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SC Court of Appeals

THE STATE OF SOUTH CAROLINA

In the Court of Appeals

APPEAL FROM SOUTH CAROLINA WORKERS' COMPENSATION COMMISSION

FULL COMMISSION

Appellate Case No.: 2022-001546

Monica Murphy, Claimant.....Appellant,

v.

Halocarbon Products Corporation, Employer, and Commerce & Industry Insurance Company c/o
AIG Claims, Inc., Carrier.....Respondents.

FINAL BRIEF OF APPELLANT

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ISSUES ON APPEAL

- 1. The substantial evidence rule provides that evidence cannot be viewed blindly from one side. There is undisputed evidence from the Employer's own experts, which is consistent with evidence from Claimant's experts, that Murphy had a significant exposure to HF which could have caused the Claimant's heart and lung injuries. The Commission ignored this evidence. Is the Commission's decision based on substantial evidence?**
- 2. In medically complex cases, an employee shall establish by medical evidence that the injury arose in the course of employment. "[M]edically complex cases" under S.C. Code § 42-1-160 means sophisticated cases requiring highly scientific procedures or techniques for diagnosis or treatment. *Id.* Both Murphy's and Defendant's HF experts agree that a prolonged QT interval on an ECG is evidence of a significant HF exposure. Was it error to ignore this evidence?**

STATEMENT OF THE CASE

This is a medically complex workers' compensation case involving an admitted exposure to a lethal chemical known as hydrofluoric acid (HF). The Single Commissioner heard the case in a hearing which lasted approximately 4 hours on April 27, 2017. The Single Commissioner entered an order denying compensability of the claim on March 12, 2018, finding that although there was an injury, it was not of sufficient magnitude, duration or amount to have caused any permanent heart or lung injuries. She further found that the Employee's version of the facts was not credible, though the evidence was in conflict. The Employee (Murphy) filed a Form 30 Request for Commission Review on March 22, 2018 setting forth 12 assignments of error and questions for appeal on her attachment to the Request. An Amended Attachment A was filed to correct certain matters in the assignments of error on April 11, 2018.

Ms. Murphy alleged she was injured on August 11, 2015 while she was taking waste to an outside disposal area, when she was suddenly overwhelmed by a draft of chemical odors, fumes and vapors as she proceeded to open a door to a satellite area in the plant near the end of her shift at approximately 5:30 a.m. Murphy alleged she sustained serious and permanent injury to her heart, lungs, and suffered post-traumatic stress disorder, all of which has been causally related by her treating doctors to her exposure to HF, which is one of the most lethal chemicals used in all of industry.

HF is well-known to cause delayed, as well as immediate, symptoms to the heart, lungs and systemic parts of the body. Murphy sought an order from the Commission finding that she was injured in the course and scope of her employment due to her exposure to HF, and a finding of permanent and total disability, payment of all causally related medical expenses, Dodge Medical expenses, medical evaluations for the claimant's inability to smell, taste and such other medical evaluations as in the opinion of the Commission could lead to further delineation as to the extent of Ms. Murphy's injuries.¹

In an appeal to the Full Commission, Murphy requested that the Commission find that the Single Commissioner's findings were not supported by the substantial, reliable and probative evidence on the whole record, and were clearly erroneous. Additionally, Murphy alleged that the Single Commissioner's finding that the expert report of Dr. Philip Edelman, a highly qualified physician, environmental toxicologist and who served as a medical doctor at the Centers for Disease

¹ Claimant proceeded at the hearing only on the issue of compensability, temporary total benefits and additional medical treatment, and held in abeyance the issue of permanent disability.

Control in medical toxicology was not timely submitted rebuttal evidence is manifest legal error and should be reversed.

The Appellate Panel of the Full S.C. Workers' Compensation Commission entered an Order affirming the Single Commissioner's findings on July 23, 2018, from which a timely appeal was filed. This Court reversed the Full Commission in an Unpublished Opinion filed June 2, 2021, in *Murphy v. Halocarbon Products Corporation*, 2021 WL 229025, with instructions to admit the Report of Philip Edelman, one of Murphy's experts which was submitted as rebuttal evidence and to consider his report on remand. *Id.* at *2. The Appellate Panel and Full Commission entered its Decision and Order on October 18, 2022, and again affirmed the findings of the Single Commissioner, with amendments. Murphy timely filed Notice of Appeal with this Court on October 26, 2022.

STATEMENT OF THE FACTS

This incident arises out of Monica's Murphy's employment as a lab technician at Halocarbon Products, Corp. (Halocarbon), which is a chemical manufacturer of products such as sevoflurane. Sevoflurane is used in general anesthesia. (Tr. pp. 14-18; R. pp. 284-288). One of the chemicals used in the process of manufacturing sevoflurane is hydrofluoric acid (HF). *Id.* HF or Hydrogen Fluoride Anhydrous is very pure and has no water in it. It fumes at concentrations greater than 40% and at 67° Fahrenheit. (Tr. p. 18, R. p. 288; Mackinnon Dep. pp. 26-27, R. pp. 424-425). It is very corrosive and a serious health hazard. *Id.* Prior to her employment at Halocarbon, Murphy had worked many years at the Savannah River Plant as a lab technician. *Id.* Her duties ranged from metallurgy to liquid process sampling. She had also worked as an E.N.T. and OSHA Coordinator. She takes safety very seriously.

During the early morning hours of August 11, 2015, as Ms. Murphy's shift was ending around 5:30 a.m., she was taking waste to an organic satellite area for disposal. (Tr. p. 20; R. p. 290). Ms.

Murphy was in full acid gear or personal protective equipment at the time, which included a lab-coat, acid apron, neoprene gloves, face-shield, and safety glasses. Id. In order to reach what Murphy described as the process area where the chemicals are manufactured, she had to go through the control room and entered through a door which is pictured in APA No. 23, p. 222; R. p. 711. The danger sign on the door is on the outside of the door, opposite from where Murphy entered into the satellite area to dispose of waste. (Tr. pp. 21-24; R. pp. 291-294). There is a grated floor or walkway upstairs on the second floor. (Tr. p. 22; R. p. 292). On the morning of the accident, as she pushed the door open, Murphy got resistance. She pushed harder to open the door and a draft of air entered, which she inhaled, and she immediately noticed a pungent, sharp, chemical odor. (Tr. p. 25; R. p. 295). She began coughing, like a choking cough and got "several breaths." Id. She then pulled the door closed and felt as she was going to collapse. Id.

