UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SEMICONDUCTOR COMPONENTS INDUSTRIES, LLC

Petitioner,

v.

GREENTHREAD, LLC,

Patent Owner

IPR2024-00266
Patent 8,421,195

PETITIONER'S OBJECTIONS TO PATENT OWNER'S DEMONSTRATIVES

Pursuant to the Board's Order Setting Oral Argument (Paper 49 at 3–4), Petitioner respectfully submits the following objections to the demonstratives filed by Patent Owner (EX2913). The parties met and conferred on Friday, May 2, 2025, and were able to narrow the dispute, but they did not reach resolution as to the objections below. Petitioner objects to the slides below because, in addition to other noted objections, the slides violate the Board's order which stated "Demonstratives are not a mechanism for making new arguments." Paper 49 at 3.

I. Objections

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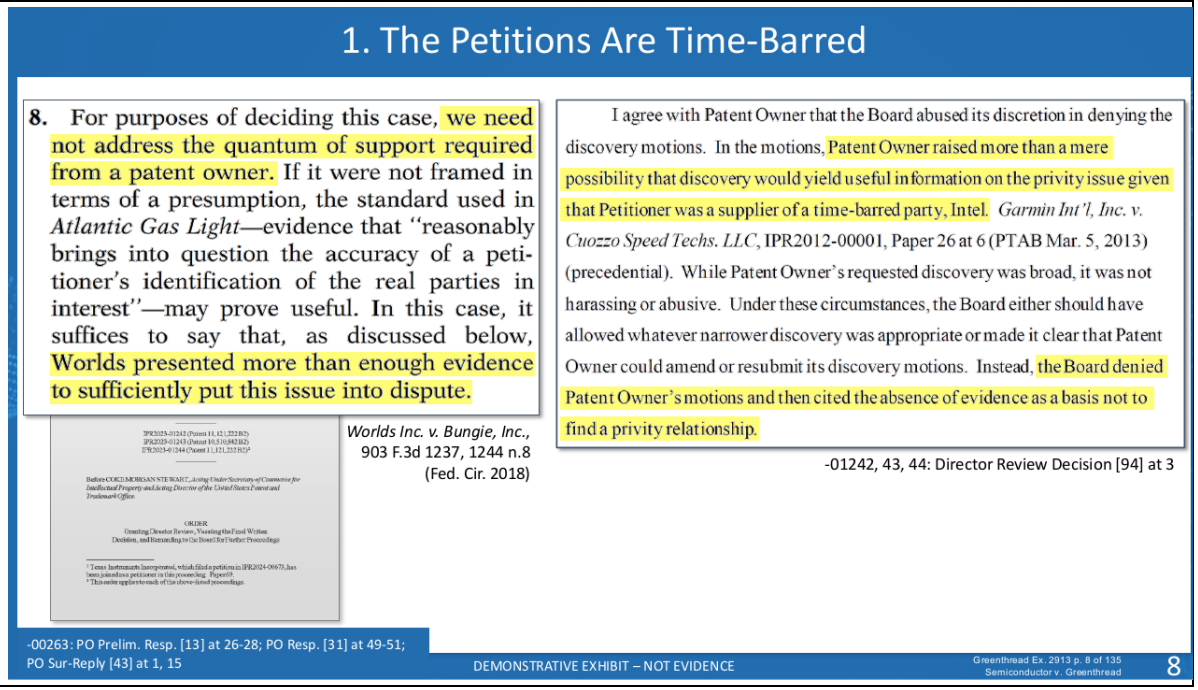
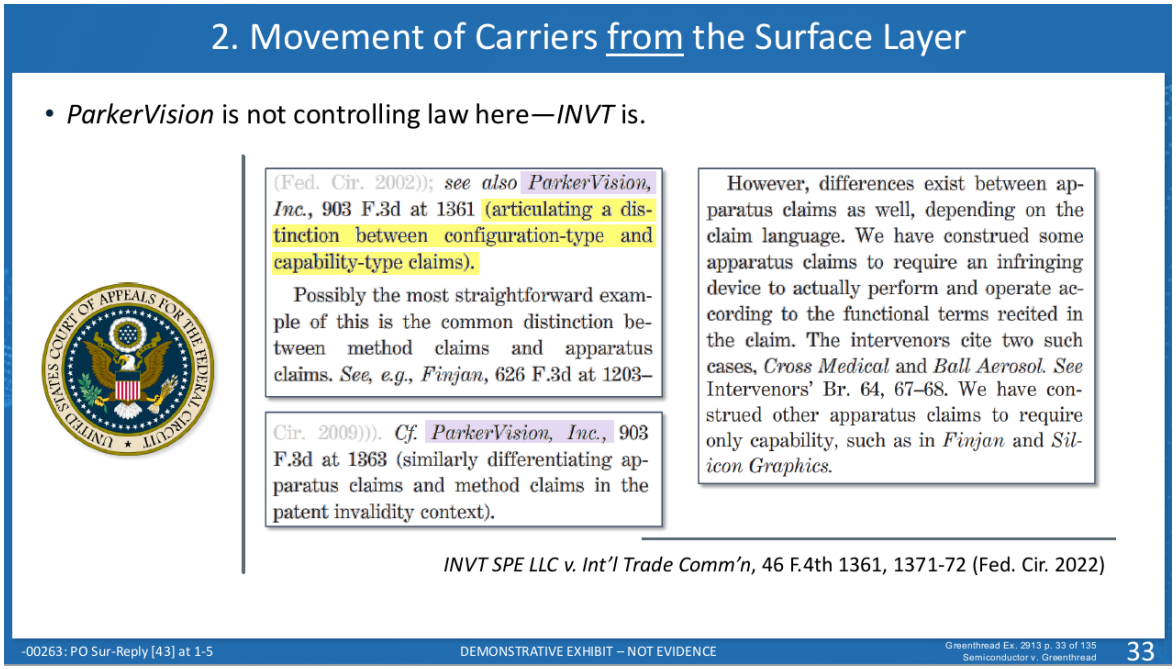
8	New argument that refers to a decision that is not part of the record of this proceeding.	

Slide #	New argument / objection	Copy of slide
33	Untimely argument that was not properly raised in the Patent Owner's Response (regarding *INVT*).	
43-61	Untimely argument that was not properly raised in the Patent Owner's Response ("Movement of Minority Carriers from the Surface Layer").	*See, e.g.*, Slide 45.

Slide #	New argument / objection	Copy of slide
		3. Movement of Minority Carriers from the Surface Layer • The Challenged Claims ***must*** be considered in light of the specification. ¶¶ 1,2. The claims are directed to the invention that is described in the specification; they do not have meaning removed from the context from which they arose. Thus the claims are construed to state the legal scope of each patented invention, on examination of the language of the claims, the description in the specification, and the prosecution history. *See Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250, 48 USPQ2d 1117, 1122 (Fed. Cir.1998) ("[T]he interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim."). Although *Netword LLC v. Centraal Corp.*, 242 F.3d 1347, 1352 (Fed. Cir. 2001) [1–3] "If the intrinsic record fully governs the proper construction of a term, we review the [b]oard's claim construction *de novo*." *Wasica Fin. GmbH v. Cont'l Auto. Sys., Inc.*, 853 F.3d 1272, 1278 (Fed. Cir. 2017). During reexamination, "the PTO must give claims their broadest reasonable construction consistent with the specification." *In re ICON Health & Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir. 2007). Even under the broadest reasonable construction rubric, however, the board must always "consider the claims in light of the specification and teachings in the underlying patent." *In re CSB-Sys. Int'l, Inc.*, 832 F.3d 1335, 1341 (Fed. Cir. 2016) (citations and internal quotation marks omitted). And there is no reason why this construction could not coincide with that of a court in litigation. *In re Power Integrations*, 884 F.3d 1370, 1375 (Fed. Cir. 2018) Courts must exercise caution lest dictionary definitions, usually the least controversial source of extrinsic evidence, be converted into technical terms of art having legal, not linguistic, significance. The best source for understanding a technical term is the specification from which it arose, informed, as needed, by the prosecution history. The evolution of restrictions in the claims, in the course of examination in the PTO, reveals how those closest to the patenting process—the inventor and the patent examiner—viewed the subject matter. *See Hoechst Celanese Corp. v. BP Chemicals Ltd.*, 78 F.3d 1575, 1578, 38 USPQ2d 1126, 1129 (Fed.Cir. 1996) ("A technical term used in a patent document is interpreted as having the meaning that it would be given by persons experienced in the field of the invention, unless it is apparent from the patent and the prosecution history that the inventor used the term with a different meaning.") When the specification explains and defines a term used in the claims, without ambiguity or incompleteness, there is no need to search further for the meaning of the term. *Multiform Desiccants, Inc. v. Medzam, Ltd.*, 133 F.3d 1473, 1478 (Fed. Cir. 1998) -00266: PO Sur-Reply [45] at 15-16 DEMONSTRATIVE EXHIBIT – NOT EVIDENCE Greenthread Ex. 2913 p. 45 of 135 Semiconductor v. Greenthread 45

Slide #	New argument / objection	Copy of slide
		Overview of Issues 1. **Petitioner has presented zero "actual evidence" that the Petitions are timely.** 2. **The Claims require "movement of carriers" from the "surface layer.** 3. **The '195 and '502 Claims require "movement of minority carriers" from the "surface layer."** 4. Kawagoe does not disclose "movement of carriers" and "movement of minority carriers" from the "surface layer." 5. Wieczorek does not disclose "movement of carriers" from the "surface layer." 6. Payne does not disclose "movement of minority carriers" from the "surface layer." 7. Petitioner has the burden to identify electric fields that would "aid carrier movement." 8. Experts confirm that carriers in the "surface layer" are affected by numerous other fields and forces. 9. The "movement of carriers" depends on the sum of all of the fields in the "surface layer." 10. Dr. Blalock did not analyze any of the fields or force magnitudes in the "surface layer." 11. Petitioner's prosecution-related arguments are incorrect. 12. Greenthread's licensing agreements provide substantial evidence of objective indicia of non-obviousness. DEMONSTRATIVE EXHIBIT – NOT EVIDENCE Greenthread Ex. 2913 p. 43 of 135 Semiconductor v. Greenthread 43

