

In the
United States Court of Appeals
For the Seventh Circuit

No. 01-1081

Dura Automotive Systems of Indiana, Inc.,
formerly known as Excel Corporation,

Plaintiff-Appellant,

v.

CTS Corporation,

Defendant-Appellee.

Appeal from the United States District Court
for the Northern District of Indiana, South Bend Division.
No. 93 C 119--Robert L. Miller, Jr., Judge.

Argued October 26, 2001--Decided April 4, 2002

Before Posner, Manion, and Diane P. Wood,
Circuit Judges.

Posner, Circuit Judge. In 1981 the Main Street Well Field, part of the water supply of the city of Elkhart, Indiana, was discovered to be contaminated by TCE and other volatile organic compounds that are used as industrial or household solvents. Twelve years later the EPA, having cleaned up the contamination, sued several entities under the Superfund statute (Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. sec.sec. 9601 et seq.), including Dura Automotive Systems (actually its predecessor, Excel, but that's a detail we can ignore), to recover the costs of the clean-up. Dura impleaded CTS Corporation, claiming that it was responsible for some of the pollution and should therefore be required to reimburse a share of Dura's clean-up expense. The EPA's claims were settled or otherwise resolved, leaving only Dura's third-party claim against CTS. At the behest of CTS and on the authority of *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 592-93 (1993), the district judge disqualified Dura's sole expert witness; and then, holding that the remaining evidence was insufficient to create a genuine issue of material fact, he

granted summary judgment for CTS.

The groundwater stream beneath CTS's plant, a plant that manufactures plastic by a process that employs volatile organic compounds, is 3,000 feet west of the Main Street Well Field and runs generally south rather than east. In contrast, Dura's plant, which also uses these chemicals, is across the street from the well field and it was Dura rather than CTS that was a defendant in the EPA's suit. But conceivably some of the groundwater beneath CTS's plastics plant had seeped into the well field back in the late 1970s or early 1980s, contributing to the pollution discovered in 1981. This could only be so, however, if CTS's plant was within the well field's "capture zone" (in other words, its catchment basin), the area within which groundwater, if present, could be expected to flow to the well field. The size of the capture zone would depend on such things as the porosity of the soil and--a factor particularly emphasized by the parties--the rate at which the well field pumps water. The more it pumps, the larger the capture zone, because the removal of groundwater beneath the field causes groundwater to be drawn in by gravity from other areas.

To use porosity, pumping, and other data that bear on the size of the capture zone to map the zone, hydrogeologists build mathematical models consisting of systems of equations that show changes in the boundaries of the zone as functions of changes in the causal variables, such as porosity. These models are used to predict the future size of capture zones but they can also be used to estimate the size of a capture zone in the past if the requisite historical data on the causal variables are available, here, for example, data on pumping rates in the late 1970s. The parties agree that without such a model Dura could not prove its case against CTS. A consulting firm retained by the EPA in the original suit had placed CTS's plant outside the well field's capture zone, and if this placement stood, CTS could not have been a source of the pollution of the Main Street Well Field and so Dura would have no right of reimbursement by CTS.

Dura designated as its one and only expert witness Nicholas Valkenburg, a

hydrogeologist who works for a consulting firm called Geraghty & Miller. At his deposition, however, Valkenburg admitted that he was not an expert in mathematical models of groundwater flow and that the modeling on which he relied for his conclusion that CTS's plastics plant was indeed within the well field's capture zone had been done by other employees of Geraghty & Miller, using two models, QuickFlow and SLAEM.

When CTS moved that Valkenburg be barred from testifying and that Dura's third-party claim be dismissed, Dura responded with affidavits from four employees or ex-employees of Geraghty & Miller who had worked on the Dura project. These professional groundwater-flow modelers attested that the models they had used, QuickFlow and SLAEM, were reliable and were appropriate for determining the well field's capture zone in the late 1970s. CTS moved to strike the affidavits under Fed. R. Civ. P. 37(c)(1) on the ground that Dura's disclosure of additional expert witnesses, required by Rule 26(a)(2), was untimely, since the deadline for filing expert reports had expired six months previously. The district judge granted the motion to strike, and holding that without the affidavits there was insufficient evidence of the reliability of the models, ruled that Valkenburg could not testify--and without Valkenburg's testimony, Dura had no case. So the judge granted summary judgment for CTS.

