidental actions (or inactions) by human hand.

Analysis of the evidence and information supports that the area of origin was the eastside of the D wing cafeteria located at or near the northside of the stage.



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Analysis of the evidence and information supports that the fire was initiated with an unidentified ignition source. Knute Sandahl, State Fire Marshal was provided a verbal briefing of the investigation and findings.

#### PROPERTY STATUS:

Occupied

#### FIRE DAMAGE ASSESSMENT:

This fire involved a one-story structure in normal use as a high school. Fire damage assessments conducted of the structure suggest the property damages to be approximately \$15,000,000.00 with an additional \$5,000,000.00 in content losses.

#### ADJACENT PROPERTIES INVOLVED:

No fire damages observed.

#### INJURY/DEATH:

During the process of the investigation and examination, a firefighter was injured. See the Pocatello Fire Department report held in the case file.

#### SUSPECTS/PERSONS of INTEREST/ARRESTS:

None

#### INSURANCE:

Sedgwick  
Seth McClure, Adjuster, National General

#### EVIDENCE:

During the process of the investigation and examination, physical evidence was tagged for the insurance investigator.

#### SUBJECTS/INDIVIDUALS PRESENT:

With the exception of any witnesses interviewed, there were no other interested parties present at the time of the examination.



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## Preliminary Information

### Tasks Conducted

Among the efforts conducted as a result of the assignment were:

- Investigation
- On-Site Examination
- Weather Report
- Capture Digital Photographs
- Capture UAV Video
- Capture UAV Photographs
- Written Report
- Diagram(s)
- Request Fire Department Response Report
- Review Fire Department Response Report
- Request Pocatello Police Report
- Review Pocatello Police Report

### Environmental Conditions

Weather data was gathered from [www.wunderground.com](http://www.wunderground.com). The information includes the date of the fire, focusing on the hours immediately prior to the discovery of the fire, as well as approximately seven days prior. A printed copy of the information retrieved is included as an addendum to this report.

Analysis and consideration of the information obtained indicates that during the fire:

- Wind was from the SSW at 18 mph with 24 mph wind gusts.
- Cloudy then light snow.
- Humidity levels within the area prior to, and during the fire, ranged from approximately 57% to 82%.
- Ambient temperatures ranged between 38° F and 49° F.

Analysis of the weather data revealed no evidence of a weather-related ignition source. Additionally, wind-related conditions had substantially contributed to the propagation (*spread*) of this fire.

### Photographic Documentation

As the examination was conducted, digital color photographs were taken to document the general examination process and findings. These master original photographic images are held within the case file. The original photographic images can be provided upon request.

The photos that have been printed, provided as exhibits, or included in the addenda section of this report may have been adjusted. These adjustments may include icons, pointers, or other similar notations to direct the viewer's attention to a specific area or detail. When present, the depictions included at the bottom of each photograph were added to draw attention to specific observations or existing conditions.



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#### Permission to Access

Permission to access and conduct the fire investigation was the result of:

- A search warrant issued on April 21, 2023 by the Honorable Judge Anson Call of the 6th District Magistrate. A copy of this warrant is included in the addenda of this report.

#### First Contact

Upon arrival, I met with Fire Marshal Dean Bullock. Together we reviewed the activities and information revealed prior to my arrival. The fire alarm system was discovered to be inoperative, allowing the fire to rapidly grow from incipient stage to full development before the fire department was notified. Fire Marshal Bullock and I talked to personnel that were on the scene and discovered that no fire personnel touched the fire alarm system.

#### Firefighter Observations

Interviews were conducted involving fire department first responders. Specifically, to identify any evidence or information that may be useful in determining the origin and cause of the fire. The information conveyed included that the Pocatello Fire Department was dispatched at 0358 hours and arrived on scene at 0403 hours. Upon their arrival, the officers on scene observed flames coming from the roof of the cafeteria. They described the center portion of the cafeteria roof as collapsed at 0420 hours. Additionally, the wall collapsed on the southside at 0504 hours.

#### Firefighter Activities

Interviews were conducted to obtain information regarding fire extinguishment and suppression activities. Specifically, with the goal of considering how those activities may have affected the ventilation of the fire, the fire's spread, as well as the absence or presence of fire effects, and fire and heat-related patterns in the areas examined. Information from the Pocatello Fire Department incident report indicated that fire crews began fire attack on the southside exterior. Upon collapse of the roof and southside exterior wall, a defensive fire was declared.

#### Security/Surveillance Images

During the process of the investigation, efforts were conducted to identify still, or video images captured prior to, during, and/or after the fire. As a result of these efforts, still/video images were identified. Specifically, these images were documented by school video, drone video, and ring cameras.

A copy of these images is held in the case file.

#### Aerial Images

During the process of the investigation, efforts were conducted to capture aerial images of the fire scene using an UAS (*Unmanned Aircraft System*). Video and still images were captured by Pilot Ballard of the Pocatello Police Department through the use of a DJI Mavic Mini which is owned by the Pocatello Police Department. The images included the general fire scene and portions of the surrounding areas.

A copy of the images is held in the case file.



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#### Fire Department Response

In an effort to collect additional data for consideration involving fire suppression and other similar activities, an official copy of the Pocatello Fire Department incident and response report was obtained. The following is a summary of the information obtained during my review of the report:

The information from the Pocatello Fire Department incident report indicated that fire crews began fire attack on the southside exterior. Upon collapse of the roof and southside exterior wall, a defensive fire was declared.

Overall, the information contained is consistent with the dates, times and locations discovered during my investigation.

The body of the report revealed no information that would support, or preclude, any deliberate cause or act of negligence that would have resulted in the fire. The report provided no witness statements. There was no narrative included in outlining a hypothesized or probable sequence of events leading up to the fire.



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## Exterior of Structure

### Safety Assessment

During the process of examination, efforts were conducted to determine if any safety related conditions could be identified which may cause me (*or any other individual*) physical harm as a result of anticipated investigative efforts. Beyond the personal safety gear normally associated with fire investigation (*e.g., eye, hand, respiratory, and footwear protection*), safety concerns were identified that required attention, including but not limited to, structurally compromised walls, floors and roof.

### Preliminary Efforts

Examinations of the exterior and surrounding areas of the fire location were conducted. In part, these efforts focused on both pre and post-fire scene safety, security, current status of utility services, potential means of ingress and egress, as well as the absence or presence of (*public or private*) fire extinguishment fixtures and/or apparatus. The efforts also included assessments focused on determining the fire's origin, cause, propagation and spread.