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		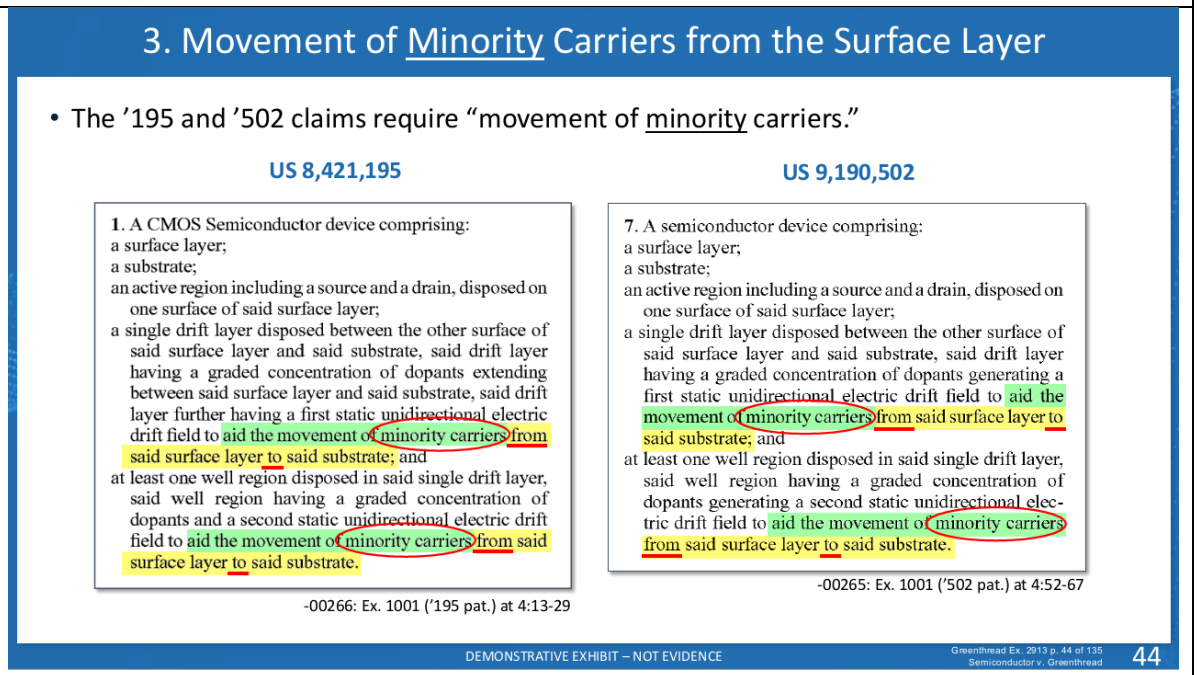

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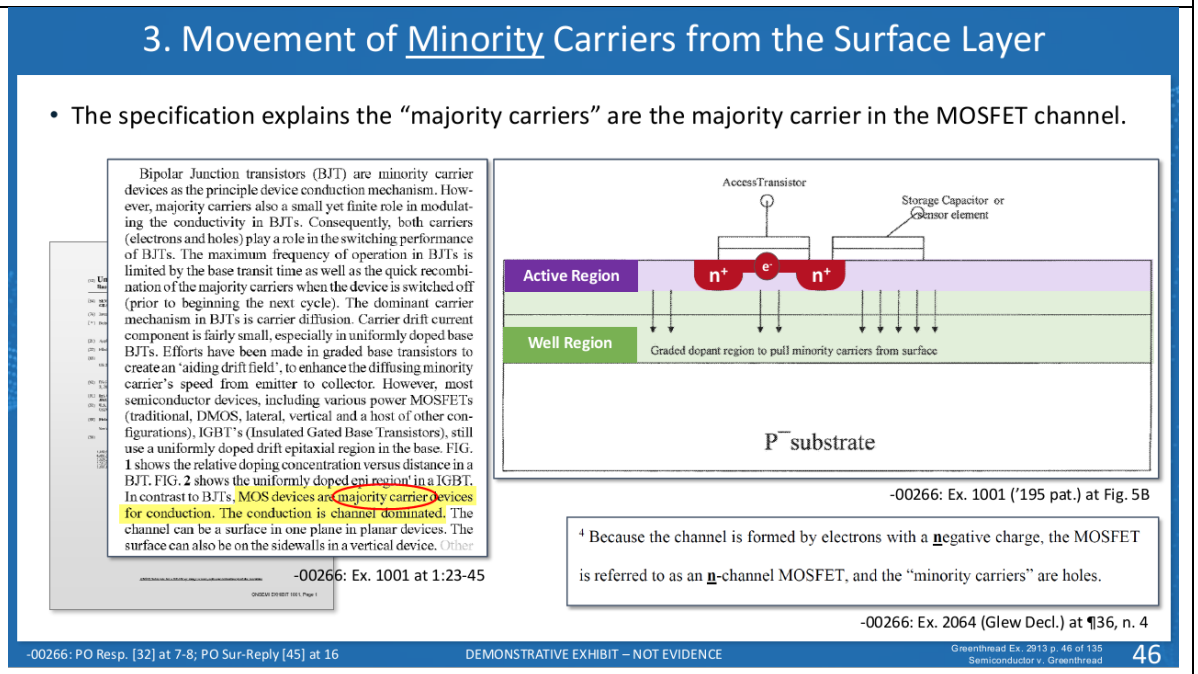
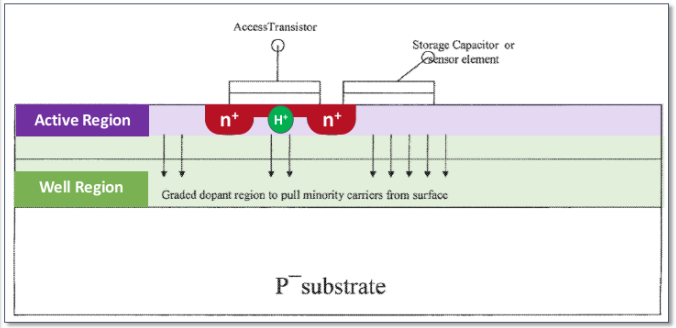
		

Slide #	New argument / objection	Copy of slide

3. Movement of Minority Carriers from the Surface Layer

- The "spurious minority carriers" interfere with the "active circuitry at the surface."

As illustrated in FIGS. **5**(*a*), **5**(*b*), **5**(*c*), donor gradient is also of benefit to very large scale integrated circuits (VLSI)– VLSI logic, DRAM, nonvolatile memory like NAND flash. Spurious minority carriers can be generated by clock switching in digital VLSI logic and memory IC'S. These unwanted carriers can discharge dynamically-held 'actively held high' nodes. Statically held nodes (with V_{cc}) can not be affected, in most cases. Degradation of refresh time in DRAM's is one of the results, because the capacitor holds charge dynamically. Similarly, degradation of CMOS digital images, in digital imaging IC's is another result of the havoc caused by minority carriers. Pixel and color resolution can be significantly enhanced in imaging IC's with the embodiments described here. Creating 'Sub Terrain' recombination centers underneath the wells (gold doping, platinum doping) as is done in some high-voltage diodes is not practical for VLSI circuits. Hence, a novel technique has been described here by creating a drift field to sweep these unwanted minority carriers into the substrate as quickly as possible, from the active circuitry at the surface. In a preferred embodiment, the subterrain n-layer has a graded donor concentration to sweep the minority carriers deep into the substrate. One or more of such layers can also be implemented through wafer to wafer bonding or similar "transfer" mechanisms. This n-layer can be a deeply-implanted layer. It can also be an epitaxial layer. The n-well and p-well also can be graded or retrograded in dopants, as desired, to sweep those carriers away from the surface as well.



-00266: Ex. 1001 ('195 pat.) at Fig. 5B

-00266: Ex. 1001 ('195 pat.) at 3:14-40

-00266: PO Resp. [32] at 7-8; PO Sur-Reply [45] at 3, 16-17

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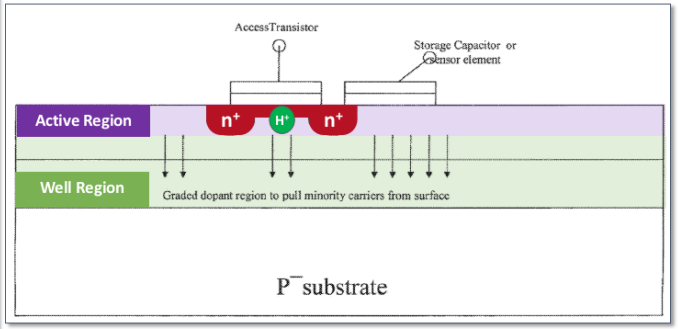
Slide #	New argument / objection	Copy of slide

3. Movement of Minority Carriers from the Surface Layer

- The "minority carriers" interfere with the MOSFET's channel.