If the affidavits were properly struck, Valkenburg's testimony indeed lacked an adequate foundation. For while there is a smattering of other evidence about the models (for example, that they are widely used), it does not establish their appropriateness for mapping the well field's capture zone 20-odd years ago. Dura argues, however, that even if properly struck as untimely expert-witness reports, so that Dura would not be able to call the authors as expert witnesses at trial, the affidavits remained usable as evidence that the QuickFlow and SLAEM models were indeed suitable for the purpose to which Valkenburg sought to put them. This is true to the extent that the affidavits merely attest to facts or opinions on which Valkenburg would be permitted to rely, such facts as that SLAEM had been

peer- reviewed. But to the extent that the affidavits contain evidence that would have to be presented at trial by an expert witness or witnesses other than Valkenburg in order for Dura to withstand a motion for judgment as a matter of law, Dura's failure to have made timely disclosure of their expert opinions invited application of Rule 37(c)(1) to bar the authors of the affidavits, or any other expert for that matter, from testifying along with Valkenburg. *NutraSweet Co. v. X-L Engineering Co.*, 227 F.3d 776, 785-86 (7th Cir. 2000); *Salgado by Salgado v. General Motors Corp.*, 150 F.3d 735, 741 n. 6 (7th Cir. 1998); *Lohnes v. Level 3 Communications, Inc.*, 272 F.3d 49, 60-61 (1st Cir. 2001).

We must decide whether the district judge was reasonable in regarding the affidavits as experts' reports that Dura had failed to disclose to CTS in a timely fashion rather than merely as attestations that show that Valkenburg was competent to report the results of the modeling exercises undertaken by other employees of the consulting firm. As the form in which we have stated the question makes clear, we must give the benefit of the doubt to the district judge. *General Electric Corp. v. Joiner*, 522 U.S. 136, 141-43 (1997); *NutraSweet Co. v. X-L Engineering Co.*, *supra*, 227 F.3d at 786; *Yeti by Molly, Ltd. v. Deckers Outdoor Corp.*, 259 F.3d 1101, 1106 (9th Cir. 2001).

An expert witness is permitted to use assistants in formulating his expert opinion, and normally they need not themselves testify. *United States v. Bramlet*, 820 F.2d 851, 855-56 (7th Cir. 1987); *United States v. Lawson*, 653 F.2d 299, 301-02 (7th Cir. 1981). The opposing party can depose them in order to make sure they performed their tasks competently; and the expert witness can be asked at his deposition whether he supervised them carefully and whether his relying on their assistance was standard practice in his field. If the requisite assurances are forthcoming, the assistants' work need not be introduced into evidence. Rule 703 of the Federal Rules of Evidence is explicit that "the facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the

hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence in order for the opinion or inference to be admitted."

Analysis becomes more complicated if the assistants aren't merely gofers or data gatherers but exercise professional judgment that is beyond the expert's ken. (They needn't, of course, be assistants. We use the term because that seems the best description of the relation of the four affiants to Valkenburg, but it would make no difference if they were independent experts.) Now it is common in technical fields for an expert to base an opinion in part on what a different expert believes on the basis of expert knowledge not possessed by the first expert; and it is apparent from the wording of Rule 703 that there is no general requirement that the other expert testify as well. The Committee Notes to the 1972 Proposed Rule 703 give the example of a physician who, though not an expert in radiology, relies for a diagnosis on an x-ray. We too do not "believe that the leader of a clinical medical team must be qualified as an expert in every individual discipline encompassed by the team in order to testify as to the team's conclusions." *Walker v. Soo Line R.R.*, 208 F.3d 581, 589 (7th Cir. 2000); see also *United States v. Smith*, 869 F.2d 348, 355 (7th Cir. 1989); *Ferrara & DiMercurio v. St. Paul Mercury Ins. Co.*, 240 F.3d 1, 8-9 (1st Cir. 2001). But suppose the soundness of the underlying expert judgment is in issue. Suppose a thoracic surgeon gave expert evidence in a medical malpractice case that the plaintiff's decedent had died because the defendant, a radiologist, had negligently failed to diagnose the decedent's lung cancer until it was too advanced for surgery. The surgeon would be competent to testify that the cancer was too advanced for surgery, but in offering the additional and critical judgment that the radiologist should have discovered the cancer sooner he would be, at best, just parroting the opinion of an expert in radiology competent to testify that the defendant had x-rayed the decedent carelessly. The case would be governed by our decision in *In re James Wilson Associates*, 965 F.2d 160, 172-73 (7th

Cir. 1992), where the issue was the state of repair of a building and "the expert who had evaluated that state--the consulting engineer--was the one who should have testified. The architect [the expert who did testify] could use what the engineer told him to offer an opinion within the architect's domain of expertise, but he could not testify for the purpose of vouching for the truth of what the engineer had told him--of becoming in short the engineer's spokesman." See also *TK-7 Corp. v. Estate of Barbouti*, 993 F.2d 722, 732 (10th Cir. 1993). It is the same here. Valkenburg could have testified that the well field was contaminated by volatile organic compounds and that if CTS's plastics plant was within the well field's capture zone some of the contamination may have come from that plant. It does not follow that he could testify that the plant was within the well field's capture zone.

