



OFFICE OF THE MEDICAL EXAMINER  
701 W. Jefferson St.  
Phoenix, AZ 85007

MEDICAL EXAMINER REPORT

DECEDENT: Robert E. Caldwell

CASE: 13-04439

DATE OF EXAMINATION: 07/02/2013

TIME: 11:12 Hours

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PATHOLOGICAL DIAGNOSES

- I. Smoke inhalation.
  - A. Thin layers of soot deposition in oropharynx, larynx, trachea and mainstem bronchi.
  - B. Iliac blood: Carboxyhemoglobin of 17% saturation.
  
- II. Thermal changes of oropharynx and upper and lower airways.
  
- III. Level I toxicology testing (see separate Toxicology Report).
  - A. Iliac blood: Positive for ethyl alcohol of 0.01 g% (trace amount); negative for methanol, isopropanol and acetone.
  - B. Vitreous humor: Positive for ethyl alcohol of 0.01 g% (trace amount).
  - C. Brain: Positive for GC/MS for benzene, toluene and xylene.
  - D. Lung: No volatiles detected by GC/MS.
  
- IV. Decompositional changes.

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CAUSE OF DEATH: Fire-related injuries  
MANNER: Accident

9/23/2013  
Date Signed

Kathleen M. Enstice MD  
KATHLEEN M. ENSTICE, M.D.  
MEDICAL EXAMINER

ROBERT E. CALDWELL

13-04439

On July 1, 2013, Yavapai County officials requested assistance from the Maricopa County Office of the Medical Examiner with the medicolegal death investigations of 19 firefighters who died in the Yarnell Hill wildfire on June 30, 2013. Under the Maricopa County Manager's authority and direction, the Maricopa County Office of the Medical Examiner examined the firefighters' remains for the purpose of forensic identification and postmortem evaluation. The Maricopa County Office of the Medical Examiner also agreed to provide consultative services to investigating authorities and the Yavapai County Medical Examiner. The Yavapai County Medical Examiner agreed it will certify the firefighters' death certificates. The following Maricopa County Office of the Medical Examiner case numbers were designated for this incident: 13-04425, 13-04426, 13-04427, 13-04428, 13-04429, 13-04430, 13-04431, 13-04432, 13-04433, 13-04434, 13-04435, 13-04436, 13-04437, 13-04438, 13-04439, 13-04440, 13-04441, 13-04442, and 13-04443.

### IDENTIFICATION

The decedent is received in a zippered orange bag (#19) sealed by yellow lock #042613. A red OME ID tag is on the left ankle, labeled with "13-4439".

### EVIDENCE OF MEDICAL INTERVENTION

None.

### CLOTHING AND PERSONAL EFFECTS

The decedent has a silver-tone, fragmented foil-like shelter covering both feet and the left arm. The decedent is lying on top of the majority of this shelter. The tag from the shelter has become separated, and is retrieved and placed with the shelter. The decedent is clad in a long-sleeved, button front yellow protective shirt (size M), a black short-sleeved tee shirt with "Granite Mountain Interagency Hot Shot Crew" imprinted above the left front shirt pocket, green protective pants (30-34 SHORT) with a brown belt that has an ornate oval metal buckle, blue "Fruit of the Loom" boxer briefs, two laced boots worn over a pair of tan socks and a pair of black socks, and tan gloves on the right and left hands.

Within the metallic-like shelter is a black, partially melted "BULLARD" hardhat labeled with "BOB" inside the hat; two soft earplugs melted to the front of the yellow shirt, a black "Free Style" watch around the left wrist, a multi-toned metal band ring on the left 4<sup>th</sup> finger, a key ring with five keys and two cards, a black foldable planner containing a compass/ruler and a pen, multiple papers, and other items; a folded pocket knife tied to a shoestring attached to a metal clip in the right front pants packet, a yellow and black iPod-like phone in the right front pants pocket, brown sunglasses in the left front pants pocket, a small metal can opener in the right front pants pocket, a small blue notepad and a pen in the left front shirt pocket, a small mirror with multicolored stones inside of a small cover in the right front shirt pocket, two packs of chewing gum - one in the right front shirt pocket and the other in the left front shirt pocket; a small tube of suntan lotion and two clear plastic sandwich bags - each containing clean white soft paper towels, in the lateral left leg pocket of the pants; a black wallet containing multiple cards, photos, papers and three one dollar bills in the right rear pant pocket; a plastic water container filled with water and labeled with "BOB" in black marker, an Arizona commercial driver's license, two City of Prescott Fire Department ID cards, one tube of lip balm, and one green lighter.

