

**IN THE UNITED STATES COURT OF APPEALS
FOR THE FIFTH CIRCUIT**

United States Court of Appeals
Fifth Circuit

FILED

May 6, 2013

No. 12-30105

Lyle W. Cayce
Clerk

UNITED STATES OF AMERICA,

Plaintiff-Appellee

v.

WEN CHYU LIU,

Defendant-Appellant

Appeal from the United States District Court
for the Middle District of Louisiana

Before DAVIS, GRAVES, and HIGGINSON, Circuit Judges.

W. EUGENE DAVIS, Circuit Judge:

Appellant, Wen Chyu Liu, also known as David W. Liou (“Liou”), challenges his conviction for conspiracy to steal trade secrets and perjury. The principal issue on appeal concerns the propriety of the court’s ruling excluding the testimony of defendant’s engineering expert. We conclude that the district court erred in excluding the testimony but that the error did not affect the outcome of the trial. We AFFIRM.

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I.

Liou was convicted after an eleven-day jury trial for conspiring to steal trade secrets in violation of 18 U.S.C. § 1832(a)(5) (Count 1) and perjury in violation of 18 U.S.C. § 1623 (Count 2). Liou moved for a new trial, which the district court denied. The district court sentenced Liou to 60 months' imprisonment on each count (to run concurrently).

A.

This case, more than some cases, is record driven, requiring us to report the facts in more detail than usual. The Dow Chemical Company ("Dow") is a chemical company that developed and manufactured a type of chlorinated polyethylene ("CPE") which it marketed globally as "Tyrin CPE." CPE is a white, powdery substance that tolerates extreme pressures and temperatures. CPE is used in hydraulic hoses, electrical cable jackets, and building and construction materials such as vinyl siding. Dow manufactured CPE at two facilities: one in Plaquemine, Louisiana, and one in Stade, Germany. The Government's witnesses testified that Dow invested millions into designing and improving the CPE manufacturing process and its end product. They asserted that Dow's investment and research resulted in the development of important refinements in operating conditions for CPE manufacturing as well as the technical design specifications of certain vessels and equipment used in the process. The Government contended that Liou conspired to steal Dow's trade secrets and sell that information to Chinese companies for his own profit.¹

According to the Government's witnesses, because Dow considered the manufacturing process and the equipment it designed for the process to be a

¹ Dow filed a civil lawsuit against Liou on July 1, 1999, alleging theft of trade secrets used in the production of its Tyrin CPE.

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trade secret² that gave it a “competitive edge,” it took extensive physical and legal security precautions to protect its technology and the processes used in CPE manufacture. Such measures included restricted access to Dow facilities and confidentiality and non-disclosure agreements with employees, including Liou.

Liou worked for Dow from 1965 until his retirement in 1992. Liou worked in research and development on various aspects of the development and manufacture of Dow’s products, including CPE. Liou signed a confidentiality agreement when he began working in which he promised not to disclose confidential and trade secret information to third parties. Upon Liou’s retirement, Dow sent a letter to Liou reminding him of this agreement.

In the early 1990s, prior to his retirement, Liou and his wife formed a company in Baton Rouge, Louisiana, called Pacific Richland. Soon thereafter, Chinese companies expressed an interest in making chlorinated polyvinyl chlorides (CSM or CPVC). Though Dow never made CSM, CPE is used as an ingredient in the production of CSM. Liou recruited a number of former and then-current Dow employees to assist him in developing the CPE process including the following: John Wheeler—an engineer who had worked as project manager to modernize the Plaquemine CPE plant and who was still working as

² The term “trade secret,” as defined by 18 U.S.C. § 1839(3), means: all forms and types of financial, business, scientific, technical, economic, or engineering information, including patterns, plans, compilations, program devices, formulas, designs, prototypes, methods, techniques, processes, procedures, programs, or codes, whether tangible or intangible, and whether or how stored, compiled, or memorialized physically, electronically, graphically, photographically, or in writing if—

- (A) the owner thereof has taken reasonable measures to keep such information secret; and
- (B) the information derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable through proper means by, the public

18 U.S.C. § 1839(3)(A-B) (2006).

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a consultant for Dow when Liou recruited him; Hein Meyer—an engineer who helped construct the Dow Stade plant and was working for Dow in Germany until 1997; and Keith Stoecker—the senior engineer responsible for coordinating day-to-day CPE production who worked for Dow until 1999 and was the author of substantial portions of the Dow CPE process manual.³

In summary, the Government witnesses testified that after forming Pacific Richland, Liou asked Wheeler to provide a CPE process design that Pacific Richland could sell to Chinese companies. Wheeler testified that he created an engineering flow diagram for the CPE manufacturing process based on his knowledge of the Dow CPE plants. Liou and Wheeler then made multiple trips to China to market the CPE process to Chinese customers and Liou funded these trips. The Chinese companies Qingdao Chemical Works (“Qingdao”) and Hubei Shaunghuang Chemical Group Company (“Hubei”) expressed interest in building plants in China. According to trial testimony, the companies were specifically interested in obtaining “Dow technology.” Liou signed contracts to sell both companies a CPE design engineering package and stood to gain almost two million dollars from the CPE portions of these contracts. Stoecker subsequently provided a process manual for Liou’s CPE project. Stoecker testified that he plagiarized large sections of this manual from the Dow CPE process manual.