The Daubert test must be applied with due regard for the specialization of modern science. A scientist, however well credentialed he may be, is not permitted to be the mouthpiece of a scientist in a different specialty. That would not be responsible science. A theoretical economist, however able, would not be allowed to testify to the findings of an econometric study conducted by another economist if he lacked expertise in econometrics and the study raised questions that only an econometrician could answer. If it were apparent that the study was not cut and dried, the author would have to testify; he could not hide behind the theoretician.

We must decide whether the district judge was reasonable in concluding that this was such a case. The answer lies in the four affidavits of the Geraghty & Miller employees who did the modeling that mapped the capture zone. The affidavits are much alike, and we can confine attention to those of James Rumbaugh, who developed the QuickFlow model, and of Eric Evans, a current employee of Geraghty & Miller. Rumbaugh's affidavit confirms that QuickFlow is a system of equations for mapping a capture zone from data causally related to the size of the zone. It acknowledges that modeling groundwater flow (the capture zone being, remember, the area from which the groundwater that polluted a given

site could have flowed) "is inherently not the most precise of scientific tools" because "one never possesses complete geotechnical information." (So this is not like taking an x-ray.) As a result, "the process of constructing a valid and useful groundwater model is an iterative process that requires the exercise of sound technical judgment in evaluating all available geotechnical data to determine what input values should be used with respect to each parameter utilized in the model." (In other words, professional discretion--expertise--is involved.) Rumbaugh goes on to say that in his experience "most hydrogeologists are not experts in modeling"--and we know that Valkenburg is not; and groundwater modeling is not the sort of thing that a lab technician or other subprofessional does. Rumbaugh therefore "generally work[s] with other hydrogeologists [such as Valkenburg] to provide modeling results upon which they can rely." Rumbaugh states that he is familiar with SLAEM and while it is not as sophisticated as some groundwater models, it is "entirely adequate and appropriate" for answering the sort of question posed by the present case. That of course is an expert opinion. It is also his expert judgment (not Valkenburg's) that "it was reasonable and appropriate to use QuickFlow" in the case. He calibrated the QuickFlow model, that is, compared the results it generated with observable results for the current period (obviously, the accuracy of its map of the capture zone in the late 1970s cannot be observed). He attests that the kind of calibration he did, though visual rather than quantitative, is "an accepted practice in the modeling community."

Evans's affidavit adds that it is his "opinion today that the hydrogeologic data set available to Geraghty & Miller was adequate for the development of a groundwater system model that would provide reliable information regarding the area encompassed by the Well Field capture zone under certain conditions" and specifically that SLAEM "is a valid tool for determining the extent of the Well Field 'capture zone' at various times in the past," reflecting "reasonable technical judgments" by himself, the other affiants, and Valkenburg. He explains why SLAEM didn't have to be recalibrated and attests that

"the use of groundwater models to simulate historic conditions ('backward-modeling') is a valid and a commonly applied approach" and that "an inherent assumption" of SLAEM, namely "that groundwater flow is two-dimensional," is "valid within the area surrounding the [Main Street] Well Field." Obviously, these are expert opinions, not recitations of cut-and-dried procedures.

It is apparent from these affidavits that Valkenburg's assistants did not merely collect data for him to massage or apply concededly appropriate techniques in a concededly appropriate manner, or otherwise perform routine procedures, and that he himself lacks the necessary expertise to determine whether the techniques were appropriately chosen and applied. Remember that there were two crucial issues--the map of the capture zone and whether, if CTS's plant was within it, how much if any of the contamination of the well field was due to the groundwater running beneath that plant. Valkenburg was not competent to opine on the first issue, and without an expert opinion on that issue Dura could not get to the second and so could not prevail.