There was no barricade or warning at the door she opened. (Tr. p. 26; R. p. 296). No one had told Murphy not to open the door. (Id. p. 27; R. p. 297). No one had told her there was an HF leak in the area, which violated safety protocols. Id. Murphy took at least three, no more than four breaths because she was coughing and choking. Id. She saw no one in the area at that moment, but she had seen another operator, Lonnie Parsons, in the area earlier when she was dumping organic waste. (Tr. p. 29; R. p. 298).

After she closed the door, she took her container, held her breath and proceeded down an interior corridor to another door where she had previously dumped organic waste and observed that Lonnie Parsons was out there. He was up on the second level where they process sevoflurane

and other chemicals. (Tr. p. 30; R. p. 299). The area is pictured in APA No. 23 p. 217.² (R. p. 710).

Murphy then heard Parsons coming down the steps from above her and he was waving his arms at her to not come where he was. Her heart was pounding, and she was experiencing shortness of breath. (Tr. p. 31; R. p. 300). Murphy told Parsons she had inhaled an awful chemical when a draft of air came in on her. Parsons told her it was HF. Id. She was in a state of disbelief. Parsons told Murphy he would dump her flammable waste. (Tr. p. 32; R. p. 301).

After Parsons dumped the waste, Murphy, still stunned, walks toward Parsons to get the empty waste container and notices two carboys (black, plastic, industrial containers) one of which is unvented and is fuming a billowing white smoke, over two feet high. (Tr. p. 33; R. p. 302). The area in which the carboys were located is pictured in APA No. 23 p. 217; R. p. 710. The carboy that was fuming was located closest to the door where the fumes entered the building and is not shown in APA No. 23 p. 217; R. p. 710 but was in the area. Murphy asked Parsons if the fuming carboy that was billowing was HF and he looked at Murphy as if he were in a state of shock. (Tr. p. 35; R. p. 304).

At this point, Murphy's heart is pounding out of her chest, and she is short of breath. She feels overwhelmed. As she gets to the top of the stairs, she hears a noise and turns toward the way she goes back to the lab. She vaguely recalls seeing another operator George Campbell, coming up the other stairs. She went straight to the lab and told her workers that she had inhaled HF. (Tr. p. 36; R. p. 305). She also told the assistant production supervisor, Chip Babb, that she had inhaled

² References to some APA Submission page numbers have been corrected from some of the designated APA page numbers which are in the Appellant's Brief as filed with the Commission because they did not refer to the correct APA page numbers. Many of these pages were renumbered because of supplemental submissions made after the first hearing was continued.

HF and had seen a billowing carboy. (Tr. p. 38; R. p. 307). Although safety protocol required that she be given calcium gluconate, she was not administered this antidote. (Tr. p. 39; R. p. 308). She did ask Babb for it. Id. Babb then told Murphy that there were leaks in the 3-K system. (Tr. p. 40; R. p. 309).

When Murphy asked for the calcium gluconate nebulizer, Babb told her she just needed fresh air. (Tr. p. 40; R. p. 309). Murphy's mouth was dry and her sinuses were burning. Id. She testified, "I was having coughing, and then my throat started feeling as if it was closing up." (Tr. p. 41; R. p. 310). She asked for some water. Id. Her co-worker, Janice Tierney told Murphy her face was red, except where her safety glasses fit. (Tr. p. 42; R. p. 311). Before she left work around 7:00 a.m., Murphy notified her supervisor in writing about what had happened. (Tr. p. 43; R. p. 312). She then went home and began having abdominal pain, diarrhea, and weakness. She self-medicated with calcium chews, but was still having headaches, and burning in her throat and sinuses. (Tr. p. 44; R. p. 313). She also received a text from Emily Parrish, her supervisor, and responded with a request to get medical attention. Id. She then returned to work for her evening shift on the same day, August 11, 2015. She also received a call from either Ken McDowell- the Safety Supervisor- or Ms. Parrish and that they wanted her to go to Urgent M.D. (Tr. p. 45; R. p. 314). When she arrived at Urgent M.D. she saw a physician's assistant by the name of Timber Wages, and heard Ken McDowell, who met her there, tell the P.A. that Ms. Murphy had been exposed to 40% HF. She was not given any medication but did receive a "regular check." They checked her reflexes and listened to her chest and heart. Id. She was released to go back to work with no restrictions, but continued having symptoms, including headaches, burning in her throat, shortness of breath and coughing. (Tr. p. 46; R. p. 315). Prior to this event, Ms. Murphy's general health was very good. Id.

Murphy went through a divorce in 2007 and had what she described as a racing heart, but her cardiologist, Dr. Cundey, attributed this to the stress of her divorce. (Tr. pp. 47-48; R. pp. 316-317). She was also hospitalized with kidney stones in 2010 and had a little tachycardia. (Tr. p. 48; R. p. 317). Her doctor told her that this was attributable to the body's response to fever and infection. Id.

When Murphy returned to work on the evening shift on August 11, 2105, the same day of the accident, her symptoms worsened. She was having shortness of breath, and all of the symptoms described above. She returned to Urgent M.D. on August 13th, 2015 but did not receive any treatment there. (Tr. p. 54; R. p. 322). She was referred to the emergency room at University Hospital in August, Ga. for evaluation. She did receive a nebulizer treatment of albuterol on August 13, 2015 at the hospital, which is the first treatment she had received. (Tr. p. 55; R. p. 323).

After the visit to the ER on August 13, and being out for several days, Ms. Murphy returned to work on August 19th to light duty. (Tr. p. 56; R. p. 324). But her condition deteriorated. Her headaches and pain worsened and she asked Ken McDowell, Halocarbon's safety director, if she could go to the emergency room. He did not grant her permission. (Tr. pp. 58-59; R. pp. 326-327). No one helped her.