Liou ultimately shipped the CPE process manual and design package—which included numerous engineering documents such as reactor and fluid bed dryer equipment specifications, process flow sheets, and piping and instrumentation diagrams (“P&IDs”) to Hubei. The process flow sheets depict the entire process of making CPE from beginning to end. They show the equipment, including size and materials of construction, the way the equipment

³ All three of these individuals cooperated with the Government and testified against Liou at trial.

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parts are connected by pipelines, and for each line, the kind and amount of material that will flow through it and at what temperature. P&IDs show an additional level of detail regarding each stage of the manufacturing process. Liou shipped the equipment specifications, P&IDs, and CPE process manual to Qingdao as well. The testimony of Wheeler, Stoecker, Meyer, and James Akers (a current Dow engineer) highlighted some of the numerous similarities between the Dow CPE process and the contents of the Pacific Richland materials Liou shipped to China.

Specifically, Wheeler testified that Liou “recruited [him] to steal proprietary information from Dow chemical to build a CPE plant in China” and Wheeler admitted that he personally stole Dow CPE trade secrets along with Stoecker, Meyer, and Liou. Wheeler then compared the process flow diagram for the Stade Dow plant to the process flow diagram sent to the Chinese and characterized the stages of the process as depicted in the two diagrams as “essentially the same.”⁴ He also testified that Liou paid him around \$196,000 over the course of two and a half years. Wheeler claimed that Stoecker was brought on to assist with the CPE project specifically because he was then-employed by Dow with access to Dow technology. Wheeler stated that Qingdao requested the “Dow process,” and asserted that Liou promised that “he would provide the CPE process from Dow Chemical”; he also stated that Hubei was interested in Dow technology. Wheeler also examined and compared drawings of the Dow Stade fluid bed dryer and the fluid bed dryer Liou submitted to the Chinese⁵ and testified that the two were substantially the same and that the temperatures found on the document were exactly the same because “one [the Stade design] was used to make the other [the design sold to the Chinese].”

⁴ Government Exhibit 39—Dow Stade simplified Process Flow Diagram; Government Exhibit 40—Pacific Richland simplified Process Flow Diagram.

⁵ Government Exhibits 83 and 84, respectively.

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Wheeler testified that Liou and the others all worked in the same small work space and essentially knew what everybody else was working on with respect to the CPE process. He testified that it only took several months for them to complete the Chinese packages because they “had the Dow CPE package at [their] fingertips.” Finally, Wheeler testified that after Dow filed its civil suit, he witnessed Liou dump several boxes of documents in a parking lot dumpster prior to a meeting with his attorney.

Stoecker, a Dow employee at the time Liou sent the materials to the Chinese companies, testified that Liou specifically “wanted Dow technology” from him and that Liou agreed to pay him \$50,000 in cash for his assistance. He testified that a process manual provides an overview of the chemical process and that it gives descriptions of the vessels, the vessels’ sizes, and what each one does in the operation and that Liou needed a process manual for the Chinese project because it was required as part of the contract. Stoecker, who had authored substantial portions of the Dow process manual, testified that he plagiarized large parts of the Dow manual to produce the process manual for Pacific Richland⁶ and that Liou knew the information was coming from Dow and is the reason Liou had promised to pay Stoecker up to \$50,000. Stoecker also testified that after hearing rumors that Dow was about to file a civil suit against them, he and Wheeler deleted files off of their Pacific Richland computers; Wheeler informed Stoecker that Liou knew that they were deleting files. Stoecker further asserted that after the initiation of Dow’s civil suit he and Liou agreed they were going to fight the suit and discussed how to lie. Finally, Stoecker testified that Liou later moved to Canada and told him that he did so to put himself outside of the reach of United States law.

⁶ The Government introduced excerpts of the Pacific Richland manual as Government Exhibits 75, 81, and 87, and excerpts of the Dow manual as Exhibits 74, 80, and 86.

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Meyer admitted that he personally provided secret Dow CPE technology to Liou to sell to the Chinese companies. Meyer testified that when he saw that they were using Dow's P&IDs, he approached Liou with his concerns, but Liou placated him by telling him that he should not worry about it and that he had checked everything legally.

Akers, a Dow engineer at the time of trial and the former leader of Dow Plaquemine's CPE process research group, testified that the Dow CPE process was "absolutely not" publicly available, and that Dow employees, including Liou, would have understood that fact. Akers also examined Pacific Richland's flow sheet of the CPE process⁷ and testified that the flow sheet encompassed characteristics from both the Stade Dow plant and Plaquemine Dow plant. More specifically, he testified that the flow sheet included "Dow's high density polyethylene premix and slurry system," "Dow's surfactant storage and feed system," "Dow's chlorination system," "Dow's design of the washing and neutralization portion of the CPE process," "Dow's continuous drying and dewatering systems," "Dow's continuous fluid bed dryer process," and that it also reflected "Dow's use of additives in the mixing systems." He further testified that all of the above-referenced Dow systems were kept secret by Dow. He also reviewed P&IDs⁸ that were shipped to the Chinese and testified that virtually all of the technology contained in the diagrams was consistent with the Dow process. He additionally reviewed a list of process equipment,⁹ which included detailed specifications of individual pieces of equipment, and testified that the documents pertaining to the reactor, premix vessel, and fluid bed dryer were all very similar to the Dow design. He compared the Stade four-stage fluidized bed

⁷ Government Exhibit 40.

