

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

REMEDIATION PRODUCTS, INC.,
Petitioner,

v.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.,
Patent Owner.

IPR2019-01452
Patent 7,531,709 C1

Before CHRISTOPHER M. KAISER, JEFFREY W. ABRAHAM, and
DAVID COTTA, *Administrative Patent Judges*.

KAISER, *Administrative Patent Judge*.

DECISION
Denying Patent Owner's Request on Rehearing of
Final Written Decision Determining All Claims Unpatentable
37 C.F.R. § 42.71(d)(2)

INTRODUCTION

Remediation Products, Inc. (“Petitioner”) filed a Petition (Paper 3, “Pet.”) requesting an *inter partes* review of claims 1–18 of U.S. Patent No. 7,531,709 C1 (Ex. 1001, “the ’709 patent”). Innovative Environmental Technologies, Inc. (“Patent Owner”) did not file a Preliminary Response. We instituted review of all challenged claims on each of the grounds asserted in the Petition. Paper 11 (“Dec. Inst.”).

Following institution, Patent Owner filed a Response (Paper 15, “PO Resp.”), Petitioner filed a Reply (Paper 20, “Reply”), and Patent Owner filed a Sur-Reply (Paper 22, “PO Sur-Reply”). Petitioner also filed a motion to strike portions of the Sur-Reply and certain exhibits. Paper 24 (“Mot.”). Patent Owner opposed this motion. Paper 27 (“Opp. Mot.”). We held a hearing on November 13, 2020, the transcript of which has been entered into the record. Paper 29 (“Tr.”).

On January 15, 2021, we entered a Final Written Decision determining that Petitioner had shown by a preponderance of the evidence that all challenged claims were unpatentable. Paper 30 (“Dec.”). Patent Owner filed a timely Rehearing Request. Paper 31 (“Req. Reh’g”). We have considered Patent Owner’s Request for Rehearing and, for the reasons set forth below, we deny the requested relief.

STANDARD OF REVIEW

A party requesting rehearing bears the burden of showing that a decision should be modified. 37 C.F.R. § 42.71(d). The party must identify all matters it believes the Board misapprehended or overlooked, and the place where each matter was addressed previously in a motion, an opposition, or a reply. *Id.* When rehearing a decision on petition, we review

the decision for an abuse of discretion. 37 C.F.R. § 42.71(c). An abuse of discretion occurs when a “decision was based on an erroneous conclusion of law or clearly erroneous factual findings, or . . . a clear error of judgment.” *PPG Indus. Inc. v. Celanese Polymer Specialties Co.*, 840 F.2d 1565, 1567 (Fed. Cir. 1988) (citations omitted).

DISCUSSION

Patent Owner requests rehearing of our Final Written Decision, arguing that we abused our discretion in three respects. Req. Reh’g 1–14. We consider each of Patent Owner’s arguments below.

A. Alleged Error by Overlooking or Misapprehending Evidence When Adopting Petitioner’s Interpretation of “Dissolved” in Orolin

Patent Owner first argues that we “adopted an inaccurate and unsupported interpretation of dissolved” through several errors that led to a misunderstanding of the parties’ positions and the evidence supporting those positions. *Id.* at 1–6. We consider Patent Owner’s argument with respect to each of these errors below.

1. Patent Owner’s Original Argument Regarding Meaning of “Dissolved” in Orolin

Patent Owner’s first alleged error relates to our understanding of Patent Owner’s argument regarding the meaning of “dissolved” and similar terms in the disclosure of Orolin. Req. Reh’g 1–2. Specifically, Patent Owner argues that we misunderstood its argument as contending that the zero-valent iron “used in the injection embodiment cannot be zero-valent iron [is] because [ZVI] does not dissolve in water.” *Id.* at 2 (alterations in original). This argument does not persuade us that we abused our discretion in interpreting Patent Owner’s argument.

The challenged claims require “a mixture including a zero valent metal.” Ex. 1001, Reexamination Certificate, 2:4. Orolin teaches a “bioremediation composition[]” that includes an “iron derivative,” which, according to Orolin, may be “electrolytic iron” or “elemental iron,” both of which are zero-valent metals. Ex. 1004 ¶ 204; Ex. 1005, code (57), 4:42–47. In a working example of Orolin, the bioremediation composition contains “electrolytic iron” in a “mixture [that] was thoroughly dissolved,” and Orolin describes its injected bioremediation compositions as “in solution.” Ex. 1005, 9:25–36, 15:35–63. But Petitioner’s declarant, John Thomas Wilson, Ph.D., testified that, to a chemist, “dissolved” has a narrow meaning of “disassociated to the level of atoms or molecules,” and the electrolytic iron of Orolin “cannot be disassociated to the level of atoms or molecules.” Ex. 2025, 24:11–25. Dr. Wilson concluded that Orolin must be using the term “dissolved in the more general layman’s sense of simply carried up . . . and sustained in the fluid as it’s injected,” which a chemist would refer to as “[s]uspended.” *Id.* at 24:23–25:4.

