

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF COLORADO  
Judge John L. Kane

Civil Action No. 90-cv-00181-JLK

MERILYN COOK, et al.,

Plaintiffs,

v.

ROCKWELL INTERNATIONAL CORPORATION AND THE DOW CHEMICAL  
COMPANY,

Defendants.

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**MEMORANDUM OPINION REGARDING *DAUBERT* MOTIONS  
AND MOTIONS IN LIMINE**

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Kane, J.

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## Introduction

This class action presents claims for trespass and nuisance against the former operators of the Rocky Flats Nuclear Weapons Plant (“Rocky Flats”) near Denver. The named Plaintiffs represent a class of individuals and businesses that owned property in a defined area (the “Class Area”) adjoining the plant site as of June 7, 1989.<sup>1</sup> Plaintiffs seek damages for the diminished value of Class members’ properties as a result of Defendants’ alleged trespass and nuisance.

In February 2005, I set the class claims for an eight to ten week jury trial commencing on October 3, 2005. *See* Order (Doc. 1325).<sup>2</sup> As part of the run-up to trial, I ordered the parties to file any motions challenging the admissibility of expert witness testimony (“*Daubert* motions”) and any other motions in limine no later than June 16, 2005. *See* Order on Scheduling and Jury Instruction Issues (Doc. 1338) at 1 (May 17, 2005)[hereinafter “May 2005 Order”]; Minute Order (Doc. 1340).

Defendants responded by filing nineteen motions seeking to exclude all testimony by Plaintiffs’ eleven designated expert witnesses and much of Plaintiffs’ anticipated lay evidence. Defs.’ Mot. to Exclude Expert Witness Test. Relating to Damages (Doc. 1371); Defs.’ Mot. to

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<sup>1</sup> Plaintiffs also assert medical monitoring claims in this action and were initially successful in certifying a separate class with respect to them. *See Cook v. Rockwell Int’l Corp. (Cook IV)*, 151 F.R.D. 378, 389 (D. Colo. 1993). The medical monitoring class was later decertified, *see Cook v. Rockwell Int’l Corp. (Cook VIII)*, 181 F.R.D. 473, 480 (D. Colo. 1998), and Plaintiffs’ individual medical monitoring claims have been severed for trial, Order (Doc. 1235) at 15. All references to trial in this memorandum opinion are to trial on the property class claims for trespass and nuisance.

<sup>2</sup> For additional information on the nature of this action and the challenges in bringing it to trial, see *Cook v. Rockwell International Corp. (Cook IX)*, 273 F. Supp. 2d 1175, 1178-79 (D. Colo. 2003), Order (Doc. 1235) at 1-4, 10-11 (May 28, 2004), and Memorandum and Order in Advance of February 28, 2001 Hearing (Doc. 1176) at 3-9.

Exclude Expert Witness Test. Relating to Defs.' Conduct (Doc. 1374); Defs.' Mot. to Exclude Expert Witness Test. Relating to Risk (Doc. 1376/1380); Defs.' Mots. in Limine Nos. 1-16 (Docs. 1354-69). Plaintiffs filed two, more limited motions seeking to exclude or limit the testimony of eleven of the eighteen or more expert witnesses designated by Defendants and to exclude certain lay evidence. *See* Pls.' Mot. to Exclude Test. of Certain Defense Expert Witnesses (Doc. 1350); Pls.' Omnibus Mot. in Limine (Doc. 1341). By the time briefing was completed on these motions, Plaintiffs had submitted nearly 300 pages of argument and Defendants had submitted more than 700 pages. Together, the parties provided approximately 5400 additional pages of exhibits to be considered in connection with their motions.

I heard oral argument on the parties' *Daubert* motions and motions in limine on July 28-29 and August 2-3, 2005. I offered the parties the opportunity to present live testimony at this hearing, but both declined. *See* Order (Doc. 1349); Jt. Statement re: Hr'g on *Daubert* Mots. and Mots. in Limine (Doc. 1403). Upon review of the parties' *Daubert* motions, I also determined that live testimony was not necessary for me to decide them.

After careful consideration of the parties' arguments, exhibits and authorities, I decided their respective motions in a series of pretrial bench rulings. Aug. 22, 2005 Tr. (Doc. 1430) at 3-9, 14-15 (ruling on Defendants' *Daubert* motions and Motions in Limine Nos. 1-12, 14-15); Sept. 13, 2005 Tr. (Doc. 1443) at 4-10 (ruling on all of Plaintiffs' motions except those seeking to exclude national security evidence and certain lay opinion testimony); Sept. 22, 2005 Tr. (Doc. 1459) at 4-10 (ruling on all remaining motions). I also granted Defendants leave to file an additional *Daubert* motion regarding one of Plaintiffs' expert witnesses, *see* Defs.' Mot. to

Exclude Test. of Dr. Steven Wing (Doc. 1444), and decided that motion before trial as well, *see* Order (Doc. 1483). In general, I denied Defendants' *Daubert* motions and granted in part and denied in part their motions in limine, and granted in part and denied in part Plaintiffs' *Daubert* motion and motion in limine. All of these rulings were reported in summary fashion so they could be provided to the parties as soon as possible and incorporated in their trial preparations.<sup>3</sup>

At the time of these summary rulings, I recognized my obligation under governing Tenth Circuit authority to make specific findings on the record sufficient for the appellate court to review my conclusions regarding the admissibility of the challenged expert witness testimony and to confirm that I had properly exercised my "gatekeeping" function with regard to this testimony. Aug. 22, 2005 Tr. at 4; Sept. 13, 2005 Tr. at 4; Sept. 22, 2005 Tr. at 4; *see Bitler v. A.O. Smith Corp.*, 400 F.3d 1227, 1232 (10<sup>th</sup> Cir. 2004); *Dodge v. Cotter Corp.*, 328 F.3d 1212, 1225 (10<sup>th</sup> Cir. 2003). In light of the number, length and complexity of the parties' *Daubert* motions, meeting this obligation required a written opinion reporting my findings and rationale. Given the nature of the parties' *Daubert* motions, however, as well as the need to complete the jury instructions and to deal with a plethora of additional pretrial motions and other matters,<sup>4</sup> it was not possible to prepare this written opinion before trial. Delaying the start of trial to allow the

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<sup>3</sup> I described these rulings as "preliminary" when they were issued to convey to the parties that the rulings would be reported with additional explanation in a written opinion and that they might be fine-tuned in minor ways in the process. *See* Aug. 22, 2005 Tr. at 4; Sept. 13, 2005 Tr. at 4; Sept. 22, 2005 Tr. at 4.

<sup>4</sup> It is my practice to instruct the jury at the beginning of trial and to provide jurors with copies of the instructions at this time so they are informed about the issues they are to decide when the parties present their evidence. If changes to the instructions are required by events during trial, these changes are made and communicated to the jury. *See generally* Mem. Op. re: Jury Instructions (Dec. 7, 2006).

opinion to be completed was not an option given the difficulty of scheduling a trial of this length and the long delays the parties had already suffered in this action. The parties were prepared to go to trial in this fifteen year old case, and any further delay would have imposed an undue hardship on them and their counsel.

Accordingly, my intent at the time I made my rulings was to transform the notes and preliminary drafts that I had relied on in rendering them into a comprehensive written decision meeting the Tenth Circuit's requirements during the course of what ultimately became a four and half month trial. This too proved impossible, however, as the parties filed approximately 300 additional substantive motions, written objections, proposed jury instructions and related legal memoranda during the trial that required my attention when I was not presiding in the courtroom.<sup>5</sup> *See* Order Limiting Mots. Practice During Trial (Doc. 1626) (describing trial motion practice). These filings presented well in excess of a thousand additional pages of legal argument and thousands of pages of supporting material regarding issues that in most instances had to be decided almost immediately in order for the trial to continue. This daily deluge of filings as well as matters raised during the parties' courtroom presentations consumed all of my and my staff's time during trial. This pace continued through the three weeks of jury deliberations, as every question from the jury prompted new disputes and argument by the parties.

I am issuing this written opinion today as one of four memorandum opinions setting out the rationale for my rulings on various motions and disputes that were decided before, during and

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<sup>5</sup> Defendants were responsible for approximately two-thirds of these filings, which included additional motions in limine to strike Plaintiffs' expert and lay testimony and written objections to most of the more than 600 exhibits offered by Plaintiffs.

after the class trial.<sup>6</sup> I opted to issue all of these opinions at one time rather than in seriatim as they were completed because some of them address related issues and because I wanted to ensure that the parties had all relevant opinions in hand before they filed any final motions in this case.

This opinion reports my findings and rationale for ruling as I did on the parties' pretrial evidentiary motions. It is based on the arguments and materials presented by the parties in connection with their June, 2005 motions. In some instances, such as when the parties cited evidence or authorities but did not provide adequate (or any) excerpts of these materials in their supporting exhibits, I made an effort to locate and retrieve the cited material from the pretrial case record or from public sources.<sup>7</sup> I did not, however, make a comprehensive search of the thousands of filings in this case or all potential sources to find materials that were cited but not adequately produced in connection with these motions.

Many of the parties' pretrial motions sought exclusion of broad categories of evidence, and my pretrial rulings were correspondingly broad. Some of these rulings were refined during trial to address discrete issues that emerged concerning specific testimony or items of evidence

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<sup>6</sup> In addition to this opinion, I have today issued two opinions setting out the basis for my rulings on jury instructions proposed by the parties before and during trial, *see* Mem. Op. re: Jury Instructions.; Mem. Op. re: Defs.' Theory of Plutonium Removal, and a third decision ruling on Defendants' most recent post-trial motion for mistrial, *see* Mem. Op. re: Defs.' Second Renewed and New Mot. for Mistrial.

<sup>7</sup> Defendants filed an earlier motion to strike Plaintiffs' expert witness testimony, Defs.' Mot. to Strike Pls.' Experts (Doc. 981) (Aug. 29, 1997), which I struck initially because it was premature, *see Cook v. Rockwell Int'l Corp. (Cook VIII)*, 181 F.R.D. 473, 487-88 (D. Colo. 1998), and later declined to reconsider because the extensive relevancy arguments advanced in it did not reflect my subsequent decisions defining the issues to be tried in the class trial, *see* Order (Doc. 1220) at 24 (Apr. 14, 2004). I did, however, consider some of the complete expert reports and affidavits produced in connection with this 1997 motion when the excerpted versions produced with the parties' June, 2005 motions were not adequate for my review.



falling within these categories. The analysis in this decision, however, is written from the broad, pretrial perspective and does not, with one exception noted in the text, include consideration of arguments, issues or rulings that occurred during trial. The analysis is written in the present tense because it reflects my thinking at the time I issued my pretrial rulings and reports the findings that would have accompanied these rulings if circumstances had permitted it.

This opinion begins with a statement of the standard I utilized in reviewing the parties' motions to exclude expert witness testimony. It next reports my analysis of first Defendants' expert witness motions and motions in limine and then Plaintiffs' motions. The decision concludes with a summary of the rulings on each of the parties' motions, as initially reported in my pretrial bench rulings.

#### **Standard for Review of Expert Witness Testimony**

My review of the parties' motions to exclude expert testimony is governed by Rule 702 of the Federal Rules of Evidence and *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993), and its progeny. In *Daubert*, the Supreme Court held that Rule 702 had replaced the former standard for admission of expert witness testimony with a "flexible" inquiry focused on determining whether the proffered expert testimony is both relevant and reliable. *Daubert*, 509 U.S. at 589, 594-95. The Court stated Rule 702 requires a trial judge faced with a proffer of scientific expert testimony to determine at the outset whether the testimony is admissible under this standard. *Id.* at 592. The Supreme Court clarified in its subsequent *Kumho Tire* decision that this "gatekeeping" obligation and Rule 702's relevance and reliability standard also applies to proffers of non-scientific expert testimony. *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 147 (1999).