Eventually, Murphy did go to Urgent M.D. on August 19th in North Augusta, which documented that Ms. Murphy had an abnormal EKG, read as a conduction abnormality- reported as chronic in nature, but which her treating cardiologist, Dr. Kellie Lane, later read as 3rd degree heart-block. According to Dr. Lane, Ms. Murphy should have been hospitalized at this point. (Lane Dep. pp. 8-9; R. pp. 452-453). A patient in complete heart block is at risk of sudden death. (Id. p. 11: 1-11; R. p. 454). Dr. Lane opined in her deposition that the exposure was the cause of a vasovagal response triggered by severe coughing and choking related to Ms. Murphy's exposure

to HF. She testified, "We did think that this was very much related to what had been going on with the respiratory issues." Q. And therefore with the exposure? A. Yes, was the cause, yes." (Lane Dep. pp. 17: 25 to 18: 1-5; R. pp. 457-458). The chemical HF is well-known to cause cardiac arrhythmia and Ms. Murphy did have this. (Lane Dep. p. 15: 13-15; R. p. 455). Dr. Lane opined within a reasonable degree of medical certainty that, "Ms. Murphy had an issue with [her heart] the rhythm related to the exposure [to HF] primarily related to the severe respiratory issues she was experiencing." (Lane Dep. p. 15: 22-25; R. p. 455). She testified:

13 Q. And did Ms. Murphy have cardiac

14 arrhythmias?

15 A. She did.

16 Q. Do you have an opinion, within a

17 reasonable degree of medical certainty, whether her

18 temporal exposure to hydrofluoric acid had any impact

19 on these arrhythmias?

20 A. Yes.

21 Q. What is your opinion?

22 A. I believe that this patient had an issue

23 with the rhythm related to the exposure primarily

24 related to the severe respiratory issues that she was

25 experiencing.

Lane Dep. p. 15: 13-25; R. p. 455.

Ms. Murphy's symptoms deteriorated further on August 21, 2015 while she was at work when she started feeling light-headed, like she could faint. (Tr. pp. 63-64; R. pp. 331-332). She

was weak and sick but was told she could not go to the ER. Her supervisor said, "I have a place back where you can work." She did a breathing treatment and as she entered the warehouse workspace area but felt as if she was going to faint. (Tr. p. 64; R. p. 332). Shortly thereafter, she began feeling like she was having problems breathing, worse than shortness of breath and told her supervisor that she was "in respiratory distress." (Tr. p. 66; R. p. 334). Murphy began having chest pain.

Halocarbon called EMS and when they arrived, they began administering calcium gluconate. (Tr. pp. 66-67; R. pp. 334-335). Ultimately EMS transported Murphy to University Hospital where she had a pacemaker put in as she was on the verge of complete cardiac arrest. She has had a constellation of symptoms and diagnoses related to this exposure, including Reactive Airways Dysfunction (RADS), heart-block, cardiac arrhythmias, and dysrhythmias, and post-traumatic stress disorder.

The Chemical Hydrofluoric Acid

The Safety Data Sheet published by LanXess, the manufacturer of the brand of HF used by Halocarbon Products, Corp. (Halocarbon) denotes HF as a dangerous chemical in the Hazards Identification Section of the Safety Data Sheet. (SDS) The Hazards Identification Section of the SDS states that HF is "Fatal if Swallowed, in contact with skin, or if inhaled." (APA p. 183; R. p. 704) If the product is inhaled, the SDS urges the victim to "Get medical attention immediately." (APA p. 184; R. p. 705). The SDS also instructs to "Call a physician immediately," if inhaled. Id. Halocarbon did not comply with this safety dictate, and thus, this led to serious medical complications which the SDS warns against. Specifically, inhalation of HF "may cause pulmonary edema with symptoms of breathing difficulty, and tightness of the chest." Further, "[the] product may have a direct toxic action, resulting in a fall of blood pressure and cardiac arrhythmia." (APA

p. 185; R. p. 706). The product is also “corrosive with symptoms of coughing, burning, ulceration and pain.” Id. Pulmonary symptoms may be delayed for several hours up to several days. Id. According to a SDS Revision date of March 18, 2015 in the case of inhalation, the protocol requires safety personnel to “Take victim immediately to hospital.” (APA p. 197; R. p. 707). The Revised SDS of March 18, 2015 denotes the “Most important symptoms and effects, both acute and delayed,” are in cases of inhalation: Breathing difficulties, sore throat, and nose bleeding. There is a risk of hypocalcemia and cardiac arrhythmia. Id.

Halocarbon’s own Contingency Plan in cases of inhalation calls for the immediate movement of the victim to fresh air and to “arrange immediate transportation to University Hospital.” (APA p. 201; R. p. 708). It goes further to state that, “Even in case of suspect slight inhalation, the victim should be brought to the hospital for observation. The symptoms of HF inhalation (pulmonary edema) can be delayed and serious.” Id.

According to Halocarbon’s Safe HF Handling protocol:

Hydrogen Fluoride is a very strong acid used at Halocarbon as a source of fluorine in the production of several different chemicals. Hydrogen fluoride is used in its anhydrous (meaning without water or dry) form at Halocarbon. **Pure liquid anhydrous HF fumes copiously when exposed to the atmosphere (its normal boiling point is only 67°F)**, as do mixtures containing more than about 50 % HF. HF, even in low concentrations, can severely burn the skin and eyes and be fatal if swallowed. The fumes from pure HF or HF- containing mixtures are dangerous to the skin, eyes and respiratory system. Exposure to HF can cause serious and painful burns if not treated promptly. **HF can also cause a range of delayed effects that may not show for many hours or days after initial exposure if not treated properly, even when the exposure is minimal.** (Emphasis added)

Halocarbon Products Corporation Safe Handling, APA p. 204; R. p. 709.

STANDARD OF REVIEW

This appeal is governed by the substantial evidence rule which applies in workers' compensation cases and S.C. Code §1-23-380 (1976, as amended).

ARGUMENT

- I. The substantial evidence rule provides that evidence cannot be viewed blindly from one side. There is undisputed evidence from the Employer's own experts, consistent with evidence from Claimant's experts, that Murphy had a significant exposure to HF which could have caused the Claimant's heart and lung injuries. The Commission ignored this evidence. The Commission's decision is therefore not based on substantial evidence and must be reversed because it is clearly erroneous and unreliable.**

The substantial evidence rule applies in South Carolina Workers' Compensation cases. *Lark v. Bi-Lo, Inc.*, 276 S.C. 130, 276 S.E.2d 304 (1981). The standard of review in cases appealed from the South Carolina Workers' Compensation Commission is laid down in the South Carolina Administrative Procedures Act, which provides in relevant part as follows:

- (5) The court may not substitute its judgment for the judgment of the agency as to the weight of the evidence on questions of fact. The court may affirm the decision of the agency or remand the case for further proceedings. The court may reverse or modify the decision if substantial rights of the appellant have been prejudiced because the administrative findings, inferences, conclusions, or decisions are:
- (a) in violation of constitutional or statutory provisions;
 - (b) in excess of the statutory authority of the agency;
 - (c) made upon unlawful procedure;
 - (d) *affected by other error of law;*
 - (e) *clearly erroneous in view of the reliable, probative, and substantial evidence on the whole record; or*
 - (f) arbitrary or capricious or characterized by abuse of discretion or clearly unwarranted exercise of discretion. (emphasis added)

S.C. Code Ann. § 1-23-380.