Patent Owner disagreed with this argument. Sur-Reply 18–19. Specifically, Patent Owner argued that a person of ordinary skill in the art “would not consider the bioremediation composition in solution of Orolin to be a suspension,” stating without citation to any record evidence that “water is not capable of suspending particles unless the bioremediation composition in solution is being rotated at a rapid speed” and that Orolin failed to disclose such rotation. *Id.* at 18. Instead, Patent Owner offered its own interpretation of the disclosure of Orolin: “a POSITA would understand dissolved to mean that the constituent parts were now in a liquid form,” and that, according to Dr. Wilson, zero-valent iron could “corrode[]” or

“oxidize[]” to become “ferrous iron which is soluble.” *Id.* at 19. Accordingly, argued Patent Owner, Orolin’s use of the terms “dissolved” and “in solution” must refer to this process of converting insoluble zero-valent iron to soluble ferrous iron, meaning that Orolin’s mixture would “not contain ZVI by the time that it [was] applied to the contaminated site.” *Id.*

Patent Owner now argues that it was an abuse of discretion for us to interpret this argument as advocating for the narrow meaning of “dissolved” rather than as advocating for a meaning that extended to the corrosion or oxidation of zero-valent iron into some other soluble form. Req. Reh’g 2. We are not persuaded that we abused our discretion.

There is no dispute that Orolin teaches dissolving a mixture that includes zero-valent iron, and the parties seem to agree that, without converting into some other species, zero-valent iron cannot dissociate to the level of atoms or molecules so as to meet the narrow, scientific definition of dissolution. We were offered two possible consequences stemming from those facts. First, Orolin might, as Dr. Wilson testified, intend “dissolve” to cover not only the narrow, scientific meaning of the term, but also a broader meaning that includes suspension of insoluble particles. Second, Orolin might, as Patent Owner argued, intend the phrase “dissolve the electrolytic iron” to cover not only the narrow, scientific meaning of the phrase (an interpretation that would be meaningless), but also a broader meaning that includes actual dissolution of some soluble species into which the electrolytic iron is converted.

Implicit in Patent Owner’s argument, however, was this proposition: when Orolin uses the terms “dissolved” or “in solution,” it means precisely what it says, that some species must actually dissociate to the level of atoms

or molecules, not merely be suspended as insoluble particles in the fluid. This is clear from Patent Owner’s statement that a person of ordinary skill in the art “would understand dissolved to mean that the constituent parts were now in a liquid form.” Sur-Reply 19. According to Patent Owner, because “dissolved” must mean “in a liquid form,” Dr. Wilson’s testimony that “dissolved” could include situations of mere suspension must be incorrect. When we summarized Patent Owner’s argument as “the requirement in the injection embodiment [of Orolin] that the composition be ‘in solution’ means that the iron derivatives used in the injection embodiment cannot be zero-valent iron, because zero-valent iron does not dissolve in water,” we were referring to this implicit proposition. Dec. 11. Thus, we interpreted Patent Owner’s argument in precisely the way that Patent Owner presented it, and we are not persuaded that doing so constituted an abuse of discretion.

2. *Dr. Wilson’s Testimony Regarding Oxygen Scavengers*

Patent Owner next argues that some evidence supports its interpretation of the term “dissolved” in Orolin and that we abused our discretion by overlooking this evidence. Req. Reh’g 2–5. The first of these pieces of evidence allegedly contradicts Dr. Wilson’s testimony about oxygen scavengers. *Id.* at 2–3. Specifically, Patent Owner argues that, contrary to Dr. Wilson’s testimony that “Orolin included materials that are oxygen scavengers that would prevent the ZVI from corroding” into a soluble form of iron, “the oxygen scavengers would create an anaerobic environment in which the interaction of the water and the ZVI results in hydrolysis of the water on the surface of the ZVI particle and the creation of ferrous iron from the ZVI.” *Id.* at 3 (citing Pet. 23–24; Ex. 1004 ¶¶ 210–214; Ex. 1018, Figs. 2–3; Ex. 2025, 20:2–14, 34:18–24). As noted above, a

party requesting rehearing must identify where it previously raised the argument that it contends we misapprehended or overlooked. 37 C.F.R. § 42.71(d). Here, Patent Owner does not identify where it previously directed us to the testimony that allegedly contradicts Dr. Wilson’s testimony about oxygen scavengers. Req. Reh’g 2–3. Accordingly, this evidence falls outside the scope of a proper rehearing request, so we do not consider it.