⁸ Liou Exhibit 11.

⁹ Liou Exhibit 12.

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dryer design to the design contained in the Qingdao material¹⁰ and found that the four temperatures used during the drying process were “exactly the same” in both materials. Finally, he reviewed the hand calculations Liou had done as background for heating material balance¹¹ and testified that other than the fact that the calculations appeared to be for a smaller facility,¹² the calculations were “very similar” to the Dow process and featured many temperatures, percentages, and quantities that were all consistent with the Dow process. While Akers admitted on cross examination that his entire professional life as an engineer had been as a Dow employee, he testified that it would “surprise” him that others could duplicate Dow’s results in their own work and/or mimic these same numeric temperatures and percentages on their own.

At trial, Liou testified that he developed a new process for making CPE and denied using any Dow-derived CPE information to do so. He claimed that he was able to create an independent process for making CPE by consulting expired patents and other information found in the public domain. He contended that the Chinese contracts required him to provide the basic process design, but that his role was to provide the process technology from the invention, i.e., the chemistry and the method of how to do it, and he relied on Wheeler for the work related to the assembly of the equipment, i.e., the “pots and pans.” Liou further testified that his CPE design package was not the same as Dow’s process, and to the extent that any material was copied or taken from Dow by others, this was without his knowledge or approval. He specifically denied stealing any protected Dow information multiple times.

¹⁰ Government Exhibit 83.

¹¹ Government Exhibit 42.

¹² Testimony adduced throughout the trial explained that the Chinese sought to build a CPE plant smaller in size than the Dow CPE plants.

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When shown Wheeler's drawings of silos, reactors, and dryers,¹³ Liou testified that Wheeler never told him he had based his drawings on stolen information from Dow and that Liou believed Wheeler was a good engineer who was capable of doing his own work. He further contended that the process flow diagrams submitted to Qingdao and Hubei¹⁴ were put together by Wheeler. Liou then compared the Hubei process flow diagram to a diagram of the Dow Stade plant¹⁵ and pointed out various differences between the two diagrams. Liou admitted that he personally labeled Wheeler's process flow diagram¹⁶ in Chinese and handwrote equipment numbers on all the different vessels in the process. He claimed he made those notations only so that he could "understand which equipment belonged . . . where" in order to coordinate it with other documents Wheeler had given him. Liou also denied knowing that Stoecker was working on a process manual or having paid Stoecker anything for process manual work, and he characterized the task of completing a process manual as having been Wheeler's job.

Liou admitted that included in the materials he shipped to Hubei and Qingdao were process flow diagrams, equipment lists, P&IDs, and process manuals. He stated on cross examination that he sent his "invention" and "technology" to the Chinese companies, but claimed that he did not have these critical documents because he "didn't keep a copy."¹⁷ He also explained that his

¹³ Government Exhibit 40 featured Wheeler's drawings of "pots and pans."

¹⁴ Government Exhibits 44 and 45.

¹⁵ Government Exhibit 46.

¹⁶ Government Exhibit 40.

¹⁷ [Government, all questions:] [Y]ou knew that your invention and your technology was not in any material that you were sending to Hubei and Qingdao; is that correct?
[Liou, all answers:] No, that's not correct. I sent it separately.
Q. Oh, you sent something separately?

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invention was not reflected in the process manual, that he only looked at the process manual briefly before shipping it, and that he only sent it “because Wheeler did all this work,” but upon reviewing the process manual after the initiation of the lawsuit he realized that what he shipped was actually a “useless piece of document.”

B.

After the Government rested, Liou sought to begin his defense with his previously identified expert, a chemical engineer, Ronald Ostermiller. Ostermiller had been named as an expert prior to trial and his curriculum vitae and expert report had been provided; he also served as Liou’s expert in Dow’s civil suit several years before. At the beginning of Liou’s evidence the Government objected, for the first time, to Ostermiller’s testimony on the manufacturing of CPE. The Government argued that Liou had only provided notice that Ostermiller would testify regarding equipment in the public domain and about general engineering knowledge regarding the manufacture of CPE available without access to proprietary Dow information.¹⁸ The Government complained that defense counsel had just advised them that Liou intended to elicit testimony from Ostermiller comparing the Dow CPE process to that of

A. That is correct.

Q. Where is that document?

A. That document is in Hubei.

Q. It’s in China?

A. I did sent [sic] to Qingdao. I sent to Hubei directly.

Q. And you didn’t keep a copy?

A. I didn’t keep copy.

Q. So all the things that you sent over to China, none of that that we have looked at that we have documents and we have seen in this trial, none of that reflects your technology; is that your testimony?

A. In a way, yes.

¹⁸ Notably, this topic—testimony about what information is available in the public domain—was never objected to by the court or the Government: a point to which we will return. *See Infra* II.B.

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Pacific Richland—the CPE process sold to the Chinese companies. The Government objected to the comparison aspect of Ostermiller’s testimony as being outside the scope of the summary of testimony it was provided.