"Substantial evidence" is not a mere scintilla of evidence nor evidence viewed blindly from one side of the case, but is evidence which considering the record as

a whole, would allow reasonable minds to reach the conclusion that the administrative agency reached in order to justify its action. (emphasis added)

Lark v. Bi-LO, at 135 *supra*, citing, *Law v. Richland County School Dist. No. 1*, 270 S.C. 492, 243 S.E.2d 193 (1978).

Furthermore, substantial evidence is not just any evidence. It must be reliable and probative. Indeed, it must be "substantial." The substantial evidence rule does not allow the administrative agency to mishandle the evidence or ignore evidence. To do so would be to allow the agency to "blindly view the evidence from one side." *Id.* The Single Commissioner and the Full Commission turned a blind eye to the evidence which follows.

The Exposure

There is no dispute in this case that Monica Murphy was exposed to HF. And indeed, the contemporaneous memos of this incident for the most part indicate that it was pure HF to which Murphy was exposed. The defense strategy and position, which the Single Commissioner bought into in her Order, is that the exposure was so minimal as to not cause any lasting injury. But even a minimal exposure can cause serious health effects, though Murphy does not admit the exposure here was minimal in any regard.

The scientific evidence produced from the Halocarbon's own records squarely refutes the notion that a minimal exposure cannot cause injury. According to Halocarbon's Safe HF Handling protocol:

Hydrogen Fluoride is a very strong acid used at Halocarbon as a source of fluorine in the production of several different chemicals. Hydrogen fluoride is used in its anhydrous (meaning without water or dry) form at Halocarbon. **Pure liquid anhydrous HF fumes copiously when exposed to the atmosphere (its normal boiling point is only 67°F)**, as do mixtures containing more than about 50 % HF. HF, even in low concentrations, can severely burn the skin and eyes and be fatal if swallowed. The fumes from pure HF or HF- containing mixtures are dangerous to the skin, eyes and respiratory system. Exposure to HF can cause serious and painful burns if not treated promptly. **HF can also cause a range of delayed effects that**

may not show for many hours or days after initial exposure if not treated properly, even when the exposure is minimal. (Emphasis added)

Halocarbon Products Corporation Safe Handling, APA p. 204; R. p. 709.

The contemporaneous memos made by Halocarbon confirm that there was an HF leak, without regard to any dilution of the fumes.

Halocarbon's Safety Director, Ken McDowell, notes "We received a note from Monica at 0658 on August 11, alleging an HF inhalation exposure that she stated occurred at about 0545. Mark Frye stated at the 9 am morning meeting that the economizer had an HF leak and that was the cause." There is no mention of dilution. (Cl. APA No. 8, APA p. 163; R. p. 696). In another memo from McDowell to Mark Frye, Mark Harris, Mickey Brown and Chip Babb, McDowell writes about an upcoming "roundtable discussion" which "will center around the HF leak that occurred in the process side of the heat exchanger, 3k214. Probably related to wet HF." (APA p. 165; R. p. 697).

The "root cause" of the event was noted to be a combination: 1. Improper venting: a. "Hazardous vapors should not be vented to a carboy." 2. Improper Area Warning: a. "Anytime hazardous vapors are present, use a plant evacuation, an area evacuation, or a PA announcement as appropriate." (APA No. 16, APA p. 181; R. p. 702).

The Halocarbon Products Corporation Supervisor's Incident Report notes that there were "trace HF fumes," but Ken McDowell, the company's Safety Director, could not provide an estimate of the amount of HF that was present. (Tr. p. 145; R. p. 378). And no measurement of the fumes was made. (Tr. p. 142; R. p. 375). According to the CDC publication on HF which was made an exhibit to Dr. MacKinnon's deposition, the Defendants' HF expert, HF which is more than 40% hydrogen fluoride fumes in the air. (Cl. Ex. 2 to MacKinnon Dep.; R. p. 529). Ken

McDowell provided information regarding the exposure to Urgent MD of Aiken that the amount of HF concentration to which Monica was exposed was 40%. (See Urgent MD visit 8/11/15, APA No. 1, APA p. 7; R. p. 551). Of course, at this time McDowell was not prompted to urge a diluted amount, and therefore, the Court should rely on what was more spontaneously reported. Murphy's health is at stake.

The Safety Data Sheet published by LanXess, the manufacturer of the brand of HF used by Halocarbon Products, Corp. (Halocarbon) denotes HF as a dangerous chemical in the Hazards Identification Section of the Safety Data Sheet. (SDS) The Hazards Identification Section of the SDS states that HF is "Fatal if Swallowed, in contact with skin, or if inhaled." (APA p. 183; R. p. 704). If the product is inhaled, the SDS urges the victim to "Get medical attention immediately." (APA p. 184; R. p. 705). "The SDS also instructs to "Call a physician immediately," if inhaled. Id. Halocarbon did not comply with this safety dictate, and thus, this lead to serious medical complications of which the SDS warns. Specifically, inhalation of HF "may cause pulmonary edema with symptoms of breathing difficulty, and tightness of the chest." Further, "[the] product may have a direct toxic action, resulting in a fall of blood pressure and cardiac arrhythmia." (APA p. 185; R. p. 706). The product is also "corrosive with symptoms of coughing, burning, ulceration and pain." Id. Pulmonary symptoms may be delayed for several hours up to several days. Id.

According to a [Safety Data Sheet] SDS Revision dated March 18, 2015, in the case of inhalation, the protocol requires safety personnel to "Take victim immediately to hospital." (APA p. 197; R. p. 707). The Revised SDS of March 18, 2015 denotes the "Most important symptoms and effects, both acute and delayed," are in cases of inhalation: Breathing difficulties, sore throat, and nose bleeding. There is a risk of hypocalcemia and cardiac arrhythmia. Id.