As illustrated in FIGS. 5(*a*), 5(*b*), 5(*c*), donor gradient is also of benefit to very large scale integrated circuits (VLSI)– VLSI logic, DRAM, nonvolatile memory like NAND flash. Spurious minority carriers can be generated by clock switching in digital VLSI logic and memory IC'S. These unwanted carriers can discharge dynamically-held 'actively held high' nodes. Statically held nodes (with V_{cc}) can not be affected, in most cases. Degradation of refresh time in DRAM's is one of the results, because the capacitor holds charge dynamically. Similarly, degradation of CMOS digital images, in digital imaging IC's is another result of the havoc caused by minority carriers. Pixel and color resolution can be significantly enhanced in imaging IC's with the embodiments described here. Creating 'Sub Terrain' recombination centers underneath the wells (gold doping, platinum doping) as is done in some high-voltage diodes is not practical for VLSI circuits. Hence, a novel technique has been described here by creating a drift field to sweep these unwanted minority carriers into the substrate as quickly as possible, from the active circuitry at the surface. In a preferred embodiment, the subterrain n-layer has a graded donor concentration to sweep the minority carriers deep into the substrate. One or more of such layers can also be implemented through wafer to wafer bonding or similar "transfer" mechanisms. This n-layer can be a deeply-implanted layer. It can also be an epitaxial layer. The n-well and p-well also can be graded or retrograded in dopants, as desired, to sweep those carriers away from the surface as well.



-00266: Ex. 1001 ('195 pat.) at Fig. 5B

-00266: Ex. 1001 ('195 pat.) at 3:14-40

-00266: PO Resp. [32] at 7-8; PO Sur-Reply [45] at 3, 16-17

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		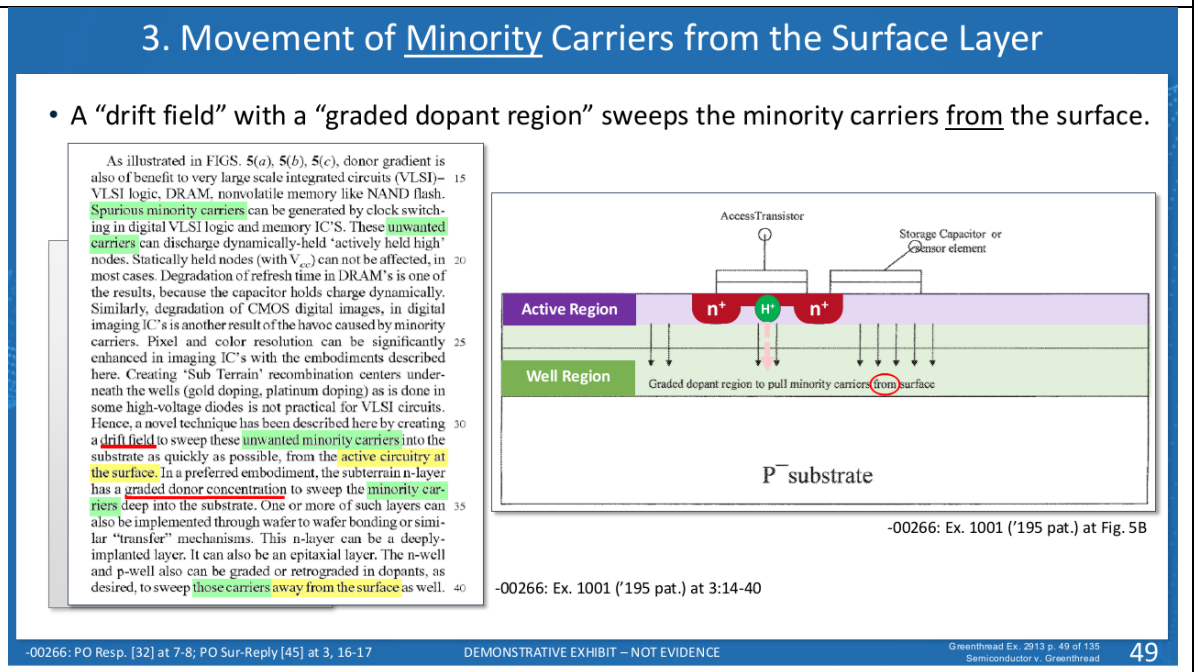

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		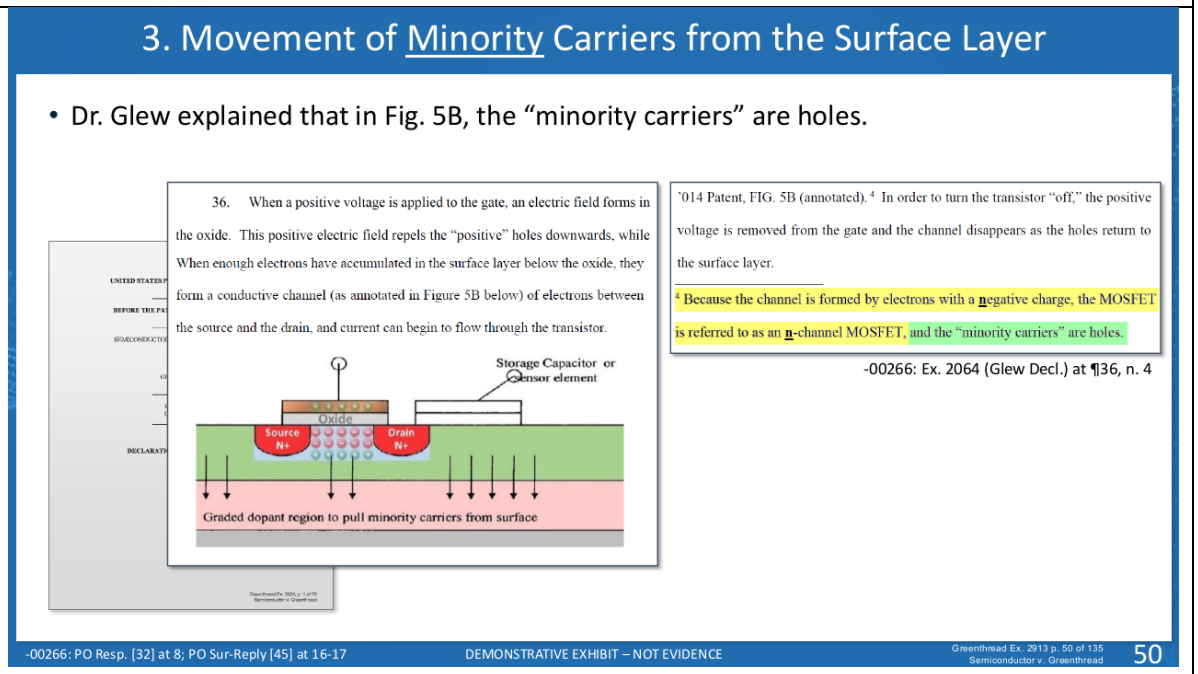

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		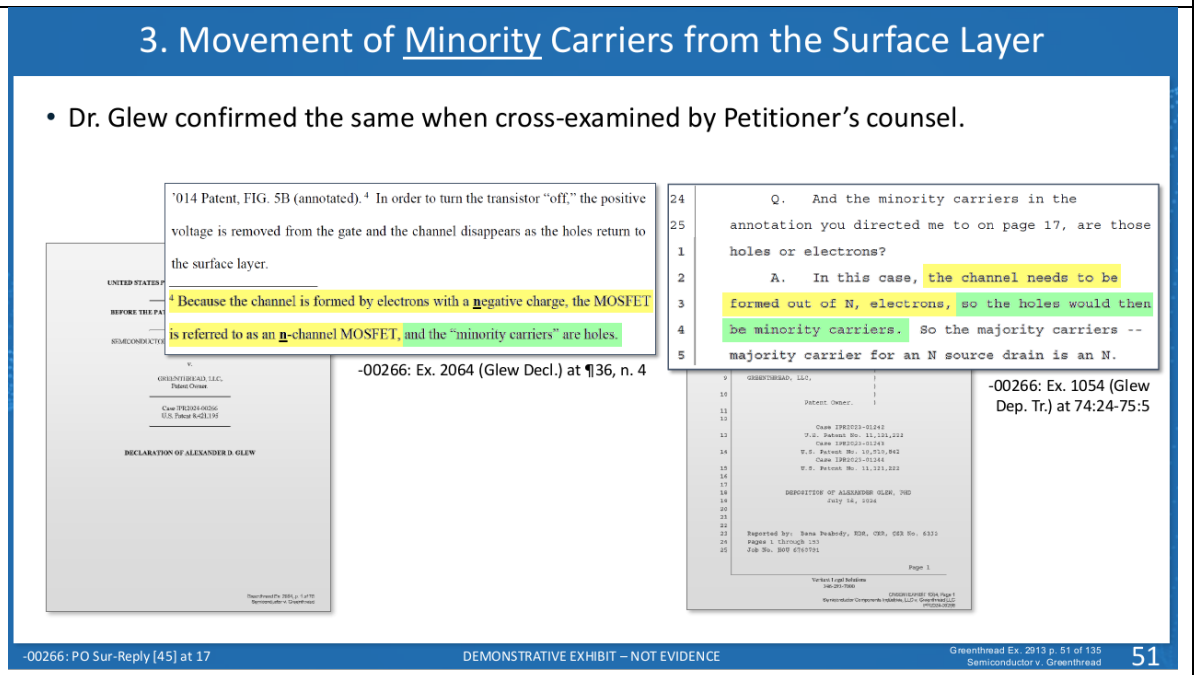