At that point, the district court stated: “My inclination is to allow [Ostermiller’s comparison testimony], but I’m going to withhold a ruling. Let me see how you qualify this witness, and what areas he’s qualified in, and see what questions you ask him.”

Liou’s counsel then attempted to qualify Ostermiller as an expert in chemical engineering, process design, and project engineering, with the ability to read and interpret CPE engineering documents. Liou’s counsel, the Government, and the district court conducted an extensive voir dire of Ostermiller.

The testimony elicited during voir dire established that Ostermiller’s chemical engineering education and training made him familiar with various vessels, reactors, silos, pipes, and other equipment known as pots and pans, used in the chemical industry, and used to make CPE and CSM. Ostermiller testified he had worked as a production supervisor for Monsanto, a process designer for Pace Company, a consultant and process designer with Chem Tram, and later started his own consulting business.

Ostermiller, however, had never worked in a CPE plant and, faced with that testimony, the district court explained it was “troubled by the fact that he’s never even been to a CPE plant, never worked in a CPE plant, never been accepted as an expert in CPE, and can’t talk about the significance of the operating conditions of a CPE plant, or the effect on the CPE process.” The court further noted that what “I have to keep in mind under *Daubert* is granting the status of expert cloaks in with some indicia of authority before the jury.” The court found that Ostermiller was not an expert with respect to CPE, and it excluded Ostermiller’s testimony entirely.

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II.

We are first presented with the question of whether the district court erred in excluding Ostermiller's testimony.

A.

Federal Rule of Evidence 702 permits opinion testimony from a witness "qualified as an expert by knowledge, skill, experience, training, or education" if such testimony will assist the trier of fact and (1) "the testimony is based on sufficient facts or data," (2) "the testimony is the product of reliable principles and methods," and (3) "the expert has reliably applied the principles and methods to the facts of the case." FED. R. EVID. 702. In *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993), the Supreme Court assigned to trial courts the responsibility of determining whether expert testimony under Rule 702 is "not only relevant, but reliable." *Id.* at 589.

We review the district court's decision to exclude expert witness testimony under an abuse of discretion standard, and the ruling "will not be disturbed on appeal unless it is manifestly erroneous." *United States v. Valencia*, 600 F.3d 389, 423 (5th Cir. 2010). Even after finding an abuse of discretion, this court will not reverse harmless error. *Kanida v. Gulf Coast Med. Pers. LP*, 363 F.3d 568, 581 (5th Cir. 2004). "[I]t is an abuse of discretion for a trial court to exclude expert witness testimony on the ground that the witness is not qualified to render the opinion at issue because the witness lacks a certain educational or other experiential background." 4 JACK B. WEINSTEIN & MARGARET A. BERGER, WEINSTEIN'S FEDERAL EVIDENCE § 702.04(1)(a) (Joseph M. McLaughlin ed., 2d ed. 1997). Nonetheless, before admitting the testimony, the court must also gauge whether the "witness's qualifying training or experience, and resultant specialized knowledge, are sufficiently related to the issues and evidence before the trier of fact that the witness's proposed testimony will help the trier of fact." *Id.* § 702.04(1)(b).

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B.

At the outset, it is clear to us that the district court's wholesale exclusion of the expert's testimony was error.¹⁹ The Government clearly objected only to the portion of Ostermiller's testimony in which he would have compared specific Dow plant drawings to Pacific Richland drawings and commented on their similarities and differences. But the Government stated at trial: "Obviously, we don't object to the public domain part. We have been given notice of that. But we would object to the other, the comparison aspect of this testimony as being beyond the scope of the summary provided." Thus neither the court nor the Government expressed concern with the portions of Ostermiller's proposed testimony about whether Dow equipment used in the process at issue was in the public domain or that Ostermiller was qualified to make those specific assessments. In fact, Liou's counsel noted (obviously referring to the earlier agreement with the prosecution), that Ostermiller's testimony was not being offered *solely* to prove the similarities or dissimilarities between Liou's drawings and Dow plant diagrams, and made clear to the court that Ostermiller would testify to other issues as well.²⁰

¹⁹ Although Liou argues that the Government's *Daubert* objection was untimely, it is also clear to us that the district court did not abuse its discretion in ruling on the *Daubert* motion at trial. See *Club Car, Inc. v. Club Car (Quebec) Imp., Inc.*, 362 F.3d 775, 780 (11th Cir. 2004) ("A *Daubert* objection not raised before trial may be rejected as untimely. But a trial court has broad discretion in determining how to perform its gatekeeper function, and nothing prohibits it from hearing a *Daubert* motion during trial.") (internal citation omitted), *abrogated on other grounds as recognized by Diamond Crystal Brands, Inc. v. Food Movers Int'l, Inc.*, 593 F.3d 1249, 1258-59 (11th Cir. 2010).

²⁰

The Court: You're calling him, as I appreciate it, to testify about the similarities, the dissimilarities between these two demonstrative diagrams with the CPE plant?

A: Not exclusively, Your Honor. It's just that those two are the ones that caught [the Government's] objection.