### CONDITION OF BODY

The unembalmed body is cold following refrigeration. The upper and lower extremity joints are fixed in position. Lividity cannot be assessed due to moderate decompositional changes, including diffuse green discoloration, widespread slippage, and marbling of the skin; bloating, and a decompositional odor. In the regions of the distal shins, ankles, and feet covered by boots, these decompositional changes are minimal to mild.

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**EVIDENCE OF INJURY**

None.

**GENERAL EXTERNAL EXAMINATION**

The unclad body is of a 72 inch, 169 pound adult male appearing compatible with the reported age of 23 years. The scalp has 1/8 inch light brown hair. The decedent wears a 1/4 inch light brown mustache and beard. The eyes have indeterminate irides. The cherry red conjunctivae have no congestion, petechiae, icterus or edema. The nasal bridge and septum are intact. The external auditory canals are unremarkable. The lips and oral mucosa have no lesions. The maxilla and mandible have native dentition in good repair. The symmetric neck has no injuries or palpable masses. The well-developed chest and back are symmetric. The flat abdomen is firm. The external genitalia are of a normally developed circumcised adult male with bilaterally descended testes. The anus is atraumatic. The paired extremities have no clubbing, cyanosis, edema or deformity. The short, intact fingernails and toenails are clean. No needle punctures, needle track marks or hesitation marks are identified. The soles of the feet are unremarkable.

**IDENTIFYING MARKS, TATTOOS, SCARS**

1. One pierce mark in the right earlobe (no pierce marks identified in the left earlobe).
2. A vertical 14 x 8 inch multicolored tattoo of a mermaid and an anchor on the right upper and midline chest.
3. An 8 x 8 inch green tattoo of a woman resembling Marilyn Monroe riding a torpedo imprinted with "REC 25-95" on the midline upper back.

**INTERNAL EXAMINATION**

The body is opened by a standard Y-shaped thoracoabdominal incision. All body organs are in their normal anatomic positions. The internal organs have mild thermal changes and moderate decompositional changes with minimal surrounding adipose tissue. The subcutaneous fat layer is 1.0 cm thick at mid-abdominal level. The intact serosal surfaces are intact. The right pleural cavity contains 300 ml of cherry red-maroon fluid. The left pleural cavity contains 200 ml of cherry red-maroon fluid. No adhesions or blood are in the body cavities.

**HEAD/NERVOUS SYSTEM**

The intact reflected scalp, galea and temporalis muscles have no injury. The calvarium and skull base are of normal thickness, with no fractures. The intact dura mater has no epidural or subdural hemorrhages. The blood in the dural sinuses is not clotted. The leptomeninges are thin and transparent. The symmetric 1580 gram brain has a normal gyral configuration, moderate to marked swelling and faint cherry red-pink discoloration, but no subarachnoid hemorrhage or exudate. The brain has softening associated with decompositional changes. The faint cherry red-tan cerebral cortex has no contusions. The cerebral white matter has faint pink discoloration. The faint cherry red-tan caudate nuclei, thalami and basal ganglia are symmetric. The symmetric brainstem and cerebellum are unremarkable. The substantia nigra is normally pigmented. The normally formed blood vessels at the brain base have no atherosclerosis, aneurysm and thrombi. The paired cranial nerves and mammillary bodies are normally distributed. The slit-like ventricles have no hemorrhage. The upper cervical spinal cord is unremarkable. The atlanto-occipital articulation is intact.

**NECK**

The intact cervical spine, strap muscles, blood vessels, prevertebral tissues, hyoid bone and laryngeal and tracheal cartilages have no hemorrhages. The epiglottis, periepiglottic region, laryngeal mucosa, and entire length of the trachea have cherry red-maroon discoloration and mucosal sloughing associated with thermal changes. The mucosa of the larynx and trachea

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has a thin confluent layer of black soot deposition that extends into the mainstem bronchi. The tongue has a thin layer of black soot coating its surface, but has no masses or hemorrhage.