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		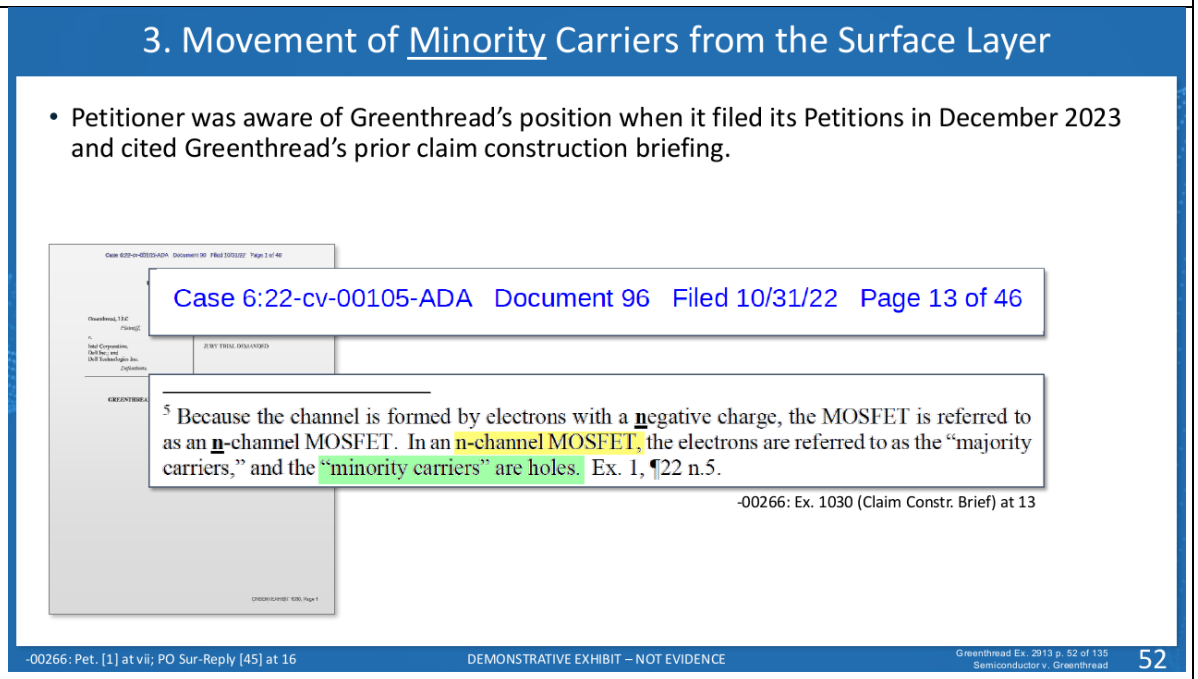

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		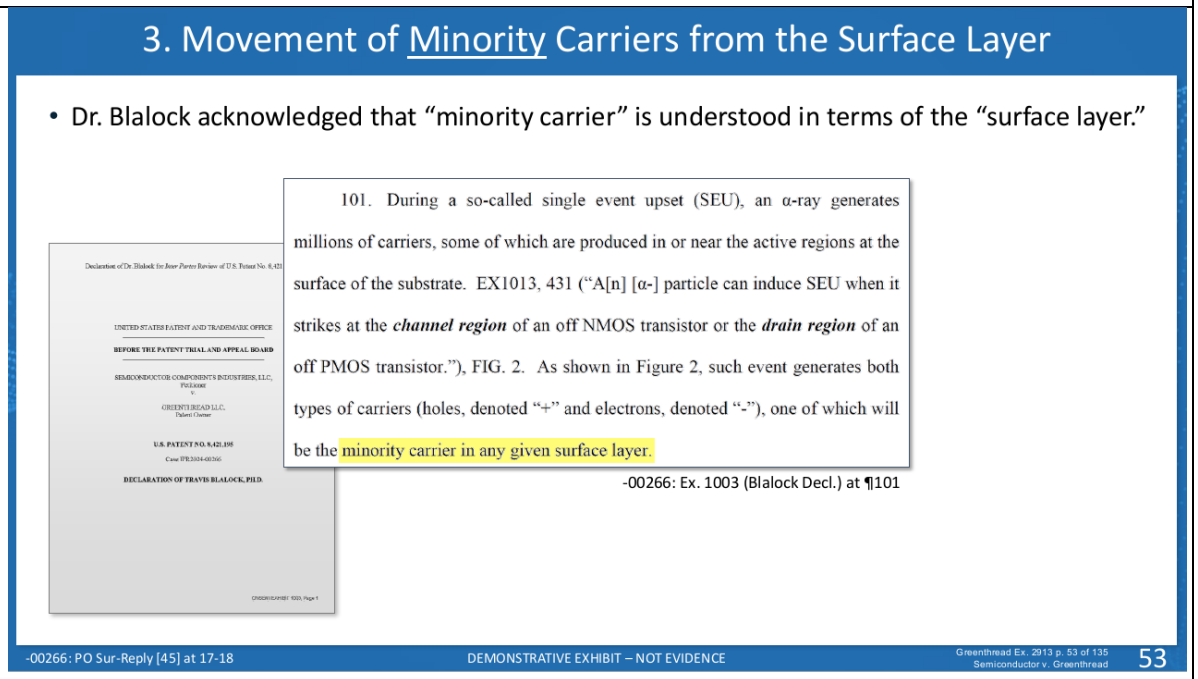

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		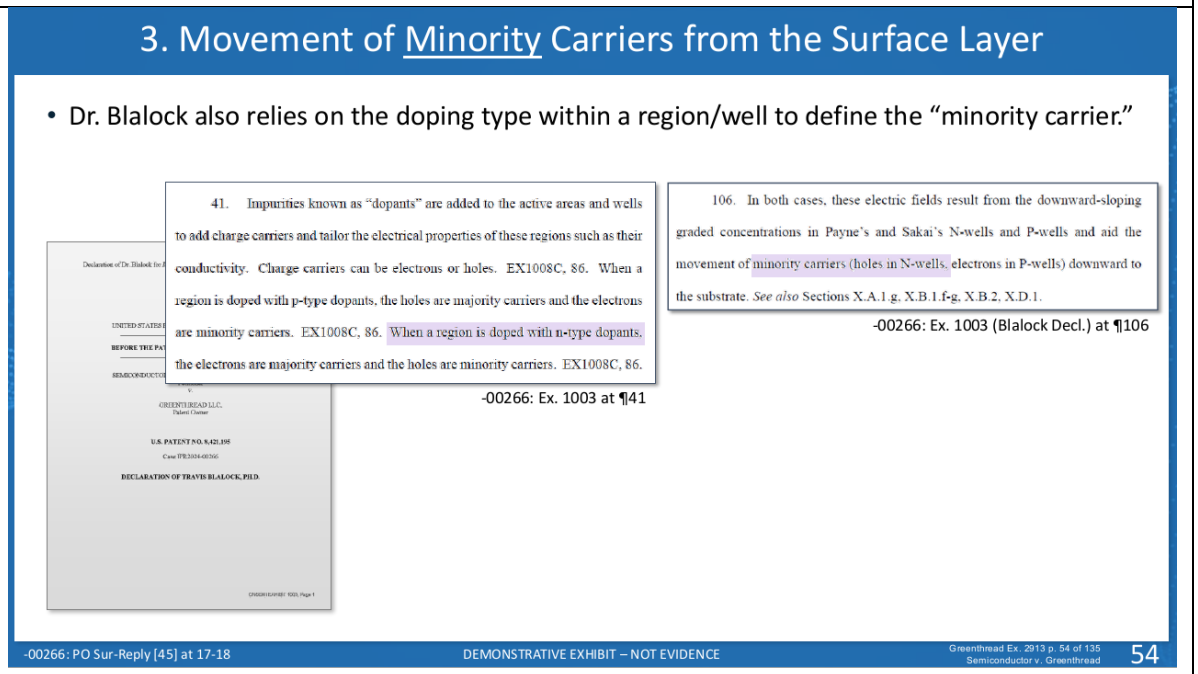

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		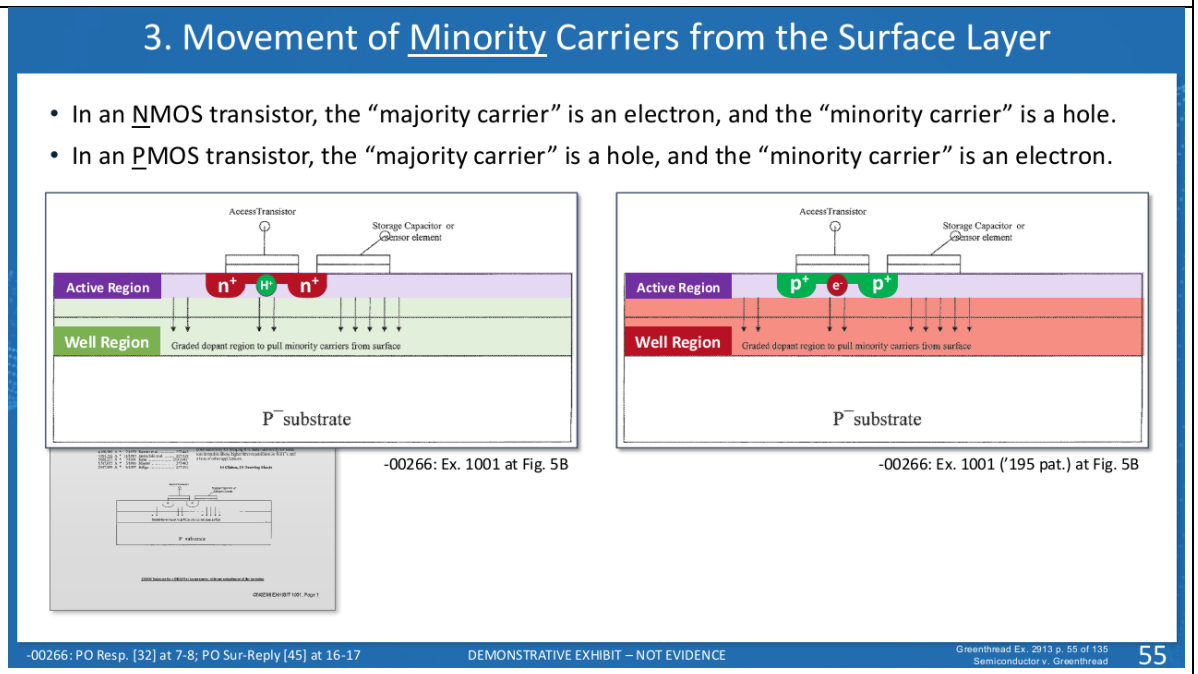