3. Orolin’s Focus on Bioremediation

The next piece of evidence Patent Owner argues we overlooked is Orolin’s focus on “activation of indigenous micro-organisms.” *Id.* at 3–5. According to Patent Owner, bacterial reactions “are aqueous phase reactions,” requiring any composition that activates bacteria “to be in an aqueous phase,” and thereby requiring any components of those compositions, “including iron derivatives, . . . to be soluble.” *Id.* (citing Ex. 1005, code (57), 1:8–16, 3:10–15; Ex. 1036, 46:22–23). Patent Owner argues that its interpretation of Orolin’s “dissolved” is more consistent with this requirement than is Petitioner’s (and Dr. Wilson’s) interpretation, because suspended, insoluble particles of zero-valent iron would not be in a form that “could not be utilized by the bacteria as required by the [sic] Orolin.” *Id.* at 5 (citing Ex. 1005, 4:24–27).

Patent Owner notes correctly that this argument for an alternative construction of “dissolved” appeared in Patent Owner’s opposition to Petitioner’s motion to strike Patent Owner’s Sur-Reply. *Id.* at 4 (citing Opp. Mot. 2). But the opposition to a procedural motion is intended to provide a forum for responding to the motion in question, not for making new substantive arguments on the merits of the Petition. 37 C.F.R. § 42.6(a)(3)

(“Combined motions, oppositions, replies, or other combined documents are not permitted.”). Our failure to consider a substantive argument made for the first and only time in an opposition to a procedural motion does not amount to overlooking the argument, so we are not persuaded that we abused our discretion by overlooking this argument.

Even if we had overlooked this argument, we are not persuaded that considering it would have changed our interpretation of the term “dissolved” as used in Orolin. Patent Owner is correct that Orolin focuses on activating indigenous microorganisms, but even if we assume that such activation requires some components to be dissociated to the level of atoms or molecules in the aqueous phase, it does not necessarily follow that all of Orolin’s components must be so. Even if some iron derivative must be in solution rather than suspended, Orolin teaches using multiple non-zero-valent iron derivatives in addition to the zero-valent iron when zero-valent iron is used. Ex. 1005, 15:35–62 (teaching the use of “chelated iron” and “citrated iron” in addition to the zero-valent “electrolytic iron”). Moreover, as discussed in our Final Written Decision, there is ample evidence of record that a person of ordinary skill in the art would not have understood Orolin’s use of the term “dissolved” to be limited to a narrow, formal meaning, and the fact that Orolin teaches that its compositions promote bacterial growth does not outweigh that evidence. Dec. 11–13.

4. Suspension of Particles in Water

Next, Patent Owner argues that we overlooked its argument that a person of ordinary skill in the art “would not consider the bioremediation composition in solution of Orolin to be a suspension as the composition is mixed in water and water is not capable of suspending particles such as ZVI

(the particles would sink and collect on bottom).” Req. Reh’g 5 (citing Sur-Reply 18). But the original argument was “Patent Owner submits that a POSITA would not consider the bioremediation composition in solution of Orolin to be a suspension as water is not capable of suspending particles unless the bioremediation composition in solution is being rotated at a rapid speed.” Sur-Reply 18. There was no citation to any evidence of record, nor even any reasoning to support this conclusory attorney argument. *Id.* Even with its modification to this argument in the Rehearing Request, Patent Owner fails to provide a citation to any supporting evidence. Req. Reh’g 5. “Attorney’s argument in a brief cannot take the place of evidence.” *In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974). Accordingly, our refusal to give this argument significant weight was not due to our overlooking it.

5. Opportunity to Respond to Dr. Wilson’s Testimony

Finally, Patent Owner argues that Dr. Wilson offered his testimony supporting Petitioner’s interpretation of the term “dissolved” in Orolin late enough in the proceeding that Patent Owner had no opportunity to offer contradictory evidence. Req. Reh’g 5. This is true. As Patent Owner notes, Dr. Wilson’s testimony regarding Orolin’s extension of “dissolved” to cases of mere suspension of particles appeared for the first time in a deposition that Patent Owner took after Petitioner had filed its Reply. Ex. 2025, 1:16–20 (showing that Dr. Wilson provided the testimony at Ex. 2025, 24:11–25:4, on August 27, 2020). At that time, Patent Owner was still permitted to file a Sur-Reply, but that Sur-Reply was not permitted to “be accompanied by new evidence other than deposition transcripts of the cross-examination of any reply witness.” 37 C.F.R. § 42.23(b). But we are not persuaded that

Patent Owner’s lack of opportunity to provide evidence with its Sur-Reply constitutes an abuse of discretion.

