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SUMMARY
May 4, 2023

2023COA38

No. 20CA0882, *People v Perkins* — Crimes — Arson — National Fire Protection Association Guide for Fire and Explosion Investigations; Evidence — Testimony by Experts — *Shreck* Hearing

A division of the Court of Appeals holds that the standards set by the National Fire Protection Association (NFPA) and specifically NFPA 921, the Guide for Fire and Explosion Investigations, constitute a reliable basis for an expert's opinion, under *People v. Shreck*, 22 P.3d 68 (Colo. 2001). As a matter of first impression, the division further holds that strict compliance with NFPA 921 is not required for an expert's testimony to be admissible under CRE 702, and that deviations from NFPA 921 go to the weight of the expert's opinion and not the opinion's admissibility.

Court of Appeals No. 20CA0882
City and County of Denver District Court No. 19CR1178
Honorable John W. Madden IV, Judge

The People of the State of Colorado,

Plaintiff-Appellee,

v.

Todd N. Perkins,

Defendant-Appellant.

JUDGMENT AFFIRMED

Division A
Opinion by JUDGE FREYRE
Fox and Lipinsky, JJ., concur

Announced May 4, 2023

Philip J. Weiser, Attorney General, Josiah Beamish, Assistant Attorney General, Denver, Colorado, for Plaintiff-Appellee

Adrienne R. Teodorovic, Alternate Defense Counsel, Denver, Colorado, for Defendant-Appellant

¶ 1 Defendant, Todd N. Perkins, appeals twenty-eight criminal convictions stemming from a jury’s verdict finding that he intentionally caused a building explosion. He challenges the trial court’s denial of a *Shreck* hearing to determine the reliability of the bases for the arson investigators’ opinions. *See People v. Shreck*, 22 P.3d 68 (Colo. 2001). We discern no abuse of discretion and affirm the judgment.

I. Background

¶ 2 The prosecution’s evidence at trial established the following pertinent facts.

¶ 3 In August 2018, a residential apartment building in Denver exploded and caught fire. Law enforcement personnel, including two fire investigators from the Denver Fire Department, responded to the scene and found Perkins, badly injured and burned, in the rubble of an apartment unit belonging to tenant Matthew Brady. No one else was injured. Perkins was taken to the hospital, where he remained for several months to recover. An officer who followed Perkins to the hospital noticed a strong smell of gasoline coming from Perkins’s clothing. The clothing was collected as evidence and testing confirmed that the smell on the clothing was gasoline. A few

months after the explosion, the police interviewed Perkins at the hospital. He admitted that he was in the basement of Brady's apartment on the date of the explosion.

¶ 4 During their investigation, the police learned the following information:

- In the months before the explosion, Perkins worked as a handyman for the building owner and had performed repairs in Brady's apartment.
- The building owner had recently fired Perkins.
- Brady had not given Perkins permission to be inside his apartment on the day of the explosion.
- After he was fired, Perkins had sent a series of strange and arguably threatening text messages to the building owner.
- There was a natural gas smell in the building before the explosion.
- There were no gas leaks outside the building on the date of the explosion.
- Right before the explosion, Perkins was seen either on the roof of the building or in Brady's backyard.

¶ 5 After obtaining a search warrant, the police and the fire investigators searched the building. The fire investigators observed that the building was extremely damaged and that a significant amount of debris surrounded the building. There was little remaining of Brady's apartment.

¶ 6 The fire investigators also observed three disconnected gas lines in the basement. They noted horizontal cracks in the ceiling joists consistent with the ceiling being forced upward by the explosion and then dropping back down. There were also burn patterns extending into the unit adjacent to Brady's apartment consistent with a secondary fire resulting from the explosion.

¶ 7 The police recovered several pieces of evidence during their search. In the basement, they found a small plastic gasoline can without a nozzle, three cigarette lighters, and a box of matches at the bottom of the stairs. They also found Perkins's cell phone under the gasoline can. Additionally, they found a crescent wrench on the basement floor, which was set to fit the diameter of the flex hose for the apartment's stove. A certified K-9, trained to detect accelerants, identified multiple potential areas of accelerant in the basement. On the first floor of the apartment, the police found the

gas stove turned on, and the thermostat set to “heat.” Subsequent testing confirmed that Perkins’s DNA was present on both the thermostat and the crescent wrench. Finally, inside Perkins’s camper, which was located on the building property, police found his journal and a letter containing notes about incidents between himself and the building owner.