In 2000, the Supreme Court approved amendments to Rule 702 to conform it to the principles of *Daubert* and its progeny. As amended, Rule 702 states the following requirements for admission of expert testimony: (1) the proffered expert testimony must “assist the trier of fact to understand the evidence or to determine a fact in issue;” (2) the witness must be “qualified as an expert by knowledge, skill, experience, training, or education;” and (3) the proffered testimony must be “based upon sufficient facts or data,” “the product of reliable principles and methods;” and the product of the reliable application of these principles and methods to the facts of the case. Fed. R. Evid. 702. Like the parties in this case, I will refer to these requirements in short-hand as “relevance” or “fit,” “qualifications” and “reliability.”

To fulfill the mandatory gatekeeper function declared by *Daubert* and Rule 702, I must conduct a two-part inquiry. In one part, I determine if the expert’s proffered testimony has “a reliable basis in the knowledge and experience of his [or her] discipline.” *Bitler*, 400 F.3d at 1232-33 (citing *Daubert*, 509 U.S. at 592). This requires that I conduct “a preliminary inquiry” into the expert’s qualifications and “whether the reasoning or methodology underlying the testimony” is reliable under the standards set by Rule 702. *Id.* at 1233. In the second part, I consider “whether the proposed testimony is sufficiently ‘relevant to the task at hand.’” *Id.* at 1234 (quoting *Daubert*, 509 U.S. at 597). As directed by the Tenth Circuit, I must also make “specific factual findings on the record that are sufficient for an appellate court to review” my conclusions on these points. *Id.* at 1232. Within this framework, I have “broad discretion . . . both in deciding how to assess an expert’s reliability, including what procedures to utilize in making that assessment, as well as in making the ultimate determination of reliability.” *Dodge*, 328 F.3d at 1223; see *Kumho Tire*, 526 U.S. at 141-42; *Bitler*, 400 F.3d at 1232.

A key but sometimes forgotten principle of Rule 702 and *Daubert* is that Rule 702, both before and after *Daubert*, was intended to relax traditional barriers to admission of expert opinion testimony. *See, e.g., Daubert*, 509 U.S. at 588. Accordingly, courts are in agreement that Rule 702 mandates a liberal standard for the admissibility of expert testimony. *See Daubert*, 509 U.S. at 588 (Rule 702 is part of “liberal thrust” of Federal Rules of Evidence); *see generally* 4 Jack B. Weinstein & Margaret A. Berger, *Weinstein’s Federal Evidence* § 702.02[1] (2d ed. 2005) (collecting cases). As the Advisory Committee to the 2000 amendments to Rule 702 noted with apparent approval, “[a] review of the caselaw after *Daubert* shows that the rejection of expert testimony is the exception rather than the rule.”

That being said, the proponent of an expert witness must demonstrate that the expert’s proffered testimony meets Rule 702’s requirements – relevance/fit, qualifications and reliability – before the expert’s testimony will be admitted. *See Ralston v. Smith & Nephew Richards, Inc.*, 275 F.3d 965, 970 n.4 (10th Cir. 2001); *Mitchell v. Gencorp Inc.*, 165 F.3d 778, 781-82 (10th Cir. 1999). Not surprisingly given the contentious nature of this case, the parties disagree on the showing that must be made to satisfy each of these requirements. Accordingly, I set out below the standard I employed in deciding the parties’ *Daubert* motions.

#### *Relevance/fit*

Rule 702 requires that the proffered expert testimony “assist the trier of fact to understand the evidence or to determine a fact in issue.” Fed. R. Evid. 702. The Supreme Court stated in *Daubert* that this requirement goes primarily to relevance, because “expert testimony that does not relate to any issue in the case is not relevant and, ergo, non-helpful.” 509 U.S. at 591. It is also well-settled that expert testimony explaining general principles is admissible, without

application of these principles to the facts of the case, if the explanation would assist the trier of fact and is found to be reliable. Fed. R. Evid. 702 2000 advisory committee's note.

Consistent with these authorities, the Tenth Circuit has set the standard for this Rule 702 requirement by reference to Federal Rule of Evidence 401, which defines relevant evidence as “evidence having any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence.” *Bitler*, 400 F.3d at 1234 (quoting Fed. R. Evid. 401). Scientifically valid and reliable expert testimony that is not relevant to an issue of consequence to the case does not “fit” because it will not assist the trier of fact. *See id.*; *Daubert*, 509 U.S. at 591.

The Tenth Circuit takes a liberal approach to the question of whether proffered expert testimony will assist the jury. “Doubts about whether an expert’s testimony will be useful should generally be resolved in favor of admissibility unless there are strong factors such as time or surprise favoring exclusions. The jury is intelligent enough to ignore what is unhelpful in its deliberations.” *Robinson v. Mo. Pac. R.R. Co.*, 16 F.3d 1083, 1090 (10th Cir. 1994) (quotation omitted); *see also Weinstein*, § 702.03[2][c] (concluding based on case review that trial judges should approach exclusion based on this Rule 702 requirement gingerly “and should admit the testimony if there is any chance at all it will be beneficial to the finder of fact.”).

In their *Daubert* motions, Defendants assign a much more restrictive meaning to the “assist the trier of fact” requirement. Relying on *Daubert*’s reference to “fit” as a short-hand for this requirement and language they incorrectly attribute to the Supreme Court, Defendants argue that the proffered testimony of virtually all of Plaintiffs’ experts does not “fit” this case because

the testimony is not sufficient to prove one or more of the elements of Plaintiffs' claims.<sup>8</sup> This is an incorrect statement of the relevance/fit standard for the reasons just stated, and because it confuses the threshold question of whether an expert's evidence is admissible with the separate question of whether it is sufficient to prove a particular point. *See In re Joint E. & S. Dists. Asbestos Litig.*, 52 F.3d 1124, 1132 (2<sup>nd</sup> Cir. 1995) (distinguishing between inquiry into admissibility of expert evidence and "a sufficiency inquiry, which asks whether the collective weight of a litigant's evidence is adequate to present a jury question."). Neither Rule 702 nor *Daubert* require that an expert's testimony prove an element of the offering party's case for it to be admissible. *See, e.g., Adams v. Ameritech Servs., Inc.*, 231 F.3d 414, 425 (7<sup>th</sup> Cir. 2000) ("First, the question before us is not whether the reports proffered by the plaintiffs prove the entire case; it is whether they were prepared in a reliable and statistically sound way, such that they contained relevant evidence that a trier of fact would have been entitled to consider."); *City of Tuscaloosa v. Harcros Chems., Inc.*, 158 F.3d 548, 564-65 (11<sup>th</sup> Cir. 1998) (expert's study and testimony "need not prove plaintiffs' case by themselves; they must merely constitute one piece of the puzzle that the plaintiffs endeavor to assemble before the jury."); *Ambrosini v. Labarraque*, 101 F.3d 129, 135 (D.C. Cir. 1996) ("fitness prong of the *Daubert* admissibility analysis primarily concerns relevance" and "not whether the testimony satisfies the plaintiffs' [burden of proof]").

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<sup>8</sup> Defendants asserted in their briefing that the Supreme Court declared in *Daubert* that in order for expert testimony to "fit" and thereby assist the trier of fact, it must "logically advance[] a material aspect of the proposing party's case." Defs.' Intro. and Overview to Mot. to Exclude Expert Witness Test. (Doc. 1378) at 3, 12. In fact, this language is not found in the Supreme Court's *Daubert* decision, but rather in the Ninth Circuit's *Daubert II* decision on remand from the Supreme Court. *See* 43 F.3d 1311, 1315 (9<sup>th</sup> Cir. 1994). Contrary to Defendants' suggestion, I also do not find that this statement supports a higher standard for "relevance" or "fit" than the Tenth Circuit standard described above.

Defendants' confusion of the distinct concepts of the admissibility of evidence and its sufficiency as a matter of proof is a recurring flaw in their arguments as will be demonstrated shortly.

### *Qualifications*

As part of the reliability inquiry under Rule 702, I must determine whether the witness is qualified to testify as an expert. The standard for this determination is whether the witness is an expert on the subject in question based on his knowledge, skill, experience, training or education. Fed. R. Evid. 702. The Tenth Circuit and other courts have held that this standard should be construed and applied liberally. *See, e.g., United States v. Gomez*, 67 F.3d 1515, 1526 (10<sup>th</sup> Cir. 1995); *Weinstein*, § 702.04[1][a] (summarizing cases).

The expert's proffered testimony must, of course, be within the scope of his established expertise. Expertise in a specialized area directly related to the issue in question is generally not required, however, as long the expert "stays within the reasonable confines of his subject area." *Ralston*, 275 F.3d at 970 (internal quotation omitted); *Wheeler v. John Deere Co.*, 935 F.2d 1090, 1100 (10<sup>th</sup> Cir. 1991); *see generally Weinstein*, § 702.04[1][a]. In general "a lack of specialization does not affect the admissibility of [the expert] opinion, but only its weight." *Ralston*, 275 F.3d at 970 (internal quotation omitted); *Wheeler*, 935 F.2d at 1100.

### *Reliable methodology*

Expert testimony must be based on a reliable methodology to be admissible. *See, e.g., Bitler*, 400 F.3d at 1232. This does not mean, however, that the offering party must prove "that the expert is indisputably correct" for the expert evidence to be admissible. *Id.* at 1233 (quoting *Mitchell*, 165 F.3d at 781). Rather, the party need only prove that "the method employed by the expert in reaching the conclusion is scientifically sound and that the opinion is based on facts

which sufficiently satisfy Rule 702's reliability requirements.” *Id.* at 1233. “The evidentiary requirement of reliability is lower than the merits standard of correctness,” *In re Paoli R.R. Yard PCB Litig.*, 35 F.3d 717, 744 (3d Cir. 1994) (quoted with approval in Fed. R. Evid. 702 2000 advisory committee’s note), and gaps or inconsistencies in an expert’s reasoning may go to the weight of the expert evidence, not its admissibility, *see, e.g., Campbell v. Metro. Prop. & Cas. Ins. Co.*, 239 F.3d 179, 186 (2<sup>nd</sup> Cir. 2001). As the Supreme Court acknowledged in *Daubert*, expert evidence can be “shaky” and yet still admissible, and may be attacked through the traditional means of “[v]igorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof.” *Daubert*, 509 U.S. at 596. Maintaining this distinction between the evidentiary requirement of reliability and the higher standard of whether the expert’s conclusions are correct or sufficient to prove the merits “is indeed significant as it preserves the fact finding role of the jury.” *In re TMI Litig.*, 193 F.3d 613, 665 n.90 (3<sup>rd</sup> Cir. 1999).

Accordingly, my task in considering the reliability of each of the challenged expert’s methodology is to ensure that the “expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field.” *Kumho Tire*, 526 U.S. at 152. If this test is met and the expert’s testimony is otherwise admissible, it is up to the jury to decide whether the expert used the best or most reliable methodology, what weight to accord to his testimony and which of competing experts’ opinions should be credited. The ultimate determination of whether expert testimony is correct and “reliable” in this sense remains with the jury.