### **CARDIOVASCULAR SYSTEM**

The 310 gram heart has intact epicardial surfaces. The patent coronary ostia have normal takeoff angles. The coronary arteries arise normally and follow a co-dominant distribution, with no thrombi or atherosclerosis. The moderately soft cherry red-brown myocardium has no fibrosis. The atrial and ventricular septa are intact. At one cm below the valve annuli, ventricular thicknesses are: left ventricle 1.3 cm, interventricular septum 1.2 cm and right ventricle 0.2 cm. The cardiac chambers have mild decompositional dilatation. The endocardial surfaces have no hemorrhage or fibrosis. The normally formed cardiac valves have thin, pliable leaflets. The valve circumferences are appropriate to the caliber of the cardiac chambers. The valve cusps and surfaces have no fusion or vegetations. The aorta and its branches arise normally, are of normal caliber and follow the usual course. Elasticity is normal. The smooth intimal surfaces have pink-cherry red decompositional discoloration, with no aneurysm or dissection. The heart and major blood vessels contain minimal cherry red-maroon blood.

### **RESPIRATORY SYSTEM**

The pleural surfaces of the normally formed 640 gram right and 490 gram left lungs have scant anthracotic pigmentation. The well-expanded cherry red-maroon parenchyma exudes abundant cherry red blood and frothy edema fluid, with no masses, consolidation, scars or cavitations. The patent bronchi are of normal caliber and contain cherry red bloody fluid, but no obvious soot. The normally developed, patent pulmonary arteries have no thromboemboli.

### **DIGESTIVE/HEPATOBIILIARY SYSTEM**

The unobstructed oropharynx contains a thin layer of soot and thermal changes characterized by cherry-red discoloration and mucosal sloughing. The normally formed esophagus is of normal caliber, with the proximal-most aspect having sloughing of the mucosa. The midsection and distal aspect of the esophagus has intact mucosa with faint pink discoloration. The gastroesophageal junction is unremarkable. The stomach has intact cherry-red tan mucosa, with no hemorrhage, ulcers or masses. The gastric lumen contains 10 ml of thick dark brown material. The small and large intestines and appendix are unremarkable. The large intestines contain brown stool. The lobular cherry red-tan pancreas has autolysis, but no fat necrosis, hemorrhage, cysts or fibrosis. The patent pancreatic ducts are of normal caliber. The normally formed 1160 gram liver has an intact smooth capsule covering moderately soft, cherry red-brown-black parenchyma with no masses, fibrosis or fatty change. The patent intra- and extrahepatic ducts are of normal caliber. The gallbladder has viscid bile and velvety mucosa.

### **GENITOURINARY SYSTEM**

The normally formed 120 gram right and 130 gram left kidneys have capsules that strip with ease from the moderately soft, smooth, cherry red-maroon cortical surfaces. The cortices are moderately delineated from the medullary pyramids. The patent renal calyces, pelves, ureters and renal vessels are of normal caliber. The urinary bladder contains 2 ml of slightly cloudy pink-yellow urine and has smooth mucosa with faint pink discoloration. The trigone is patent. The prostate gland is not enlarged. The tan testicular parenchyma strings easily.

### **HEMATOPOIETIC SYSTEM**

The normally formed 320 gram spleen has an intact capsule covering partially liquified cherry red-black parenchyma. The lymph nodes have their normal appearance and distribution.

### **ENDOCRINE SYSTEM**

The symmetrical thyroid gland has uniform brown parenchyma. The normally formed adrenal glands and pituitary gland have no masses or hemorrhage.

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### **MUSCULOSKELETAL SYSTEM**

The supporting musculature and soft tissues have cherry red discoloration and decompositional changes, but are otherwise unremarkable. The axial and appendicular skeletal regions have no fractures, degenerative changes or atraumatic lesions.

### **EVIDENCE**

The following items of evidence are collected, inventoried and released to Joshua Nelson #5222 (Yavapai County Sheriff's Office):

- one signal mirror with sleeve
- two tan gloves
- one small blue notepad and pen
- one burned helmet
- one pocket knife with attachment
- one metal can opener
- two brown boots (burned)
- two gray socks
- two black socks
- two orange ear plugs
- one compass/ruler
- one black pocket planner
- one silver tone "shelter"
- one yellow protective fire shirt, size: medium (burned)
- one pair of protective fire pants, size: 30-34 SHORT (burned)
- one black short sleeved tee shirt (burned)
- one blue boxer briefs
- one brown belt with ornate metal buckle
- miscellaneous pieces of fabric (burned)
- one black wrist watch
- one multi-tone metal ring
- one plastic water container
- one black wallet with three one dollar bills and multiple cards, photos, papers
- two plastic sandwich bags containing clean white paper towels
- one tube of suntan lotion
- one Arizona commercial driver's license
- two City of Prescott Fire Department ID cards
- one brown sunglasses
- one key ring with five keys and two cards
- one yellow and black iPod phone
- two packs of chewing gum
- one tube of lip balm
- one green lighter

One blood stain/filter card is collected and retained.  
Pleural fluid, purple top tube, is collected and retained.  
Nasal swabs are collected and retained.