Halocarbon's own Contingency Plan in cases of inhalation calls for the immediate movement of the victim to fresh air and to "arrange immediate transportation to University Hospital." (APA p. 201; R. p. 708). It goes further to state that "Even in case of suspect slight inhalation, the victim should be brought to the hospital for observation. The symptoms of HF inhalation (pulmonary edema) can be delayed and serious." Id.

The Proof of Causation

The burden of proof in a medically complex case is upon the Claimant to establish within a reasonable degree of medical certainty that the injury claimed was caused by the conditions occurring or arising out of the Claimant's employment. S.C. Code § 42-1-60 (E). The evidence is nothing short of substantial as to the fact of Murphy's exposure to and injury from HF. And the Employer's own documents prove the case, including the manner and fact of a leak of HF, the claimant's undisputed exposure and injury and consequent medical proof of the kind and type of injury that is contemplated from such an exposure, even a minimal one.

University Hospital medical records record as "Final Diagnoses" a number of medical problems which are well-known to follow from an exposure to HF, including, atrioventricular block, complete, bronchitis and pneumonitis due to fumes and vapors and cardiac dysrhythmias. (APA p. 42; R. p. 585).

Dr. Kellie Lane, who was the front-line treating cardiologist, opined that Ms. Murphy's heart block was related to a vasovagal induced response to extreme coughing and respiratory distress precipitated by her exposure to HF, as noted above. Dr. Lane testified that Ms. Murphy is completely dependent on the pacemaker, which is in essence evidence of 100 % impairment to the heart. (Dr. Lane Dep. p. 49: 8-9; R. p. 466).

Importantly, **one of the most significant clinical factors associated with HF induced heart block is prolongation of the QT interval on electrocardiogram.** Defense expert, Dr. MacKinnon, conceded this in his deposition, along with other very salient points which were virtually ignored by the Commission. If the Commission gave great weight to Dr. MacKinnon's report, then it must of necessity yield to his honest opinions and admissions on cross-examination in his deposition. *See* July 23, 2018 Decision and Order Finding No. 62 p. 43; R. p. 186. In his deposition, Dr. MacKinnon concedes that prolongation of the QT interval would be a clinically important finding that was consistent with a significant HF exposure. He testified:

41

Q... Now, are you aware that in the hospital

23 records, Dr. Elgin Hobbs, who is an internist that

24 examined and treated Ms. Murphy, that -- that he noted a

25 prolonged QT interval with respect to her heart; is that

42

1 correct?

2 A... I don't have that information. And I don't

3 see -- looking at your -- the list that's here of

4 medical records, there's no Dr. Hobb.

5 Q...Dr. Elgin Hobbs.

6 A... Not on the list here

7... Q... All right. Well, I mean, were you provided

8...with the medical records from University Hospital?

9... A... Some, yes. But I don't recall seeing the fact

10· that there was prolongation of the QT interval

11· specifically.

12· . . . Q· If that's true, if that was noted in the

13· medical records, that would be clinically significant to

14· you; would it not?

15· . . . A· Yes, indeed it would be.

16· . . . Q· It would be some evidence, would it not,

17· that -- that that was consistent with an exposure to HF;

18· correct?

19· . . . A· It could be. There are other causes for QT

20· interval changes, but that's one of them; that had there

21· been an exposure, a significant exposure, yes, you're

22· going to get QT interval changes.

23· . . . Q· All right. And so, you know, given the timing

24· of her alleged exposure on August the 11th and her

25· subsequent admission at the University Hospital with

· less than, what, approximately ten days, for the fact

· that there was a prolonged QT interval noted, if there

· was, that would be something that would be considered

· important in a temporal exposure to hydrofluoric acid;

· would it not?

·6· . . . A· I'm not a cardiologist, so -- and I wouldn't

·7· be able -- I can't really answer that question, other

8 · than saying that I can't conceive of the QT interval
9 · staying prolonged for several days without having the
10 · patient -- without the patient having some heart
11 · complaints.

12 · · · · Q · Okay. But you're an expert in HF exposures;
13 · yes?

14 · · · · A · Yeah. Yes.

15 · · · · Q · And a prolonged QT interval is a significant
16 · finding subsequent to an exposure to HF; yes?

17 · · · · A · That's something we monitor for after an
18 · exposure of any significance.

19 · · · · Q · It would take a significant exposure to
20 · precipitate a prolonged QT interval; would it not?

21 · · · · A · It would take it, yes

MacKinnon Dep. pp. 41: 22-25 – 43: 1-21; R. pp. 432-434.

It is nothing short of damning, if not dishonest, that Dr. MacKinnon was not provided complete medical records from the Defendants since the Commission by adopting the Single Commissioner's Order has placed such great weight on his report. This is manifestly unfair and the Single Commissioner's finding on causation or lack thereof should be reversed as it is unreliable because this evidence was ignored. But it goes further. Dr. MacKinnon was asked in his deposition if the details of the exposure were important to which he replied they were. (MacKinnon Dep. pp. 16-18; R. pp. 418-420). Dr. MacKinnon testified:

16

11 Q Did you --

12 Well, you would agree that the details of any
13 exposure to HF are very important?

14 A There is two things that --

15 My answer would be yes, but I have to say that
16 what's important with hydrofluoric acid is the
17 concentration of the acid, in whatever form it's in,
18 liquid or gaseous, and the duration of exposure. These
19 are the two most important factors.

20 Q We're going to talk about that a little later.

21 A Okay. Fine.

22 Q We're going to talk about that a little later.

23 I just wanted to ask you whether or not you
24 thought that the details of an exposure, whether that
25 was important or not?

17

1 A It's always important.

2 Q All right. Now --

3 Well, it's like a medical history; yes?

4 A That's correct.

5 Q So in any case, do you recall being provided
6 the deposition of Monica Murphy to read?

7 A No.

8 Q Do you believe that Ms. Murphy's description
9 of what happened would be important, since she is the
10 person that is involved as the claimant in this case?

11 A Yes, it would be important.

12 Q All right. Now, I looked at your -- your
13 report.

14 MR. HALL: And, Madam court reporter, can you
15 hand Dr. MacKinnon -- I think I've given it to you.

16 Let me locate it real quickly. Bear with me just a
17 moment.

18 Q (By Mr. Hall) It's your report dated
19 January 25th.

20 A Yeah, I have it here.

21 Q All right.

22 A Yeah, I have it here.

23 Q Okay. Well, I want to get that to the court
24 reporter.

25 MR. HALL: Madam court reporter, do you have

18

1 it?