First, we note that any new evidence submitted by one party requires an opportunity for the other party to respond to the arguments that rely on that new evidence. There is always an argument that the response would be more effective with the opportunity to submit additional evidence, but the submission of that additional evidence by one party would require permitting the other party to respond. If that party were permitted to respond with yet more evidence, then the first party would need an opportunity to respond again, and the cycle could continue indefinitely. We normally are required to issue a Final Written Decision in an *inter partes* review within one year after instituting trial. 35 U.S.C. § 316(a)(11); 37 C.F.R. § 42.100(c). This schedule does not permit us to continue accepting evidence from the parties indefinitely. Instead, we must close the record at some point so that we can determine whether the evidence of record supports Petitioner’s assertions of unpatentability. This requires the party with the last word to base its arguments on the existing evidence rather than submitting additional new evidence. Our Sur-Reply rule permits Patent Owner to file the final substantive brief but generally prohibits the submission of new evidence along with the Sur-Reply. 37 C.F.R. § 42.23(b).

Second, the testimony of Dr. Wilson setting out his interpretation of “dissolved” in Orolin was elicited by Patent Owner’s questioning at Dr. Wilson’s deposition. Ex. 2025, 24:11–24:13 (Patent Owner’s counsel asking Dr. Wilson for his “understanding as a person of ordinary skill in the art of the use of the word ‘dissolved’”). Moreover, that testimony was

referenced in the substantive briefing for the first (and only) time by Patent Owner. Sur-Reply 18 (citing Ex. 2025, 24:11–25:4, 26:5–27:24). If Patent Owner believed that introducing this testimony without the opportunity for the subsequent introduction of additional contrary evidence was harmful to its cause, Patent Owner could have chosen not to introduce the testimony into the record in the first place. Because Patent Owner declined that opportunity and decided to introduce the testimony into the record, it was not an abuse of discretion for us to consider it.

6. Conclusion

For the reasons discussed above, none of Patent Owner’s arguments persuades us that we abused our discretion by overlooking or misapprehending any evidence or argument when we adopted Petitioner’s interpretation of the term “dissolved” in Orolin.

B. Alleged Error by Overlooking or Misapprehending Evidence When Determining that Orolin’s Zero-Valent Iron Inherently Would Abiotically Reduce the Concentration of Dissolved Chlorinated Solvents in Groundwater

Patent Owner next contends that

simply because ZVI is included in a bioremediation composition and the ZVI may interact with groundwater and contaminants at the site does not inherently mean that the amount of ZVI included in the bioremediation composition will result in reduction of concentrations of the dissolved chlorinated solvents in the groundwater (as occurs in an abiotic remediation process)

Req. Reh’g 6–11. Patent Owner then makes several inherency-related arguments that we abused our discretion by making a contrary finding. *Id.* We consider Patent Owner’s arguments below.

1. Orolin’s Failure to Disclose Abiotic Processes Expressly

Patent Owner first argues that we erred by overlooking the fact that “the bioremediation composition of Orolin is clearly directed to an abiotic process,¹ not an abiotic process.” Req. Reh’g 7 (citing Ex. 2002 ¶ 120). We are not persuaded by this argument that we overlooked any evidence.

Petitioner did not argue that Orolin expressly disclosed abiotic processes to reduce the concentrations of chlorinated solvents. Instead, Petitioner argued that “the supply of electrolytic or elemental iron to contaminated areas below the surface of soil disclosed by Orolin would *inherently* reduce chlorinated solvents in groundwater in the manner recited in claim 1.”

Pet. 23 (emphasis added). Orolin’s failure to disclose a limitation expressly is irrelevant to an argument that Orolin discloses that limitation inherently, because inherency is always about “missing characteristic[s]” of the prior art. *Schering Corp. v. Geneva Pharms.*, 339 F.3d 1373, 1377 (Fed. Cir. 2003).