### **RADIOGRAPHS**

Full body postmortem x-rays (12 total), revealed two radiopaque amalgam-like fillings.

### **SPECIAL STUDIES**

Vitreous fluid, red top tube, is collected and submitted for electrolyte analysis, with the following results:

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Glucose	31 mg/dL
Urea nitrogen	44 mg/dL
Creatinine	1.1 mg/dL
Chloride	105 mmol/L
Potassium	37.0 mmol/L
Sodium	115 mmol/L

Iliac blood, red top tube, is collected and submitted for carboxyhemoglobin analysis, with the following results:

Carboxyhemoglobin 17% saturation

### TOXICOLOGY SPECIMENS

Iliac blood, 2 oz container, is collected and submitted for level I toxicologic analysis.

Vitreous fluid, red top tube, is collected and submitted for volatile analysis.

Brain, red top tube, is collected and submitted for volatiles testing.

Lung, red top tube, is collected and submitted for volatiles testing.

Urine, gray top tube, is collected and held.

Bile, gray top tube, is collected and held.

Pleural cavity fluid, 2 oz container, is collected and held.

Gastric contents, 2 oz container, is collected and held.

Subcutaneous tissue, psoas muscle, kidney, lung, brain, liver; 2 oz containers each, are collected and held.

Spleen, two 2 oz containers, is collected and held.

Known facial hair is collected and held.

### FINAL SUMMARY

Based on the investigative history as available to me, and my above noted autopsy findings, it is my opinion that Robert Caldwell, a 23 year old male, died of fire-related injuries.

The ethyl alcohol detected in iliac blood and vitreous was most likely due to decompositional changes. The presence of benzene, toluene and xylene were likely due to burning of NOMEX fibers and ethanol.

The manner of death is accident.

KME/gz

D 7/3/13

T 7/5/13

*The Maricopa County Medical Examiner's Office is required by statute (A.R.S. § 11-594(A)(2) and (4)) to certify the cause and manner of death following completion of the death investigation of each case over which it assumes jurisdiction, and to promptly execute a death certificate, on a form provided by the state registrar of vital statistics, indicating cause and manner of death. The form provided by the state registrar of vital statistics includes five manners of death: homicide, suicide, accident, natural, and undetermined. The determination of manner of death is a forensic determination by the pathologist predicated upon the totality of all then-known forensic evidence and other circumstances surrounding the cause of death; it is not a legal determination of criminal or civil responsibility of any person(s) for the death.*

MARICOPA COUNTY OFFICE OF THE MEDICAL EXAMINER  
REPORT OF TOXICOLOGICAL EXAMINATION

Case Number: 13-04439  
Decedent: ROBERT E. CALDWELL  
Date Submitted: 07/02/2013  
Report Date: 07/26/2013

Specimens Collected: NASAL SWAB, KNOWN FACIAL HAIR, BILE, ILIAC BLOOD,  
BLOT/FILTER PAPER, VITREOUS, PLEURAL FLUID, URINE,  
PSOAS MUSCLE, GASTRIC, SUBCUTANEOUS TISSUE,  
KIDNEY, SPLEEN, LUNG, BRAIN, LIVER

Medical Examiner: KATHLEEN M. ENSTICE, MD

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**RESULTS\*:**

Vitreous: Positive for  
Ethyl alcohol 0.01 g% (trace amount)  
None detected for methanol, isopropanol and acetone

Iliac Blood: Positive for  
Ethyl alcohol 0.01 g% (trace amount)  
Carboxyhemoglobin (17% saturation)  
None detected for methanol, isopropanol, acetone, amphetamine,  
methamphetamine, phencyclidine, cocaine, benzoylecgonine,  
methadone, morphine, codeine, benzodiazepines, barbiturates,  
antihistamines, phenothiazines, tricyclic antidepressants, fentanyl,  
oxycodone, and acid neutral drugs


Brain: Positive by GC/MS for  
Benzene  
Toluene  
Xylene

Lung: None detected for volatiles by GC/MS

Urine: None detected for amphetamine, methamphetamine,  
phencyclidine, cocaine, methadone, codeine, antihistamines,  
phenothiazines, and tricyclic antidepressants

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\*If results are not listed for any specimen(s), that/those specimen(s) is/are deemed to be on "HOLD"



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Norman A. Wade  
Laboratory Director

1/1/13