2 THE REPORTER: I have something here that says
3 January 27th on it. I don't know --

4 MR. HALL: That's it. Hand it to him and
5 let's let him identify it.

6 THE WITNESS: Yeah, that's my letter.

7 MR. HALL: Okay. Let's mark that as
8 Claimant's Exhibit Number 1, Madam court reporter.

9 (Claimant's Exhibit No. 1 marked.)

10 THE REPORTER: It's marked.

11 Q (By Mr. Hall) All right. Dr. MacKinnon,
12 you're familiar with your report; yes?

13 A Yes.

14 Q All right. And did you note the testimony
15 from Mrs. Murphy's deposition where she described the HF
16 was billowing out of a carboy --

17 A No.

18 Q -- in your report?

19 A I did not see that deposition.

MacKinnon Dep. pp. 16-18; R. pp. 418-420.

The failure to provide defense experts with complete medical evidence calls into question all the Commissions' findings and the Commission's failure to weigh this evidence makes its findings unreliable. Therefore, its Order should be reversed.

Nevertheless, there is independent testimony that substantial HF fumes were encountered. George Campbell, one of the Halocarbon's employees encountered the HF fumes and had a reaction which he stated, "it took my breath away." (Tr. p. 175; R. p. 398).

As to the concentration of HF, defense expert Dr. MacKinnon testified:

18

14 Q All right. And did you note the testimony
15 from Mrs. Murphy's deposition where she described the HF
16 was billowing out of a carboy --

17 A No.

18 Q -- in your report?

19 A I did not see that deposition.

20 Q All right. Are you familiar with the Centers
21 for Disease Control's publication on hydrofluoric -- or
22 hydrogen fluoride and hydrofluoric acid as a systemic
23 agent?

24 A Not particularly.

25 Q All right. Is it true, Dr. MacKinnon, that

19

1 hydrofluoric acid that is more than 40 percent hydrogen
2 fluoride fumes in the air?

3 A No. Usually it doesn't start fuming until
4 it's past 70 percent.

MacKinnon Dep. pp. 18:14 to 19:4; R. pp. 420-421.

18 Q All right. Nobody quantified the amount of
19 fumes that had escaped; is that correct?

20 A Not that I know of.

21 Q All right. And you are aware that there were
22 fumes and vapors?

23 A I'm aware that there was some --

24 Q Is that correct?

25 A I am aware that there were vapors, yes.

1 Q All right.

2 A Or fumes.

3 Q And -- all right.

4 And --

5 So your -- you testified to us earlier that HF
6 that is greater than 70 percent fumes in the air; is
7 that correct?

8 A That's the normal, yeah, at room temperature
9 will start to boil.

10 Q All right.

11 A It's a range. If it's 70 percent or 75 or 80
12 or 90, as it gets more concentrated, it fumes more. And
13 pure HF, anhydrous, which is 99 percent, would fume very
14 readily, unless it was -- the temperature was below
15 freezing.

16 Q Okay. And if it was billowing, that would be
17 significant; would it not?

18 A Certainly if it was billowing.

19 Q Yeah.

20 So there were no monitors that you were aware

21 of that indicate -- that indicated how much HF had

22 escaped; is that correct?

23 A Correct.

MacKinnon Dep. pp. 22:18 to 23:23; R. pp. 422-423.

Dr. MacKinnon, Defendants' HF expert, further acknowledged that HF can cause cardiac arrhythmia; that HF is a toxin, and that HF can cause heart block. (MacKinnon Dep. p. 40: 19-25; R. pp. 431-432). He also testified on deposition that if you have a piece of equipment that is fuming that would indicate that the concentration was greater than 40%. (Id. pp. 29: 19-25 to 30: 1-4; R. pp. 426-427). MacKinnon acknowledged an electrolyte imbalance in the form of hypophosphatemia and that HF vapors were present. (Id. p. 37:3-6; R. p. 430). MacKinnon acknowledged that hydrogen fluoride likely has a direct adverse effect on the heart as a delayed onset of fatal dysrhythmias, and they have been described despite normal calcium, magnesium and potassium concentration. (Id. pp. 36: 17-21; 22-25 to 37:1-2; R. pp. 429-430).

Beyond this, Dr. John F. Setaro, an Associate Professor of Cardiology at Yale University School of Medicine, has opined within a reasonable degree of medical certainty that "Ms. Murphy's exposure to hydrofluoric acid (HF) at her place of employment was a substantial causative factor in the development of life-threatening third-degree electrical heart block in her case, which required the placement of a permanent electronic pacemaker." (APA No. 24, APA pp. 239-242; R. pp. 713-716).

One of the recognized indications of a toxic induced heart block due to HF exposure according to Dr. Setaro is a "prolongation of the QT interval" on ECG or other electrical disturbances. (APA p. 240; R. p. 714). Of note, according to Dr. Setaro, Ms. Murphy's QT interval was abnormally prolonged at 0.496 milliseconds." Id. This is in the medical records from University Hospital. (APA p. 45; R. p. 588). Dr. Setaro further notes that fatal cardiac rhythm

disturbances have been described following HF exposure in settings where serum calcium and magnesium remain normal. (APA p. 240; R. p. 714). According to Dr. Setaro, who is also a Board-Certified Clinical Hypertension Specialist, as well as being Board Certified in Interventional Cardiology, Ms. Murphy's diagnostic echocardiogram and Lyme studies during her stay at University Hospital were otherwise normal, pointing away from any other cause except HF poisoning to explain this cardiac electrical disorder. (APA p. 241; R. p. 715).

Ms. Murphy has permanent pulmonary problems associated with this exposure, which has been diagnosed as reactive airways dysfunction syndrome (RADS), which her treating pulmonologist and critical care expert has opined within a reasonable degree of medical certainty was caused by the exposure. (Alleyne Dep. pp. 8, 12- 14; R. pp. 481). He assigned a permanent partial impairment to each of Ms. Murphy's lungs of 30%. (Alleyne Dep. p. 27; R. p. 489). Dr. Alleyne's chart of Ms. Murphy's medical records document that "the patient is status post toxic inhalation injury due to hydrofluoric acid. This is an extremely toxic material that can be fatal. Her initial presentation in 24 hours would qualify as reactive airways dysfunction syndrome. RADS." (APA pp. 127-128; R. pp. 662-663; *see also* APA pp. 125-128; R. pp. 660-663).