¶ 8 Based on their examination of the scene, the fire investigators concluded that the disconnected natural gas lines in the basement of Brady’s apartment created a combustible mix of natural gas and air that ignited and caused the explosion.

¶ 9 Before trial, Perkins filed a motion to exclude the expert testimony of the fire investigators or, in the alternative, for the court to conduct a *Shreck* hearing to determine whether their testimony was admissible. The prosecutor objected and the court held a hearing. After hearing the parties’ arguments, the court denied the motion, permitting the experts to testify at trial. A jury convicted Perkins as noted and the court sentenced him to 195 years in the custody of the Department of Corrections.

II. *Shreck* Hearing

¶ 10 Perkins contends that the trial court erred by denying him a *Shreck* hearing to determine the reliability of the methodology underlying the fire investigators' expert testimony.¹ He further contends that the error was not harmless because the proffered testimony related to the central issue in the case — whether Perkins caused the explosion.

A. Additional Facts

¶ 11 The prosecution endorsed Denver Fire Department investigators Don Patterson and Jonathan Riegenbach to testify as fact witnesses and as experts in fire investigation and origin and cause investigation.

¶ 12 The fire investigators opined that the explosion originated in the basement of Brady's apartment and that Perkins intentionally caused the explosion by disconnecting natural gas pipes and igniting the gas.

¹ Perkins does not challenge the court's findings related to the qualification or helpfulness prongs of the *Shreck* test. Therefore, we address only the reliability prong. See *People v. Salazar*, 964 P.2d 502, 507 (Colo. 1998).

¶ 13 Perkins filed a motion to preclude their testimony or, alternatively, for a hearing on the grounds that the proffered testimony did not meet the threshold reliability required under *Shreck*. He asserted that arson investigation or “fire science” was an inaccurate and unreliable source of expert evidence. Perkins relied primarily on a law review article discussing how “fire science” has historically produced inaccurate expert evidence and stating that criminal courts routinely, but improperly, allow this kind of evidence to be presented to the jury.

¶ 14 The prosecutor objected and argued that the proffered testimony was admissible because the scientific principles underlying the testimony were reasonably reliable. He asserted that such principles were not novel or controversial, nor were they challenged in scientific literature or case law. The prosecutor further argued that the experts were qualified to testify on the subject, and he attached their respective curricula vitae showing Patterson’s and Riggerbach’s extensive knowledge of and experience with fire investigations. Last, the prosecutor asserted that the proffered testimony would be helpful to the jury because it would provide context for the large amount of physical evidence

recovered at the scene, and that it was relevant to determine who may have caused the explosion and how the explosion might have occurred.

¶ 15 The court denied Perkins’s motion, finding that he did not present a challenge to the reliability of the experts’ testimony requiring a *Shreck* hearing. In a thorough written order, the court found that the information presented in Perkins’s motion — namely, a 2019 law review article — did not challenge the proffered testimony because, though the article raised concerns regarding “old school” arson investigation, it likewise endorsed the standards set forth by the National Fire Protection Association (NFPA) in its NFPA 921, Guide for Fire and Explosion Investigations, praising it as “the single most important and reformative treatise in the field of fire investigation” and widely regarded as the gold standard for fire investigation techniques. See Valena E. Beety & Jennifer D. Oliva, *Evidence on Fire*, 97 N.C. L. Rev. 483, 495-96 (2019).

¶ 16 The court found that because the law review article Perkins cited supported the use of NFPA techniques, including NFPA 921, and because the prosecution’s experts were either NFPA certified or otherwise complied with the NFPA standards for fire investigators,

Perkins’s motion insufficiently challenged the reliability of their testimony.

¶ 17 Nevertheless, the court found that even under a *Shreck* analysis, a hearing was not required because the information the prosecutor presented showed that the experts were qualified to opine on the subject, and used reasonably reliable techniques during their investigation, and that the information they would provide would clearly be useful to the jury. The court viewed Perkins’s request as an inquiry into the facts of the investigation and the bases of the experts’ opinions — inquiries that were proper subjects of cross-examination or voir dire, but not a pretrial hearing.

¶ 18 At trial, the prosecution tendered the fire investigators as fact witnesses and as experts in fire investigation and origin and cause investigation, and the court so qualified them over counsel’s objection.