The nature of my reliability review under Rule 702 is further informed by the Rule's statement of the three areas of inquiry for determining whether an expert's methodology is sufficiently reliable for his testimony to be admitted. The first of these is whether the testimony is based on sufficient facts or data. *See* Fed. R. Evid. 702(1). This is a quantitative rather than a qualitative standard, *i.e.*, the question is whether the expert considered *enough* information to make the proffered opinion reliable. Fed. R. Evid. 702 2000 advisory committee's note. That the expert relied on disputed facts in reaching his opinion does not render the expert's opinion unreliable under this test. *Id.*

The second area of inquiry is whether the expert used reliable principles and methodologies in reaching his opinion. Fed. R. Evid. 702(2). In *Daubert*, the Supreme Court noted a number of factors that could be relevant to deciding the reliability of a scientific method or principle, including whether the method can be tested in some objective sense, its known or potential rate of error, any peer review or publication, and its general acceptance in the scientific community. 509 U.S. at 593-94; *see* Fed. R. Evid. 702 2000 advisory committee's note (summarizing *Daubert* factors). Even though the Supreme Court took pains to describe this list as non-exclusive and non-dispositive, and the inquiry in general as flexible and fact-driven, *see* 509 U.S. at 593-94, some courts, commentators and counsel have seized on these "*Daubert* factors" as a checklist for making the reliability determination. *Kumho Tire* and other authority have since clarified that this is not the case and that, depending on the circumstances presented, the *Daubert* factors and/or any number of other factors may be relevant to determining the reliability of the methodology used to produce a particular expert opinion. *See, e.g., Kumho Tire,*



526 U.S. at 150; *Bitler*, 400 F.3d at 1233; Fed. R. Evid. 702 2000 advisory committee's note (summarizing cases).

The third component of the reliability inquiry assumes the witness used reliable principles and methods in forming his opinions, and focuses instead on whether the witness applied these principles and methods reliably to the facts of the case. Fed. R. Evid. 702(3). This by necessity is a fact-specific inquiry.

Finally, in considering the parties' *Daubert* motions, I have kept in mind the Supreme Court's admonition in *Daubert* that Rule 702 is not designed to promote an "exhaustive search for cosmic understanding," but rather provides a means "for the particularized resolution of legal disputes." 509 U.S. at 597. As a result, "it is the specific relation between an expert's method, the proffered conclusions, and the particular factual circumstances of the dispute, and not asymptotic perfection, that renders testimony both reliable and relevant." *Bitler*, 400 F.3d at 1234.

### Analysis

#### **I. Defendants' *Daubert* Motions and Motions in Limine**

Defendants filed a multitude of lengthy motions seeking to exclude most of Plaintiffs' proffered evidence in this case. Some of Defendants' arguments were sound and supported by appropriate authority, but many others were not. Rather, Defendants appear to have employed in these motions an approach aptly described by the Tenth Circuit in another context as "throw - as - much - mud - against - the - wall - as - you - can - and - hope - some - of - it - sticks." *Dodd Ins. Servs., Inc. v. Royal Ins. Co.*, 935 F.2d 1152, 1158 (10<sup>th</sup> Cir. 1991). This approach resulted in an

undifferentiated mass of plausible and implausible arguments, which complicated the process of deciding and reporting on these motions.

My review also revealed that in a number of instances Defendants misreported the relevant evidence, prior rulings in this case and/or relevant legal authority in making their arguments. In other instances, Defendants relied on what they declared was the governing legal standard without providing authority that the standard existed or applied in this situation. Examples of these practices are included in the analysis of Defendants' individual motions.

#### **A. Defendants' Relevancy Standard**

Most of Defendants' *Daubert* motions and motions in limine regarding Plaintiffs' evidence of risk and conduct are based in whole or in part on the premise that the only evidence relevant to the property class claims is evidence that can be tied directly to common and class-wide contamination or health risk. *See infra* Section I.B (regarding Defendants' motions to exclude risk evidence), Section I.D (regarding Defendants' motions to exclude conduct evidence). Defendants further assert that evidence of many incidents and practices at Rocky Flats is irrelevant because Plaintiffs will not be able prove that it meets this test. *See, e.g., id.* This relevancy standard, purportedly based on my past rulings defining the parties' claims and defenses, is flawed in several fundamental respects.

Defendants' first error is in defining relevant evidence only as direct evidence pertaining to certain issues. The Federal Rules of Evidence define relevant evidence broadly as "evidence having *any tendency* to make the existence of *any fact that is of consequence* to the determination of the action more probable or less probable than it would be without the evidence." Fed. R. Evid. 401 (emphasis added). This is a liberal standard that incorporates notions of both

materiality and probativity. *United States v. McVeigh*, 153 F.3d 1166, 1190 (10th Cir. 1998).

Both direct and circumstantial evidence, as well evidence that is essentially background or contextual in nature, may be relevant under this rule. Fed. R. Evid. 401 & advisory committee's note. In addition, evidence need not be conclusive or highly probative to satisfy Rule 401 - "even a minimal probability" that the asserted fact exists will suffice. *McVeigh*, 153 F.3d at 1190.

Defendants' relevancy standard is further flawed in its narrow definition of the facts "of consequence to the determination of this action" to include only the physical invasion element of Plaintiffs' trespass claims and the interference element of their nuisance claims. A fact is "of consequence" under Rule 401 "when its existence would provide the fact-finder with a basis for making some inference, or chain of inferences, about an issue that is necessary to a verdict." *McVeigh*, 153 F.3d at 1190. The class trial in this action will require the jury to determine facts beyond these two elements and their focus on the existence of or potential for class-wide contamination or risk attributable to Rocky Flats. These additional issues include, but are not limited to, whether the conduct that caused or contributed to any physical invasion or interference was negligent or intentional, the property market's knowledge of and response to the alleged trespass and nuisance, and whether Defendants' conduct was wilful and wanton so that punitive damages should be awarded. *See, e.g., Cook v. Rockwell Int'l Corp. ("Cook IX")*, 273 F. Supp. 2d 1175, 1199-1212 (D. Colo. 2003) (stating elements of Plaintiffs' trespass and nuisance claims and standards for determining damages). Facts beyond these may also be of consequence because they provide a basis for making an inference about these or other issues necessary to the verdict. *See McVeigh*, 153 F.3d at 1190; Fed. R. Evid. 401 advisory

committee's note ("fact to be proved may be ultimate, intermediate, or evidentiary; it matters not, so long as it is of consequence to the determination of the action.").

Defendants also err in asserting that evidence relating to contamination or risk is only relevant if it applies in common to every Class member or the entirety of the Class Area. It should be self-evident that the question to be decided is not whether a single item of evidence demonstrates a common or class-wide effect, but rather whether Plaintiffs' evidence as a whole demonstrates class-wide liability and damages. Defendants' argument in this regard confuses the sufficiency of an item of evidence with its relevance.

Defendants' relevancy arguments also frequently misstate the forms of interference with the use and enjoyment of property to be tried in connection with the class nuisance claims. I have previously examined Plaintiffs' asserted forms of interference and identified two that could support a finding of class-wide interference with the use and enjoyment of property: (1) alleged interference in the form of current human health risk arising from past or on-going exposure to plutonium released from Rocky Flats as a result of one or both of Defendants' activities there;<sup>9</sup> and (2) alleged interference in the form of a demonstrable risk of future harm to Class properties based on objective conditions caused by Defendants' activities at Rocky Flats. May 2005 Order at 4-6. Many of Defendants' relevancy arguments omit any mention of the second potential basis for a class-wide finding of interference, and when it is addressed, Defendants appear to assume this basis only makes relevant evidence proving that some common, class-wide health risk *will*

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<sup>9</sup> I also allowed proof of such class-wide interference arising from exposure to non-plutonium substances if Plaintiffs demonstrated that all Class members were exposed to such substances and all suffered some increased health risk as a result. May 2005 Order at 5. Plaintiffs have since stated they do not intend to assert interference on this basis. *See* Pls.' Cons. Mem. in Opp'n to Defs.' Mots. in Limine (Doc. 1395) at 21.

occur in the future. *See, e.g.*, Defs.’ Combined Reply in Supp. of Mots. in Limine (Doc. 1410) at 8. This is not correct. Evidence that has any tendency to show that objective conditions caused by Defendants create a demonstrable *risk* of harm that has the *potential* to affect all of the Class Area is relevant to this potential form of class-wide interference. *See* Mem. Op. re: Jury Instructions, Section II.C.2 (regarding Defendants’ proposed revisions to Instruction No. 3.6 (elements of nuisance claim)).

In addition, Defendants’ relevancy arguments largely ignore a third form of interference with the use and enjoyment of property that I held may be determined in part at the class trial, which is whether Defendants’ conduct at Rocky Flats was capable of causing Class members to be fearful, anxious or otherwise disturbed by the real or perceived risks posed by the facility. The “generic causation” question of whether Defendants’ conduct is capable of causing this form of interference with the use and enjoyment of Class properties will be decided by the jury in the class trial, leaving to future proceedings (if necessary) the separate question of whether particular Class members in fact suffered this form of interference with the right to use and enjoy property.<sup>10</sup> *See* May 2005 Order at 6-7.

This summary identifies the major, persistent flaws Defendants advanced in the relevance and fit arguments in their *Daubert* motions and motions in limine. In light of the extensive briefing and oral argument by Defendants on these motions, however, I cannot say that I have addressed all such flaws in this section. Accordingly, the parties should not assume that a

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<sup>10</sup> Although the parties and I sometimes refer to this generic causation question as “generic emotional distress,” I note that this question is not part of an emotional distress claim, but rather addresses a form of interference with the right to use and enjoy property that can establish liability for nuisance if the other elements of a nuisance claim are proved. *See, e.g.*, *Cook IX*, 273 F. Supp. 2d at 1203-04.

particular interpretation of my past rulings or asserted standard for determining relevant evidence in the class trial has been approved simply because I have not called it out and corrected it here.

**B. Motion to Exclude Plaintiffs' Expert Witness Testimony Relating to Risk**

Plaintiffs offered four expert witnesses to testify at trial regarding the health and other risks posed by Rocky Flats: Dr. Robert Goble, Dr. Richard Clapp, Dr. K. Shawn Smallwood and Dr. Steven Wing. Defendants moved to exclude testimony by Drs. Goble, Clapp and Smallwood on June 16, 2005,<sup>11</sup> *see* Defs.' Am. Mot. to Exclude Expert Test. Relating to Risk (Doc. 1380) [hereinafter "Defs.' Mot. re: Pls.' Risk Experts"], and subsequently moved to exclude Dr. Wing's testimony, Defs.' Mot. to Exclude Test. of Dr. Steven Wing (Doc. 1444).<sup>12</sup> I address the admissibility of each of these witnesses' proffered testimony in turn.

**1. Dr. Robert Goble**

Dr. Goble is Plaintiffs' dose reconstruction expert. He holds a Ph.D. in physics and since 1976 has taught and conducted research on energy and environmental science and policy at Clark University. He has performed research on human health risk and risk assessment in the past for the United States Environmental Protection Agency, the National Science Foundation and the

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<sup>11</sup> Defendants also sought in this motion to exclude testimony by Dr. Lawrence Mayer, another of Plaintiffs' previously designated risk experts. This portion of Defendants' motion was rendered moot by Plaintiffs' decision not to call Dr. Mayer. *See* Pls.' Cons. Mem. in Opp'n to Defs.' Mots. to Exclude Expert Test. (Doc. 1399) at 1 n.1.

<sup>12</sup> I permitted Defendants to file their motion to exclude Dr. Wing's testimony after the pretrial deadline because Plaintiffs had inadvertently omitted Dr. Wing from the witness list they submitted in the December 10, 2003 Joint Status Report, which was the most recent witness list exchanged by the parties before the June, 2005 deadline. I rejected Defendants' request that I exclude Dr. Wing's testimony solely on the basis of Plaintiffs' omission, however, as Plaintiffs had long ago properly designated Dr. Wing as an expert in this proceeding and Defendants had ample notice after the December, 2003 Status Report that Plaintiffs intended to call him. *See* Aug. 22, 2005 Tr. at 15-16.

United States Department of Energy, among others. *See* Pls.’ Cons. Mem. in Opp’n to Defs.’ Mots. to Exclude Expert Test. (Doc. 1399) [hereinafter “Pls.’ Cons. *Daubert* Resp.”], Ex. 15, App. A at 1-2.

Dr. Goble authored an 82-page expert report for this case that addressed a number of subjects, including exposure to plutonium released from Rocky Flats and associated health risks. Pls.’ Cons. *Daubert* Resp., Ex. 15 [hereinafter “Goble Report”]. This is the only subject on which Plaintiffs offer Dr. Goble’s testimony in the property class trial.<sup>13</sup> Defendants do not challenge Dr. Goble’s qualifications to render opinions on this subject, and I find Dr. Goble qualified to testify as an expert on it.