We are not hydrogeologists, but we can imagine that the assertion that visual calibration is an adequate substitute for exact measurement, or that groundwater flow is "two dimensional" rather than three dimensional, would be controversial in the relevant community of experts. More important than these conjectures is Rumbaugh's reference to the construction of a groundwater-flow model as an "iterative process," a fancy way of describing tinkering with the original model until it yields satisfactory results. There is nothing wrong with such tinkering. But we must be realistic about expert evidence: Geraghty & Miller was hired to provide evidence favorable to Dura; so any margin of discretion in the construction of the groundwater-flow model could be expected to be exploited to Dura's benefit. That discretion was exercised not by Valkenburg but by Rumbaugh and the other affiants, for it was they who constructed the model, and the "iterative process" by which they did so is beyond the scope of Valkenburg's expertise. The quotations that we gave from their affidavits show the breadth of the expert discretion that

they exercised. Without their testimony explaining and justifying the discretionary choices that they made, his testimony would have rested on air.

Had Dura merely wanted to use SLAEM and QuickFlow to determine the current capture zone of the Elkhart well field, we might well have a different case; such use might be quite routine. Dura wanted to use these models to determine the capture zone twenty years ago. The affidavits make clear that adapting the models to that use required a host of discretionary expert judgments for the affiants, not Valkenburg, to make.

Dura argues that it could not have foreseen that the judge would find Valkenburg unqualified to give expert testimony in this case and therefore it should have been forgiven the untimely filing of additional experts' reports. Rule 37(c)(1) states that expert testimony may not be presented at trial if the expert's report was not disclosed to the other side within the deadline unless the party was justified in missing the deadline or the untimeliness of the disclosure was harmless. As some cases fail to note, however, see *Miksis v. Howard*, 106 F.3d 754, 760 (7th Cir. 1997); *Mid-America Tablewares, Inc. v. Mogi Trading Co.*, 100 F.3d 1353, 1363 (7th Cir. 1996); *Wilson v. Bradlees of New England, Inc.*, 250 F.3d 10, 20-21 (1st Cir. 2001), the rule goes on to authorize the judge, "in lieu of this sanction . . . [to] impose other appropriate sanctions," and this authorization implies, as *United States v. Johnson*, 228 F.3d 920, 926 (8th Cir. 2000), rightly holds, that a judge's failure to impose a lighter sanction might be an abuse of discretion even if the party could not show that missing the deadline was justified or harmless. Cf. *Sherrod v. Lingle*, 223 F.3d 605, 612-13 (7th Cir. 2000). But this is not such a case. Not only was there no justification for not disclosing to CTS the opinions of the other experts--for Dura should have known that Valkenburg's expertise did not extend to scientific issues at once crucial to the *prima facie* case and likely to be contested. In addition, the suit was in its seventh year when the judge acted; to have reopened discovery to give CTS its crack at the additional experts would have extended the

litigation, and burdened CTS, unreasonably. Dura is a substantial firm rather than a hapless individual. Its reticence about disclosing the other experts may have been strategic. At all events, in the circumstances the district judge could refuse to exercise lenity without being thought to have acted unreasonably.

Affirmed.

DIANE P. WOOD, Circuit Judge, dissenting. This case is about whether CTS must help Excel pay for some of the costs of cleaning up the Main Street Well Field. (I prefer to use the name "Excel" for the plaintiff, following the practice of the district court and both parties; this is the same company that the majority calls "Dura.") As the majority opinion explains, that ultimate question turns largely on a highly technical determination about the size of the Field's capture zone in the late 1970's and early 1980's. Hydrogeologists working for the Environmental Protection Agency (EPA) decided, based on their computer models and analysis, that CTS's main factory and plastics plant (the most polluted properties in the entire area) lay outside the crucial capture zone, and thus that CTS need not contribute to the cleanup costs. Excel's expert, Nicholas Valkenburg, challenges that interpretation of the data. His own research places much of the CTS property within the capture zone and identifies CTS as a major source of the Field's pollution.

A number of factors account for the difference between the EPA's and Valkenburg's conclusions about the shape and size of the capture zone. First, based on records from the Elkhart water works office, Valkenburg instructed his computer modelers, who inputted the data used to draw the capture zone and then calibrated the models, to increase the assumed Field pumping rate to 6 million gallons per day (MGD) from the 5 MGD figure that the EPA used. Second, Valkenburg consulted pond level readings made by the U.S. Geological Survey and his own employees over a two-decade span and lowered the pond recharge rate from 5 MGD to 4 MGD. Third, Valkenburg adjusted

the hydraulic conductivity rates used in the model. The USGS had determined that in different parts of the Field the conductivity rate ranged from 80 to 400 feet per day, but for estimation purposes the EPA used a rate of 200 feet per day for the entire model. Valkenburg asked his modelers to divide the region into zones based on available data to construct a more sophisticated model.