### Exterior Areas (Non-Areas of Origin)

- **Fire Hydrants**

During the process of the examination, efforts were conducted to locate public or private fire hydrants. These efforts revealed public hydrant(s) existed that were designed for use in the event of a fire involving this structure or property.

- **Electrical Service**

Examination of the structure revealed electrical service was provided via overhead power supply lines. Examination of the electric meter revealed it remained in place. Idaho Power Company shut off the electric to the building at the request of Pocatello Fire Department.

- **Main Service Panel**

Examinations of the main service panel's interior and exterior areas revealed no fire or heat-related damage. The main breaker within the service panel was in the "on" position. Examinations of the main service panel's remaining breakers revealed that some were in the "tripped" position.





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Blue arrow showing a trip on the main service panel. Picture is from file IMG\_0313.CR2. A copy of this image is included in the addenda/held in the case file.





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#### Electrical Subpanel

Examinations of the interior and exterior areas of the structure revealed a separate subpanel existed from the main service panel. The subpanel was located in the hallway of the D wing between the cafeteria and old gym. Examinations of the subpanel's interior and exterior areas revealed heat-related damage.



Panel D-2 located in the hallway of the D wing between the cafeteria and old gym. Orange arrows show breakers 5 and 9 tripped. Breaker 5 is connected to the fans in the practice room. Breaker 9 is connected to the receptacle on the stage lights. Picture is from file IMG\_0316.CR2. A copy of this image is included in the addenda/held in the case file.



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Labeling of Panel D2. Picture is from file IMG\_0317.CR2. A copy of this image is included in the addenda/held in the case file.

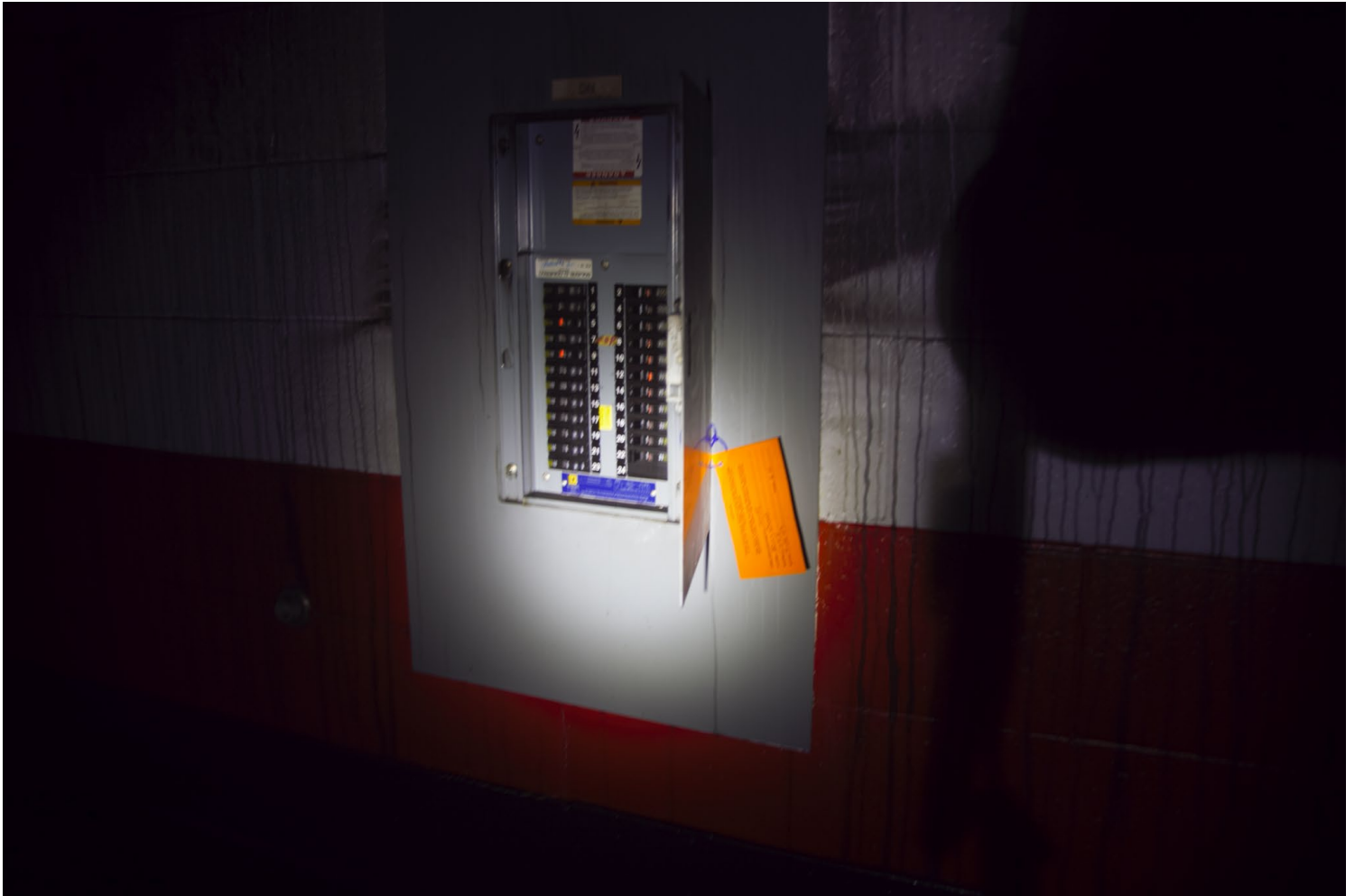


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Panel D-2 located in the hallway of the D wing between the cafeteria and old gym marked as evidence. Picture is from file IMG\_0364.CR2. A copy of this image is included in the addenda/held in the case file.

Analysis of the fire and heat-related patterns by their movement and intensity concludes the fire propagated to the panel.

Examinations of the subpanel's main breaker revealed it was currently in the “on” position.  
Examinations of the subpanel's remaining breakers revealed that some were in the “tripped” position.

- **Natural Gas**

Examination of the structure revealed natural gas service was provided to the structure for the kitchen, water heater, as well as interior area heating. Examinations of the gas main control valve revealed it was currently in the “off” position. Intermountain Gas Company shut gas off to the building at the request of the Pocatello Fire Department.





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#### Condition of Property

The property's location is best described as follows: 1800 Bench Rd., Pocatello, Idaho. Examination of the areas outside the structure revealed the property appeared to be in good condition at the time of the fire. Specifically, considering the structure's age and use, it appeared to have been well-maintained.