2. Orolin’s Requirement That the Iron Derivative Act as a Nutrient for Bacteria

Patent Owner next argues that we overlooked evidence that solid, suspended particles of zero-valent iron could not “act as a nutrient” to “promote the growth of . . . indigenous bacteria,” as Orolin requires its iron derivatives to do. Req. Reh’g 7–8. Patent Owner identifies where a portion of this argument appeared before. *Id.* at 7 (discussing requirement that iron derivatives act as nutrients for bacteria, and citing PO Resp. 22, 25). The cited portion of Patent Owner’s Response does not, however, discuss a

¹ We presume that the first use of “an abiotic process” in Patent Owner’s argument was intended to state “a biotic process.”

critical portion of Patent Owner’s argument, that suspended particles of zero-valent iron are incapable of acting as bacterial nutrients. PO Resp. 22, 25. Patent Owner does not identify any other portion of the record as a place where this portion of its argument previously appeared. Req. Reh’g 7–8 (not citing any of Patent Owner’s briefs). Because Patent Owner does not identify where in the record it previously argued that suspended solid particles of zero-valent iron would be incapable of acting as Orolin’s bacterial nutrients, that argument is beyond the scope of a proper rehearing request. 37 C.F.R. § 42.71(d). Accordingly, we do not consider this argument.

3. Orolin’s Iron Concentration

Patent Owner next argues that Orolin teaches a relatively narrow range of iron concentrations, that a person of ordinary skill in the art would have chosen an iron concentration within that narrow range, and that iron concentrations within that range would not be high enough to reduce chlorinated solvent concentrations abiotically. Req. Reh’g 8–10. There are several pieces that make up this argument, and we discuss each separately below.

a. Dr. Haselow’s Conclusory Testimony

In the Final Written Decision, we determined that Patent Owner’s argument that Orolin’s iron concentration was too low to act as anything other than a bacterial nutrient was unsupported because it relied on conclusory testimony from Patent Owner’s declarant, John S. Haselow, Ph.D. Dec. 14. Patent Owner argues that we erred in determining that Dr. Haselow’s testimony was conclusory because his testimony “is supported by his vast experience.” Req. Reh’g 9 (citing Ex. 2002 ¶¶ 18–24).

We agree with Patent Owner that Dr. Haselow's testimony demonstrates that he has extensive experience in a relevant field. Ex. 2002 ¶¶ 18–24. In the portion of his testimony cited in Patent Owner's Response, Dr. Haselow testifies that “[a] POSITA would understand that at such low concentrations that [sic] the iron derivatives would be [sic] used as nutrients and not for chemical reduction” and that “a POSITA would understand that the amount of iron derivative utilized in Orolin is sufficient to act as a nutrient but is not sufficient to create the chemical reactions required by claim 1.” *Id.* ¶¶ 124, 185. But neither of these statements is further explained or supported by citation to any other evidence, including anything specific in Dr. Haselow's “vast experience,” that provides the underlying facts or data on which these conclusions are based. *Id.* As we noted in the Final Written Decision, “[e]xpert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.” Dec. 15 (quoting 37 C.F.R. § 42.65(a)). Accordingly, we are not persuaded that we abused our discretion by treating this testimony as conclusory or by treating the argument relying on this conclusory testimony as unsupported.

b. Our Alleged Focus on Hydrogen-Generating Reactions Rather than Chemical Reactions Between Zero-Valent Iron and Chlorinated Solvents

Patent Owner argues that we erred by “focus[ing] on the hydrogen generating reactions and ignor[ing] the chemical reactions of the chlorinated solvents with the surface of the [zero-valent iron].” Req. Reh'g 8–9 (citing Dec. 15). This argument misrepresents the Final Written Decision. First, there is no reference to “hydrogen generating reactions” on the cited page of the Decision. Dec. 15. Second, our reference on page 14 of the Final

Written Decision to zero-valent iron concentrations “insufficient to participate in the hydrogen-generating reactions of claim 1” was meant simply as a short-hand reference to the limitation of claim 1 reciting “to reduce concentrations of dissolved chlorinated solvents in groundwater via chemical reactions with a surface of the zero valent metal providing a hydrogen source via hydrolysis of the groundwater at the surface of the zero valent metal and evolution of hydroxides.” *Id.* at 14 (quoting Ex. 1001, Reexamination Certificate, 2:6–12).