B. Standard of Review and Applicable Law

¶ 19 “We review a trial court’s evidentiary ruling for an abuse of discretion.” *People v. Campbell*, 2018 COA 5, ¶ 38. The trial court abuses its discretion when its ruling is “manifestly arbitrary,

unreasonable, or unfair.” *Id.* (citation omitted). We review preserved *Shreck* errors for nonconstitutional harmless error. *People v. Wilson*, 2013 COA 75, ¶ 24. An error is harmless if it did not substantially influence the verdict or impair the trial’s fairness. *Id.*

¶ 20 CRE 702 governs the admissibility of expert testimony. It states as follows:

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, [then] a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

¶ 21 Scientific evidence is admissible under CRE 702 if it is relevant and reliable. *Shreck*, 22 P.3d at 77; *People v. Friend*, 2014 COA 123M, ¶ 28, *aff’d in part and rev’d in part on other grounds*, 2018 CO 90. In determining the admissibility of expert testimony, the trial court must consider whether (1) the scientific principles at issue are reasonably reliable; (2) the witness is qualified; (3) the testimony would be helpful to the jury; and (4) the evidence satisfies CRE 403. *People v. Rector*, 248 P.3d 1196, 1200 (Colo. 2011); *Friend*, ¶ 28. The purpose of this inquiry is to determine whether

the proffered evidence is reliable and relevant, and for the trial court — acting as gatekeeper — to prevent the admission of “junk” science. *Est. of Ford v. Eicher*, 220 P.3d 939, 942 (Colo. App. 2008), *aff’d*, 250 P.3d 262 (Colo. 2011); see *Wilson*, ¶ 22. The trial court’s reliability inquiry should be “broad in nature and consider the totality of the circumstances” specific to each case. *Shreck*, 22 P.3d at 77.

¶ 22 When a party requests a *Shreck* analysis, the court may, in its discretion, determine whether an evidentiary hearing would be helpful. *Rector*, 248 P.3d at 1201. However, the trial court is not required to conduct a hearing if it “already has sufficient information to make specific findings under *Shreck*.” *Campbell*, ¶ 41 (quoting *Wilson*, ¶ 23). “Concerns about conflicting theories or the reliability of scientific principles go to the weight of the evidence, not its admissibility.” *Id.* at ¶ 42. These concerns can be mitigated by vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof. *Shreck*, 22 P.3d at 78.

C. Analysis

¶ 23 Perkins challenges the reliability of the arson science on two grounds. First, he claims that the fire investigators' methodology was not reasonably reliable because it was based on unknown and unreliable scientific principles that deviated from NFPA 921. Second, he claims that the trial court failed to make sufficient reliability findings concerning the fire investigators' opinion testimony. We address and reject each claim.

1. The Fire Investigators' Methodology Was Reliable

¶ 24 Perkins broadly asserts that, apart from NFPA 921, most fire science theories and methodology "have been discredited as unreliable and invalid." In support, he cites a host of secondary sources, including the law review article provided to the trial court, for the proposition that methodologies not strictly compliant with NFPA 921 are unreliable and therefore invalid. Consequently, he reasons that the methodology that Patterson and Riggensbach used, which he asserts did not strictly adhere to NFPA 921, was unreliable and, thus, "junk science."

¶ 25 We first lay out the legal framework for our discussion and then discuss four reasons we disagree with Perkins's contentions.

a. Legal Framework

¶ 26 The NFPA is a nonprofit organization dedicated to fire prevention, and NFPA 921 is intended to “establish guidelines and recommendations for the safe and systematic investigation or analysis of fire and explosion incidents.” NFPA 921 § 1.2.1 (2021 ed.). It is “a comprehensive, peer-reviewed, and detailed guide for fire investigation, and [courts] have held that its methodology is reliable for purposes of Rule 702.” *United States v. Thomas*, No. 18-CR-45, 2022 WL 36098, at *9 (N.D. Ind. Jan. 3, 2022) (unpublished opinion) (quoting *State Farm Fire & Cas. Co. v. Electrolux Home Prods., Inc.*, No. 08-CV-436, 2013 WL 3013531, at *17 (N.D. Ind. June 17, 2013) (unpublished opinion)).