Examination of the exterior areas of the property revealed:

- No evidence that the property may have been for sale, rent or lease.
- No evidence was observed that the property had been in foreclosure or abandoned.

#### Property Fencing

Examination of the fire loss property location revealed some perimeter fence existed.

Examination of the area revealed no observable pre-fire obstructions which would have been obstacles or restricted the fire department's access to the property.

#### Structure's Construction

Examination of the structure's foundation areas revealed it had been constructed of a concrete slab with block walls. Examination of the exterior wall areas revealed they had been constructed of masonry brick. Examination of the structure revealed no observable significant alterations (*or additions*) that had been assembled after the structure's original completion.

- **Mechanical Security Devices**

Examination of the structure's exterior revealed that prior to the fire, no window security bars, or other similar devices had been installed.

Examination of the structure's exterior revealed that prior to the fire, no metal security screen door devices had been installed (*beyond traditional door lock assemblies*).



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#### Structure Exterior Areas

The exterior areas of the structure were examined. These examinations included assessments and considerations of the remaining physical evidence. These evaluations included considering and analyzing the absence or presence of fire effects, fire patterns, as well as other physical evidence including:

- Degradation of materials consistent with direct flame impingement
- Damages consistent with radiant and/or convective heat transfer
- Soot deposits or other products of incomplete combustion

Additionally, the following were considered and analyzed:

- The distances between the available fuels and ignition sources
- The available ignition sources involving their heat energy generation properties to determine their ability to provide the competent ignition source of this fire
- Any other evidence which may have caused or contributed to the sequence of ignition for the fire

These efforts, considerations and analyses provided sufficient evidence or information, which supports:

- That the fire had not propagated from any of the exterior areas
- The elimination of each of the ignition sources and available fuels located at or near the exterior areas as having caused or contributed to the sequence of ignition for the fire

As a result of these conclusive determinations, the exterior areas were determined not to have been the area of origin for the fire.

Digital photographic images were captured of the exterior areas providing a general overview of the contents, conditions (*or damages*) documented. These images may contain, in part, the absence or presence of fire effects, fire department efforts, cleanup, or other activities that occurred after extinguishment.

Unless noted to the contrary, examinations of each of the exterior areas revealed:

- No cigarettes, cigarette butts, or other similar materials were found within the areas. No other indications were observed that suggested the occupants frequently smoked in the areas
- No evidence was observed of open flame or smoldering materials (e.g., candles, incense or other similar materials)
- Examination of the areas revealed no visible fire and heat-related patterns or other evidence consistent with an ignitable liquid having been dispersed



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A preliminary examination of the structure's exterior wall areas was conducted. This process included analyzing and considering the visually observable absence or presence of fire, heat and/or soot-related damage. During this process, some areas were identified as having observable fire damages.

#### Exterior Wall Areas

- **Window Documentation**

An examination of the exterior window(s) was conducted. These examinations were conducted in an effort to analyze and determine if any window-related involvement in the fire's ventilation occurred. These efforts included evaluations of the window glass and corresponding window frame components. Assessments were also conducted involving the absence or presence of soot (*and other particulates of incomplete combustion*), as well as any effects of fire and/or heat impingement.

These examinations revealed evidence of fire, heat or soot-related damage. Additionally, these efforts provided sufficient evidence to determine the specific position of the window(s) during the "incipient stage" of the fire.

Continued examinations and analysis were conducted of the window(s) and remaining evidence. These efforts provided sufficient evidence to conclude that during the fire, ventilation occurred through the window(s).

- **Door Documentation**

Examinations were conducted of the exterior door(s). These examinations were conducted in an effort to analyze and determine if any door-related involvement in the fire's ventilation occurred. These efforts included evaluations of the door panel and corresponding door frame components. Assessments were also conducted involving the absence or presence of soot (*and other particulates of incomplete combustion*), as well as any effects of fire and/or heat impingement.

These examinations revealed visible evidence of fire and heat-related damage. Additionally, these efforts provided sufficient evidence to conclude that prior to the fire, all exterior doors had been in the "closed" position. As a result, during the "incipient stage" of the fire, no ventilation through the door(s) occurred.

Continued examinations and analysis were conducted of the door(s) and remaining evidence. These efforts provided sufficient evidence to conclude that during the fire, ventilation occurred through the door(s).





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- **Exterior Area Overall**

Examination of the exterior wall areas revealed evidence (*e.g., visual damage from fire, heat, soot, etc.*) that the area had experienced the effects of exposure to the fire. The observations included deposits resulting from soot and other incomplete combustion materials.

Analysis of the fire and heat-related patterns involving the exterior wall areas concluded, based on the fire's movement and intensity, that the fire had propagated from an area within the structure.

#### **Roof Exterior**

Examination of the structure's exterior roof areas revealed it had been constructed using a hot mop and tar. Examination of the roof areas revealed fire and heat-related damage. This damage was the result of heat impingement from the interior and exterior areas.

Analysis of the roof located fire and heat-related patterns, by movement and intensity, supports that the fire had propagated from an area within the structure.



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#### Interior (Non-Areas of Origin)

Entrance to the interior of the structure was made through the door on the southwest side of the D-wing by the cafeteria. Upon entering the structure, efforts were conducted focused on identifying the areas exhibiting the least and greatest fire and heat-related damage.

#### Fire Control

Examinations conducted of the interior areas revealed some fire extinguishment system had been installed within the structure, notably in the corridor separating the D wing from the B wing and basement area. The possibility exists that fire and/or building codes do require a built-in extinguishment system in this type of structure.

The absence of a fire extinguishment system, during the incipient stage, contributed to the propagation of the fire. In addition, this absence contributed to the consumption of, and degradation of, the combustible materials within the area.

- **Hand-Held Extinguishers**

During the scene examination, efforts were conducted to locate hand-held extinguishers. During this process, none were observed.

- **Fire - Smoke Detector/Alarm**

In an effort to locate fire or smoke detection/alarm systems or components, which had been installed "prior to the fire," examinations were conducted of the interior compartments. During this process, none were discovered.

The absence of fire or smoke detection/alarm systems, or components, had caused a delay in discovering the fire during the incipient stage. As a result, the absence of early warning had contributed to the consumption of, and degradation of, the combustible materials within the structure. It was noted that smoke detection in other areas of the school, which showed evidence of exposure, failed or the system (panel) failed to notify a central receiving station of activation.