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Yet the district court never returned to that point of agreement about Ostermiller's qualifications and the importance of the public domain testimony and rather than limiting the expert testimony to the material referred to in the expert's report, which was not objected to, the judge excluded the expert testimony altogether.

We are satisfied the court erred in excluding the portion of the expert's testimony to which the Government did not object.

C.

We conclude that it was also error for the judge to exclude Ostermiller's expert testimony comparing Dow CPE engineering documents to documents generated by Pacific Richland.

A lack of personal experience—the district court's concern here—should not ordinarily disqualify an expert, so long as the expert is qualified based on some other factor provided by Rule 702: “knowledge, skill, experience, training, or education.” FED. R. EVID. 702 (emphasis added).²¹ For example, in *Exum v. General Electric Co.*, the D.C. Circuit found that the “rule does not require the expert to have personal familiarity with the subject of his testimony; ‘experience’ is only one among the five different ways to demonstrate an expert is qualified.” 819 F.2d 1158, 1163 (D.C. Cir. 1987). And in *Dixon v. International Harvester Co.*, we held that an expert did not lack qualifications to testify about the design of a crawler tractor, based on his review of blueprints and photographs, despite a lack of prior experience approving crawler tractor designs. 754 F.2d 573, 579-80 (5th Cir.1985).²²

²¹ *Garrett v. Desa Indus., Inc.*, 705 F.2d 721, 724 (4th Cir. 1983) (“The ‘or’ indicates that a witness may be qualified as an expert by any one of the five listed qualifications.”).

²² See also *Martin v. Fleissner GmbH*, 741 F.2d 61, 64 (4th Cir.1984) (upholding admission of expert knowledgeable in pertinent areas of engineering design although unfamiliar with the particular product at issue); *Garrett*, 705 F.2d at 724 (finding reversible error where expert was excluded “simply because he lacked one of the five qualifications,

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A lack of specialization should generally go to the weight of the evidence rather than its admissibility and “[v]igorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence.” *Daubert*, 509 U.S. at 596.²³ Thus “an expert witness is not strictly confined to his area of practice, but may testify concerning related applications; a lack of specialization does not affect the admissibility of the opinion, but only its weight.” *Wheeler v. John Deere Co.*, 935 F.2d 1090, 1100 (10th Cir. 1991).²⁴

Here, Ostermiller held a degree in chemical engineering. He had extensive experience working in chemical plants, including plants that manufactured polymers. This education and experience made him knowledgeable about various vessels, reactors, silos, pipes, valves, and fluid bed dryers used in the chemical industry. Specifically, Ostermiller had 50 years of engineering experience in a variety of high-level positions. He testified during the voir dire that he used the “pots and pans” relevant to this case in his work and that he had worked with many polymers with “many similarities” and “a lot of commonality” with the CPE manufacturing process.

Because of Ostermiller’s training and experience as a chemical engineer and his broad experience in chemical plants including polymer plants, we conclude that the district court abused its discretion in excluding his opinion

namely, prior experience with stud drivers”).

²³ *Accord Huss v. Gayden*, 571 F.3d 442, 452 (5th Cir. 2009); *Holbrook v. Lykes Bros. S.S. Co.*, 80 F.3d 777, 782 (3d Cir. 1996).

²⁴ *See, e.g., Whitehouse Hotel Ltd. P’ship v. C.I.R.*, 615 F.3d 321, 331 (5th Cir. 2010) (affirming the district court’s qualification of a licensed real estate appraiser as an expert witness when the case concerned a “specialized” appraisal issue); *Quinton v. Farmland Indus. Inc.*, 928 F.2d 335, 337-38 (10th Cir. 1991) (finding veterinarian need not be specialist in toxicology to testify on toxic effect of substance on dairy cows).

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testimony related to the manufacturing of CPE.²⁵ The court's concerns about his lack of experience in CPE manufacturing are relevant to the weight of his testimony, not its admissibility. *See Wheeler*, 935 F.2d at 1100.²⁶

D.

Of course, even if the court erred in excluding the testimony, we will not vacate a conviction based on an error committed by the district court unless the error was harmful, affecting a substantial right of the complaining party. When assessing “whether an error affected a ‘substantial right’ of a defendant, the necessary inquiry is ‘whether the trier of fact would have found the defendant guilty beyond a reasonable doubt with the additional evidence inserted.’” *United States v. Tucker*, 345 F.3d 320, 327 (5th Cir. 2003) (quoting *United States v. Roberts*, 887 F.2d 534, 536 (5th Cir. 1989)). The Government bears the burden of showing harmless error. *United States v. Munoz*, 150 F.3d 401, 413 (5th Cir. 1998).

Even though it was error for the district court to exclude Ostermiller, we conclude that the exclusion of this testimony did not affect the verdict.

With respect to the substantive offense of theft of trade secrets, the Government must prove (1) that the defendant intended to convert proprietary information to the economic benefit of anyone other than the owner; (2) that the proprietary information was a trade secret; (3) that the defendant knowingly stole, copied, or received trade secret information; (4) that the defendant intended or knew the offense would injure the owner of the trade secret; and (5)

²⁵ *See United States v. Cavin*, 39 F.3d 1299, 1309 (5th Cir. 1994); *United States v. Alexander*, 816 F.2d 164, 167-68 (5th Cir. 1987).