¶ 27 NFPA 921 recommends that fire investigators use a “systematic approach” based on the scientific method used in the physical sciences. NFPA 921 § 4.2. That approach tells fire investigators to follow several steps: “(1) identify the problem; (2) define the problem; (3) collect data; (4) analyze the data; (5) develop a hypothesis; (6) test the hypothesis; and (7) following any repeated rounds of refining and testing the hypothesis, select the final conclusion.” *Electrolux Home Prods.*, 2013 WL 3013531, at *18

(quoting *United States v. Aman*, 748 F. Supp. 2d 531, 535 (E.D. Va. 2010)).

¶ 28 A failure to strictly follow the NFPA guidelines does not automatically make the methodology unreliable, though. See *Thomas*, 2022 WL 36098, at *9. NFPA 921 states that its provisions are intended as “guidelines and recommendations.” NFPA 921 § 1.2.1. It was “not designed to encompass all the necessary components of a complete investigation or analysis of any one case” nor “intended as a comprehensive scientific or engineering text.” *Id.* §§ 1.3.2, 1.3.5. Because every fire incident is unique, NFPA 921 recognizes that not all techniques will apply to a particular incident and that it is up to the investigator’s discretion “to apply the appropriate recommended procedures in this guide to a particular incident.” *Id.* § 1.3.3. Importantly, section 1.3 of NFPA 921 states that “[d]eviations from these procedures . . . are not necessarily wrong or inferior but need to be justified.”

¶ 29 Colorado state and federal court have recognized that NFPA 921 is an accepted reference for fire investigators that provides nonmandatory guidelines and recommendations for the fire investigation field, and that expert testimony is admissible where

NFPA 921 is used only as a guide. *Farmland Mut. Ins. Cos. v. Chief Indus., Inc.*, 170 P.3d 832, 836 (Colo. App. 2007) (finding that NFPA 921 is “an accepted reference for fire investigators”); *Sipes v. Allstate Indem. Co.*, 949 F. Supp. 2d 1079, 1087 (D. Colo. 2013) (published order) (finding it was reasonable to rely on a fire origin and cause report, even though the fire investigator did not use NFPA 921 to prepare his report); *see also Pekarek v. Sunbeam Prods., Inc.*, 672 F. Supp. 2d 1161, 1176 (D. Kan. 2008) (noting that the fact a fire investigator does not cite or use NFPA 921 as his guide does not necessarily mean that his methodology is unreliable).

¶ 30 Perkins has not identified, nor have we found, any Colorado cases that have decided that strict compliance with NFPA 921 is required. Thus, absent controlling Colorado precedent, we conclude, consistent with the majority of other jurisdictions to have considered this issue, that while the methods that NFPA 921 identifies constitute a reliable way to investigate a fire, *see Nationwide Mut. Ins. Co. v. Nat’l RV Holdings, Inc.*, Civ. A. No. 05–CV–2509, 2007 WL 954258 (M.D. Pa. Mar. 28, 2007) (unpublished order) (collecting cases that have accepted NFPA 921 as a reliable

guide), following NFPA 921 is not the only way to do so. *See Russell v. Whirlpool Corp.*, 702 F.3d 450, 455 (8th Cir. 2012) (“We have held NFPA 921 qualifies as ‘a reliable method endorsed by a professional organization,’ but we have not held NFPA 921 is the *only* reliable way to investigate a fire.” (quoting *Fireman’s Fund Ins. Co. v. Canon U.S.A., Inc.*, 394 F.3d 1054, 1058-59 (8th Cir. 2005))); *see also United States v. Idaho Cnty. Light & Power Coop. Ass’n*, No. 17-cv-00391, 2020 WL 603478, at *7-9 (D. Idaho Feb. 7, 2020) (unpublished order) (declining to preclude expert witness testimony on the basis that the expert departed from NFPA 921 during the expert’s fire origin investigation, and citing NFPA 921 sections 1.3.1–1.3.5 in support of observation that, by NFPA 921’s own terms, “its provisions are intended to be guidelines, given every fire incident is unique, and . . . not all techniques will be applied in a particular investigation”); *Russ v. Safeco Ins. Co. of Am.*, Civ. A. No. 11cv195, 2013 WL 1310501, at *24 (S.D. Miss. Mar. 26, 2013) (unpublished opinion) (“[A]n expert’s reliance on a methodology other than NFPA 921 does not render his opinions per se unreliable.”)