In his report, Dr. Goble estimated the exposures to plutonium to people living near Rocky Flats and assessed the risks experienced as a result. His risk assessment is based on inhalation of plutonium, and he relied on information regarding plutonium concentrations in soil and other data to estimate the concentration of plutonium in air, and hence exposure, at various periods from 1954 to 1989. He then used these exposure estimates to estimate the radiation doses that resulted and the associated risk of disease. *Id.* at 14-16.

Dr. Goble reported the existence of substantial uncertainty and variability in the underlying data and each step in his analysis. Accordingly, a key component of Dr. Goble’s assessment was a quantitative treatment of both uncertainty and variability as they relate to plutonium exposure

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<sup>13</sup> In his report, Dr. Goble also assessed risks arising from the release of four toxic substances from Rocky Flats in addition to plutonium. *See* Goble Report. Defendants’ motion to exclude Dr. Goble’s testimony at the property class trial regarding these additional, non-plutonium substances is moot as a result of Plaintiffs’ decision not to present Dr. Goble’s testimony on these substances.

and risk.<sup>14</sup> *See, e.g.*, Goble Report at 13. Dr. Goble employed the widely recognized Monte Carlo simulation method to accomplish this and to develop estimates of the quantitative ranges within which plutonium releases, exposures, doses and risks have likely fallen. He expressed his estimates at stated levels of confidence.<sup>15</sup>

Defendants do not dispute that the principles and methods relied upon by Dr. Goble are reliable and that he utilized sufficient facts and data in conducting his analysis, as required by Rule 702. They contend, however, that Dr. Goble's expert testimony regarding plutonium exposure and risk should nonetheless be excluded in its entirety because it does not fit the issues to be decided in the class trial and because he did not apply his methods reliably to the facts of this case.

*Relevance/fit*

Defendants principally argue that Dr. Goble's plutonium exposure and risk testimony does not fit the issues to be tried because the dose and health estimates he calculated showed a large variability of exposure and risk and he did not attempt to quantify the magnitude of any plutonium exposure and risk experienced in common by every class member. This, Defendants argue,

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<sup>14</sup> "Uncertainty" in this context refers to the "imperfect knowledge" of the level of exposure to plutonium, doses and the likelihood of disease attributable to them, while "variability" is the certainty that some individuals will have higher exposures than average, some will have higher doses for the same exposure and some are particularly likely to have a disease caused by doses. *See* Goble Report at 7, Fig. 2.2.

<sup>15</sup> "Confidence levels" or "intervals" are a common method of expressing the likelihood that the true value falls within the stated range. *See, e.g.*, Michael D. Green et al., *Reference Guide on Epidemiology*, in *Reference Manual on Scientific Evidence* 333, 360-61 (2d ed. 2000). For example, if a value is estimated as falling in a certain range at a 90 percent confidence level, then there is a probability of 90 percent that the true value falls within the given range. *Id.* at 360.



violates the supposed rule that all evidence of any kind must be applicable and common to the class as a whole in order to be relevant to and fit the class trial. As stated earlier, however, no such rule exists in this case. Evidence regarding plutonium releases to the Class Area and the resulting exposure and risk is relevant to the Plaintiffs' claim that Defendants' activities at Rocky Flats constitute a nuisance because they have caused some increment of health risk to the class. *See* May 2005 Order at 4-5 (describing one form of interference with use and enjoyment of property to be tried on a class-wide basis). Dr. Goble's intended testimony will assist the jury in deciding this issue. That Dr. Goble's analysis describes a range of exposures and risks does not change this conclusion.

Defendants also argue Dr. Goble's estimates are not relevant because they do not apply to the Class Area. Defendants contend this is so because Dr. Goble based his estimates of plutonium-in-air concentrations during the key 1965-70 time period on data from three locations, none of which is in the Class Area.<sup>16</sup> As Dr. Goble stated in his report, however, these locations were selected to provide a reasonable representation of conditions inside the proposed medical monitoring region. Goble Report at 29. The proposed medical monitoring region generally encompasses the property Class Area. *See, e.g., id.* at Figure 2.1a (depicting the proposed medical monitoring region and the plutonium contour that defines the property class area). Dr. Goble's analysis regarding air concentrations in 1965-70 is, therefore, relevant to the property Class Area.

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<sup>16</sup> It was during the 1965-70 period that plutonium was released into the environment from leaking barrels at the 903 pad at Rocky Flats. It is undisputed that releases from the 903 pad were a major source of off-site plutonium exposure and contamination.

*Reliability*

Defendants assert Dr. Goble made multiple errors in applying his methodology to assess plutonium exposure and risk arising from Rocky Flats, and that these alleged errors render his expert testimony unreliable and inadmissible under Rule 702. I disagree for the following reasons.

First, Defendants argue that the range of estimated exposures, doses and risks found by Dr. Goble at the various confidence levels are simply too broad to be reliable. It is true that for a given confidence level, a narrower range indicates a more precise estimate, while a broad range indicates an estimate that may include substantial random error. David H. Kaye & David A. Freedman, *Reference Guide on Statistics*, in *Reference Manual on Scientific Evidence* 83, 119 & n.120 (2<sup>d</sup> ed. 2000) [hereinafter “*Ref. Guide on Statistics*”]. Defendants do not, however, point to any mistake in Dr. Goble’s method or analysis that caused the broad ranges he reports for various confidence intervals. Rather, Dr. Goble explained in his 1996 expert report and 1999 declaration that these ranges resulted from the large uncertainties in the available information and variability in individual responses to plutonium exposure. *See* Goble Report at 36-48; Pls.’ Cons. *Daubert* Resp., Ex. 16 [hereinafter “Goble Decl.”] at 8-10. It is undisputed that risk assessors commonly deal with such uncertainties in their analyses and that broad estimated ranges of exposure, dose and risk may result from them. The existence of such uncertainties, and the consequences that flow from them in estimating plutonium exposure, dose and health risk associated with Rocky Flats, may affect the weight to be accorded to Dr. Goble’s testimony but do not provide a basis for finding his work and conclusions unreliable within the meaning of Rule 702.

Defendants cite three cases for the proposition that courts have found statistical estimates thousands of times narrower than Dr. Goble's "scientifically unreliable" and hence inadmissible under Rule 702. *See* Defs.' Mot. re: Pls.' Risk Experts at 8-9. None of the cited cases stand for this proposition, as all concern instances in which the court or fact finder admitted and considered the statistical evidence in reaching a decision on the merits. *See Turpin v. Merrell Dow Pharm., Inc.*, 959 F.2d 1349, 1353, 1357 (6<sup>th</sup> Cir. 1992) (deciding case on basis of sufficiency of the evidence and specifically finding that the challenged statistical studies "constitute evidence on which a jury might ground" its verdict); *United States v. Am. Society of Composers*, Civ. 13-95 (WCC), (S.D.N.Y. Oct. 12, 1989) (magistrate judge sitting as trier of fact accords little weight to statistical evidence having broad confidence intervals), *aff'd sub nom. Am. Society of Composers v. Showtime/The Movie Channel, Inc.*, 912 F.2d 563 (2<sup>nd</sup> Cir. 1990) (magistrate judge decision reprinted as appendix, 912 F.2d 572, 591); *Haim v. Sec'y of Dep't of Health & Human Servs.*, No. 90-1031V, 1993 WL 346392, at \*6 (Fed. Cl. Ct. Aug. 27, 1993) (special master sitting as finder of fact weighs expert testimony). Thus, these cases demonstrate that Defendants' complaints regarding the breadth of Dr. Goble's ranges go to the weight that the finder of fact may assign them, and not to the separate question of whether his testimony is admissible.

Defendants' second basis for asserting that Dr. Goble's work is unreliable is that he failed to engage in hypothesis-testing, which Defendants assert is necessary for any reliable scientific endeavor. There should be no question, however, that scientific endeavor takes many forms, many of which do not involve hypothesis testing. *See* Goble Decl. at 2-3 (citing, among others, the work of Darwin and Einstein). Dr. Goble explained at length in his 1999 Declaration why hypothesis testing frequently is not feasible or appropriate in the risk assessment context, and why

this mode of inquiry was not appropriate to his analysis of risk arising from Rocky Flats. *Id.* at 3-9. Defendants offer no rebuttal to this reasoned explanation.

Defendants next argue Dr. Goble's expert testimony must be stricken due to his allegedly improper reliance on 95<sup>th</sup> percentile estimates. The portion of Dr. Goble's report cited by Defendants, however, conveys Dr. Goble's recommendation that the 95<sup>th</sup> percentile risk level be considered in designing a medical monitoring program. *See* Goble Report at 22-25. Medical monitoring is not part of the trial on Plaintiffs' property class claims. Plaintiffs intend in the property class trial to offer Dr. Goble's testimony regarding the various ranges he calculated for exposure, dose and risk. There is no "reliance" on the 95<sup>th</sup> percentile range, improper or otherwise, in reporting these ranges to the jury in the property class trial.

Defendants further assert Dr. Goble's proposed testimony is unreliable because he failed to compare and calibrate his estimates of plutonium-in-air concentrations for the 1965-70 time period, which Dr. Goble modeled from plutonium soil concentration data, with available air monitoring data from this period. Defendants contend such a comparison of computer-modeled estimates and "real world data" is a mandatory component of any modeling exercise, and that the results of any computerized model that omits this step are *per se* unreliable and inadmissible under Rule 702. Defendants cite their experts' statements and excerpts from scientific authority quoted by their experts in support of this proposition. They submitted no legal authority supporting this alleged rule. Defendants further assert that the actual plutonium-in-air concentrations measured at Rocky Flats establish that Dr. Goble's soil-based air concentration estimates are as much as 1,000 times too high, which in turn render his dose and risk estimates unreliable.

The scientific authority quoted by Defendants' experts is consistent with what common sense tells us: that a comparison of modeled estimates and "real world data" can aid in establishing the credibility of the modeled results, but is not always possible or informative. *See, e.g.,* App. to Defs.' Mot. re: Pls.' Risk Experts (Doc. 1377), Ex. 10, ¶¶ 11-12 (quoting scientific papers describing the desirability of comparing simulation models against environmental monitoring results "whenever possible"). Relevant environmental monitoring data, for example, may not be available or may itself be suspect.

The accuracy of the air monitoring data on which Defendants rely is a vigorously disputed issue in this case. Dr. Goble explained in his 1996 expert report and 1999 declaration why he believed the available air monitoring data were too sparse and unreliable to set bounds on his estimated exposures based on plutonium soil concentrations.<sup>17</sup> *See* Goble Report at 29; Goble Decl. at 10-12. Defendants and their experts disagree, and assert the available air monitoring data are the most reliable indicator of the concentration of plutonium in air. This is a classic disagreement between experts that goes to the credibility of each expert's opinions, not to the reliability of their methodology within the meaning of Rule 702. It is the jury's function in this instance to weigh the expert's competing views and determine their respective credibility.

Defendants make two further arguments challenging the reliability of Dr. Goble's methodology as he applied it, both relating to his estimates for plutonium air concentrations. First, Defendants argue that Dr. Goble used an improper value in estimating plutonium air concentrations in the 1965-70 time period. As stated earlier, Dr. Goble based his estimated

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<sup>17</sup> In addition, Dr. Goble used some air monitoring data from 1971-1989 to estimate the ranges of exposure during this time period, and explained why he viewed this observed data as more reliable than that available for the 1965-70 time period. *See* Goble Decl. at 12.

ranges of exposure during this period on plutonium soil concentrations. One of the factors in the model he used to estimate air concentration from soil data was the velocity at which airborne plutonium is deposited. Dr. Goble drew his velocity value from an expert judgment elicitation assessing dispersion and deposition uncertainties in modeling the consequences of a nuclear accident. *See* Goble Report at 37 (citing U.S. Nuclear Regulatory Commission and Commission of European Communities, *Probabilistic Accident Consequence Uncertainty Analysis: Dispersion and Deposition Uncertainty Assessment, Vols. I-III*, NUREG/CR-6244 (1995) [hereinafter “NUREG/CR-6244”]). The elicitation was funded and directed jointly by the U.S. Nuclear Regulatory Commission and the Commission of European Communities to “develop credible and traceable uncertainty distributions” for these input variables. NUREG/CR-6244, Vol. I (Main Report) at ES-1.<sup>18</sup> The deposition velocity used by Dr. Goble was the result of the equal weighting scheme used by the NRC and European authors to aggregate and report the results of the experts’ assessments. *See id.* at 3-9 to 3-10.