It is clear from reading CTS's brief that its principal objection to Valkenburg's research was to these adjustments--or, as CTS says more pejoratively, to his manipulation of these variables based on what CTS considers to be inadequate scientific foundation. Much of CTS's four-day deposition of Valkenburg was devoted to the technical basis for his adjustments and estimates. Had a trier of fact in this case listened to both Valkenburg and the CTS experts and then determined that the data utilized by CTS more accurately represented the characteristics of the Field circa 1980, I would probably have little quarrel with such a finding. But we are not faced with such a challenge today. Indeed, we are not even evaluating Valkenburg's decision to adjust the three variables I have mentioned. Instead, the district court's ruling and the majority's opinion focus on a fourth difference between the EPA and Valkenburg studies: the computer program used by the computer modelers to represent the capture zone. The EPA used two computer programs called GWPATH and FEMSEEP, which apparently were not available to the general public. CTS argues that is best to rely on a "three-dimensional" modeling program called MODFLOW, while Excel used the "two-dimensional" programs QuickFlow and SLAEM. Both the district court and the majority believe that Excel's evidence is fatally flawed because Valkenburg, who while an expert in hydrogeology knows little about the technical aspects of hydrogeological computer modeling, played almost no role in selecting QuickFlow and SLAEM instead of MODFLOW or some other program. Instead, he left that task to four computer modelers employed by Geraghty & Miller. This specific decision is what then prompted the inquiry in this case and the district court's ruling that Excel had failed to comply with the dictates of Daubert v. Merrell Dow

Pharm., Inc., 509 U.S. 579 (1993).

Since Daubert was decided, the Supreme Court has addressed its scope on a number of occasions. It confirmed in *General Electric Co. v. Joiner*, 522 U.S. 136, 141 (1997), that the abuse of discretion standard applies to appellate review of decisions applying the Daubert framework. In *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 147 (1999), it held that the Daubert approach applies to all expert testimony, not simply to scientific evidence. And recently, in *Weisgram v. Marley Co.*, 528 U.S. 440, 457 (2000), the Court held that a court of appeals has the authority to direct entry of judgment as a matter of law if it concludes that Daubert requires the exclusion of proffered expert evidence and the remaining evidence is insufficient to support a verdict. Moreover, Daubert's approach has been codified in the Federal Rules of Evidence, in the form of the revised version of Rule 702 that took effect on December 1, 2000. The net result of all of this is a now well-recognized approach. First, we ensure that the district court took all of the steps that a correct application of the Daubert framework (or, where it applies, amended Rule 702) requires. That is a legal inquiry, for which de novo review is proper. See, e.g., *United States v. Hall*, 93 F.3d 1337, 1341-42 (7th Cir. 1996). Beyond that, *Joiner* makes clear that our review of particular applications of Daubert is under the deferential abuse of discretion standard. *Dhillon v. Crown Controls Corp.*, 269 F.3d 865, 869 (7th Cir. 2001).

It is useful at this point to review what ought to happen under the Daubert framework, because in my opinion the flaw in both the trial judge and the majority's analysis comes from a failure to follow this framework. A trial judge faced with proffered expert testimony must initially determine whether the proposed expert would be testifying about scientific (or other expert) knowledge that would assist the trier of fact. Here, the proffered testimony is easily characterized as scientific, so I will limit my discussion to that area. Determining whether evidence is scientific "entails a preliminary assessment of whether the reasoning or methodology underlying the testimony is

scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue." 509 U.S. at 592-93. To make this assessment, the court must investigate questions such as whether the expert's methodology can be and has been tested, whether it has been subject to peer review or publication, what is its known or potential rate of error, and how generally accepted it is in the relevant scientific community. *Id.* at 593-94.

The majority has jettisoned this established framework in its acceptance of CTS's criticisms of the computer programs Valkenburg used. Under the framework, CTS should have challenged these programs through the use of its own experts. Presumably the CTS experts would have argued that QuickFlow and SLAEM are unreliable for backwards modeling (that is, predicting past conditions instead of projecting future conditions) or that a hydrogeologist would not reasonably rely on the results yielded from such a model. In response, Excel, as the party supporting Valkenburg's methodology, would have been able to introduce additional expert testimony or written materials, since hearsay is admissible at a Daubert hearing and the rules of evidence do not apply. *Daubert*, 509 U.S. at 593 n.10.