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### Exposure Rooms - Areas

Each of the compartments and areas within the structure were examined. These examinations included assessments and considerations of the remaining physical evidence. These evaluations included considering and analyzing the absence or presence of physical evidence involving:

- Degradations of combustible materials consistent with direct flame impingement
- Damages consistent with radiant and convective heat transfer
- Soot deposits or other products of incomplete combustion

Additionally, the following were considered and analyzed:

- The distances between the available fuels and competent ignition sources
- The distances between the available ignition sources and the first fuel ignited
- The available ignition sources involving their heat energy generation properties to determine their ability to provide the competent ignition source of this fire
- Any other physical evidence which may have caused or contributed to the sequence of ignition for this fire

As a result of these efforts, considerations and assessments, sufficient evidence or information was revealed which supports the following analyses:

Analysis of the fire and heat-related patterns, as well as any deposit of soot materials, concluded that the fire had not propagated from these compartments (*or areas*).

Analysis of the evidence and information was sufficient to eliminate each of the available ignition and fuel sources as having caused or contributed to the sequence of ignition for the fire. As a result of these conclusive determinations, each was determined to have been damaged to varying degrees as a result of exposure to the fire. Each of the compartments (*or areas*) was then considered "Exposure Rooms/Compartments."

Digital photographic images were captured of the compartments (*or areas*). This was done to provide a general overview of the contents, conditions (*or damages*) documented. These captured images may contain, in part, the absence or presence of exposure to the fire, fire department efforts, cleanup, or other activities that occurred after extinguishment.

A preliminary examination of the structure's interior was conducted in an effort to identify areas exhibiting any visually observable absence or presence of fire, heat and/or soot-related damage. During this process, the area with the least damage was identified.



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Analysis of the evidence and information obtained during this preliminary examination revealed areas with the least damage. Documentation of each was conducted by examining and digitally photographing the compartments exhibiting the least fire damage, then working towards the area with the greatest fire damage.

#### Group Areas

Examinations were conducted of each of the exposure areas. The exposure areas included: boys and girls locker rooms, choir and band room, cafeteria, kitchen, as well as the hallways leading to the weight room and racket ball court, and the old gymnasium.

Examination of these areas revealed evidence (*e.g., visual heat and/or soot deposits and damage*) of the effects, to varying degrees, of exposure to the fire. Observations included radiant and convective heat transfer, direct flame impingement, fire and heat-related damage, as well as the consumption of, and degradation to, the combustible materials.

The vertical and horizontal areas had severe damage, resulting from radiant and convective heat, as well as direct flame impingement.

The combustibles in the upper-most portions of the compartments sustained the most fire and heat-related damage. The lower portions had comparatively less fire and heat-related damage.

As a result of the exposure to fire and heat-related energy, consumption of and degradation to, the combustible materials occurred. The only areas with remaining combustibles were those protected from heat energy, or where the process of combustion had been limited by ventilation and extinguishment efforts.

Analysis of each of the exposure rooms revealed the greatest fire and heat-related damage was located in the D wing cafeteria stage area.

Interior doors in the affected areas were chocked open and had to be closed by fire department personnel. The door leading from the cafeteria to the stairs to the north corridor had been removed.

An overall review of the areas revealed that the contents had not been disturbed since the fire.

- **Smoking Activity**

Examination of these areas revealed no cigarettes, cigarette butts, or other similar materials. No other indications were observed that suggested the occupants frequently smoked in the area.

- **Open Flame/Smoldering**

Examination of these areas revealed no evidence (*e.g., candles, incense or other similar materials*) of an open flame or smoldering materials.



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#### Adverse Conditions

Examinations of the fire location were conducted in an effort to identify and evaluate changes that occurred during, or after, the fire. These efforts focused on the changes that may have been obstacles in determining the origin, or cause, of the fire. The result of these efforts revealed no adverse conditions affecting this fire scene examination.

#### Building Defects

Examinations were conducted to identify building defects. These efforts focused on the types of defects which may have caused, or contributed to, the "sequence of ignition" of the fire, as well as those which may have affected the "propagation and spread" of the fire. These efforts concluded with no visible building defects that could have caused this fire. In addition, defects were observed that would have substantially contributed to the fire's spread, specifically, the failure to maintain fire doors leading from the stage to the choir/band room corridor, as well the removal of the door to the stairs leading to the northside corridor.

#### Building or Fire Code

Examinations were conducted in an effort to locate any identifiable fire or building code issues. These efforts focused on the types of defects which would have caused, or contributed to, the "sequence of ignition" for the fire, as well as those which may have affected the "propagation and spread" of smoke, fire and/or heat. During this process, fire or building code issues were identified. The main fire alarm panel indicated it was in "trouble mode." The fire alarm did not activate or send a signal to the monitoring company. Once the sprinkler system was activated, it did not send an alarm or water flow to the monitoring company. The water bell did not sound, and the water strobe was not activated.



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Alarm Panel reading Fault, Supervisory, and System Trouble on the day of the fire. Picture is from file IMG\_0194.CR2. A copy of this image is included in the addenda/held in the case file. Pocatello Fire Department Inspection Report notes from November 28, 2022: Fire Alarm Panel in trouble mode (fail). The Inspection Report is included in the addenda/held in the case file.





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Main Alarm Panel showing Brown Out system trouble. Picture is from file IMG\_0197.CR2. A copy of this image is included in the addenda/held in the case file.



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Blue arrow shows last inspection and test date by FSI. Yellow arrows show monitoring contacts. Picture is from file IMG\_0193.CR2. A copy of this image is included in the addenda/held in the case file.

During the on-site examination, sufficient evidence or information was revealed that a pre-fire building or fire code violation existed. The double doors located in the hallways separating the wings did not close. The Pocatello Fire Department manually closed the doors.