Defendants assert Dr. Goble was not justified in relying on the deposition velocities reported in NUREG/CR-6244 because the equal weighting scheme used in the study to aggregate the results of the participating experts was itself unreliable. Defendants base this contention entirely on Appendix D to NUREG/CR-6244, in which the study authors discuss alternate,

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<sup>18</sup> In spite of their extensive argument concerning this document in connection with Defendants’ challenge to Dr. Goble’s testimony, neither party included a copy of it in any court filings made in connection with Defendants’ motion. Although it is likely the document can be found elsewhere in the voluminous, 15-year long record for this case, I have not searched for it there and instead, to the extent necessary, take judicial notice of this government document, which is publically available through numerous sources, including the Internet. *See* NUREG/CR-6244 (Main Report), [http://www.osti.gov/bridge/product.biblio.jsp?query\\_id=2&page=0&osti\\_id=10125585](http://www.osti.gov/bridge/product.biblio.jsp?query_id=2&page=0&osti_id=10125585).

performance-based weighting methods for aggregating the distributions elicited from experts, and apply one such method to the elicited results for comparison purposes. *See id.*, Vol. III, Appendix D; *see also id.*, Vol. I, at 3-10. Using the performance-based method selected, the deposition assessments of seven of the eight experts received a calibration score below the significance level. *Id.*, Vol. III at D-5.

It is clear from the entirety of Appendix D that the NRC and European researchers who directed the study did not consider this result to be determinative of the credibility of these experts' work, and did not view the particular performance-based weighting scheme applied in Appendix D with the same confidence as the equal weighting method they used to derive the deposition velocity relied upon by Dr. Goble. *See, e.g., id.* at D-4 to D-5; *see also* Goble Decl. at 14 (discussing Appendix D). Defendants also do not dispute that equal weighting of expert results has been used in other expert elicitation studies in this field, *see id.* at D-4, or the reliability of the expert elicitation process itself. It was the results of the equal weighting scheme that were published as the study's findings, not the alternate scheme discussed in Appendix D. Finally, Defendants have not presented evidence that anyone other than its paid experts considers the NUREG/CR-6244 velocities used by Dr. Goble to be unreliable. For all of these reasons, I find no basis to hold Dr. Goble's work unreliable and inadmissible as a result of his use of deposition velocities published in NUREG/CR-6244.

Moving beyond their general challenge to Dr. Goble's reliance on NUREG/CR-6244, Defendants assert Dr. Goble erred in selecting from it the velocities stated for one micron particles. Observed data from Rocky Flats, Defendants argue, demonstrate that the average particle size is much larger than one micron, and that the estimated concentration of plutonium in

air decreases by several orders of magnitude if deposition velocities from NUREG/CR-6244 corresponding to this larger size are used.

Dr. Goble responded in his 1999 Declaration to both this criticism and the related complaint that the NUREG/CR-6244 deposition velocities he utilized were based on different wind speeds than occurred during some of the wind-borne plutonium releases from the 903 pad in the 1965-70 period. *See* Goble Decl. at 16-18. This response included a reasoned explanation by Dr. Goble for his choice of the one micron deposition velocity and his decision not to stratify for different wind speeds. That Defendants' experts apparently disagree with Dr. Goble's choices and believe that more accurate results could have been achieved by use of different inputs does not render Dr. Goble's work unreliable and inadmissible under Rule 702.

Last but not least, Defendants complain vigorously that Dr. Goble's analysis is unreliable because he improperly used a "multiplier" of plutonium releases in 1965-70 to estimate plutonium releases and exposures in other time periods. Defendants contend courts assessing *Daubert* issues have identified use of a multiplier as a "telltale sign" of a lack of reliability, Aug. 2, 2005 Tr. at 497; *see* Defs.' Intro. & Overview to Mot. to Exclude Expert Witness Test. (Doc. 1378) at 12, and that Dr. Goble arbitrarily selected the multiplier he used.

There are at least two fundamental problems with Defendants' argument. First, they cite no authority supporting their assertion that courts consider use of a multiplier a sign that an expert analysis is unreliable. The only authority cited in support of this proposition, *In re Paoli R.R. Yard PCB Litigation*, 35 F.3d 717 (3rd Cir. 1994), does not address this issue. Instead, it affirms the district court's holding that there was no scientific justification for an expert's recalculation of certain blood test results. *Id.* at 772-73. That this recalculation involved the use of a multiplier



played no part in this decision. Moreover, the Third Circuit noted that the recalculation, presumably using a multiplier, might be acceptable in other circumstances. *Id.* at 773.

Second, Defendants misstate Dr. Goble's methodology in making this argument. As he made clear in his expert report and 1999 Declaration, Dr. Goble did not rely on a multiplier to estimate plutonium releases and air concentrations in the periods preceding and following the 1965-70 releases from the 903 pad. Instead, Dr. Goble used various period-specific data, including air monitoring data he considered of sufficient reliability, to estimate plutonium releases from 1954 to 1964 and from 1971 to 1989. Goble Report at 13-14, 38-41; Goble Decl. at 18 & n.15. He then converted the estimated plutonium releases for each period into a percentage of the 1965-70 releases for computational ease in calculating exposure and dose ranges and to capture what he considered to be the better characterization of uncertainty in the 1965-70 data. *See* Goble Report at 41-42, Table 4.2; Goble Decl. at 18. Thus, while Dr. Goble *expressed* his estimated plutonium releases for these other periods as a multiplier of the 1965-70 releases for purposes of subsequent calculations, he did not *base* these estimates on the 1965-70 releases or some multiplier thereof. What little effort Defendants made to challenge the method by which Dr. Goble arrived at these multipliers is incomplete and not persuasive. Defendants' contention that Dr. Goble relied on arbitrarily selected multipliers of 1965-70 plutonium releases for these other periods, therefore, and their arguments against admission of his testimony on this basis, are without merit.

For all of the reasons stated above, I find no merit in Defendants' challenges to the relevance and reliability of Dr. Goble's intended testimony under Rule 702. Plaintiffs have demonstrated that Dr. Goble's testimony is relevant to this action and that it is the product of the

“same level of intellectual rigor that characterizes the practice of an expert in the field.” *Kumho Tire*, 526 U.S. at 152. Dr. Goble’s expert testimony is therefore admissible under Rule 702.

## 2. Dr. Richard Clapp

Dr. Clapp is an epidemiologist with a Master of Public Health degree from Harvard University and a Doctor of Science degree from Boston University’s School of Public Health, where he is currently a Professor in the Department of Environmental Health. From 1980-89, Dr. Clapp served as Director of the Massachusetts Cancer Registry in the Massachusetts Department of Public Health. He is a member of several professional organizations and has published a number of studies on cancer and other diseases in peer-reviewed scientific journals. He also has advised graduate students and had other experience in research on the health effects of emissions from U.S. nuclear facilities, and has been qualified as an expert in numerous federal and state courts. Pls.’ Cons. *Daubert* Resp. (Doc. 1399), Ex. 4 [hereinafter “Clapp Report”] ¶ 1.

Epidemiological studies seek to determine whether there is an association between exposure to a particular agent or agents and disease. Michael D. Green *et al*, *Reference Guide on Epidemiology*, in *Reference Manual on Scientific Evidence* 333, 337, 348 (2d ed. 2000) [hereinafter “*Ref. Guide on Epidemiology*”]. An association exists when exposure and disease occur more frequently together than one would expect by chance. *Id.* at 348. Epidemiological studies frequently express the existence and strength of any observed association between exposure and disease as “relative risk.” *Id.* A relative risk of 1.0, also referred to as the “null hypothesis,” signifies that no association between exposure and disease was observed. *Id.* at 349; *see DeLuca v. Merrell Dow Pharms., Inc.*, 911 F.2d 941, 945, 947 (3<sup>rd</sup> Cir. 1990). If the relative risk is greater than 1.0, then there is a positive association because the risk in the exposed

individuals or group is greater than the risk in unexposed individuals or groups. *Ref. Guide on Epidemiology* at 349.

Where there is a positive association between the exposure and disease, epidemiologists consider further whether the association represents a causal relationship between exposure to the agent and the disease. *See id.* at 348-49, 374-75. However, “epidemiology cannot objectively prove causation; rather causation is a judgment by epidemiologists and others interpreting epidemiological data.” *Id.* at 374.

For this case, Dr. Clapp conducted an epidemiological study to assess the pattern of cancer incidence in relation to an exposure source, the Rocky Flats plant. *Id.*; Pls.’ Cons. *Daubert* Resp. (Doc. 1399), Ex. 5 [hereinafter “Clapp Dep.”] at 214. To accomplish this, Dr. Clapp analyzed cancer incidence data obtained from the Colorado Central Cancer Registry to compare the odds of a person developing lung or bone cancer in a target geographic area immediately east and south of the Rocky Flats plant with the odds of developing these cancers in more distant areas of Jefferson County. Dr. Clapp used zip codes to define the target area, which includes all or most of the Class Area, and also to define the separate reference area. Clapp Report ¶ 8 & App. 3. Dr. Clapp selected the zip codes for the target area based on whether the centroid of the zip code area was found within the inner two contours of Krey and Hardy’s mapping of plutonium contamination in soil around Rocky Flats. *Id.* Krey and Hardy’s plutonium contours also define the Class Area.

Dr. Clapp employed a standard epidemiologic methodology, known as age-standardized odds ratio analysis, to perform his comparison.<sup>19</sup> *See id.* ¶ 8. The methodology used by Dr. Clapp is also known as an ecological study or analysis. Dr. Clapp performed comparisons for three time periods, 1979-83, 1984-88 and 1989-92, and, in the case of lung cancer, analyzed the data for men and women separately.

By calculating and comparing the odds ratios for the target area population with the corresponding odds ratios for the reference area population, Dr. Clapp found there was an increased incidence of both bone and lung cancers in the target population in the two plutonium contours closest to Rocky Flats, *see id.* ¶¶ 8-10, which he concluded was “indicative of an on-going health effect” related to proximity to Rocky Flats, *id.* ¶ 12. Dr. Clapp testified in deposition that he had used the exact same methodology employed in reaching these conclusions in several published, peer-reviewed works and in expert testimony admitted in at least four trials. *See Clapp Dep.* at 300-03.

Defendants argue Dr. Clapp’s expert testimony should be excluded in its entirety under Rule 702 because it is not relevant to the issues to be tried and because both his methodology and the conclusions he drew from it are unreliable. Defendants do not challenge Dr. Clapp’s qualifications, which are clearly sufficient.

*Relevance/fit*

Defendants’ principal argument here is that Dr. Clapp did not analyze risks for persons who owned property in the Class Area as of the Class membership, June 7, 1989, with the result

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<sup>19</sup> Defendants’ expert, Dr. Geoffrey R. Howe, referred to this method as proportionate cancer incidence analysis. *See Pls.’ Cons. Daubert Resp.*, Ex. 35 at 164-65.

that the increased cancer incidence he reported is neither common to the Class nor class-wide.<sup>20</sup> As a result, according to Defendants, Dr. Clapp's study cannot demonstrate a common or class-wide risk and is therefore irrelevant to this action. Defendants' argument misses the point. It is not Plaintiffs' burden to show that all or some Class members have been diagnosed with cancer or some other disease because of exposure to plutonium or other hazardous substances released from Rocky Flats. The issue, as presented by Plaintiffs' nuisance claims, is one of risk, *e.g.*, whether Defendants interfered with the use and enjoyment of Class properties because past, current or potential future exposure to plutonium or other toxic substances released from Rocky Flats poses an increased health risk to occupants of the Class Area. Evidence that the population residing in the reportedly plutonium-contaminated area adjoining the plant has experienced an increased incidence of lung and bone cancer is relevant to this question and will assist the jury in deciding it.