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		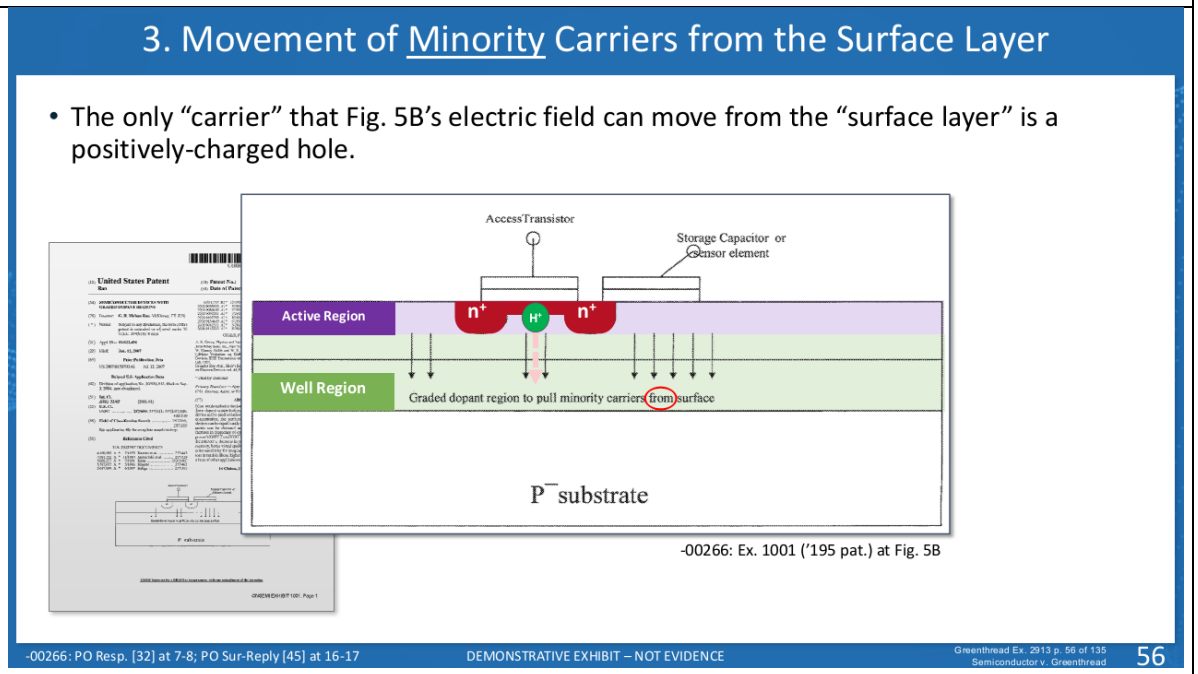

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		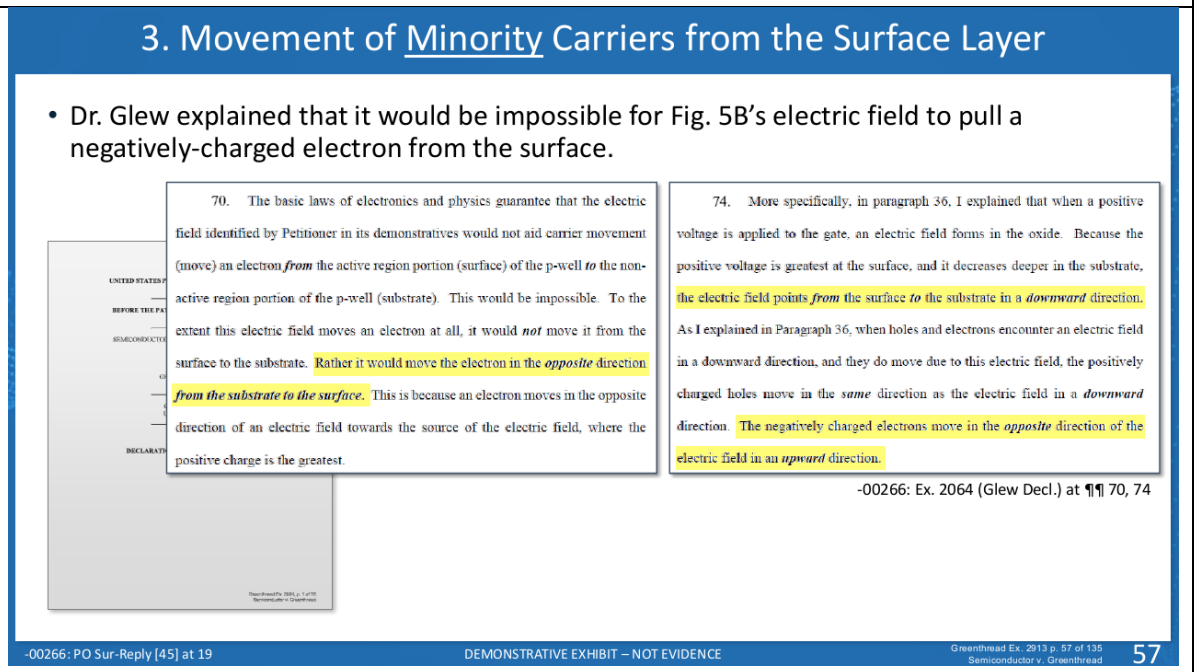

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		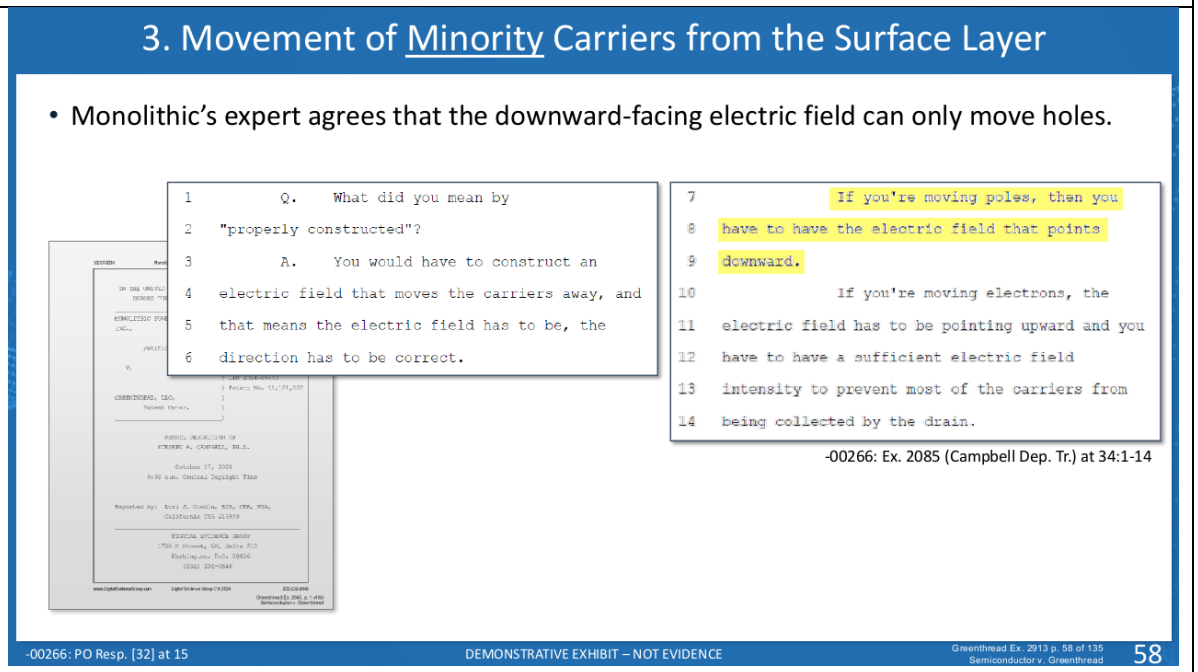

Slide #	New argument / objection	Copy of slide
		3. Movement of Minority Carriers from the Surface Layer • If the "minority carrier" in an NMOS transistor were an electron, it would exclude the specification's preferred embodiment. [17] Moreover, Defendants' expert admitted that construing the claims such that "employ[ing] the common technique of grounding the system" would cause the converter to be considered non-isolated would prevent the claims from encompassing the preferred embodiment. J.A. at 45070–71. A claim construction that "excludes the preferred embodiment is rarely, if ever, correct and would require highly persuasive evidentiary support." *Adams Respiratory Therapeutics, Inc. v. Perrigo Co.*, 616 F.3d 1283, 1290 (Fed.Cir.2010). In this case, the specification, including the claims, supports a reading that encompasses the preferred embodiment. *SynQor, Inc. v. Artesyn Techs., Inc.*, 709 F.3d 1365, 1378-79 (Fed. Cir. 2013) -00266: PO Sur-Reply [45] at 19 DEMONSTRATIVE EXHIBIT – NOT EVIDENCE Greenthread Ex. 2913 p. 59 of 135 Semiconductor v. Greenthread 59