Specific Violation Identified, fire alarm panel in trouble:

**901.6 Inspection, testing and maintenance.** Fire detection and alarm systems, emergency alarm systems, gas detection systems, fire-extinguishing systems, mechanical smoke exhaust systems and smoke and heat vents shall be maintained in an operative condition at all times and shall be replaced or repaired where defective. Nonrequired *fire protection systems* and equipment shall be inspected, tested, and maintained or removed. IFC-2018 Chapter 9

**901.7 Systems out of service.** Where a required *fire protection system* is out of service, the fire department and the *fire code official* shall be notified immediately and, where required by the *fire code official*, the building shall be either evacuated or an *approved* fire watch shall be provided for all occupants left unprotected by the shutdown until the *fire protection system* has been returned to service. Where utilized, fire watches shall be provided with not less than one *approved* means for notification of the fire department and their only duty shall be to perform constant patrols of the protected premises and keep watch for fires. IFC-2018 Chapter 9



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**907.8 Inspection, testing and maintenance.** The maintenance and testing schedules and procedures for fire alarm and fire detection systems shall be in accordance with Sections 907.8.1 through 907.8.5 and NFPA 72. Records of inspection, testing and maintenance shall be maintained. IFC-2018 Chapter 9

### Wear and Tear

The on-site examinations included efforts to identify visually observable wear and tear and/or age-related damages. The efforts focused on those damages which may have provided the ignition source or substantially contributed to the fire's propagation and spread. As a result of these efforts, it was noted interior doors in the affected areas were chocked open and had to be closed by fire department personnel.



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### Area of Origin

Examinations were conducted of the fire scene, focused on identifying the area (*or areas*) of the fire's origin. In part, these examinations focused on identifying fire effects (*changes caused by fire*), as well as the remaining fire and heat-related patterns (*physical changes or shapes caused by fire effects*). In addition, an evaluation of each of the visually identifiable fire patterns was conducted while considering the method of heat transfer (*conduction, convection, and/or radiant transfer*) that may have been involved in their creation. Other examination efforts included identifying and considering the consumption of, or degradation to, combustible/ignitable materials, as well as the availability (*and effects*) of ventilation.

During this portion of the data collection process, efforts were conducted to avoid prematurely (*before all data was collected*) determining the cause of the damage to the materials, or how each fire pattern was created.

In an effort to document some of the visually observable fire effects (*size, shape, intensity, magnitude, etc.*), as well as the fire and heat-related damages (*fire damages*), photographic images were captured. These photographic images also documented some of the locations, discoloration, physical changes, and degradation of materials, as well as some of the remaining fire patterns.

- **Fire Origin**

Efforts were conducted focused on analyzing the data collected and testing (*via inductive and deductive reasoning*) of various fire origin hypotheses. Included in the analyses were: the fire effects identified, remaining fire and heat-related patterns, pre-fire (*and engaged*) fuel loads, as well as fire damage to the combustible/ignitable materials.

These efforts also included an analysis of the consumption of, and degradation to, materials, as well as considerations involving the materials (*or areas*) that had been protected from fire and heat-related energy transfer. Other considerations involved the effects (*and changes*) of ventilation, as well as the engagement of available fuels during the progression of the fire. The analysis process included identifying and considering a variety of fire origin and fire spread hypothesis (*sequential pattern analysis*).

As a result of these efforts, sufficient evidence or information was revealed that identified the area of origin. The fire was determined to have originated within the interior of the structure. The area of origin was the eastside of the D wing cafeteria located at or near the northside of the stage.





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- **Fire Damage**

Examination of the area revealed evidence of exposure to fire and heat-related energy. The fire and heat-related damages observed within the area were consistent with significant heat energy generation, heat transfer and the consumption of combustible materials.

The fire and heat-related damage observed included radiant and convective heat transfer, and deposits resulting from soot and other incomplete combustion materials. Almost all of the combustibles in the area had experienced fire and heat-related damage. The only areas where combustibles remained were located in areas where a restriction of ventilation occurred, or fire suppression had taken place.

- **Flashover**

Examination of the compartment revealed fire and heat-related patterns, as well as a consumption of combustible/ignitable materials which were consistent with a fire that had spread rapidly. These fire effects were also consistent with a full room/compartment involvement fire.

Analysis of the fire effects support that during the fire, heat energy had been generated and transferred to the surfaces of additional combustible/ignitable materials within the compartment. Once sufficient heat energy had transferred to these materials, an (*almost*) simultaneous "open flame" ignition of the heated materials occurred.

Analysis of all the evidence and information was sufficient to conclude that a flashover of the fire occurred.

- **Contents Changes**

Examination of the area revealed that after extinguishment, the majority of the contents had not been disturbed or removed as a result of occupant activities.

- **Area of Origin Remodeling**

Examination of the area of origin revealed no observable evidence that significant remodeling occurred since the structure's original construction.

During the process of the examination, other evidence or information was revealed which identified the area of origin. As a result, arc mapping efforts were determined not to be required to identify the area of origin of the fire.

- **General Area of Origin**

Examinations were conducted in the area of origin focused on the fire effects, the remaining fire and heat-related patterns, and considering the consumption of, or degradation to, materials. Other efforts involved the fire and heat-related patterns, their movement and intensity, in combination with the heat energy generated (*and released*). Additional efforts were focused on the availability (*and effects*) of ventilation during the various stages of the fire.

Efforts were then conducted focused on analyzing the data collected and the testing (*via inductive and deductive reasoning*) of various fire origin hypotheses. Among the factors included in the analyses were: the fire effects



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identified, remaining fire and heat-related patterns, pre-fire (*and engaged*) fuel loads, ventilation, as well as fire damage to the materials.

As a result of these efforts, sufficient evidence and information was revealed which supports a conclusive determination regarding the fire's general area of origin. The general area of origin was located within the D wing cafeteria on the northside of the stage.

- **Specific Area of Origin**

After identifying the general area of fire origin, efforts were focused on identifying the specific area of origin. Similar data collection efforts were conducted of the local fire effects, fire patterns, fire and heat-related damages, and degradations involving the local materials.

Additional efforts were conducted focused on analyzing the data collected and the testing (*via inductive and deductive reasoning*) of various specific area of origin hypotheses. Among the factors analyzed were: the fire effects identified, remaining fire and heat-related patterns, pre-fire (*and engaged*) fuel loads, ventilation, as well as fire damage to the materials in the area.

As a result of these efforts, sufficient evidence and information was revealed which supports a conclusive determination regarding the fire's specific area of origin. The specific area of origin was located on the northside of the stage.

### Available Fuels

During the on-site examination, efforts were conducted to identify available fuels within the area of origin. When identified, additional efforts focused on the fuels' composition, density and their thermal inertia properties (*rate(s) of surface temperature increase when exposed to heat energy*).

Additional efforts and analysis were conducted involving the fuel(s), including the distance and directional relationship for comparisons to any available ignition sources identified. These efforts provided additional evidence and information that resulted in the elimination of some of the available fuels as the first fuel ignited.

- **Unable To Eliminate Fuel**

During the in-field examination, insufficient evidence or information was revealed to eliminate each of the fuels considered as the first fuel ignited. Specifically, the fuels that could not be eliminated were the power supply wiring and internal components of the audio amplifier, in addition to external wiring for a battery charging appliance and internal components of the floor scrubber.