¶ 31 We further conclude, consistent with courts in other jurisdictions, that “an expert who purports to follow NFPA 921 must apply its contents reliably.” *Russell*, 702 F.3d at 455. Thus, an opinion by an expert who purported to follow NFPA 921 may only be excluded “on NFPA 921 grounds” if such expert did not reliably apply the methodology to the fire investigation at issue. *Id.*; see also *State Farm Fire & Cas. Co. v. Steffen*, 948 F. Supp. 2d 434, 443-46 (E.D. Pa. 2013). But where NFPA 921 serves only as an investigator’s guide, the expert’s testimony may still be admitted. *Russell*, 702 F.3d at 455-56; cf. *Phila. Indem. Ins. Co. v. BMW of N. Am. LLC*, No. CV-13-01228, 2015 WL 5693525, at *6 (D. Ariz. Sept. 29, 2015) (unpublished order) (stating that the testimony of experts who assert that they complied with the standards set forth in NFPA 921 “is reliable to the extent they complied with NFPA 921 in forming their opinions”); *Allstate Ins. Co. v. Ford Motor Co.*, No. CV-08-2276, 2010 WL 1654145, at *5 (D. Ariz. Apr. 10, 2010) (unpublished order) (expert testimony is reliable if expert complied with either NFPA 921 or general scientific method).

¶ 32 Additionally, we conclude, consistent with courts in other jurisdictions, that an expert’s “decision not to follow the

methodology set forth in NFPA 921, as well as other purported flaws in [their] methodology[,] . . . goes to the weight of the evidence, not its admissibility.” *Schlesinger v. United States*, 898 F. Supp. 2d 489, 505 (E.D.N.Y. 2012) (stating that failure to follow the methodology in NFPA 921 does not automatically require exclusion of expert testimony on the cause and origin of a fire); *State Farm Fire & Cas. Co. v. Hewlett-Packard Co.*, No. 13-CV-0328, 2015 WL 5821898, at *4-5 (E.D. Wash. Oct. 5, 2015) (unpublished order) (denying motion to preclude expert witness’s testimony on the ground that his methodology deviated from NFPA 921 standards); *see Shreck*, 22 P.3d at 81-82.

b. Discussion

¶ 33 Perkins claims that the investigators “disavowed” and “renounced” NFPA 921 by deviating from its principles by:

- exhibiting expectation bias by identifying Perkins as an arson suspect before obtaining “all relevant data to confirm that the fire and resulting explosion [were] even an act of arson,” as well as by concluding that natural gas had leaked for minutes before the explosion despite

contradicting witness testimony about the timeline of the gas leak;

- relying on alerts from K-9s trained to detect accelerants, but never confirming the alerts with lab results;²
- failing to review and analyze all pertinent data, such as fingerprints and DNA, from critical pieces of evidence or police and lab reports;
- failing to investigate the pre-fire conditions of the building; and
- failing to record any structural dimensions of the building.

¶ 34 He further claims the investigators deviated from NFPA 921 because their methods were not tested or peer reviewed.

¶ 35 However, as noted above, Perkins has not identified, nor have we found, any controlling authority in Colorado holding that a fire investigator may not provide opinion testimony on the origin and cause of a fire unless the investigator's methodology strictly

² Perkins does not challenge the reliability of the K-9 evidence on appeal so we do not address it. *See People v. Hill*, 228 P.3d 171, 176-77 (Colo. App. 2009) (declining to consider a bald legal proposition presented without argument or development).

complied with NFPA 921. Instead, we concur with the general rule, accepted in many jurisdictions, that a fire investigator's reliance on methodology other than NFPA 921 does not render the investigator's opinions per se unreliable. *See Sipes*, 949 F. Supp. 2d at 1087 (“Although Mr. Kramarczyk did not utilize the NFPA to prepare his report, NFPA 921 § 1.3 specifically indicates that “[d]eviations from [NFPA] procedures . . . are not necessarily wrong or inferior but need to be justified.”).

¶ 36 *Sipes* involved an insurance coverage dispute arising from a fire that damaged Sipes's rental property. Sipes sued Allstate, which insured the property, after it denied coverage, and Allstate moved for summary judgment. It claimed it was entitled to judgment as a matter of law, based on origin and cause expert reports, because there was a reasonable basis to believe that “(1) the fire at the Rental Property was incendiary, (2) Mr. Sipes had a motive to set the fire to the Rental Property, and (3) the circumstantial evidence supported an inference of arson.” *Id.* at 1085.