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		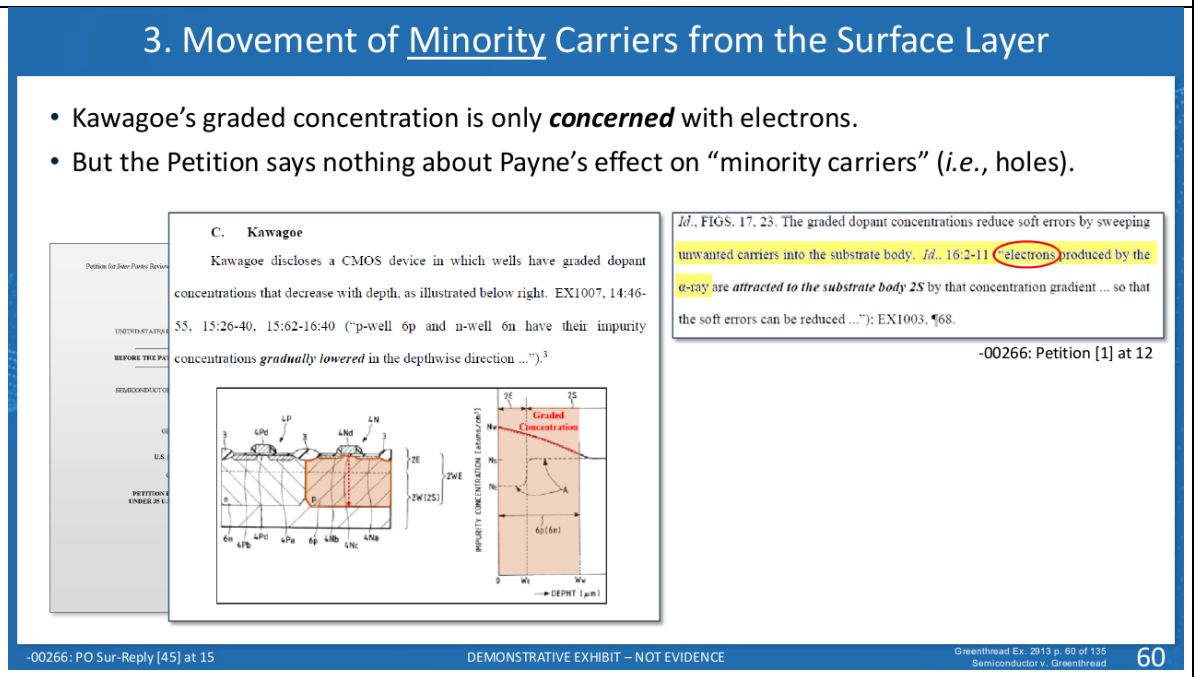

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		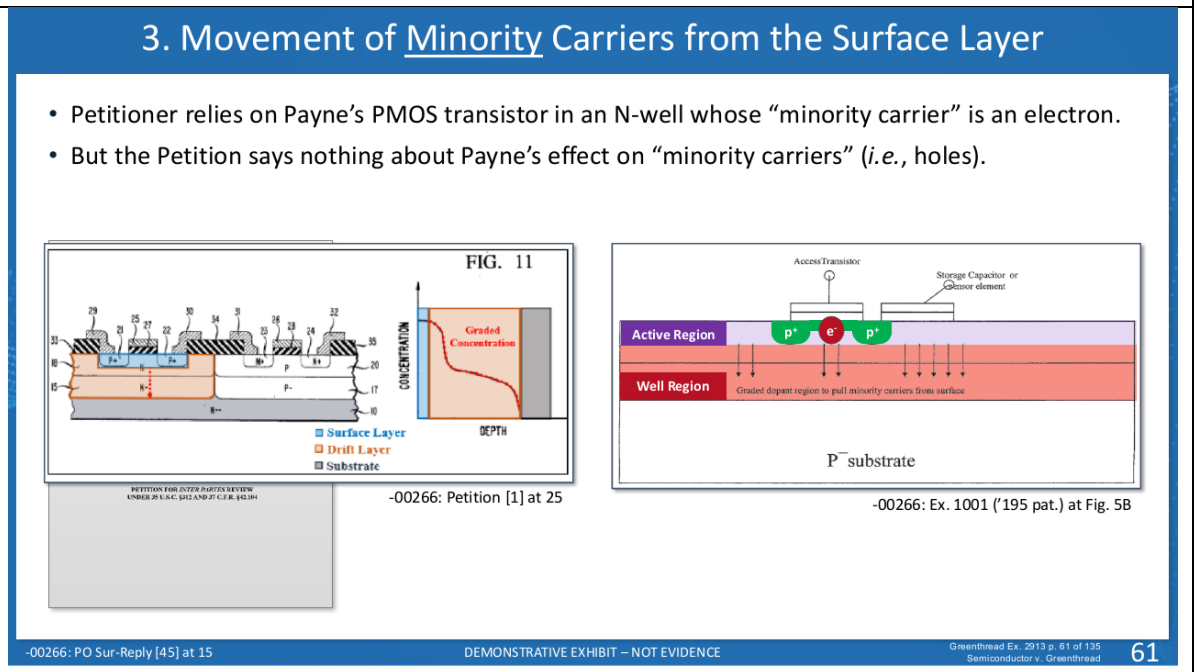
90-97	Untimely argument regarding movement of "minority carrier" from the "surface layer" that was not properly raised in the Patent Owner's Response	*See, e.g.*, Slide 96.

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		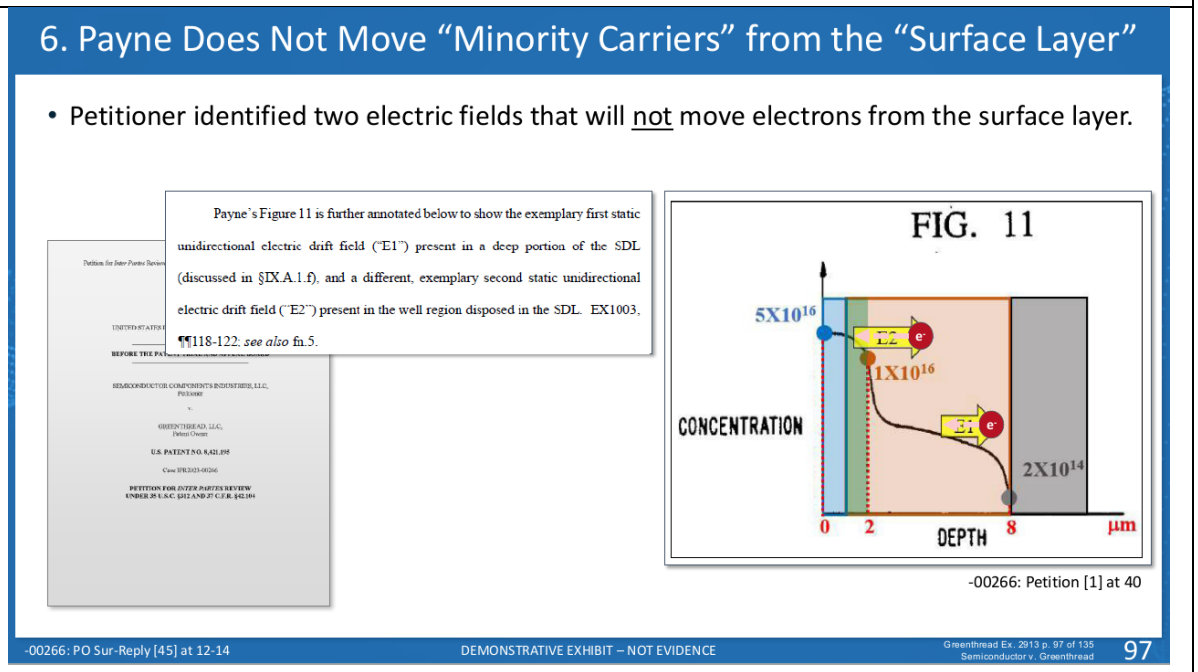

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		6. Payne Does Not Move "Minority Carriers" from the "Surface Layer" • Because Payne does not expressly teach moving carriers from the "surface layer," Petitioners had the burden to identify an electric field in the "surface layer." In the absence of any teaching of the claim limitation in the prior art, Petitioners have two options: 1) they can read "aid the movement of minority carriers from said surface" (or active region) out of the claim or 2) they can argue that any "graded dopant concentration" in the active region will "aid the movement of minority carriers." Both options fail. -00266: PO Response [32] at 3 -00266: PO Resp. [32] at 3 DEMONSTRATIVE EXHIBIT – NOT EVIDENCE Greenthread Ex. 2913 p. 90 of 135 Semiconductor v. Greenthread 90

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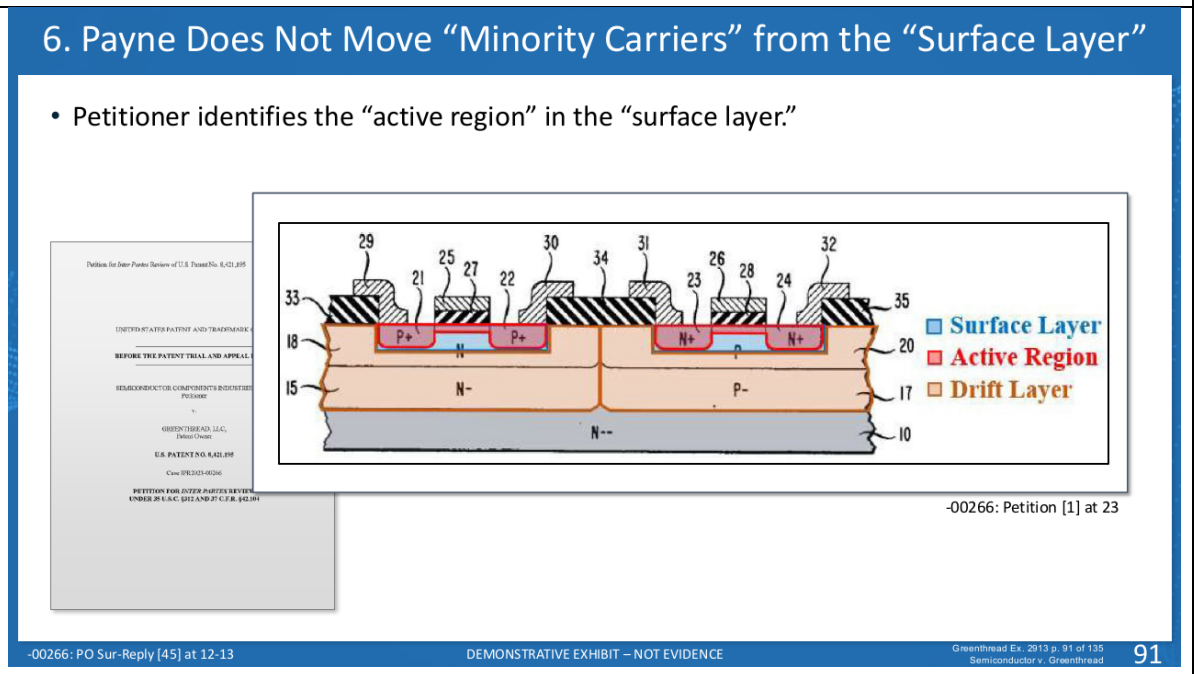
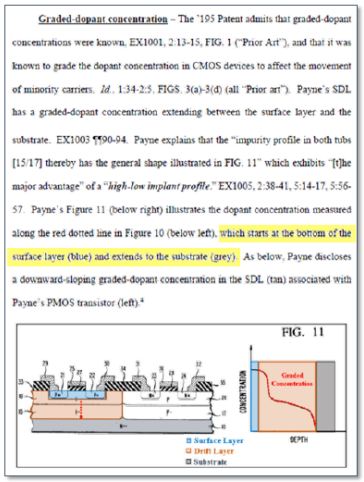
		