As for our actual analysis of Patent Owner’s argument, page 15 of the Final Written Decision discusses the argument Patent Owner makes on page 25 of the Response. *Id.* at 15. In full, Patent Owner’s argument reads: “Furthermore, the Patent Owner submits that a POSITA would understand that the amount of iron derivative utilized in Orolin is sufficient to act as a nutrient but is not sufficient to create the chemical reactions required by claim 1.” PO Resp. 25 (citing Ex. 2002 ¶¶ 124, 125, 184, 185; Ex. 2024, 1). This argument contends that Orolin’s zero-valent iron was absolutely incapable of creating any chemical reaction required by claim 1, regardless of how that reaction might be described. *Id.* This was the argument we analyzed. Dec. 15. As discussed above, the testimony of Dr. Haselow in the four cited paragraphs of his declaration that is relevant to this argument is unsupported and conclusory. Ex. 2002 ¶¶ 124, 125, 184, 185. The cited page of Exhibit 2024 might support an argument that bacteria require iron as a nutrient but not an argument that any particular concentration of iron would be insufficient to act as anything other than a nutrient. Ex. 2024, 1. Regardless, nothing about Patent Owner’s argument or our analysis of that argument limits the function of the zero-valent iron to any particular role,

such as participating in hydrogen-generating reactions. Accordingly, we are not persuaded that we focused exclusively on claim 1’s hydrogen-generating reactions, much less that we abused our discretion by doing so.

c. Possibility of Zero-Valent Iron Acting as Both Bacterial Nutrient and Abiotic Reductant

Patent Owner argues that the zero-valent iron of Orolin could act either as a bacterial nutrient or as an abiotic reductant and that we erred by determining that it could play both roles at the same site. Req. Reh’g 9–10. Patent Owner does not identify where it previously made this argument, so we need not consider it. *Id.* Moreover, even if Patent Owner had satisfied the requirements for a rehearing request with respect to this argument, we would not find it persuasive.

As Patent Owner admits, “Dr. Haselow testified that it was possible for iron to act as either a nutrient and/or an abiotic reductant.” *Id.* at 9 (citing Ex. 1036, 46:14–48:4). In fact, Dr. Haselow was less vague than Patent Owner’s summary suggests. He actually testified that, “if we’re talking about a football field of contaminated soil, some of the iron could be acting as a nutrient and some of it could be acting as a reductant,” and he expressly added that “some of it could be acting as both.” Ex. 1036, 46:19–24. This testimony quite clearly supports “iron” acting both as a nutrient and as a reductant simultaneously, not merely as one or the other.

To escape this testimony, Patent Owner argues that the “iron” that Dr. Haselow was discussing was not necessarily zero-valent iron, because zero-valent iron “must be converted to a usable form” and “must be [in] an aqueous phase” to serve as a nutrient. Req. Reh’g 10 (citing Ex. 1036, 46:14–15, 46:22–23). To do this, Patent Owner argues that zero-valent iron

must be “converted to ferrous iron,” making it “no longer [zero-valent iron],” and causing “any reduction of concentrations of the dissolved chlorinated solvents in the groundwater [not to be] based on the chemical reactions with a surface of the zero valent metal, as required by claim 1.” *Id.*

This argument assumes that all zero-valent iron supplied in Orolin is converted to ferrous iron. As discussed above, if Orolin required all of its iron derivative to be dissociated to the level of individual atoms or molecules, the complete conversion of all zero-valent iron to ferrous iron might be a good assumption, but the evidence of record here demonstrates that Orolin does not impose such a requirement. Accordingly, there is no reason to interpret Orolin as requiring either all zero-valent iron or all ferrous iron, but never some amount of both. In fact, Orolin expressly teaches just the opposite, disclosing a mixture in which both soluble iron derivatives and zero-valent iron are used. Ex. 1005, 15:35–62. Thus, we are not persuaded that we abused our discretion by interpreting Orolin as permitting iron to serve both as a bacterial nutrient and as an abiotic reductant.

d. Conclusion

None of Patent Owner’s arguments persuade us that we abused our discretion through our consideration of Patent Owner’s original argument that Orolin teaches a relatively narrow range of iron concentrations, that a person of ordinary skill in the art would have chosen an iron concentration within that narrow range, and that iron concentrations within that range would not be high enough to reduce chlorinated solvent concentrations abiotically.

4. *Petitioner's Calculation of Zero-Valent Iron Concentration in Field Demonstration*

In briefing this case, Petitioner discussed a calculation by Dr. Wilson of the concentration of zero-valent iron in a field demonstration that was included in the prosecution history of the '709 patent. Reply 12–13; Ex. 1037 ¶¶ 42–43. Petitioner argued that, pursuant to this calculation, the concentration of zero-valent iron in the field demonstration overlapped with the range of concentrations taught by Orolin. Reply 12–13. Patent Owner argues that Dr. Wilson admitted during his deposition that this calculation was flawed. Req. Reh'g 10–11 (citing Ex. 2025, 167:1–13, 167:17–168:22). Patent Owner does not, however, identify where in the record this argument previously appeared, so Patent Owner does not satisfy the requirements for raising this argument in its Request for Rehearing. *Id.* Moreover, no part of our Final Written Decision rests on the referenced calculation by Dr. Wilson or on Petitioner's argument stemming from that calculation. Accordingly, we are not persuaded that we abused our discretion with respect to this issue.