¶ 37 Though the court ultimately denied the motion because there were genuine disputes of material fact, it found, citing to numerous

out-of-state cases, that it was reasonable for Allstate to rely on its expert's fire origin and cause report even though the fire investigator did not use NFPA 921 to prepare his report, where his methodology "was otherwise consistent with the NFPA as he identified the origin of the fire based on an examination of the exterior and interior of the property, analysis of burn patterns, and observation of the fire's trajectory." *Id.* at 1087.

¶ 38 We agree with this reasoning and therefore apply it in this case to conclude that the fire investigators' methodology was reliable because they used NFPA 921 to guide their investigation even though they did not strictly adhere to every step in NFPA 921. Contrary to Perkins's claim that the investigators "renounced the only peer reviewed guidelines," the record shows that the investigators used NFPA 921 to guide their investigation.

¶ 39 Patterson's curriculum vitae indicates that he is a Certified Fire and Explosion Investigator in compliance with NFPA 1033, Standard for Professional Qualifications for Fire Investigator. He is also a member of the National Association of Fire Investigators and the International Association of Arson Investigators. At the time of the investigation in this case, Patterson had investigated over 150

fire and explosion scenes and had been a fire investigator for three years. Before joining the Denver Fire Department, Patterson worked as an engineer in the private sector for nine years. Before that, he worked as a firefighter for ten years.

¶ 40 Patterson testified that he was “[w]ell versed in [NFPA] 921 as a reference” or as a “guideline used by arson investigators.” On cross-examination, defense counsel asked a series of questions about his familiarity with various techniques recommended by NFPA 921 and whether he applied those techniques. For example, counsel asked whether Patterson knew that NFPA 921 recommended documenting pre-fire conditions and recording the dimensions of a structure and whether he did so during the investigation. Patterson responded that while he did not document the pre-fire conditions or record dimensions as a part of his investigation, NFPA 921 is “a recommendation and a guideline” and whether it is appropriate to apply it in a particular case “[d]epends on the fire scene and the scope of the investigation.” Responding to a jury question, Patterson said that NFPA 921 is applicable to fires and explosions “[a]s a guideline and a reference,” after which the following colloquy occurred on redirect.

PROSECUTOR: Does every provision of 921 apply to every fire and every explosion, or is it a reference if it's relevant?

PATTERSON: It is a reference as it's relevant and it is a guideline, and it is left up to jurisdictions to decide to what level they follow 921. And it's also laid out that way in the preamble of 921.

PROSECUTOR: Is it something you use?

PATTERSON: Yes. We use it as a reference, yes.

PROSECUTOR: How often do you use 921?

PATTERSON: Fairly frequently.

¶ 41 Riggensbach's curriculum vitae shows that he is a Certified Fire and Explosion Investigator, a Certified Fire Investigation Instructor, and an NFPA Level I and Level II Certified Fire Inspector. He is a member of NFPA, the National Association of Fire Investigators, the International Association of Arson Investigators, and the International Association of Fire Fighters. At the time of the investigation, Riggensbach had investigated 861 fire scenes and had been a fire investigator for approximately eighteen years. Before joining the Denver Fire Department, Riggensbach worked as a fire prevention technician in the private sector, and before that, as a firefighter for three years.

¶ 42 Like Patterson, Riggensbach testified that NFPA 921 is a guide for fire and explosion investigations that “highlights different tools that are available for fire investigations” and that “could [be] resource[d] as we conduct investigations,” depending on the nature of the incident being investigated. Riggensbach also testified that NFPA 921 is intended to be used as a resource for investigators and pointed out that it does not include the word “shall” or any other mandatory language requiring that investigators follow its recommendations.

¶ 43 Accordingly, because the record shows that the fire investigators used NFPA 921 as a reference or guide, the principles underlying their testimony were reliable, thereby rendering their testimony admissible. *See Russell*, 702 F.3d at 455-56.