Slide #	New argument / objection	Copy of slide
		6. Payne Does Not Move "Minority Carriers" from the "Surface Layer" • Petitioner admits the graded dopant concentration "starts at the bottom of the surface layer." Petition for Inter Partes Review of U.S. Patent No. 8,421,195 UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD SEMICONDUCTOR COMPONENTS INDUSTRIES, LLC, PETITIONER v. GREENTHREAD, LLC, Patent Owner U.S. PATENT NO. 8,421,195 Case IPR2023-00266 PETITION FOR INTER PARTES REVIEW UNDER 35 U.S.C. §312 AND 37 C.F.R. §42.104  Graded-dopant concentration – The '195 Patent admits that graded-dopant concentrations were known, EX1001, 2:13-15, FIG. 1 ("Prior Art"), and that it was known to grade the dopant concentration in CMOS devices to affect the movement of minority carriers. *Id.*, 1:34-2:5, FIGS. 3(a)-3(d) (all "Prior art"). Payne's SDL has a graded-dopant concentration extending between the surface layer and the substrate. EX1003 ¶¶90-94. Payne explains that the "impurity profile in both tubs [15/17] thereby has the general shape illustrated in FIG. 11" which exhibits "[t]he major advantage" of a "*high-low implant profile*." EX1005, 2:38-41, 5:14-17, 5:56-57. Payne's Figure 11 (below right) illustrates the dopant concentration measured along the red dotted line in Figure 10 (below left), which starts at the bottom of the surface layer (blue) and extends to the substrate (grey). As below, Payne discloses a downward-sloping graded-dopant concentration in the SDL (tan) associated with Payne's PMOS transistor (left).[4] FIG. 11 Graded Concentration CONCENTRATION DEPTH Surface Layer Drift Layer Substrate -00266: Petition [1] at 23-24 -00266: PO Sur-Reply [45] at 12-13 DEMONSTRATIVE EXHIBIT – NOT EVIDENCE Greenthread Ex. 2913 p. 92 of 135 Semiconductor v. Greenthread 92

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		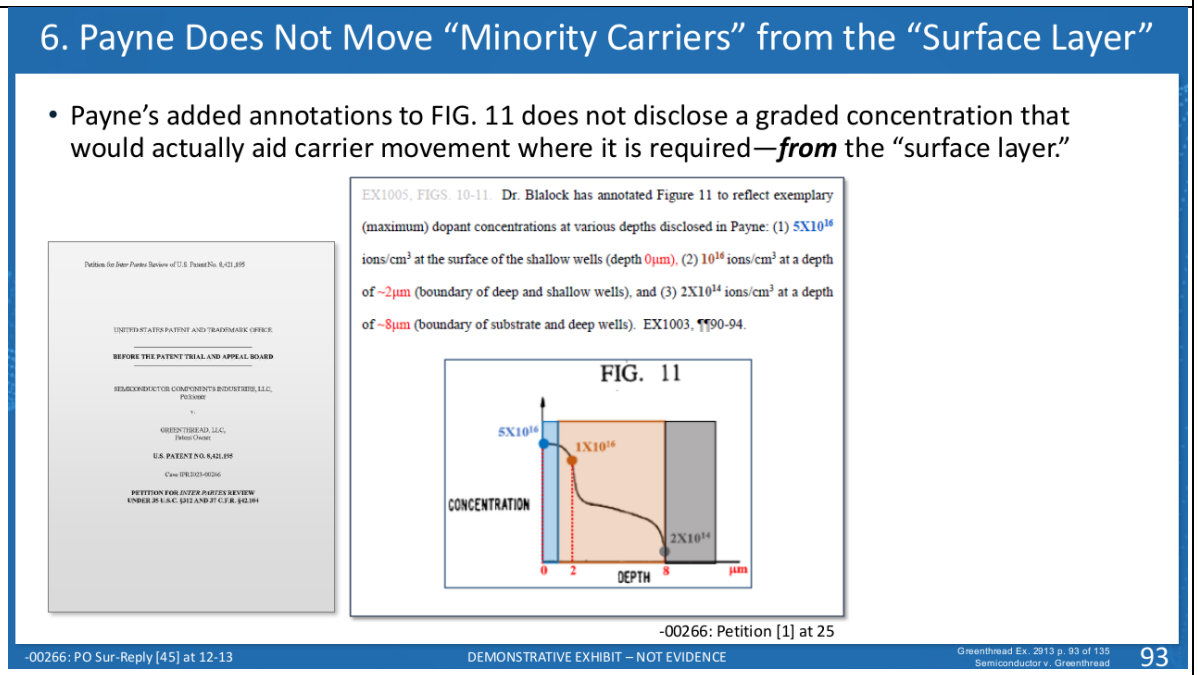

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		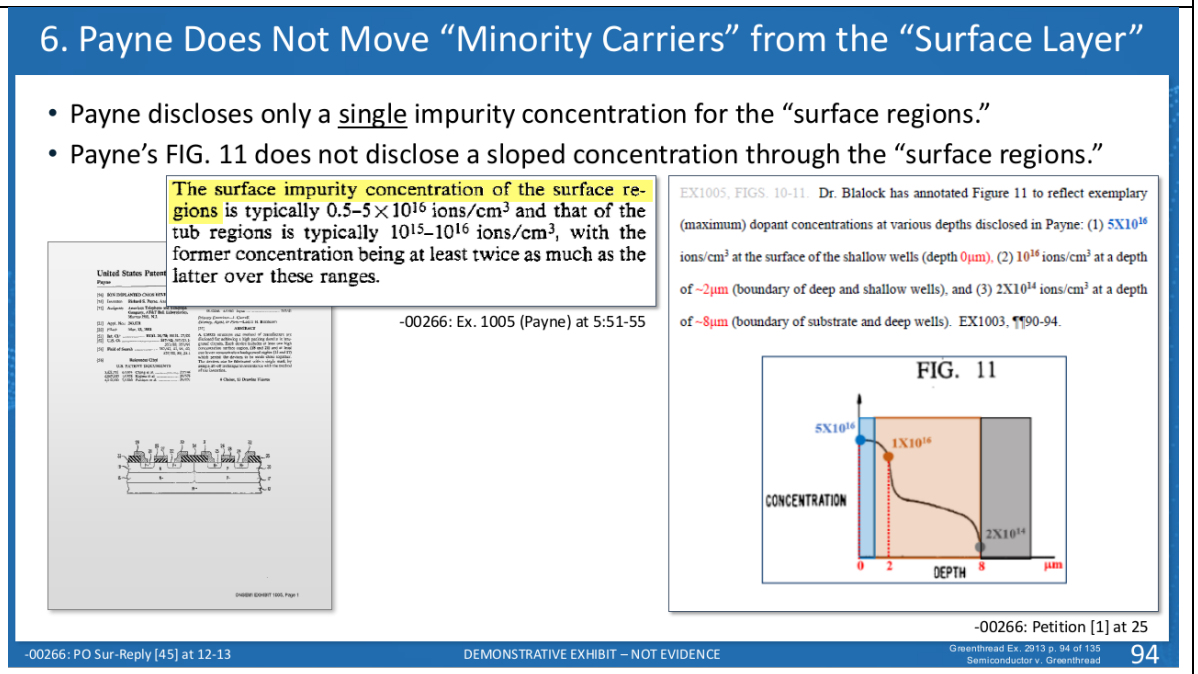

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		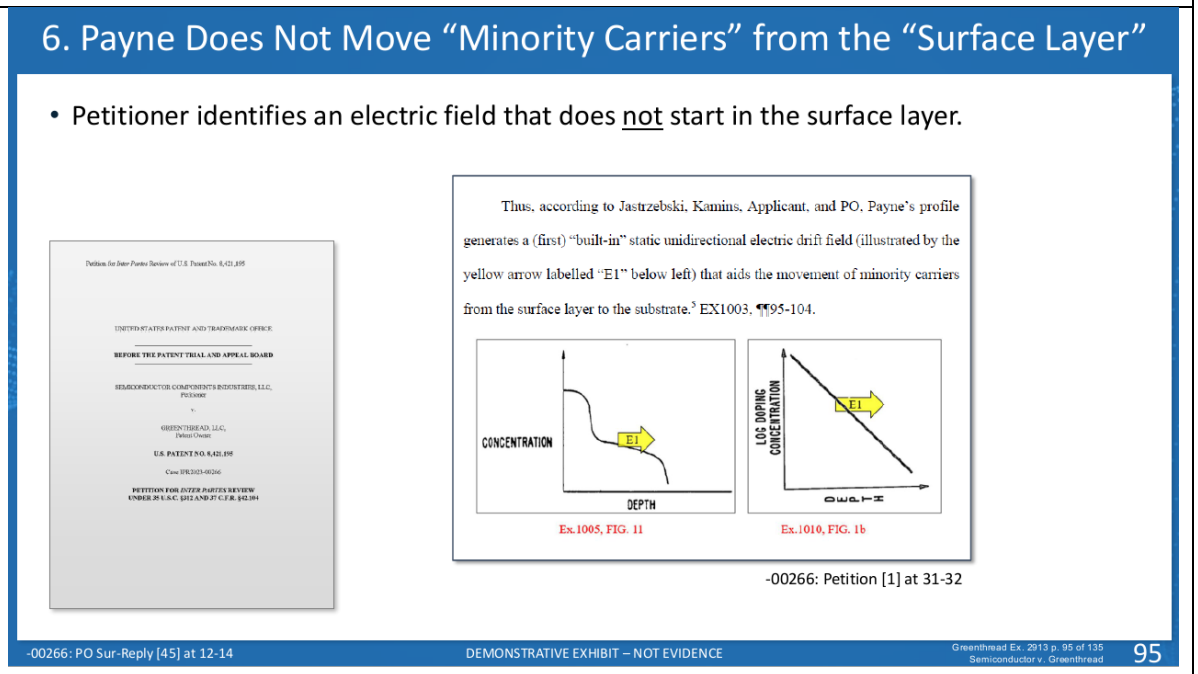