5. *Conclusion*

For the reasons discussed above, none of Patent Owner's arguments persuades us that we abused our discretion by overlooking or misapprehending any evidence or argument by determining that Orolin's zero-valent iron inherently would abiotically reduce the concentration of dissolved chlorinated solvents in groundwater.

C. Alleged Error by Overlooking or Misapprehending Evidence or by Misapprehending the Law When Determining that the Combination of Orolin, Vance, and Liskowitz Would Have Suggested How to Select an Appropriate Amount of Iron to Perform both Biological and Abiotic Remediation

Finally, Patent Owner argues that we erred in several respects when determining that the combination of Orolin, Vance, and Liskowitz would have suggested to a person of ordinary skill in the art how to select the appropriate amount of zero-valent iron to perform both biological remediation and abiotic remediation. Req. Reh’g 11–14. We consider Patent Owner’s argument with respect to each of these errors below.

1. Failure of Orolin’s Method Alone

In our Final Written Decision, we noted that Orolin and Liskowitz each expressly disclose, and Vance suggests, that a person of ordinary skill in the art would have known how to adjust iron concentrations to account for site conditions. Dec. 15–16. In light of these facts, we found that “a person of ordinary skill in the art would know how to determine the proper iron concentration to permit both [abiotic reduction and bioremediation] processes to proceed.” *Id.* at 16–17. Patent Owner argues that we abused our discretion by determining that a person of ordinary skill in the art would have combined the teachings of Orolin with those of Vance and Liskowitz to arrive at an iron concentration outside the range taught by Orolin, because there was insufficient evidence to show that “the bioremediation results of Orolin are not being met by [Orolin’s disclosed iron concentration range].” Req. Reh’g 11–12.

We are not persuaded by this argument that we abused our discretion. First, Patent Owner does not identify where this argument previously

appeared. *Id.* In fact, Patent Owner has never previously challenged Petitioner’s argument with respect to the reason to combine the teachings of Orolin, Vance, and Liskowitz. Dec. 17; PO Resp. 46. More important, however, Patent Owner’s argument misstates the law of obviousness. To show that a person of ordinary skill in the art would have had reason to combine the teachings of Orolin, Vance, and Liskowitz, Petitioner was not required to demonstrate that Orolin alone would fail to achieve its purpose. Instead, Petitioner was required only to show “some articulated reasoning with some rational underpinning” to combine the known elements in the manner required in the claim at issue. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). As discussed in the Final Written Decision, Petitioner did so here. Dec. 17. Accordingly, we are not persuaded that we abused our discretion by failing to note the lack of evidence that Orolin alone would fail to achieve its purpose.

2. *Orolin’s Disclosed Range of Iron Concentrations*

Next, Patent Owner argues that, even if a person of ordinary skill in the art had combined the teachings of Orolin, Vance, and Liskowitz to arrive at a method in which they might adjust the concentration of Orolin’s iron derivative to account for site conditions, they would only have adjusted that concentration within the 30–100 ppm range taught by Orolin. Req. Reh’g 12–13. Patent Owner argues that we abused our discretion by finding otherwise. *Id.* As noted above, an argument may be raised in a rehearing request only if the party raising it identifies where it was previously raised. 37 C.F.R. § 42.71(d). Here, Patent Owner fails to identify any place in the record that it previously raised this argument. Req. Reh’g 12–13. Accordingly, we do not consider this argument.

3. Reason to Combine Abiotic Reduction and Bioremediation

Finally, Patent Owner argues that we abused our discretion by overlooking evidence that, when the application leading to the '709 patent was filed, “abiotic and biotic remediations were considered [to be] separate pathways, and that . . . different remediation processes were not combined because, for example, it was believed that the change in pH caused by abiotic reduction would affect the growth of the bacteria in biotic reduction.” Req. Reh’g 14 (citing PO Resp. 18–21; Ex. 2002 ¶¶ 60–73). Patent Owner previously raised this argument as a reason a person of ordinary skill in the art would not have used both abiotic and biotic processes at the same time. PO Resp. 18–21 (citing Ex. 1003, 134–35, 204–10, 212–24; Ex. 2002 ¶ 70; Ex. 2003, 42:6–18, 46:21–23, 93:21–95:3, 98:10–102:6, 112:14–113:2, 113:21–114:2, 123:15–124:6, 128:4–130:19, 209:5–20, 212:1–213:15). We are not persuaded by this argument that we abused our discretion.