Defendants next argue Dr. Clapp's testimony is irrelevant because his target area is larger than the Class Area. There is no dispute, however, that Dr. Clapp's zip-coded defined target area encompasses all or most of the Class Area. This renders his study relevant to the question of risk to persons in the Class Area. That his target area includes some additional areas slightly further

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<sup>20</sup> Specifically, Defendants point to the fact that members of the Class purchased their properties at different periods, including just before the Class membership date, and to Dr. Clapp's testimony that the latency period for lung cancer is approximately 20-35 years and for bone cancer is approximately 10-25 years. *See* App. to Defs.' Mot. re: Pls.' Risk Experts (Doc. 1377), Ex. 5 (excerpts from Clapp deposition) at 100-03. Taken together, Defendants assert, this means that Dr. Clapp's study of cancer incidences between 1979 and 1992 fails to address any actual increase in lung and bone cancer incidences among Class members, because the latency period for many Class members has not yet run, and, turning this proposition around, does not reflect the results of any plutonium exposure to the many Class members who purchased their Class properties after 1982, the last period of exposure reflected in Dr. Clapp's results using his latency periods.

from the plant, and presumably having lower levels of plutonium in soil and fewer airborne contaminants as a result, does not change this conclusion.

Defendants finally contend that Dr. Clapp's work is irrelevant because he failed to take into account or assess plutonium exposure. This argument misreads Dr. Clapp's study. As described above, Dr. Clapp defined his target area by reference to the Class Area, which itself is defined by the reported pattern of plutonium contamination caused by releases of plutonium from the plant. Thus his study takes account of plutonium exposure. Defendants' further complaint that Dr. Clapp did not perform a formal exposure assessment as part of his study has no bearing on the relevance or "fit" of his intended testimony.<sup>21</sup>

#### *Reliability*

Defendants argue Dr. Clapp's study and conclusions are unreliable and hence inadmissible for numerous reasons, starting with his use of an ecology study as his method of analysis. Relying primarily on the opinion of their rebuttal expert, Dr. Geoffrey Howe, Defendants assert that ecological studies are inherently unreliable and therefore inadmissible under Rule 702. Ecological studies, however, are one of several methods of epidemiological study that are well-recognized and accepted in the scientific community.<sup>22</sup> *See, e.g., Ref. Guide on Epidemiology* at 344-45; Kenneth J. Rothman & Sander Greenland, *Modern Epidemiology* 77, 459-80 (2<sup>d</sup> ed. 1998). Both

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<sup>21</sup> Defendants also make no showing that such a formal assessment is required to establish the reliability of the type of epidemiological study Dr. Clapp performed.

<sup>22</sup> An "ecological" or "aggregate" epidemiology study focuses on a comparison of groups, rather than individuals as is the case in other types of epidemiological studies. *See, e.g., Ref. Guide on Epidemiology* at 344; *Modern Epidemiology* at 77. Ecological studies are widely used in the field because they offer many practical advantages over other types of epidemiological studies. *See Modern Epidemiology* at 462, 469.

the scientific community and courts considering such studies view them as useful for establishing associations between exposure to a particular condition and disease, but as relatively weak evidence for establishing a conclusive or definitive causal relationship between exposure and the disease in question. *See, e.g., Ref. Guide on Epidemiology* at 344 (ecological studies “may be useful for establishing associations but they rarely provide definitive causal answers”); *Modern Epidemiology* at 78 (ecological studies useful for detecting associations between exposure and disease occurrence); *Ruff v. Ensign-Bickford Indus., Inc.*, 168 F. Supp. 2d 1271, 1282 (D. Utah 2001) (ecological studies generally provide “relatively weak evidence for establishing a conclusive cause and effect relationship”); *In re Hanford Nuclear Reservation Litig.*, No. CY-91-3015-AAM, 1998 WL 775340 at \*106 (E.D. Wash Aug. 21, 1998) (same), *rev’d on other grounds*, 292 F.3d 1124 (9<sup>th</sup> Cir. 2002). This relative weakness as to causation goes to the weight to be accorded ecological studies in proving causation, and does not render these studies or opinions based on them *per se* unreliable as a matter of science or law. *See In re Hanford*, 1998 WL 775340 at \*106. Dr. Clapp, in fact, reported he has testified as an expert based on this same methodology on at least four occasions, Clapp Dep. at 300-03, and Defendants cite no case in which a court excluded expert testimony regarding an ecological study on the ground that such testimony was inherently unreliable.<sup>23</sup>

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<sup>23</sup> The only evidence cited or provided by Defendants concerning the reliability of ecological studies, other than their expert’s affidavit, is an excerpt from a 1995 National Research Council publication. The excerpt provided by Defendants is too incomplete to determine the context informing its comments on ecological studies. *See App. to Defs.’ Mot. re: Pls.’ Risk Experts* (Doc. 1377), Ex. 28. Even taken at face value, however, the comments there are not determinative in light of the scientific and legal authority cited above.

Defendants next claim that Dr. Clapp's study and the conclusions he drew from it are unreliable because they failed to comply with four factors or criteria for drawing causal inferences from epidemiological studies: accounting for known confounders, temporal trend, biological plausibility, and dose-response relationship.

Defendants cite no authority, scientific or legal, that compliance with all, or even one, of these factors is required for Dr. Clapp's methodology and conclusions to be deemed sufficiently reliable to be admissible under Rule 702. The scientific consensus is, in fact, to the contrary. It identifies Defendants' list of factors as some of the nine factors or lenses that guide epidemiologists in making judgments about causation. *Ref. Guide on Epidemiology* at 375. These factors are not tests for determining the reliability of any study or the causal inferences drawn from it, as Austin Bradford Hill, the author of these factors, made clear:

What I do not believe – and this has been suggested – [is] that we can usefully lay down some hard-and-fast rules of evidence that must be obeyed before we can accept cause and effect. None of my nine viewpoints [factors] can bring indisputable evidence for or against the cause-and-effect hypothesis and none can be required as *sine qua non*.

A.B. Hill, *The Environment and Disease: Association or Causation*, 58 Proceedings of the Royal Society of Medicine 295, 299 (1965). The Reference Manual on Scientific Evidence and other authority are in accord with this view. *See, e.g., Ref. Guide on Epidemiology* at 375; *Modern Epidemiology* at 28 (“there is no necessary or sufficient criterion for determining whether an observed association is causal”).

Defendants' specific complaints regarding each factor as a basis for challenging the reliability and admissibility of Dr. Clapp's study and conclusions are also unsupported or unpersuasive. As defense expert Dr. Howe acknowledged, ecological studies in general do not



account for known confounders. *See* App. to Defs.’ Mot. Re: Pls.’ Risk Experts (Doc. 1377), Ex. 27 [hereinafter “Howe Aff.”] ¶ 16; Pls.’ Cons. *Daubert* Resp. (Doc. 1399), Ex. 34 [hereinafter “Howe Report”] at 12-13. This is one of the reasons that ecological studies, while recognized and accepted in the scientific community, are viewed as less probative of causation than some other types of epidemiological studies. As stated earlier, the relative weakness of ecological studies on causation issues, because of confounding or other standard concerns, goes to the weight to be accorded to these studies, and does not render them inadmissible.<sup>24</sup>

Defendants next assert Dr. Clapp’s conclusions are scientifically unreliable because he testified at his deposition that he found no consistent temporal trend in the incidence of lung and bone cancer. Defendants do not explain why this fact is of significance here, and did not include in the record enough of Dr. Clapp’s deposition testimony for me to determine exactly what Dr. Clapp and the questioner were referring to in their discussion of temporal trends. The scientific literature establishes, however, that the focus of this “factor” is more properly on the temporal or chronological relationship of exposure and disease, that is, whether the putative cause preceded the putative effect. *See, e.g., Ref. Guide on Epidemiology* at 376; *Modern Epidemiology* at 25. Defendants do not and cannot make any argument that the excess lung and bone cancer incidences found by Dr. Clapp during the 1979-92 study period preceded Defendants’ activities at Rocky Flats.

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<sup>24</sup> The same is true of Defendants’ contention that Dr. Clapp’s methodology is unreliable because, due to migration in and out of the target area, he could not guarantee that each individual who reported a cancer incidence while living in the target area had actually been exposed to releases of plutonium or other toxic chemicals from Rocky Flats. *See* Defs.’ Mot. re: Pls.’ Risk Experts at 49. This migration-related problem is, according to Dr. Howe, another standard limitation on ecological studies, *see* Howe Report at 12-13, and as a result goes to the weight of Dr. Clapp’s testimony.

Defendants' assertion that Dr. Clapp's expert testimony must be excluded because his opinions are not biologically plausible is also not persuasive. Defendants cite only the opinion of their rebuttal expert, Dr. Howe, for this position. Dr. Howe based his opinion in part on his view that ecological studies assessing radiation exposure and cancer incidence do not produce biologically plausible results as compared to the results of his preferred methodology, risk projection modeling. *See* Howe Aff. ¶ 17; Howe Report at 4-5, 11-12, 13, 21. Dr. Howe also criticized the biological plausibility of Dr. Clapp's study and conclusions because Dr. Clapp did not design and interpret his ecological study according to Dr. Howe's preferred approach for such studies. Howe Report at 15-17, 21. It is not my role here, however, to determine whether Dr. Howe or Dr. Clapp's methodology is the most reliable. It is only to decide, as a threshold matter, whether Dr. Clapp's testimony is the product of reliable principles and methodologies reliably applied to sufficient and appropriate data. Fed. R. Evid. 702; *see Ruiz-Troche v. Pepsi Cola*, 161 F.3d 77, 85 (1st Cir. 1998) ("*Daubert* neither requires nor empowers trial courts to determine which of several competing scientific theories has the best provenance.") (quoted with approval in Fed. R. Evid. 2000 advisory committee's notes). The disagreements between Drs. Clapp and Howe on the best methodology to use and the biological plausibility of the results obtained from their competing methodologies do not cast doubt on this threshold question, but rather go to the weight of their respective testimony.

Defendants also argue Dr. Clapp's testimony must be excluded because "Plaintiffs failed to meet their burden of establishing Dr. Clapp's rate of error." Defs.' Mot. re: Pls.' Risk Experts at 51. Defendants cite no authority establishing that Plaintiffs have a "burden" of establishing Dr. Clapp's rate of error or that a study that does not include a calculated "rate of error" is *per se*

inadmissible.<sup>25</sup> Moreover, Defendants ignore that Dr. Clapp calculated confidence intervals for his results, which is a recognized and accepted statistical method for assessing whether these results were the result of random error. *See Ref. Guide on Epidemiology* at 354. In his deposition, Dr. Clapp testified there was no way to provide a more general estimate of the possibility that the results of his study did not reflect the truth. *See App. to Defs.’ Mot. re: Pls.’ Risk Experts* (Doc. 1377), Ex. 5 (excerpts from Clapp deposition) at 307. Defendants have not argued or presented evidence that this statement was inaccurate or that there is, in fact, a method by which an overall “rate of error” can be calculated for an epidemiological study.

Finally, Defendants assert that Dr. Clapp’s expert testimony is unreliable and must be excluded because his study did not produce statistically significant results. “Statistical significance” assesses the probability that a particular outcome is due to random variation in the study population, that is, is due to chance rather than a true association between the exposure and disease. *See Ref. Guide on Epidemiology* at 354; *DeLuca*, 911 F.2d at 946-47. With respect to an epidemiological study, it involves the calculation of the “*p*-value” for any association between an agent and disease observed in the study, and a comparison of this value to a preselected significance level. *See Ref. Guide on Epidemiology* at 357; *Modern Epidemiology* at 184; *DeLuca*, 911 F.2d at 947. The most commonly utilized significance level in science is .05, but this is recognized to be an arbitrary selection and other significance levels can and have been used. *See, e.g., Ref. Guide on Epidemiology* at 357-58.