This is consistent with the University Hospital Medical Record. Dr. Varsha Kulkarni opined that Ms. Murphy may have some RADS related to her exposure. (Cl. APA No. 2, APA p. 53; R. p. 596). Dr. Elgin Hobbs of University Hospital noted at Ms. Murphy's admission that she was complaining of shortness of breath and symptoms of moderate to severe severity. Dr. Hobbs noted "possible delayed sequelae to hydrofluoric acid." His final diagnosis was "Toxic Inhalation Injury, Chemical Exposure." (APA p. 46; R. p. 589).

Dr. Alleyne also noted that Ms. Murphy has post-traumatic stress disorder, in addition to 3rd degree heart block and a diffusion capacity of 40% of predicted, which qualifies as a class IV impairment to her lungs. (APA No. 4, APA p. 127; R. p. 662).

Dr. Early, Defendants' toxicologist, upon whom the Single Commissioner, in part, relied on to reject any injury to the Claimant's lungs, found that Ms. Murphy was "worse now" after the exposure" insofar as her lungs are concerned. (See Early Report p. 402, Def. APA No. 27, APA p. 402; R. p. 753). Interestingly, Dr. Early also notes that he did not find a low phosphate level in Ms. Murphy's medical records, which is clearly documented in the University Hospital records, which he refers to incorrectly as MCG records. Ms. Murphy was not taken to the Medical College of Georgia hospital. In fact, Ms. Murphy did have an abnormal electrolyte finding, which the Commissioner found she did not have in her Order at p. 56, finding no. 83. (R. p. 131). The hospital records note that Ms. Murphy had a low phosphorous level of 1.1 as noted on APA page number 51, noted by Dr. Patel. (R. p. 594). Furthermore, Dr. Early's report cites to research which documents that "electrolyte abnormalities are rather uncommon in HF exposures." (Early Rep., Def. APA No. 27, APA p. 400; R. p. 751). Thus, the Single Commissioner's heavy reliance on the lack of abnormal electrolyte findings is seriously flawed and clearly erroneous, as are the Full Commission's findings, and Dr. Early's findings are inconsistent with his own research. Nevertheless, even Dr. Early thinks the Claimant's lungs were at least aggravated in the face of pre-existing restrictive lung disease. In addition, Dr. Early's report bolsters the findings of Dr. Setaro, Claimant's cardiology expert from Yale, as both agree that a prolonged QT interval on EKG is a finding clinically associated with HF exposure. (Early Rep., APA p. 400; R. p. 751; *see also*, Setaro Rep., Cl. APA No. 24, APA p. 238; R. p. 712). No reasonable finder of fact should be allowed to turn a blind eye to this evidence. Nor could any reasonable fact- finder conclude that

such evidence pointed in any other direction than a compensable, permanent injury to Ms. Murphy's heart and lungs from her exposure to HF.

There is abundant evidence of causation and injury to the Murphy's heart and lungs to which the Commission turned a blind eye. There is also manifest evidence that Halocarbon's experts are grossly mistaken based on the reliable, substantial and probative evidence on the whole record. Therefore, because their opinions are riddled with error and incomplete, the Commission's decision is not based on substantial evidence, and should be reversed.

II. In medically complex cases, an employee shall establish by medical evidence that the injury arose in the course of employment. "[M]edically complex cases" mean sophisticated cases requiring highly scientific procedures or techniques for diagnosis or treatment excluding MRIs, CAT scans, x-rays, or other similar diagnostic techniques. Murphy's and Defendants' HF experts agree that a prolonged QT interval on ECG is evidence of a significant HF exposure. The Commission erred in ignoring this evidence.

A. The Commission's complete failure to address medical evidence, not in dispute, and properly weigh such objective evidence in favor of compensability is manifest legal error.

In a medically complex case, the objective medical and scientific evidence control over subjective credibility findings in the determination of a compensable injury. In this case, the credibility findings of the Commission are wholly divorced from the most critical, objective, medical evidence in this case. Significantly, both Defendants' HF experts and Murphy's experts agree that with concentrated exposures to HF a prolonged QT interval, arrhythmias (ventricular tachycardia, fibrillation, and electromechanical dissociation) are often observed. (Early Rep., APA p. 400; R. p. 751). "Of note, [Murphy's] QT interval was abnormally prolonged at 0.496 milliseconds." *Id.* In agreement Murphy's expert, Dr. John F. Setaro, Director, Cardiovascular Disease Prevention Center at Yale University School of Medicine, opines that with exposure to

HF “there can be prolongation of the QT interval on the ECG or other electrical disturbances.” (Sentaro Rep., APA p. 240; R. p. 714). Further, there can also be serum phosphorus disturbances as well. Id. In agreement, Defense HF expert, Dr. Mackinnon, admits that it would take a significant exposure to HF to precipitate a prolonged QT interval. (Mackinnon Dep. pp. 41: 22-25 to 43: 1-21; R. pp. 432-434).

It is simply indisputable that Ms. Murphy was exposed to HF; and that she had a prolonged QT interval on ECG (evidence of a significant HF exposure) as noted by the main treating and diagnosing physician, Elgin Hobbs (whose records were not even furnished to the Defendants’ main HF expert, Dr. McKinnon). Dr. Hobbs notes “initial Electrocardiogram sinus bradycardia, 59 bpm, Nonspecific ST changes. **Prolonged QT.**” (Cl.’s APA p. 45; R. p. 588). The claimant also had low phosphorus. (APA p. 51; R. p. 594). No less than 4 doctors note the significance of a prolonged QT interval subsequent to Murphy’s exposure to HF, Dr. Hobbs, Dr. Setaro, Dr. MacKinnon, and Dr. Early. The Commission’s total failure to address this medical evidence, which is not in dispute, and properly weigh it in favor of compensability is unmistakable legal error. The Commission should be instructed to note this evidence and find a compensable injury to Murphy’s heart and lungs, holding in abeyance any finding of the degree of permanent impairment until a further hearing.

B. The Commission’s arbitrary credibility findings should be given no weight as these findings in no way negate the objective, agreed-upon medical evidence of a significant HF exposure in this case, including a prolonged QT interval and low phosphorus level.

All the Commission’s “absolutist” credibility findings do not in the least refute the objective medical evidence of a significant HF exposure in this case, including a prolonged QT interval and low phosphorus (electrolyte) level. Credibility findings may not be used as a talisman

to defeat objective scientific, medical evidence. *Clark v. Philips Electronics/Shakespeare*, 433 S.C. 186, 193-194, 857 S.E.2d 378, 381-382 (2021). Rather, in a medically complex case, as in this matter, the threshold for compensability is established by the weight of the incontrovertible medical evidence.