First, we note that, of the fourteen paragraphs of Dr. Haselow’s declaration cited in the Request for Rehearing, only a single paragraph was cited in the portion of the Response to which Patent Owner directs us.

Compare Req. Reh’g 14 (citing Ex. 2002 ¶¶ 60–73), *with* PO Resp. 18–21 (citing Ex. 2002 ¶ 70). Because Patent Owner does not identify where it previously directed us to the remaining thirteen paragraphs, we do not consider them. 37 C.F.R. § 42.71(d).

Second, much of the evidence Patent Owner actually did cite in the Response does not support Patent Owner’s arguments. For example, Patent Owner argued that Dr. Wilson had testified that people in the industry held a “prevailing view” based on an “improper extrapolation” and that he believed they continued to hold this view “until the market potential of using both

biotic and abiotic processes together was realized,” which he believed happened “when sales were at least \$1 million dollars [sic].” PO Resp. 19 (citing Ex. 2003, 93:21–95:3). The cited portion of Dr. Wilson’s deposition transcript, however, contains no mention whatsoever of any timeframe when the “improper extrapolation” ceased to be the “prevailing view,” let alone the detail that that timeframe ended once sales exceeded one million dollars. Ex. 2003, 93:21–95:3.

Similarly, Patent Owner argued that Dr. Wilson testified that a person of ordinary skill in the art “would not have a clear understanding of how the ‘709 Patent works” even today, let alone on the filing date of the ’709 patent. PO Resp. 21 (citing Ex. 2003, 212:1–213:15). The cited testimony, however, is more equivocal. Dr. Wilson actually testifies that, although a person of ordinary skill in the art “would not necessarily know how [the invention of the ’709 patent] works” today, even “decades before the filing of the ’709 [patent],” “[t]hey would know that you could combine the elements of the [’709] patent and have a reasonable prospect of expecting it to work.” Ex. 2003, 212:19–213:6, 213:11–15. Moreover, even the testimony regarding a person of ordinary skill in the art not knowing how the invention worked was equivocal when considered in context, as Dr. Wilson testified that people do not “**fully understand[] at a mechanistic level** how the ‘709 patent works,” not that there was a complete lack of any knowledge. *Id.* at 209:5–20 (emphases added).

In determining that a person of ordinary skill in the art would have had reason to combine the teachings of Orolin, Vance, and Liskowitz, Dec. 17, we did not overlook the evidence Patent Owner cited on pages 18–21 of its Response. Instead, we gave that evidence the weight it deserved,

given its equivocal support of (and, in some cases, complete lack of support for) Patent Owner’s position. Giving it that weight, we concluded that the preponderance of the evidence supported Petitioner’s assertion that a person of ordinary skill in the art would have had a reason to combine the teachings of these references. *Id.* (citing Ex. 1004 ¶ 305; Ex. 1006 ¶¶ 9–12, 122; Ex. 1008, 8:30–51). We are not persuaded that we abused our discretion by reaching this conclusion.

4. Conclusion

For the reasons discussed above, none of Patent Owner’s arguments persuades us that we abused our discretion by overlooking or misapprehending any law, evidence, or argument when determining that the combination of Orolin, Vance, and Liskowitz would have suggested to a person of ordinary skill in the art how to select the appropriate amount of zero-valent iron to perform both biological remediation and abiotic remediation.

CONCLUSION

For the foregoing reasons, Patent Owner has not demonstrated that we abused our discretion in “determining that independent claim 1 was obvious over a combination of Orolin, Liskowitz and Vance.” Req. Reh’g 1.

ORDER

It is hereby
ORDERED that the Request for Rehearing is denied.

PETITIONER:

Christopher H. Blaszkowski
Andrew J. Koopman
RATNERPRESTIA
cblaszkowski@ratnerprestia.com
akoopman@ratnerprestia.com

John P. Higgins
ADDITON, HIGGINS & PENDLETON, P.A.
jhiggins@ahpapatent.com

PATENT OWNER:

Douglas J. Ryder
Joseph M. Konieczny, Sr.
RYDER, MAZZEO & KONIECZNY LLC
dryder@rmkiplaw.com
jkonieczny@rmkiplaw.com

Bryan R. Lentz
BOCHETTO & LENTZ, PC
blentz@bochettoandlentz.com