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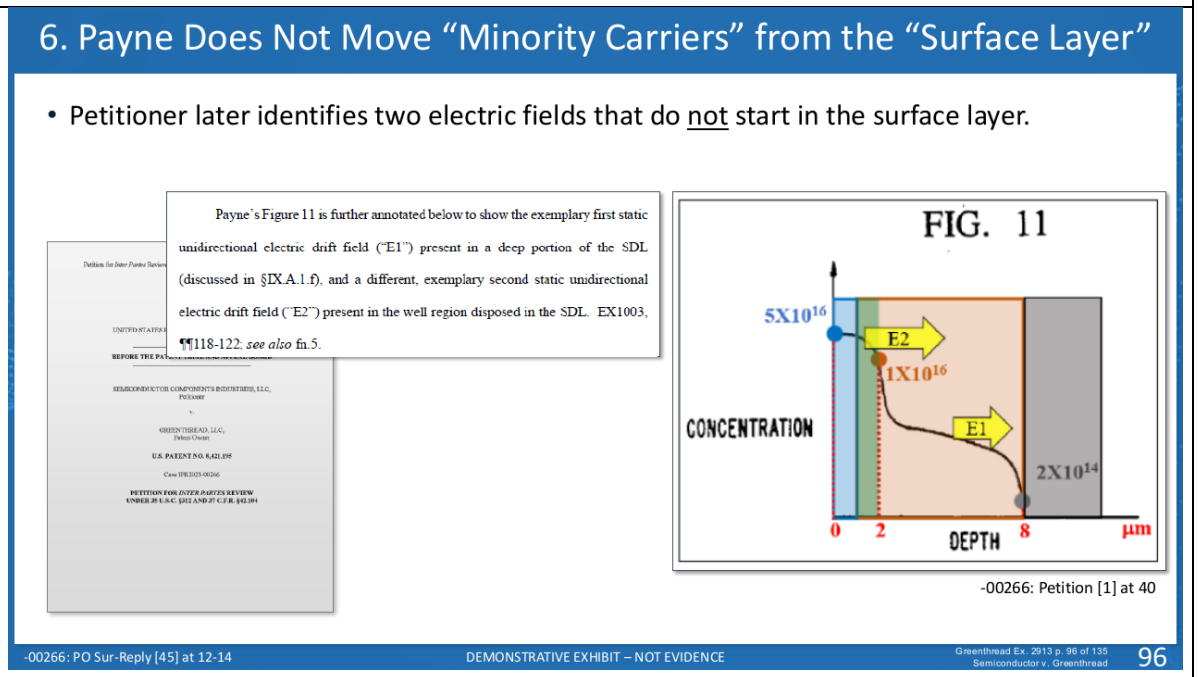
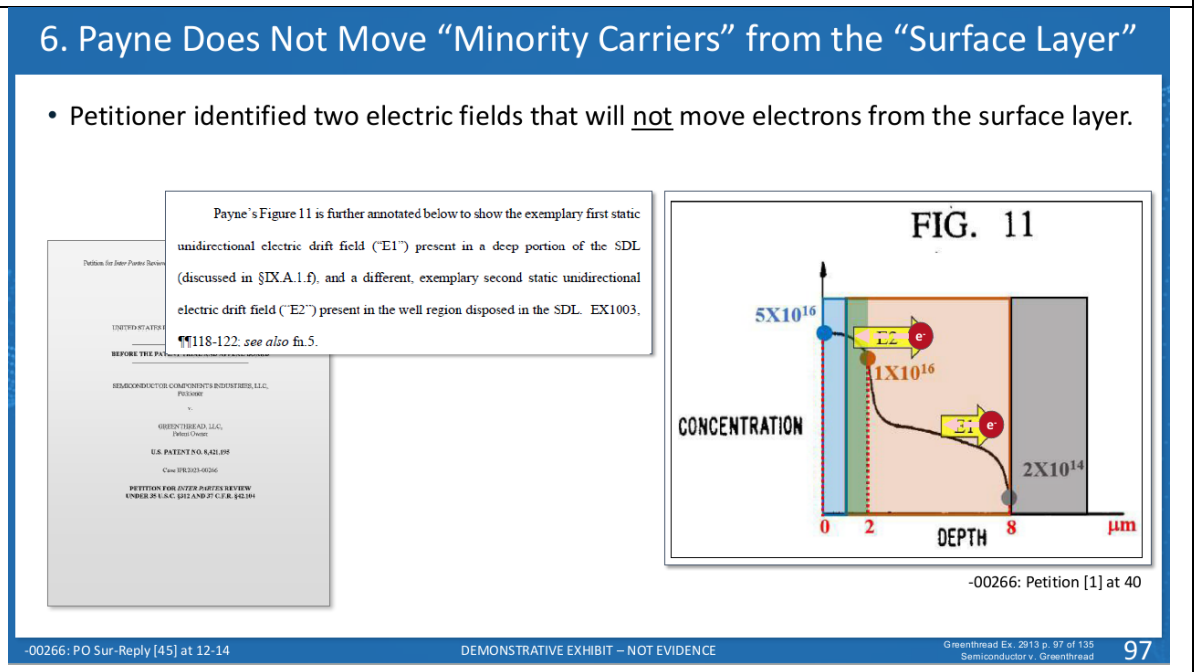
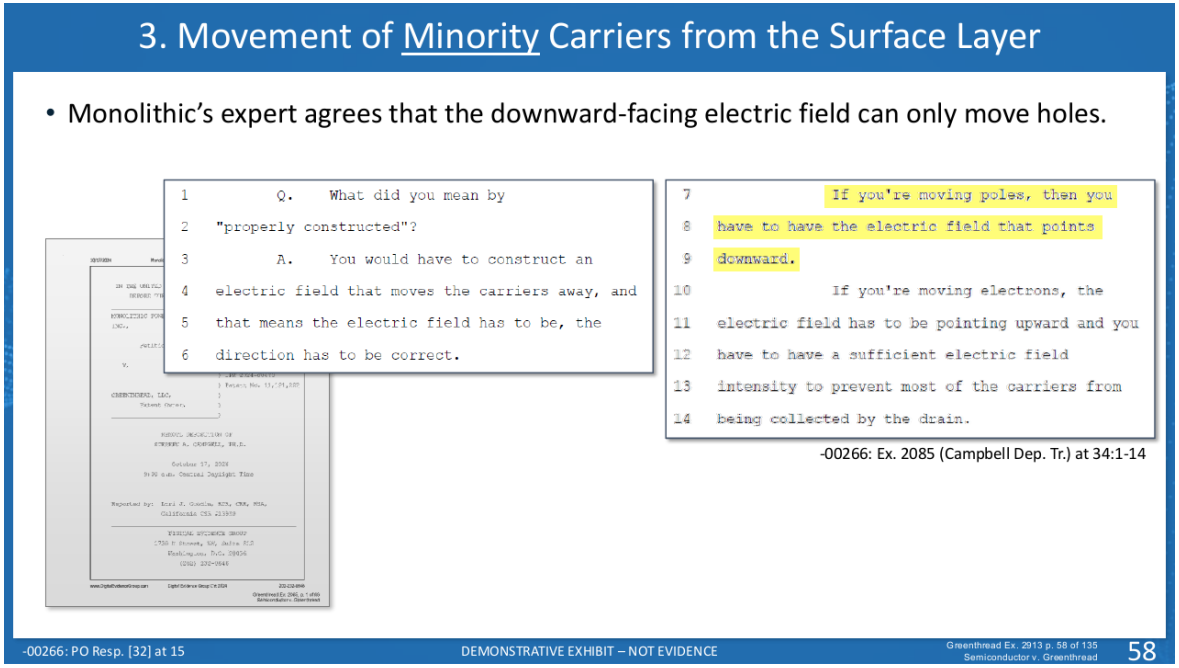
		

Slide #	New argument / objection	Copy of slide
		

Slide #	New argument / objection	Copy of slide
58	Untimely argument that was not properly raised in the Patent Owner's Response ("Movement of Minority Carriers from the Surface Layer") and relies on impermissible hearsay from an unrelated third-party's expert (Campbell Deposition Transcript, EX2085) under F.R.E. 801-803.	

Dated: May 05, 2025

Respectfully submitted,

/Roger Fulghum/

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CERTIFICATE OF SERVICE

In accordance with 37 C.F.R. § 42.6(e), the undersigned certifies that on the 5th day of May, 2025, a complete and entire copy of this **PETITIONER'S OBJECTIONS TO PATENT OWNER'S DEMONSTRATIVES** were served on Patent Owner electronically via email to counsel for the Patent Owner:

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