The investigative efforts conducted involving the available fuels (*within the general and specific areas of origin*) provided sufficient evidence and information which supports a conclusive determination regarding the first fuel ignited. The first fuel ignited was determined to have been combustible materials.





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- **Presence of Open Flame**

Examination of the area was conducted in an effort to determine if, prior to the fire, open flame candles, incense or other similar items had been used. These examinations provided no observable physical evidence that these items had been in use.

- **Pre-Fire Oxidizing Agent**

Examinations were conducted focused on identifying any evidence of a pre-fire oxidizing agent (*beyond atmospheric oxygen*) that was consistent with (*or capable of*) a self-heating and/or a self-ignition fire. Additional efforts focused on identifying any evidence consistent with the pre-fire presence of pyrophoric materials (*materials capable of spontaneous ignition when exposed to air*).

These efforts revealed no physical evidence or fire and heat-related patterns which were consistent with the presence of either a pre-fire oxidizing agent(s) or pyrophoric material(s).

### Available Ignition Sources

During the on-site examination, efforts were conducted to identify available ignition sources within the area of origin. When identified, additional efforts focused on the ignition sources and their ability (*sufficient energy*) to release heat and transfer it (*via conductive, radiant, and/or convective heat transfer*) to the available fuels. Specifically, these efforts focused on collecting information which may support, or preclude, that each had been the competent ignition source which had transferred sufficient heat energy to the first fuel ignited.

The investigative efforts conducted involving ignition sources within the general and specific areas of origin provided sufficient evidence and information which support a probable competent ignition source. The probable ignition source that may have transferred sufficient heat energy to the first fuel ignited was the stage audio amplifier (a power amplifier boosts the input signal's strength to a level that may drive numerous output devices, including speakers, headphones, RF transmitters, etc.) or Tomcat floor scrubber.

### HVAC Systems

During the examination, efforts were conducted to analyze the HVAC (*heating, ventilation and air-conditioning*) systems potential involvement in the ventilation of the fire. Examinations were conducted of the HVAC duct and vent components within the compartment. These examinations revealed physical damage, as well as fire and heat-related damage.

These damages had caused an inability to fully examine and analyze fire and heat-related patterns and/or any soot accumulations which may have occurred during the fire. As a result, no conclusive determinations can be made involving the effects of the HVAC system by the venting of smoke (*or combustible air entrainment*) through the ducting.



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#### Ventilation and Propagation

During the on-site examination, efforts were conducted to locate, identify and analyze the physical evidence and other available information involving the ventilation and propagation of the fire. The examination included the remaining fire and heat-related patterns, as well as the materials in both protected and unprotected areas. These efforts included considering and analyzing existing evidence of combustible consumption and corresponding degradations. Also considered were the variables involving any changes of ventilation that may have occurred during the different stages of the fire.

- **Ventilation**

During the development stage (*engagement of additional fuels*), the fire's propagation had been affected as a result of the continuous availability of combustible air and venting of the smoke and other particles of incomplete combustion.

Analysis of all of the evidence and information involving the effects of ventilation was sufficient to conclude that no restriction of ventilation had affected the fire's propagation and spread.

- **Propagation**

The results of the efforts involving the fire's spread supports that once ignited, the fire propagated (*extended*) from the area of origin to the surrounding fuels (*ignitable materials*). The propagation of the fire was a result of both radiant and convective heat energy transfer. As the fire propagated, additional fuel loads within the area contributed to the total heat energy release. As a result, a compounding effect of heat energy had caused a more rapid propagation and spread of the fire. The largest contributor to the fire's propagation and extension was an almost continuous availability of combustible air.

#### Evidence On-Site

During the on-site examination, physical evidence was identified that needed to be collected for the purposes of preservation or future examinations. The audio power amplifier and Tomcat floor scrubber were tagged as evidence and left for the insurance company investigator.



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## Origin and Cause Determination

### Area of Origin

As a result of the examinations and consideration of the remaining burn patterns, witness statements, and fire flow patterns, this fire was determined to have originated from within the structure. The area of origin was the eastside of the D wing cafeteria located at or near the northside of the stage.

### Fuel Sources

Examinations were conducted in an effort to identify any pre-fire available fuels within the general area of origin. During this process, fuels were identified. The fuels that were present or considered include: couch/sofa/chair materials, curtains/drapes, combustible wood cabinetry, combustible wood material used in the structure's construction, and a built-in wood storage closet.

In-field investigation and examination provided sufficient evidence, or information, which eliminated some of the available fuels as having been the first fuel ignited. The available fuels that could not be eliminated were stage curtains and a built-in wood storage closet.

Analysis of all the evidence and information revealed during this examination provided sufficient evidence to support that the probable first fuel ignited had been the stage curtains.

### Ignition Sources

Examinations were conducted in an effort to identify any pre-fire available ignition sources within the general area of origin. During this process, ignition sources were identified. The ignition source(s) that were present or considered include: audio power amplifier, Tomcat floor scrubber, 120V outlets, structure-related wiring, wall-light switches, and extension cord.

In addition, ignition sources included the electrical wiring (*or electronics*) used in the construction of the: VCR component, DVR component, and audio components.

In-field investigation and examination provided sufficient evidence, or information, which eliminated some of these ignition sources as having been the competent ignition source of the fire. The ignition source(s) that could not be eliminated were the audio power amplifier and Tomcat floor scrubber.

Analysis of all the evidence and information revealed during this examination provided sufficient evidence that the probable competent ignition source had been the audio power amplifier or Tomcat floor scrubber.

### Causes Considered

Efforts were conducted to determine the specific action, or inaction, which caused the competent ignition source and the first fuel ignited to interact which resulted in the fire. Among the fire cause scenarios considered were: engineering design defect, component failure, degradation of materials over time, manufacturer defect, occupant/invitee negligence, unauthorized individuals actions, service provider negligence, accidental or incendiary (arson), and natural (lightning).



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In-field investigation and examination provided evidence or information indicating the cause of the fire is most probably a component used in the construction of the audio power amplifier or the Tomcat floor scrubber.