No such Daubert hearing occurred in this case. CTS has offered no testimony from any experts even to hint that QuickFlow and SLAEM are scientifically questionable. In contrast, as I discuss below, Excel offered considerable support for the proposition that they are widely accepted in the relevant expert community for substantive (that is, non-litigation) work. Moreover, the district court never convened a hearing on the issue; instead, it simply struck the supporting affidavits proffered by the computer modelers themselves. At this point, the majority criticizes Excel for not naming the modelers earlier, but it is not at all obvious that this should have been done. No one else had delved that deeply into the background programs and materials from which the hydrogeologists were forming their opinions; to the contrary, both the EPA and the other principal defendant also disclosed only a single expert hydrogeologist as a witness. While it is possible that these

individuals are expert computer modelers, that seems unlikely.

I am deeply concerned that the majority's approach will have the effect of transforming--in a manner un contemplated by and unauthorized by Rule 702--the way in which litigants approach the use of expert witnesses in all kinds of cases. All experts, and all people for that matter, rely on the expertise of others. Cautious parties will feel compelled to engage in something like an infinite regression of the naming of experts. Expert 1 may have relied on something prepared using the expertise of Expert 2, who in turn relied on the expertise of Expert 3, and on out until we reach Expert N. There is no reason to assume that Experts 2, 3, and others are "hiding behind" Expert 1, if the information they produce is commonly relied upon by people in the field of Expert 1. Indeed, Rule 702 permits exactly this kind of reliance, as I explain later. Thus, it makes no difference to my analysis whether we consider the computer modelers to be "mere" technicians or experts in their own right. The critical question is instead whether CTS ever introduced any evidence tending to show that a hydrogeologist would not commonly rely on their choice of a computer model.

Recall that here Valkenburg ordered his modelers to increase the pumping rate used in the models based on a review of the Elkhart city water records. CTS also argued below that this evidence was suspect because Valkenburg himself did not inspect the water records, leaving that chore to his assistants, and because Valkenburg testified that he did not know how Elkhart's water records were kept. While the majority might decide that these tasks lack discretion and do not require testimony at trial, another district court might take a different view of the matter. The radiologist, the computer modeler, the data collector, the Water Department recordkeeper, even the lab technician who selects a test tube that is not of the highest quality on the market all exercise some measure of discretion that could conceivably influence an expert's end product. And since the expert can never supplement an expert report in any way under the majority's approach, the only responsible

course would be to disclose all of these individuals as potential expert witnesses and have each submit a comprehensive Rule 26(b)(2)(B) expert report, fueling ever more time-consuming and expensive litigation.

Nothing in Daubert, any of the later Supreme Court decisions, or amended Rule 702 requires any such thing; the Daubert approach is designed only to ensure that an expert's methodology is reliable and accepted rather than quack science. But that one central question was never explored here, because as I have already mentioned the district court never conducted a Daubert hearing or heard a single CTS expert opine that Valkenburg had made unreliable assumptions or had utilized an unaccepted computer program in reaching his conclusions about the Field capture zone and the migration of chemicals from the CTS plastics plant. This was a failure of procedure, not a discretionary decision about the way to apply the Daubert factors in a particular situation. I thus regard it as the kind of thing this court should review de novo. *Cummins v. Lyle Indus.*, 93 F.3d 362, 367 (7th Cir. 1996). Because the district court and the majority's approach drastically modifies the Daubert analytical framework, I cannot accept its conclusions.

Turning briefly to the details of the Daubert analysis, let me suppose for a moment that we should disregard the affidavits of the four computer modelers who were prepared to testify about the general acceptance of the programs on which Valkenburg relied. Even without those affidavits, the only evidence in the record is that SLAEM is a generally accepted computer program in the modeling community. The program has been used by the lead environmental agencies of the United States, the Netherlands, and Minnesota. It has been published and has sold well in commercial markets. Valkenburg unequivocally testified that SLAEM is widely used by hydrogeologists outside the litigation context, a major indicator of reliability. Daubert, 509 U.S. at 593. (Most lawyers widely use computer research programs like LEXIS and WestLaw, and they would be competent to testify about their general acceptance, even if they do not know how the programs were written.) Valkenburg

also noted that his model can be validated and calibrated by visually comparing its projections to actual current water levels, which could help determine an error rate. Id. at 594.