First, the Defense HF experts argued HF induced heart issues are normally immediate, within twenty-four hours. This is patently false. Defendant's own scientific literature and Safety Data Sheets make it abundantly clear in plain language that **"HF can ... cause a range of delayed effects that may show many hours or days after initial exposure if not treated properly, even when the exposure is minimal."** See Halocarbon Products Corp. Safe HF Handling, APA 204; R. 709. Dr. MacKinnon, the Defendants' touted expert, who opined that effects of HF on the heart are normally immediate, within twenty-four hours, is severely impeached by his own published article on HF wherein he writes, **"The most important factors to remember are the delay in the onset of signs and symptoms related to the concentration of the acid and the penetration and destruction of tissues by fluoride ions... with serious systemic effects."** (APA p. 44; R. p. 587). The truth in this case is not dependent upon belief or credibility. The Defendants cannot on the one hand say that delay is a major feature of HF exposure and toxicity and then, on the other hand, deny published scientific, medical literature which says symptoms may be delayed for hours or days. Dr. MacKinnon's offer to the contrary is nothing but a bought and paid for opinion which is of dubious worth, and which should be afforded no credibility by the Commission or this Court. His opinion is clearly erroneous.

Second, the opinions of Dr. Feldman (the Defense cardiologist) and Dr. Mitchell (the Defense pulmonologist) are entitled to no weight whatsoever and are inherently unreliable for several reasons. Neither of these doctors has any demonstrable experience with HF exposures. In

a medically complex case, this is fatal. Dr. Mitchell's report was mistaken as to the chemical to which Murphy was exposed, noting it was HCL, rather than HF to which she was exposed. Def. APA p. 408. Additionally, in Dr. Mitchell's deposition, he concedes he has never seen a patient to his knowledge who was exposed to HF. *See* Appellate Panel Review, Decision and Order, October 18, 2022, at 54, par. 76; R. p. 54; *see also*, Mitchell Dep. p. 5: 4-12; R. p. 510.

As to Dr. Feldman, Halocarbons' cardiologist, he opined it is "physiologically improbable that there is a causal relationship between Hydro-fluoride inhalation and high-grade heart block. Def. APA at p. 426. This is scientifically untrue. Period. Dr. Feldman's report is devoid of any qualifications to opine as to medical conditions resulting from exposure to HF. His opinion flies in the face of the scientific literature, including applicable Safety Data Sheets (SDS) on HF. With respect to HF First Aid measures, the SDS notes regarding inhalation: "Fatal if inhaled... This product may have a direct toxic action, resulting in fall of blood pressure and cardiac arrhythmia." Cl.'s APA 185; R. 641. Complete heart block is in fact a cardiac arrhythmia. (Lane Dep. pp. 11: 1-13 and 15: 1-20; R. pp. 454-455). Dr. Lane, the treating cardiologist, opined within a reasonable degree of medical certainty that HF was a causal factor with regard to Murphy's heart block. (Id. pp. 15-17; R. pp. 455-457).

Third, perhaps the most qualified expert in this case is Dr. Philip Edelman, a board-certified toxicologist and MD, who has written and published extensively on HF exposures. (Edelman Rep., Cl. APA pp. 295-296, 301; R. pp. 726-727, 732). He was a physician at the Centers for Disease Control and Prevention and opined in this case that Murphy's onset of heart-block was probably more rapid than was actually diagnosed initially. (Cl.'s APA p. 300; R. p. 731). He further opined that it is biologically plausible that the direct toxicity of HF was a co-contributor to her complete heart block. (APA p. 299; R. p. 730). Within a reasonable degree of medical certainty, he opined

that HF contributed to her asthma. (APA p. 298; R. p. 729). Defense toxicologist Dr. Early in fact agrees that Murphy's "lung condition is worse now than it was prior to the exposure." (Early Rep. p. 8, Def. APA p. 402; R. p. 753).

Finally, both the Full Commission and Commissioner Barden not only improperly impugned the credibility of the claimant's experts, but also improperly impugned the credibility of the claimant by wading into a sea of subjectivity, stringing together minor and insignificant discrepancies to draw grandiose conclusions about Murphy's character for veracity. The Commission may not base a factual-finding on credibility determinations without explaining both the basis of the credibility determination and how the determination rationally affects the disputed facts. None of the credibility findings in the record undermine or explain the objective medical evidence that Murphy suffered injuries to her heart and lungs by reason of her exposure to HF. "An unexplained credibility determination or an unexplained use of a credibility finding means the factfinder's approach was arbitrary rather than rational." *Clark*, 433 S.C. at 192, 857 S.E.2d at 381.

The Commission and Commissioner Barden's seeming campaign to impugn the Murphy's credibility finds no historical basis in the record upon which to suggest that she is a liar, especially when she objectively suffered sequelae from her exposure to a dangerous chemical. Commissioner Barden impugned Murphy's credibility without any notion of how it affected, if at all, the objective medical evidence.

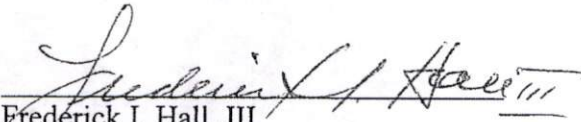
The Appellate Panels' Decision and Order of October 18, 2022 should be reversed with instructions to enter an order which finds the injuries to Ms. Murphy's heart and lungs are fully compensable and referring her to such other medical providers as deemed necessary in light of these findings.

CONCLUSION

The Single Commissioner and the Full Commission committed an error in law in failing to examine and give weight to the objective medical evidence from the treating physicians, as well as Claimant's experts, and Defendant's experts, which points to only one reasonable conclusion, which is that Ms. Murphy sustained a compensable, serious and permanent injury to her heart and lungs. Therefore, the Commission's Decision is not based on substantial evidence and is clearly erroneous.

Furthermore, the Single Commissioner and Full Commission committed an error of law in applying subjective, arbitrary credibility findings in a medically complex case where the objective medical evidence controls. The Claimant continues to meet the threshold to required to establish injury in a medically complex case according to the objective, medical evidence in this matter. Therefore, the Commission's finding should be reversed and remanded with instructions to enter an order finding Appellant's injuries are fully compensable based on indisputable medical evidence.

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