²⁶ *See also Martin*, 741 F.2d at 64 (“[A] lack of direct experience is not a sufficient basis to reject [expert’s] testimony, but may affect the weight that testimony is given, a decision properly made by the jury.”).

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that the trade secret was included in a product that is placed in interstate commerce. *See* 18 U.S.C. § 1832.²⁷

Yet the Government argued (and the unobjected to jury instruction so informed the jury) that when *conspiracy* to steal trade secrets is charged, the jury need not find that the information at issue was actually a trade secret. Rather, the relevant inquiry in a conspiracy case, such as this one, is whether the defendant entered into an agreement to steal, copy, or receive information that he *believed* to be a trade secret—that is, did the defendant believe that the information he conspired to obtain was proprietary and was being taken for the economic benefit of someone other than the owner? *See United States v. Yang*,

²⁷ The statute provides in full:

(a) Whoever, with intent to convert a trade secret, that is related to a product or service used in or intended for use in interstate or foreign commerce, to the economic benefit of anyone other than the owner thereof, and intending or knowing that the offense will, injure any owner of that trade secret, knowingly—

(1) steals, or without authorization appropriates, takes, carries away, or conceals, or by fraud, artifice, or deception obtains such information;

(2) without authorization copies, duplicates, sketches, draws, photographs, downloads, uploads, alters, destroys, photocopies, replicates, transmits, delivers, sends, mails, communicates, or conveys such information;

(3) receives, buys, or possesses such information, knowing the same to have been stolen or appropriated, obtained, or converted without authorization;

(4) attempts to commit any offense described in paragraphs (1) through (3); or

(5) conspires with one or more other persons to commit any offense described in paragraphs (1) through (3), and one or more of such persons do any act to effect the object of the conspiracy,

shall, except as provided in subsection (b), be fined under this title or imprisoned not more than 10 years, or both.

18 U.S.C. § 1832.

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281 F.3d 534, 544 (6th Cir. 2002); *United States v. Martin*, 228 F.3d 1, 11-13 (1st Cir. 2000); *United States v. Hsu*, 155 F.3d 189, 198 (3d Cir. 1998).²⁸

Liou contends that Ostermiller's expert testimony would have supported Liou's belief that he was creating a new method to produce CPE and that the work being submitted to him by the men he employed did not include trade secrets.

It is important for us to point out that defense counsel's failure to submit a contemporaneous proffer of Ostermiller's testimony makes it difficult to assess how helpful Ostermiller's testimony would have been to Liou in persuading the jury that Liou was truthful when he testified that he did not believe that the documents he was sending to the Chinese contained Dow trade secret information. Liou relies in part on an affidavit prepared by Ostermiller in connection with Liou's Motion for New Trial as to the substance of what Ostermiller's testimony would have been. Yet Federal Rule of Evidence 103(a) provides that a party "may claim error in a ruling to admit or exclude evidence only if the error affects a substantial right of the party" and if a "ruling excludes evidence, a party informs the court of its substance by an offer of proof, unless the substance was apparent from the context." FED. R. EVID. 103(a)(2). "The offer of proof required by Rule 103(a)(2) is meant to give the trial judge *contemporaneous* knowledge about the proposed evidence . . . at the time it is offered. Presentation of an offer after the trial or on appeal does not help the

²⁸ Importantly, "Independent discovery and analysis of publicly available products or information are not improper means of acquisition," but the "theoretical ability of others to ascertain the information through proper means does not necessarily preclude protection as a trade secret [and] the trade secret owner retains protection against an improper acquisition, disclosure, or use." RESTATEMENT (THIRD) OF UNFAIR COMPETITION §§ 39, 43 (1995).

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trial judge, and is too late.” 1 WEINSTEIN & BERGER, *supra*, at § 103.20(4) (emphasis in original) (footnote omitted).²⁹

Because Liou did not make an offer of proof that would have put the district court on notice of the substance of Ostermiller’s testimony,³⁰ the only information the district court had—and the only information we should consider—is that Ostermiller sought to testify about general engineering knowledge and about equipment used in the manufacturing of CPE that was in the public domain. If Ostermiller had compared the Dow design drawings and the design drawings Liou furnished to the Chinese, the record does not establish, and we can not determine, the extent to which he would have found them similar.³¹ In light of this, Liou can not point to anything in the record indicating that Ostermiller’s testimony would have been helpful to the defendant in rebutting the Government’s evidence that Liou conspired to steal what he

²⁹ See also *United States v. Winkle*, 587 F.2d 705, 710 (5th Cir. 1979) (“[T]his circuit will not even consider the propriety of the decision to exclude the evidence at issue, if no offer of proof was made at trial.”); *United States v. Lara-Hernandez*, 588 F.2d 272, 274 (9th Cir. 1978) (citing Rule 103 and finding that the defendant’s offer of new theories of relevance for a line of cross examination barred as irrelevant during trial, made for the first time in a motion for new trial, “does not comport with the salutary purpose of the timeliness requirement” to preserve a claim of error under Federal Rule of Criminal Procedure 51).

³⁰ “[T]he proponent of excluded evidence must show in some fashion the substance of his proposed testimony.” *Winkle*, 587 F.2d at 710.