#### Hypotheses Developed

Based on the evidence and information revealed, working hypotheses have been identified which describe both the sequence of ignition (*that may have resulted in the fire*) and the fire's development (*fire spread*). The following are supported by the evidence and information revealed to date:

**Hypothesis Number One:** It is most probable that the audio power amplifier, which was determined to have been plugged in and energized at the time of the fire, sustained an unspecified electrical fault within. The fire then ignited the stage curtains which surrounded the audio power amplifier, resulting in a sufficient heat release rate for the fire to communicate with nearby combustible materials. Due to the fire load directly above the audio power amplifier, which consisted of stage curtain panels and other synthetic materials, the fire spread vertically into the roof truss area, and horizontally through the fire doors that were not maintained.

**Hypothesis Number Two:** It is possible that on the day of the fire, the electric Tomcat floor scrubber that was plugged into an outlet and stored on the northside of the stage in a janitor room, sustained an unidentified electrical failure. This failure resulted in a sufficient generation of heat and molten debris to ignite the plastic components used in the manufacturing of the Tomcat floor scrubber. The resulting flaming combustion then communicated with secondary fuels within the janitor room and eventually the rest of the structure. The specific failure within the scrubber could not be determined during the course of this investigation

Without the benefit of additional evidence and information, continued fire location examinations are unlikely to provide sufficient evidence for more conclusive determinations.





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Blue arrow showing arcing on outlet cover that the audio power amplifier was plugged into. Picture is from file IMG\_0345.CR2. A copy of this image is included in the addenda/held in the case file.





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Yellow arrow showing equipment located in the cabinet on the northside of the stage area. Blue arrows show arcing inside the cabinet. Picture is from file IMG\_0360.CR2. A copy of this image is included in the addenda/held in the case file.





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Blue arrow shows Tomcat floor scrubber located on the northside of the stage. Yellow arrow showing power cord for the Tomcat floor scrubber. Picture is from file IMG\_0365.CR2. A copy of this image is included in the addenda/held in the case file.



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### Summary

Based upon the totality of information obtained during the course of this investigation, this fire was determined to have originated from an area within the structure. Once ignited, the fire burned upward and outward, communicating to the surrounding combustibles. After identifying the area of origin, additional efforts were conducted focused on available ignition and fuel sources, as well as fire cause scenarios.

Analysis of all the evidence and information supports conclusive determinations regarding the first fuel ignited.

#### Accidental Cause

Analysis of all the evidence and information revealed was sufficient to support that the fire was the result of an unintentional act. During the course of this investigation, no evidence or information was discovered that would support any deliberate act which would have caused this fire.

#### Alternative Scenarios

During the course of this examination and investigation, all other probable cause scenarios that could have resulted in this fire were taken into consideration. All probable ignition sources that remained within the area of origin at the time of the examination were also taken into consideration.

The opinions and conclusions contained in this report are based on a systematic examination of the physical evidence, an analysis of information obtained followed by the testing of the hypotheses supported by the evidence revealed.



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## Glossary of Terms

In addition to my education, training and experience, other reference materials were considered. In part, these materials provide guidance, suggestions, recommendations and/or information involving fire and explosion investigations. The following is provided in an effort to aid the reader's understanding of some of the concepts, descriptions and definition of terms within the fire investigation profession.

\* **Origin and Development of NFPA 921** – NFPA 921, *Guide for Fire and Explosion Investigations*, was developed by the Technical Committee on Fire Investigations to assist in improving the fire investigation process and the quality of information on fires resulting from that process. The goal of the committee is to provide guidance to both public and private investigators based on accepted scientific principles and scientific research. *"Origin and Development of NFPA 921" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.01*

\* **Guide** – A document that is advisory or informative in nature and that contains only nonmandatory provisions. A guide may contain mandatory statements such as when a guide can be used, but the document as a whole is not suitable for adoption into law. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.13, 3.2.3*

\* **Scene** – The general physical location of a fire or explosion incident (geographic area, structure or portion of a structure, vehicle, boat, piece of equipment, etc.) designated as important to the investigation because it may contain physical damage or debris, evidence, victims, or incident-related hazards. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.18, 3.3.166*

\* **Fire** - A rapid oxidation process, which is an exothermic chemical reaction, resulting in the evolution of light and heat in varying intensities. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.16, 3.3.68*

\* **Origin** – The general location where a fire or explosion began. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.18, 3.3.140*

\* **Area of Origin** – A structure, part of a structure, or general geographic location within a fire scene, in which the “point of origin” of a fire or explosion is reasonably believed to be located. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.14, 3.3.13*

\* **Point of Origin** – The physical location within the area of origin where a heat source, a fuel, and an oxidizing agent first interact, resulting in a fire or explosion. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.18, 3.3.149*

\* **Fuel** – A material that will maintain combustion under specified environmental conditions. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.16, 3.3.95*

\* **Fuel Analysis**. Fuel analysis is the process of identifying the first (initial) fuel item or package that sustains combustion beyond the ignition source and identifying subsequent target fuels beyond the first fuel ignited. *"Fire Cause Determination" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.233, 19.4.1*

\* **Accelerant** – A fuel or oxidizer, often an ignitable liquid, intentionally used to initiate a fire or increase the rate of growth or spread of fire. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.14, 3.3.2*





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\* **Ignitable Liquid** – Any combustible or flammable liquid. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.17, 3.3.116*

\* **First Fuel Ignited** – The first fuel ignited is that which first sustains combustion beyond the ignition source. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.16, 3.3.83*

\* **Ignition** – The process of initiating self-sustained combustion. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.17, 3.3.117*

\* **Arc (Arcing)** – A high-temperature luminous electric discharge across a gap or through a medium such as charred insulation. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.14, 3.3.8*

\* **Ignition Source Analysis** – The investigator should evaluate all potential ignition sources in the area of origin to determine if they are competent. A competent ignition source will have sufficient energy and be capable of transferring that energy to the fuel long enough to raise the fuel to ignition. *"Fire Cause Determination" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.233, 19.4.2*

\* **Competent Ignition Source** – An ignition source that has sufficient energy and is capable of transferring that energy to the fuel long enough to raise the fuel to its ignition temperature. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.15, 3.3.37*

\* **Autoignition** – Initiation of combustion by heat but without a spark or flame. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.14, 3.3.16*

\* **Autoignition Temperature** – The lowest temperature at which a combustible material ignites in air without a spark or flame. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.14, 3.3.17*