While CTS baldly asserts that Valkenburg's methodology is unreliable and the majority "imagines" that hydrogeologists might find something controversial or suspect about visual calibration or two-dimensional modeling, CTS has presented no hydrogeologist or other scientist to attest to this fact. Indeed, the only information we have suggests exactly the opposite: Excel contends that CTS's own environmental consulting experts used visual calibration in constructing their models. Even under abuse of discretion review, when CTS has offered nothing to challenge any of the support offered by Excel, I see no possible way to hold that either SLAEM or QuickFlow are inherently unreliable or that an expert hydrogeologist would for some other reason not rely on them.

As a theoretical matter, I have no problem with the majority's proposition that a thoracic surgeon in a medical malpractice suit cannot testify that a radiologist was negligent for failing to diagnose lung cancer at an earlier time, or that a theoretical economist may not serve as a "mouthpiece" for an econometrician. But the real question is whether those analogies fit the situation of a hydrogeologist's reliance on a computer modeler's choice of a program. I think not. The dispute here is far more like the x-ray example from the Advisory Committee Notes to the 1972 Proposed Rules, which permits a physician to rely upon x-rays in formulating her diagnosis,¹ or, even more appropriately, like a case in which the opposing party objected to a physician's testimony on the ground that the radiologist who took the x-rays relied on an x-ray machine that was old, antiquated, or in some other way inadequate under modern day standards. The only objection ever voiced even by CTS's counsel (whose expertise in these matters is certainly unproven) is that QuickFlow and SLAEM are inferior two-dimensional programs that require visual calibration and therefore give inaccurate and scientifically unsound results.

Daubert and the Federal Rules of Evidence anticipate only a basic inquiry into whether an expert physician would reasonably rely on a radiologist to do her job and use adequate and up-to-date technology and whether an expert hydrogeologist such as Valkenburg would reasonably rely on his computer modelers to select an adequate and up-to-date computer model to crunch the data necessary for him to interpret his results. The record shows that he would.

This does not mean that if a physician really did rely on a radiologist who used an inferior x-ray machine the results could go unchallenged; it means only that such potential flaws go to the weight, not to the admissibility, of the evidence. The party's opponent would have an opportunity to introduce an expert radiologist in rebuttal under Rule 26(a)(2)(C) who could assert that, although a physician would normally have every right to rely on a radiologist's work, in this specific case that reliance was unjustified. But CTS has introduced no such expert here. The only evidence in the record is that an expert hydrogeologist would reasonably rely on computer modelers to select appropriate computer models and plug in the data the hydrogeologist provides to produce accurate capture zones.

In the end, even CTS's argument makes it clear that the dispute here is about Valkenburg's decisions as a hydrogeologist, not about the computer program he was using. As CTS repeatedly noted in its motion before the district court, Valkenburg acknowledged in his deposition that when he had earlier instructed his computer modelers to run QuickFlow and SLAEM using the same variables that CTS and the EPA had used, the CTS plants were not located within the capture zone. This indicates that the computer program used has little or nothing to do with the real dispute in this case: the correctness of Valkenburg's expert opinion that the pumping, pond recharge, and hydraulic connectivity rates were different than the EPA had thought. That dispute is all about the variables and data that Valkenburg, not the computer modelers, decided to use for the program. Assuming that Valkenburg used reliable and generally accepted methods in determining those variables (another issue never reached by

the district court) these questions should be resolved as a factual matter at trial. The fact that the selection of a computer program, whether a "two-dimensional" or "three-dimensional" model, seems largely irrelevant to the final analysis also likely explains why Excel considered it unnecessary to disclose any of its computer modelers as expert witnesses under Rule 26(a)(2)(A), as opposed to the majority's speculation about strategic motivations. CTS was well aware of the existence of each of Excel's four modelers since their work and computer models were turned over in response to discovery requests in August 1996. One of the modelers, Eric Evans, has even been deposed by CTS. It is quite hard to see what Excel could possibly have gained strategically through an attempt to hide them.