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<sup>25</sup> The Supreme Court in *Daubert* identified the “rate of error” in an expert’s work as one of the factors that may be relevant to deciding its reliability, *see* 509 U.S. at 594, but that does not make production of a “rate of error” a litmus test for determining the admissibility of an expert’s work. *See, e.g., Kumho Tire*, 526 U.S. at 149-50; *Bitler*, 400 F.3d at 1233.

If the  $p$ -value for a particular study result is less than the selected significance level, then that result is said to be “statistically significant,” which means the probability that the observed association is the result of chance rather than a true association is less than the stated significance level. *Ref. Guide on Epidemiology* at 357 & n.64; *De Luca*, 911 F.2d at 947. If the  $p$ -value is greater than the significance level, then the result is said to be statistically insignificant, which means there is insufficient evidence at the selected significance level to reject the “null hypothesis” of the observed association being a product of chance rather than a true association. Sander Greenland, *The Need for Critical Appraisal of Expert Witnesses in Epidemiology and Statistics*, 39 Wake Forest L. Rev. 291, 298 (2004). It is important to note that “statistically insignificant” results do *not* indicate that it is probable the results were a product of chance or that they otherwise do not reflect a true association. *See id.*; *Ref. Guide on Epidemiology* at 357 n.64 (commenting that some courts have confused this issue); *id.* at 358 n.67 (significance testing does not assess whether the null hypothesis, *i.e.*, that there is no real association, is true).<sup>26</sup>

An alternate means of assessing the probability of random error in study results is through the use of confidence intervals. *Ref. Guide on Epidemiology* at 354-55; *DeLuca*, 911 F.2d at 947-48. A confidence interval is a range of values, calculated from the results of a study,

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<sup>26</sup> The statistical significance or nonsignificance of study results also does not address the magnitude of any association found by the study. For example, a study may find a very weak association between an agent and disease and yet be “statistically significant,” or may find a strong association but, because of the sample size, not be statistically significant. *See, e.g., Ref. Guide on Epidemiology* at 359 & n.71. In other words, “[s]tatistically significant results are not necessarily significant (important), and significant (important) results are not necessarily ‘statistically significant.’” David Egilman et al., *Proving Causation: The Use and Abuse of Medical and Scientific Evidence Inside the Courtroom – An Epidemiologist’s Critique of the Judicial Interpretation of the Daubert Ruling*, 58 Food & Drug L.J. 223, 238 (2003).

within which the true value is likely to fall. *Ref. Guide on Epidemiology* at 360; *see DeLuca*, 911 F.2d at 948. A 95% confidence interval for an epidemiological study, for example, “is constructed with enough width so that one can be confident that it is only 5% likely that the relative risk attained would have occurred if the true parameter, i.e., the actual unknown relationship between the two studied variables, were outside the confidence interval.” *DeLuca*, 911 F.2d at 948. The width of the interval reflects the possibility that the relative risk, that is the observed association between exposure and disease, is a product of random error. *See Ref. Guide on Epidemiology* at 360. This method of assessing study results is viewed as superior to significance testing by some leading epidemiologists. *See DeLuca*, 911 F.2d at 946-48 (describing views of Kenneth J. Rothman in his epidemiology text book, *Modern Epidemiology*); *Ref. Guide on Epidemiology* at 360 & n.75 (“Calculation of a confidence interval permits a more refined assessment of appropriate inferences about the association found in an epidemiological study,” citing views of Rothman and others).

Although it need not be used for this purpose, a confidence interval can also be used to infer the  $p$ -value and thus can be used as a surrogate test for significance. A 95% confidence interval, for example, that does not include the null hypothesis (relative risk of 1.0, which indicates no association between the agent and disease) indicates that there is a less than 5% chance that the observed association is the result of random error or chance. *See Ref. Guide on Epidemiology* at 361. This is equivalent to a  $p$ -value of less than .05, meaning the study result is “statistically significant.” *Id.* Conversely, if the null point falls within the 95% confidence interval, then the study result is not deemed “statistically significant” under a significance level of .05. *See id.*; *DeLuca*, 911 F.2d at 948.

In this case, Dr. Clapp calculated confidence intervals for the results of his study, but did not calculate their *p*-value. *See* App. to Defs.’ Mot. re: Pls.’ Risk Experts (Doc. 1377), Ex. 5 (excerpts from Clapp deposition) at 226. He also testified at his deposition that he did not consider statistical significance in interpreting these results and that this was consistent with his general practice in interpreting studies such as this. *Id.* at 126-27.

When questioned on the subject, Dr. Clapp further testified that the confidence intervals for his results did not indicate an excess of lung cancer in any time period or for any exposure scenario that would be considered statistically significant under the conventional .05 significance level. *Id.* at 128. This testimony differs from that of defense expert Dr. Howe, who acknowledged finding a statistically significant increase in the incidence of lung cancer in the 1989-92 period for men residing within the plutonium contours closest to Rocky Flats in the confidence levels he generated in a recreation of Dr. Clapp’s study. *See* Pls.’ Cons. *Daubert* Resp. (Doc. 1399), Ex. 35 [hereinafter “Howe Dep.”] at 194; Howe Report, Table 5. Dr. Howe discounted this outcome because he preferred a different method of grouping the study population that did not produce any statistically significant results, and because he considered a finding of one or more statistically significant results itself a matter of chance given the number of results generated under Dr. Clapp’s study design.<sup>27</sup> *See* Howe Report at 19-20; Howe Dep. at 194.

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<sup>27</sup> Defendants allege Dr. Clapp, by dividing his study population into 24 overlapping groups, deliberately “designed his analysis so as to substantially increase his chances of finding a statistically significant result purely by random chance.” Defs.’ Mot. re: Pls.’ Risk Experts at 44 n.11. I find no basis for this personal attack on Dr. Clapp and the integrity of his study. Dr. Clapp provided a reasoned, science-based explanation for his study design and study groups, and nothing in the record suggests any improper purpose in his design or analysis.

Defendants argue that the lack of statistically significant results reported by Dr. Clapp renders his study unreliable as a matter of science and inadmissible as a matter of law under Rule 702.<sup>28</sup> In addition to disregarding the statistically significant results for excess lung cancer reported by Dr. Howe, this contention is based on Defendants' assertion that "[t]o *prove* with expert evidence that it is more likely than not that plaintiffs were placed at an increased risk by exposure to hazardous substances, a party must make a threshold showing that the expert's study reveals statistically significant results." Defs.' Mot. re: Pls.' Risk Experts at 44 (emphasis added). This argument, of course, confuses the threshold question of admissibility of expert evidence with the separate question of its sufficiency to prove a factual issue. *See, e.g., In re Joint E. & S. Dists. Asbestos Litig.*, 52 F.3d at 1132 (distinguishing inquiry into threshold question of whether expert evidence is admissible from inquiry into whether this and other evidence is sufficient to present jury question); *see also Obrey v. Johnson*, 400 F.3d 691, 696 (9<sup>th</sup> Cir. 2005) (same and stating "[a]s a general matter, so long as the evidence is relevant and the methods employed are sound, neither the usefulness nor the strength of statistical proof determines admissibility under Rule 702.").

Defendants nonetheless implied in their briefs and in oral argument that statistical significance is a threshold requirement for establishing the admissibility of expert testimony involving the use of statistics. They failed, however, to cite any scientific or legal authority for this proposition with respect to epidemiological studies or in general.

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<sup>28</sup> Defendants do not challenge the reliability of Dr. Clapp's work based on the confidence intervals he reported.

In fact, as admitted by Defendants' own expert, Dr. Howe, there is a considerable dispute in the scientific community about the necessity or even relevance of statistical significance testing to epidemiological studies. Howe Dep. at 201-203; *see Ref. Guide on Epidemiology* at 359-60; Greenland, *The Need for Critical Appraisal*, 39 Wake Forest L. Rev. at 299 ("Significance testing is neither necessary nor appropriate as a requirement for drawing inferences from epidemiological data;" internal quotation omitted); *Modern Epidemiology* at 183-84 (explaining historical basis of significance testing and its limits as applied to epidemiological studies). This dispute, and the corresponding move by some in this field away from using *p*-values and "statistical significance" as a means of determining what conclusions and inferences can be reliably drawn from an epidemiological study, has been recognized by the courts, *see, e.g., DeLuca*, 911 F.2d at 946-48, and influential commentators and epidemiologists.<sup>29</sup> *See, e.g., Greenland, Need for Critical Appraisal*, 39 Wake Forest L. Rev. at 297-301 (criticizing misuse of statistical significance in legal proceedings, and particularly improper assumption that a finding of nonsignificance demonstrates that an observed association is false because it is most likely a product of chance); David Egilman et al., *Proving Causation: The Use and Abuse of Medical and Scientific Evidence Inside the Courtroom – An Epidemiologist's Critique of the Judicial Interpretation of the Daubert Ruling*, 58 Food & Drug L.J. 223, 236-41 (2003) (significance testing "is merely a statistical tool that is frequently – and often inappropriately – utilized in the process of testing inferences. The notion expressed by some courts that epidemiologists only draw inferences from data that demonstrate 'statistical significance' is not true."). Defendants' assertion that an

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<sup>29</sup> Dr. Howe described the movement in epidemiology away from use of statistical significance as "reasonably widespread." Howe Dep. at 203.



epidemiological study must produce “statistically significant” results to satisfy the “reliability” prong of Rule 702 is thus contrary to some of the evolving views in this field of science and provides no basis for excluding Dr. Clapp’s testimony.<sup>30</sup> The statistical significance or insignificance of Dr. Clapp’s results may affect the weight given to his testimony, but does not determine its admissibility under Rule 702.<sup>31</sup>

In sum, after considering all of the parties’ arguments concerning Dr. Clapp’s methodology, I find that Dr. Clapp, in conducting his study and reporting its conclusions, employed scientifically sound methods and based his conclusions on facts that satisfy Rule 702’s reliability requirements. I therefore find Plaintiffs have met their burden of demonstrating that Dr. Clapp’s methodology is reliable within the meaning of Rule 702 and that it is admissible in this action. Defendants’ criticisms of Dr. Clapp’s methods and conclusions, considered singly or

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<sup>30</sup> Reliance on statistical significance to determine the admissibility of expert evidence has been rejected by courts in other contexts as well. *See, e.g., Kadas v. MCI Systemhouse Corp.*, 255 F.3d 359, 362 (7<sup>th</sup> Cir. 2001) (age discrimination suit). As Judge Posner observed in criticizing such reliance, “[l]itigation generally is not fussy about evidence; much eyewitness and other nonquantitative evidence is subject to significant possibility of error, yet no effort is made to exclude it if doesn’t satisfy some counterpart to the 5 percent significance test.” *Id.*

<sup>31</sup> Some courts have stated or suggested that statistically significant epidemiological studies are required for a party to meet its burden of producing *prima facie* evidence of medical causation. *See, e.g., Brock v. Merrell Dow Pharms., Inc.*, 874 F.2d 307, 312, as amended, 884 F.2d 166 (5<sup>th</sup> Cir. 1989); *but see, e.g., Allen v. United States*, 588 F. Supp. 247, 417 (D. Utah 1984) (“The cold statement that a given relationship is not ‘statistically significant’ cannot be read to mean there is no probability of a relationship.”). In light of the reevaluation of “statistical significance” in epidemiology as described above, *Brock* and other decisions using statistical significance as a bright-line test for the sufficiency of causation evidence may be subject to reevaluation. Even if this were not the case, the showing necessary to meet the burden of proof on medical causation is distinct from the question presented here, which is whether Dr. Clapp’s epidemiological study is sufficiently grounded in reliable principles and methodology for its results to be admitted and considered by the jury in connection with Plaintiffs’ nuisance claim.

collectively, are matters that go to the weight of his testimony and that may be tested through vigorous cross-examination and the presentation of rebuttal evidence.