³¹ The bulk of the discussion on the record during trial simply indicates Ostermiller would have pointed out the similarities and differences between CPE plant demonstrative diagrams of Dow Stade and Pacific Richland and would have rebutted the testimony of Government witnesses that testified that the pots and pans in one drawing were the same as the pots and pans in the other. And we glean from Ostermiller’s Affidavit, submitted with Liou’s Motion for New Trial, that he would have compared Government Exhibits 39 (Dow Stade Process Flow Diagram) and 40 (Pacific Richland Process Flow Diagram) and testified that both exhibits suggest that there are five steps in making CPE, but these exhibits simplify the number of steps in the process and the steps are, in any event, well-known and common in the manufacturing of CPE and many other polymers; he would have compared Exhibits 48 and 49 (Dow Stade Reactor Equipment Sheets) to Exhibits 50 and 51 (Pacific Richland Reactor Equipment Sheets) and commented on the different materials called for in the designs; and he would have testified that the use of centrifuges, spargers, and “Christmas tree” manifolds are common in the industry.

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believed to be trade secrets from Dow to sell to the Chinese companies.³²

We have no indication by way of offer of proof or otherwise that Ostermiller could have offered testimony that the Government exhibits contained no trade secret information. Even if information about the vessels and some of the other equipment Dow used in its process is publicly available, the process manual gave in excruciating detail the process Dow followed. And Stoecker testified that the Dow process manual that he largely copied gave a description of each vessel including its size and each vessel's purpose in the process. We have no way of knowing how Ostermiller would have answered questions such as whether any material in the plagiarized process manual was publicly available or whether the handwritten document Liou submitted showing optimal operating conditions including temperatures and mixtures at various stages of the manufacturing process was readily ascertainable or generally known to engineers. Thus, even if Ostermiller testified that some of the "pots and pans" used in the process, that some of the materials used in the equipment, and that the five basic steps of CPE manufacturing were in the public domain, none of this would have rebutted the Government's evidence that Dow's overall CPE process and the operating conditions and underlying details of that process were trade secrets.

Furthermore, even had Ostermiller testified that certain details and specifications of the Dow CPE process were in the public domain, Liou does not

³² See, e.g., *United States v. Ballis*, 28 F.3d 1399, 1406 (5th Cir. 1994) ("By itself, . . . a general description of the excluded evidence would not preserve error."); *Stockstill v. Shell Oil Co.*, 3 F.3d 868, 872 (5th Cir. 1993) (concluding that in absence of offer of proof, court of appeals could not assess whether exclusion affected substantial right); *United States v. Harrelson*, 754 F.2d 1153, 1178-79 (5th Cir. 1985) (finding, where defendant made no offer of proof as to contents of excluded evidence, that appellate court was precluded from finding error in the exclusion); *James v. Bell Helicopter Co.*, 715 F.2d 166, 174-75 (5th Cir. 1983) (holding that when plaintiff's statements concerning excluded evidence were so "general as to be meaningless," the court will "decline to speculate on the complicated questions presented without sufficient knowledge of the true character of the evidence excluded").

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contend that Ostermiller had knowledge about or would have testified as to *how* Liou and his co-conspirators actually developed the CPE process design package he provided to the Chinese companies. Particularly, Liou does not argue that Ostermiller could have testified about the extent to which Liou and his co-conspirators relied on Dow trade secrets as opposed to information in the public domain in order to prepare the materials.

Liou's defense theory was that he did not steal any Dow technology, and he did not know any of the secret Dow material was taken by others and sold to the Chinese companies. In persuading the jury to accept this theory, Liou was faced with the formidable task of overcoming the testimony of the former and then-current Dow employees who testified that Liou paid them hundreds of thousands of dollars to obtain the details of Dow's process. The witnesses explained in detail how Pacific Richland relied on confidential Dow materials including Dow's process manual, flow charts, and equipment, and other diagrams related to the complex Dow process specifically because the Chinese companies wanted Dow technology.

In the face of this testimony and without explanation, Liou stated baldly that he did not know that these witnesses were stealing this information from Dow; he assumed they were developing the process independently and on their own. Yet nothing in the record supports the contention that Liou's co-conspirators relied on information regarding CPE manufacturing in the public domain to independently produce or reverse engineer the design package sold to the Chinese companies. In fact, given the overwhelming testimony and documentary evidence produced at trial, defense counsel, in closing arguments, had little choice but to admit that Liou's cohorts, Wheeler, Stoecker, and Meyer, "all took trade secret information from Dow."

The Government produced other evidence that rebutted Liou's contention that he did not know the material was being stolen including testimony that

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Liou and the others worked together in small working quarters and were able to complete the entire Chinese design package in only a few months. And there was testimony that after Dow filed a civil suit against Liou and his co-conspirators, Liou took extensive steps to cover his tracks and destroy evidence which included dumping boxes of documents in a parking lot dumpster, allowing Wheeler and Stoecker to delete information from Pacific Richland computers, discussing “how to lie” with Stoecker, and moving to Canada.

We are persuaded beyond a reasonable doubt that Ostermiller’s testimony would have given Liou no help in persuading the jury to disregard the numerous exhibits offered by the Government or to resolve in his favor the conflict between his testimony and that of his co-conspirators.