Finally, let us suppose that there is now some controversy regarding the use of QuickFlow and SLAEM for modeling in this case. Everyone agrees that Valkenburg cannot testify about the differences between these programs and others that might have been used because he is not an expert modeler, and so additional testimony is required to rebut this challenge. The district court found that because Excel had failed to disclose the four computer modelers earlier (as experts; at least two of the modelers were disclosed as fact witnesses), it was compelled to strike their testimony by Fed. R. Civ. P. 37(c)(1). Rule 37 is designed to prevent a party from springing new expert testimony on an opponent at the last minute. The remedy of striking testimony is admittedly a drastic one, and some circuits have found discretion to relax it, *Newman v. GHS Osteopathic, Inc.*, 60 F.3d 153, 156 (3d Cir. 1995); *Orjias v. Stevenson*, 31 F.3d 995, 1005 (10th Cir. 1994). We, however, have held that exclusion is automatic unless the sanctioned party proves that its violation was either justified or harmless. *NutraSweet Co. v. X-L Eng'g Co.*, 227 F.3d 776, 786 (7th Cir. 2000).

I believe the failure to disclose was both justified and harmless. First, since the changes in variables, rather than the specific modeling program used, appear to account for most if not all of the change in the size of the capture zone, Excel was justified in producing an expert who

could respond to these criticisms without worrying about the more technical aspects of its experts' work. Furthermore, the only harm cited by the majority opinion is the seven years that have elapsed since this case began. But that is a misleading time frame. The case was stayed for nearly three years while the United States and most of the other parties negotiated a settlement. Then the district court took over thirteen months to rule on the motion to strike. The case has been pending before this court for over a year. Thus, the case was in active discovery for just a little under two years, hardly a great span of time in a complicated environmental cleanup suit. The only other harm noted by the district court was that CTS might have to hire additional computer modelers to testify. Presumably, though, CTS must already have some modelers on hand who dispute the validity of QuickFlow and SLAEM, or else its attorneys could not credibly raise a challenge to Valkenburg's reliance on the programs. I therefore cannot conclude that CTS has been harmed. In summary, even if I am wrong about the need for the testimony of the computer modelers, I would find that their affidavits fit within the exception noted by NutraSweet, because Excel's failure to present them earlier was both justified and harmless to CTS.

No one should be under any illusions about the importance of the difference of opinion between the majority and myself. The majority thinks that every party who wishes to proffer expert testimony has an obligation under the discovery rules to name as an expert everyone whose expertise in any way affects the opinion of another expert: my example of Experts 1 through N above. In my opinion, Rule 702 expressly permits one expert to rely on the informed opinion of other experts. An opposing party who wishes to argue that the underlying expert's opinion is contestable, in the sense that both Daubert and amended Rule 702 use this idea, is entitled to produce evidence to that effect. That should occur during the Daubert/Rule 702 hearing. At that point, if the court agrees that it is confronted with a situation more like the theoretical economist and the econometrician than like the doctor and the x-ray technician, the court should afford the party proffering the evidence

the opportunity to name Expert 2. That system respects the fact that in our complex society, all experts rely in countless ways on the conclusions of other experts, and it structures the process for deciding which of those many experts must testify at a trial. The majority's rule does not; it proceeds from the unwarranted assumptions that experts are "hiding behind" the work of other experts, that there is no obligation on the resisting party to introduce so much as a scrap of evidence to challenge the secondary expert's work, and that parties must name everyone from the hydrogeologist to the weatherman from Day 1. Although many might have thought that litigation in areas like environmental disputes, antitrust, and intellectual property could not become more unwieldy and expensive than it already is, the majority has shown them to be wrong. Its rule will hamper governmental plaintiffs (like the EPA in this very case, which named only a hydrogeologist) just as much as private plaintiffs, and defendants just as much as any plaintiffs. Furthermore, its approach is inconsistent with amended Rule 702, with the "just, speedy, and inexpensive determination of every action" command of Fed. R. Civ. P. 1, and with a fair balance of obligations on both parties.

I would Reverse the district court's judgment, and I respectfully dissent.

FOOTNOTE

/1 The committee's comments are instructive. It said "the rule is designed to broaden the basis for expert opinions beyond that current in many jurisdictions and to bring the judicial practice into line with the practice of the experts themselves when not in court. Thus a physician in his own practice bases his diagnosis on information from numerous sources and of considerable variety, including statements by patients and relatives, reports and opinions from nurses, technicians and other doctors, hospital records, and X rays." Advisory Committee Notes to Proposed Rule 703. It is evident that some of the information that the Committee considered legitimate as a basis for the expert's testimony is itself the product of the expertise of others, such as the work of other doctors, or the evidence from x-rays. Yet this was not a reason to forbid the first expert from testifying. Those who wished to challenge the testimony were responsible for

impeaching the basis for it with their own counterexpertise.