\* **Spontaneous combustion** due to self-heating is a special form of smoldering ignition that does not involve an external heating process. An exothermic reaction within the material is the source of the energy that leads to ignition and burning. The key concept in ignition by self-heating is the ability of the material to dissipate the heat generated by the internal exothermic reactions. If the heat generated by the reaction cannot be dissipated to the surroundings, the material will rise in temperature to an extent that the reaction rates accelerate (i.e., runaway), and a smolder front is formed. Key variables in self-heating include the ambient temperature, the pile size, and the reaction kinetics of the exothermic process. As the ambient temperature rises, the baseline reaction rate increases, and as the pile size increases, the ability to dissipate heat to the surroundings decreases. Both high ambient temperatures and large pile sizes favor selfheating processes. See the following section for more detailed information concerning self-heating in piles. *"Basic Fire Science" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.39, 5.7.4.1.1.5*

\* **Fire Effects** – The observable or measurable changes in or on a material as a result of a fire. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.16, 3.3.74*

\* **Total Burn** – A fire scene where a fire continued to burn until most combustibles were consumed and the fire self-extinguished due to a lack of fuel or was extinguished when the fuel load was reduced by burning and there was sufficient suppression agent application to extinguish the fire. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.19, 3.3.200*

\* **Smoke** – The airborne solid and liquid particulates and gases evolved when a material undergoes pyrolysis or combustion, together with the quantity of air that is entrained or otherwise mixed into the mass. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.19, 3.3.177*



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- \* **Soot** – Black particles of carbon produced in a flame. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.19, 3.3.181*
- \* **Char** – Carbonaceous material that has been burned or pyrolyzed and has a blackened appearance. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.14, 3.3.29*
- \* **Clean Burn** – A distinct and visible fire effect generally apparent on noncombustible surfaces after combustible layer(s) (such as soot, paint, and paper) have been burned away. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.14, 3.3.31*
- \* **Fire Patterns** – The visible or measurable physical changes, or identifiable shapes, formed by a fire effect or group of fire effects. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.16, 3.3.78*
- \* **Arc Mapping** – Identifying and documenting a fire pattern derived from the identification of arc sites used to aid in determining the area of fire origin or spread. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.14, 3.3.9*
- \* **Fuel Load** – The total quantity of combustible contents of a building, space, or fire area, including interior finish and trim, expressed in heat units or the equivalent weight in wood. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.16, 3.3.97*
- \* **Fuel-Controlled Fire** – A fire in which the heat release rate and growth rate are controlled by the characteristics of the fuel, such as quantity and geometry, and in which adequate air for combustion is available. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.16, 3.3.98*
- \* **Ventilation** – The movement of gases within, into, or from any compartment or space or the firefighting operation of removing smoke and heat from the structure by opening windows and doors or making holes in the roof. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.20, 3.3.206*
- \* **Ventilation-Controlled Fire** – A fire in which the heat release rate or growth is controlled by the amount of air available to the fire. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.20, 3.3.207*
- \* **Data Analysis** – The process of systematically utilizing logical techniques to dissect, reorder, evaluate, and interpret data. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.15, 3.3.42*
- \* **Empirical Data** – Factual data that is based on actual measurement, observation or direct sensory experience rather than on theory. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.15, 3.3.54*
- \* **Deductive Reasoning** – The process by which conclusions are drawn by logical inference from given premises. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.15, 3.3.43*
- \* **Inductive Reasoning** – The process by which a person starts from a particular experience and proceeds to generalizations. The process by which hypotheses are developed based upon observable or known facts and the training, experience, knowledge, and expertise of the observer. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.17, 3.3.122*





# IDAHO STATE FIRE MARSHAL'S OFFICE

## FIRE INVESTIGATION REPORT

FIRE INVESTIGATION  
700 W. State Street  
3<sup>rd</sup> Floor  
Boise, ID 83720

### ACCIDENTAL

\* **Failure** – Distortion, breakage, deterioration, or other fault in an item, component, system, assembly, or structure that results in unsatisfactory performance of the function for which it was designed. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.15, 3.3.64*

\* **Failure Analysis** – A logical, systematic examination of an item, component, assembly, or structure and its place and function within a system, conducted in order to identify and analyze the probability, causes, and consequences of potential and real failures. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.15, 3.3.65*

\* **Cause** – The circumstances, conditions, or agencies that brought about or resulted in the fire or explosion incident, damage to property, bodily injury, or loss of life. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.14, 3.3.27*

\* **Fire Cause** – The circumstances, conditions, or agencies that bring together a fuel, ignition source, and oxidizer (such as air or oxygen) resulting in a fire or a combustion explosion. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.16, 3.3.71*

\* **Accident** – An unplanned event that interrupts an activity and sometimes causes injury or damage or a chance occurrence arising from unknown causes; an unexpected happening due to carelessness, ignorance, and the like. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.14, 3.3.3*

\* **Factors Involved in Accidental Fires** – The actions or inactions of people frequently result in accidental fires. Negligence, carelessness, lack of knowledge, disregard of fire safety principles, or an individual's failure to be cognizant of the ultimate results of such actions or inactions can be categorized into groups of similar behaviors. Examples of these behavior groupings are improper maintenance; poor housekeeping; issues involving product labels, instructions, and warnings; and violations of fire safety codes and standards. *"Fire-Related Human Behavior" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.160, 11.4.1*

\* **Arson** – The crime of maliciously and intentionally, or recklessly, starting a fire or causing an explosion. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.14, 3.3.15*

\* **Incendiary Fire** – A fire that is intentionally ignited in an area or under circumstances where and when there should not be a fire. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.17, 3.3.121*

\* **Detection** – (1) Sensing the existence of a fire, especially by a detector from one or more products of the fire, such as smoke, heat, infrared radiation, and the like. (2) The act or process of discovering and locating a fire. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.15, 3.3.46*

\* **Spoliation** – Loss, destruction, or material alteration of an object or document that is evidence or potential evidence in a legal proceeding by one who has the responsibility for its preservation. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.19, 3.3.186*

\* **Thermal Inertia** – The properties of a material that characterize its rate of surface temperature rise when exposed to heat; related to the product of the material's thermal conductivity ( $k$ ), its density ( $\rho$ ), and its heat capacity ( $c$ ). *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.19, 3.3.194*

\* **Pyrolysis** – A process in which material is decomposed, or broken down, into simpler molecular compounds by the effects of heat alone; pyrolysis often precedes combustion. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.18, 3.3.158*



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### ACCIDENTAL

\* **Pyrophoric Material** – Any substance that spontaneously ignites upon exposure to atmospheric oxygen. *"Definitions" NFPA 921 Guide for Fire and Explosion Investigations. 2021 ed. Quincy, MA: National Fire Protection Association, 2021. Print pg.18, 3.3.159*