In summary, given the overwhelming evidence that Liou and his co-conspirators stole trade secrets from Dow and that Liou believed he was stealing trade secrets, we are persuaded that Ostermiller’s testimony would have been of little or no benefit to the defendant. We therefore conclude that the exclusion of Ostermiller did not affect the verdict.

III.

We now turn to Liou’s perjury conviction. Following the initiation of the civil suit by Dow, Liou and Stoecker continued to travel to China. Specifically, in November 1999, Liou allegedly paid for Stoecker to travel to China to meet with the company China Tianteng. Stoecker testified that Liou arranged for his trip and paid for his ticket through Liou’s wife, Katherine Liou; Katherine Liou, in turn, had her friend Li Chen Chao pay for the ticket and then Katherine immediately reimbursed her.

On January 16, 2001, Liou was deposed in connection with the civil suit. When asked about Stoecker’s trip, Liou denied that he had in any way arranged for or paid for the travel, that his wife had arranged payment in any way, or that

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he even knew that Stoecker went on the trip. Liou's perjury charge was based on these statements made in his civil deposition.

Liou argues that the evidence was insufficient to support his perjury conviction. In reviewing the sufficiency of the evidence, this court considers whether "any reasonable trier of fact could have found that the evidence established guilt beyond a reasonable doubt." *United States v. Martinez*, 975 F.2d 159, 161 (5th Cir. 1992). The evidence is viewed in the light most favorable to the verdict. *United States v. Lopez-Urbina*, 434 F.3d 750, 757 (5th Cir. 2005). A defendant seeking reversal of a jury's determination of guilt bears a "heavy burden." *United States v. Greer*, 939 F.2d 1076, 1090 (5th Cir. 1991).

To obtain a perjury conviction, the Government must prove: (1) that the defendant's statements were material; (2) false; (3) and at the time the statements were made the defendant did not believe them to be true. *United States v. Nixon*, 816 F.2d 1022, 1029 (5th Cir. 1987). Liou does not appear to contest that his statements were material, but rather he argues that the statements he made were not false.

Count 2 charged Liou with lying in response to questions in his civil deposition in which he was asked: (1) whether he assisted "in any way" in arranging for Stoecker's travel to China in 1999; (2) whether he arranged payment "in any way or manner" for Stoecker's tickets, accommodations, and travel to China; (3) if he knew that his wife arranged "in any way" for the payment of Stoecker's travel expenses to China; (4) if he knew whether Stoecker utilized Gateway Travel to take any trips to China; and (5) if he knew whether Stoecker went to China in either November or December of 1999.

Viewing all evidence in the light most favorable to the verdict, there was sufficient evidence in the record to support Liou's perjury conviction. The jury had the opportunity to hear Stoecker's testimony concerning his travel to China.

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Namely:

Q. Now, the jury has already seen . . . a portion of the deposition of Mr. Liou where he denied assisting to arrange for your [Stoecker's] travel to China in November of 1999. . . . [W]hen he swore that he did not arrange to have your tickets and travel paid for that trip, was that the truth or not?

[Stoecker, all answers]

A. No, no, he had arranged through Katherine [Liou] to get my tickets for me.

Q. And did Mr. Liou indeed know how your tickets were being paid for?

A. I believe so, yes.

Q. And did he know whether or not you even went to China in November of 1999?

A. We discussed it, yes.

Q. [When the jury] reads that he swore that he did not know you were in China in either November or December of 1999, was that the truth or not?

A. No, it would not be.

Documents introduced at trial confirmed the true source of the funding for Stoecker's trip: the total cost reflected on Stoecker's itinerary was \$778; Li Chen Chao, a personal friend of Katherine Liou, wrote two checks—one for \$778 and one for \$10—to Gateway Travel on November 16, 1999; Katherine Liou then issued her a check for \$788—drawn from David and Katherine Liou's bank account—also on November 16, 1999.

Further, Wheeler testified that he made numerous trips to China to market the CPE process and that Liou funded all of these trips; thus the jury could reasonably infer that Liou's usual practice was to arrange and fund

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business travel to China for his employees. Finally, the fact that Liou and Stoecker were in China on different dates is irrelevant to the question of whether Liou played *any role* in planning or funding the trip. And the jury was entitled to find that the fact that Stoecker's credit card number appears on the itinerary was irrelevant in light of Stoecker's explicit testimony that he did not pay for the trip and that his credit card was never charged.

Although Liou argues that Stoecker's testimony was inconsistent, assessing the credibility of witnesses is the sole province of the jury. *United States v. Gardea Carrasco*, 830 F.2d 41, 44 (5th Cir. 1987). Based on Stoecker's testimony and additional corroborating evidence, there is sufficient evidence in the record to support Liou's perjury conviction.

IV.

For reasons stated above, we affirm the judgment of the district court.³³

AFFIRMED.

³³ On appeal, Liou also argued that the district court erred in denying his motion for new trial. Because Liou's motion for new trial is premised on his two previous arguments addressed above: that the district court improperly excluded the testimony of Ostermiller and the verdict as to Liou's perjury count (Count 2) was against the weight of the evidence, it is unnecessary to address this argument further.