¶ 44 Next, we are not persuaded that the investigative methods employed here were unreliable simply because they did not copy the NFPA 921 methods, were not peer reviewed, and were not subjected to testing. The record shows that the fire investigators relied on their training, experience, deductive reasoning, and observations to reach their conclusions. And we do not perceive an abuse of discretion in the admission of expert testimony “that employs an

expert's physical investigation, professional experience, and technical knowledge to establish causation.” *Bitler v. A.O. Smith Corp.*, 400 F.3d 1227, 1238 (10th Cir. 2005) (finding that a fire investigator's proffered testimony that a water heater was the source of the explosion was based on sufficiently reliable methodology, as required to be admissible, given the expert's experience and knowledge as a fire investigator and that he observed the physical evidence at the scene of the accident); see *Mickelsen v. Aramark Sports & Ent. Servs.*, 536 F. Supp. 3d 1238, 1243 (D. Utah 2021) (published order) (denying motion to exclude expert testimony and finding physical testing of hypotheses unnecessary where fire investigator's opinion was based on “‘fundamental principles of science’ and ‘analytical techniques’” — an approach expressly permitted by NFPA 921 (quoting NFPA § 19.6.4)).

¶ 45 The fire investigators' testimony reveals that their proffered conclusions were based on deductive reasoning, drawing from their personal observations at the scene of the explosion (i.e., the significant amount of physical evidence of the explosion), as well as

their review of related investigative reports and other documentary materials — including NFPA 921.

¶ 46 Patterson opined that the damage to the building was caused by an explosion originating in Brady's apartment and that the explosion caused the roof to go up in the air and then settle back down, leaving a large hole in the middle of the apartment. He testified that his conclusions were based on his personal observations of the significant damage to the building and how little of Brady's apartment was left behind after the explosion, as well as the pattern of debris in the area. *See Farmland Mut. Ins. Cos.*, 170 P.3d at 836 (noting that the process of elimination (i.e., deductive reasoning) is a reliable scientific methodology accepted by the vast majority of courts as well as explicitly accepted by NFPA 921).

¶ 47 Likewise, Riegenbach opined that the explosion originated in the apartment's basement based on his observations of the debris and the damage to the building, including horizontal breaks in the floor joists. He opined that the disconnected natural gas pipes created a free flow of natural gas, which created a rich environment of oxygen and natural gas in the basement. Riegenbach further opined that the pipes were disconnected with the crescent wrench

set perfectly to fit the pipes and that the pipes were disconnected just before the explosion because the threads on the pipes were still intact. He opined that the fire was secondary to the explosion based on the extension of burn patterns into the adjacent apartment. Finally, he opined that based on the totality of the investigation, Perkins was near or at the top of the basement stairs when the explosion occurred.

¶ 48 The fire investigators' conclusions regarding the origin and cause of the explosion were based on their reasonable inferences drawn from their physical investigation, professional experience, deductive reasoning, and technical knowledge. Moreover, their conclusions are consistent with NFPA standards. See NFPA 921 §§ 18.1.2, 19.1.1 (addressing determination of the origin and cause of a fire).

¶ 49 Thus, their testimony was not misleading or unduly prejudicial to Perkins. Rather, their testimony was both relevant and reliable, and it was admissible under CRE 702. See *Kendall Dealership Holdings, LLC v. Warren Distrib., Inc.*, 561 F. Supp. 3d 854, 861 (D. Alaska 2021) (published order) (admitting expert testimony where fire investigator's conclusions were based on his

personal observations as well as his review of investigative reports including NFPA 921); *see also Occidental Fire & Cas. of N.C. v. Intermatic Inc.*, No. 09-CV-2207, 2013 WL 4458769, at *2 (D. Nev. Aug. 15, 2013) (unpublished order) (finding testimony of fire investigation expert was reliable where the expert's investigation consisted only of witness statements and a physical examination of the fire site because NFPA 921 identifies witness reports and the examination of physical evidence as sufficient means to determine a fire's origin).

¶ 50 Next, we conclude that the fire investigators' deviations from NFPA 921 went to the weight of their testimony and not its admissibility. We observe that NFPA 921 expressly provides that it contains only nonmandatory provisions and merely sets guidelines and recommendations for fire investigations, not requirements. *See* NFPA 921 § 1.3 ("Deviations from these procedures, however, are not necessarily wrong or inferior but need to be justified.").

¶ 51 As discussed previously, the investigators' conclusions that the explosion resulted from an intentional act of disconnecting gas pipes and igniting the gas were based on their personal observations of the substantial physical evidence at the scene, to

which Patterson and Riegenbach applied reliable fire investigation principles and methods guided by NFPA 921. *Shreck*, 22 P.3d at 81-82; *Hewlett-Packard Co.*, 2015 WL 5821898, at *4; *People v. Fletcher*, 679 N.W.2d 127, 145 (Mich. Ct. App. 2004); *Schlesinger*, 898 F. Supp. 2d at 504. Moreover, as noted by the trial court, inquiries regarding the facts of the investigation and the bases of the experts' opinions are properly addressed in cross-examination and voir dire. The record reflects that Perkins had such an opportunity to address the alleged weaknesses in the fire investigators' investigation and conclusions. *Alaska Rent-A-Car, Inc. v. Avis Budget Grp., Inc.*, 738 F.3d 960, 969 (9th Cir. 2013); *see also Glassman v. Home Depot USA, Inc.*, No 16-cv-07475, 2018 WL 3569344, at *4-5 (C.D. Cal. July 20, 2018) (flaws in NFPA 921 implementation can be attacked on cross-examination).

¶ 52 To the extent Perkins criticizes the fire investigators' opinions on grounds that they were contrary to other evidence, such as witness reports suggesting that the gas had been leaking from the pipes for some time before the explosion, these discrepancies do not render their testimony inadmissible, but reflect conflicts in the

evidence the jury was tasked with resolving. *Oram v. People*, 255 P.3d 1032, 1038 (Colo. 2011).

¶ 53 Finally, we are not persuaded that the bases for the investigators' opinions are unreliable under the secondary sources Perkins cites for the proposition that fire investigation methodologies in general are historically founded in debunked "junk science" and that many "junk science fire origin and cause theories" have either been called into question or proved false altogether. In addition to citing legal publications, Perkins also cites to reports from scientific bodies, such as the National Research Council and the American Association for the Advancement of Science, that express concerns about the legitimacy of modern fire investigation methodology and advocate for more research and testing regarding the reliability of fire origin and cause determinations.

¶ 54 Beyond discrediting the outdated methodologies described in his sources, Perkins then touts NFPA 921 as an "acceptable guideline" for fire investigation, claiming that, other than NFPA 921, there is no other identifiable, validated methodology in the fire

investigation field. He cites several law review articles endorsing NFPA 921 as a reliable fire investigation methodology.

¶ 55 But contrary to what Perkins implies, there is no evidence in the record that either of the fire investigators used any of the outdated methodologies described in his secondary sources. Instead, the record supports that both experts made reasonable inferences based on their observations of the scene in conjunction with their education and training as fire investigators, and that both were guided by NFPA 921 in reaching their conclusion that Perkins caused the explosion.

2. The Trial Court Made Sufficient Reliability Findings

¶ 56 Perkins contends that the trial court did not make *any* findings regarding the reliability of the fire investigators' methodology. He faults the court for relying on the fire investigators' credentials rather than the principles underlying their methodology when it determined such methodology was reasonably reliable.

¶ 57 In its order, the court emphasized the fact that the fire investigators were either certified by or otherwise compliant with NFPA. But the court did not stop its analysis there. It also found

that based on the information presented by the parties, the “techniques [the fire investigators] used are reasonably reliable.” Importantly, the court noted that the overview of the fire investigators’ testimony presented in the People’s objection to Perkins’s motion to exclude, as well as in the affidavit and application for arrest warrant Riegenbach authored, contained observations that would not be considered expert opinions under CRE 702, as they did not require scientific, technical, or other specialized knowledge to understand.

¶ 58 Based on the record, we conclude that the trial court did not abuse its discretion by determining that it had sufficient information to make reliability findings without holding an evidentiary hearing because it received a detailed synopsis of the proposed expert testimony, the curricula vitae of the experts, and the evidence relating to fire origin and cause, which was of the type previously accepted as reliable evidence in Colorado state and federal courts. *See Farmland Mut. Ins. Cos.*, 170 P.3d at 836-37; *Sipes*, 949 F. Supp. 2d at 1087-88.

¶ 59 Accordingly, we discern no abuse of discretion in the trial court’s denial of Perkins’s request for a *Shreck* hearing.

III. Disposition

¶ 60 The judgment is affirmed.

JUDGE FOX and JUDGE LIPINSKY concur.