I will break here from reporting the basis of my pretrial rulings on the parties' *Daubert* motions to address briefly an additional motion to exclude Dr. Clapp's testimony filed by Defendants, this time during trial in the middle of Dr. Clapp's testimony. I denied the motion from the bench after a recess, but told the parties at the time that I would address it further in this written decision. *See Order Limiting Mots. Practice During Trial* (Doc. 1626) at 2.

In their second attempt to strike and exclude Dr. Clapp's testimony, Defendants renewed their unsuccessful argument that Dr. Clapp's testimony was inadmissible because his epidemiological study did not produce statistically significant results. The only difference between Defendants' original and renewed argument was their assertion for the first time that the Tenth Circuit had specifically rejected "Dr. Clapp's blasé attitude towards statistical significance" and "adopted statistical significance at the 95-percent confidence level as a [sic] evidentiary threshold for epidemiological studies." Defs.' Mot. to Strike and Exclude Test. of Dr. Richard Clapp (Doc. 1620) at 4. Defendants represented the Tenth Circuit had established this unequivocal rule in two decisions, *Renaud v. Martin Marietta Corp.*, 972 F.2d 304 (10<sup>th</sup> Cir. 1992), and *Boughton v. Cotter Corp.*, 65 F.3d 823 (10<sup>th</sup> Cir. 1995).<sup>32</sup> In fact, neither decision stands for any such proposition.

In *Renaud*, residents of a Denver suburb alleged they had been exposed to toxic chemicals released from the defendant's manufacturing facility and that this exposure had caused them to

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<sup>32</sup> Defendants offered no explanation for failing to mention either of these allegedly controlling decisions in their June, 2005, motion to exclude Dr. Clapp's expert testimony.

suffer a variety of injuries. *See Renaud*, 972 F.2d at 305. Plaintiffs' theory of exposure, based on expert reports and testimony, was that waste water containing a certain level of toxic chemicals had been discharged by the defendant into local surface and ground waters on a regular basis for more than a decade, and that these chemicals had made their way to a near-by water treatment plant and from there to the plaintiffs' homes through the city water supply system. *Id.* at 307. All of the expert evidence offered in support of this theory rested on a single data point, a water sample collected in a wastewater pond at the defendant's facility. *Id.*

On summary judgment, the district court considered whether the plaintiffs had presented a *prima facie* case that contaminants from the defendant's facility had reached the plaintiffs' taps in quantities sufficient to cause the injuries they alleged. *Renaud v. Martin Marietta Corp.*, 749 F. Supp. 1545, 1548 (D. Colo. 1990). Invoking the testimony of the court's appointed geochemical expert that "[i]t is unsound scientific practice to select one concentration measured at a single location and point in time and apply it to describe continuous releases of contaminants over an 11-year period," the district court excluded the conclusions of plaintiffs' exposure experts, *id.* at 1553, and therefore granted summary judgment against the plaintiffs based on their failure to present evidence that they were ever exposed to toxic chemicals from the defendant's facility. *Id.* at 1555.

In its decision, the district court also commented in dicta that the *Renaud* plaintiffs could have but did not offer epidemiological studies as indirect or circumstantial evidence of exposure,<sup>33</sup> and that "even if plaintiffs had been able to prove exposure by their direct evidence, they would

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<sup>33</sup> The Reference Manual on Scientific Evidence criticizes this assertion, reporting that the district court in *Renaud* "confused the role of epidemiology in proving causation with the issue of plaintiffs' exposure to the alleged carcinogen." *Ref. Guide on Epidemiology* at 344 n.28.

have been required to submit epidemiological evidence in support of their causation contentions.”<sup>34</sup> *Id.* at 1554-55. In the course of these comments, the court observed that the Fifth Circuit, “when addressing a similar argument,” had found that a plaintiff’s “failure to present statistically significant epidemiological proof that Bendectin causes limb reduction defects to be fatal to their case.” *Id.* at 1555 (quoting *Brock v. Merrell Dow Pharms., Inc.*, 874 F.2d 307, 313, 315, as amended, 884 F.2d 166 (5<sup>th</sup> Cir. 1989)).<sup>35</sup>

On appeal, the Tenth Circuit stated that the central issue before it was “the propriety of the District Court’s observation regarding the single water sample used as a basis for plaintiffs’ extrapolations.” *Renaud*, 972 F.2d at 308. The Tenth Circuit agreed this extrapolation was unsound, and affirmed the district court’s decision to exclude the conclusions of the plaintiffs’ exposure experts and to grant summary judgment against plaintiffs based on their failure to make a *prima facie* showing of exposure. *See id.* The Tenth Circuit’s only comment on epidemiological studies was to “question, but leave for another day, the dicta of the Court below that a supporting epidemiological study was required here even had there been acceptable direct proof of exposure.” *Id.* at 308 n.7. The court made no mention of statistical significance or any test for the admission of epidemiological studies. In short, there is nothing in the Tenth Circuit’s decision in *Renaud*, and next to nothing in the lower court’s decision, to support Defendants’

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<sup>34</sup> Although Plaintiffs did not present epidemiological evidence to prove causation, they did present Dr. Clapp and another expert to testify in rebuttal to an epidemiological study offered by the defendants. *See* 749 F. Supp. at 1551.

<sup>35</sup> It should go without saying that the district court did not by this statement “adopt[] statistical significance at the 95-percent confidence level” as the test for proof of medical causation, and even if it had, that this test would go to the sufficiency of epidemiological evidence to prove this issue, and not to the separate question of whether an epidemiological study is admissible for this or some other purpose. *See supra* note 31.

repeated declarations in their trial motion and at oral argument, *see* Nov. 10, 2005 Trial Tr.

at 4891-4901, that the Tenth Circuit (or any other court) has adopted a rule barring admission of any epidemiological study that was not statistically significant at the 95-percent confidence level.

Defendants fare no better in their reliance on *Boughton v. Cotter Corporation*.

Defendants represent that the Tenth Circuit in *Boughton* “affirmed the exclusion of another cancer study on the grounds that ‘none of the observed levels of cancer were elevated to a statistically significant level.’” Defs.’ Mot. to Strike and Exclude Test. of Dr. Clapp at 4 (quoting *Boughton*, 65 F.3d at 835 n.20). This is simply incorrect. In *Boughton*, the Tenth Circuit considered whether the district court had abused its discretion in excluding evidence of the plaintiffs’ fears of cancer and other disease to show damages for “annoyance and discomfort” under nuisance and trespass theories of recovery. *Boughton*, 65 F.3d at 831. The district court’s decision was based on its legal conclusion that fear of contracting a disease is compensable under Colorado law as part of “annoyance and discomfort” damages only if the fear of disease is grounded in substantial evidence.<sup>36</sup> *See id.* at 834-35. The Tenth Circuit affirmed this legal interpretation, and also found no abuse of discretion in the trial court’s decision to exclude evidence of the plaintiffs’ fears, because the sole evidence of risk offered by the plaintiffs, an epidemiological cancer study that did not produce statistically significant results, was insufficient to meet this test. *Id.* at 835 & n.20. The Tenth Circuit never considered, let alone decided, whether the cancer study was admissible, but rather considered only whether it was sufficient to demonstrate a factual basis for the plaintiffs’ claimed fear of cancer. Again, this is a sufficiency determination, which is distinct from

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<sup>36</sup> This is not an issue in this case because Plaintiffs do not seek damages for annoyance and discomfort, which is a separate category of damages for nuisance and trespass under Colorado law. *See Cook IX*, 273 F. Supp. 2d at 1206-07.

an admissibility determination. *Boughton*, therefore, sets no threshold for the admission of epidemiological studies under Rule 702.

### **3. Dr. Steven Wing**

Dr. Wing is a professor of epidemiology who specializes in studying the health effects of radiation and has extensive experience in evaluating radiation health effects among workers at U.S. Department of Energy (DOE) nuclear facilities. In his expert report, Dr. Wing addressed two subjects: (1) the state of scientific knowledge on human health effects resulting from exposure to plutonium; and (2) the DOE's role in research regarding radiation health effects. Based on his survey of relevant literature and professional experience with both subjects, Dr. Wing concluded that DOE's control of research into radiation health issues has led to gaps in current scientific knowledge about the health effects of plutonium, an understatement of the risks associated with exposure to plutonium, and the promulgation of standards for radiation exposure based on inadequate information regarding the human health effects of plutonium exposure. *See* Pls.' Opp'n to Defs.' Mot. to Exclude Test. of Dr. Wing (Doc. 1472), Ex. 1 [hereinafter "Wing Report"] at 5.

Defendants do not challenge Dr. Wing's qualifications to testify as proposed, and I find he is qualified to do so.

Defendants argue I must exclude Dr. Wing's proposed expert testimony in its entirety because it will not assist the trier of fact and is the product of unreliable methodology and insufficient facts and data. For the reasons stated below, I disagree and find Dr. Wing's proffered testimony admissible under Rule 702.

*Relevance/fit*

Dr. Wing's testimony regarding the state of knowledge concerning the health effects of plutonium exposure and the adequacy of current radiation exposure standards will assist the jury in deciding whether exposure to plutonium poses a health risk, which is relevant to Plaintiffs' contention, in connection with their nuisance claims, that the health risk posed by plutonium exposure has interfered with the use and enjoyment of property. *See* May 2005 Order at 5.

Dr. Wing's intended testimony regarding radiation exposure standards, and the DOE's role in the research on which they are based, is also relevant to the jury's consideration of Defendants' evidence and arguments that rely in whole or in part on these standards or on the current state of knowledge regarding the health effects of plutonium exposure. *See, e.g.*, Pls.' Opp'n to Defs.' Mot. to Exclude Test. of Dr. Steven Wing (Doc. 1472), Ex. 2 (excerpts of report by Defendants' expert Dr. Auxier) & Ex. 3 (excerpts of report by Defendants' expert Dr. Frazier). Defendants' contention that Dr. Wing's testimony is irrelevant because it does not address the conduct of Dow or Rockwell or seek to determine the actual health risk to Class members from exposure to Rocky Flats plutonium are both strawman arguments, as neither subject need be addressed for Dr. Wing's testimony to be relevant and helpful to the jury. Lastly, I find no merit in Defendants' assertion that Dr. Wing's testimony would not assist the jury and/or would usurp its function of weighing the evidence because the jury could just as easily review all of the voluminous scientific materials Dr. Wing collected and reviewed and draw its own conclusions from them. The scientific expertise and experience utilized by Dr. Wing in his review cannot be duplicated by the jury.

*Reliability*

With respect to reliability, Defendants allege Dr. Wing “formulated his opinions based on a few historical documents selected by plaintiffs’ counsel,” and assert on this basis that his intended testimony is based on insufficient facts and data. Defs.’ Mot. to Exclude Test. of Dr. Steven Wing (Doc. 1444) at 7. This statement and argument misrepresent Dr. Wing’s expert report, in which he detailed the exhaustive search he and his assistants conducted of international biomedical literature to collect and review information concerning the health hazards of plutonium, their search for and review of relevant documents in the database of the Health Division of the Los Alamos National Laboratory and their review of other relevant materials gathered from national and international sources. *See* Wing Report at 5. That Plaintiffs’ counsel provided Dr. Wing with a relative handful of documents is neither improper nor any grounds to disregard the vast amount of material Dr. Wing and his assistants collected and that he reviewed to prepare his expert report and testimony.

Defendants also seek to exclude Dr. Wing’s testimony based on the rule that any expert testimony that “does not lend itself to any means of testing or verification” must be excluded as unreliable. Defs.’ Mot. to Exclude Test. of Dr. Wing at 5. Defendants cite no authority for this supposed rule. To the extent Defendants are relying on the *Daubert* court’s statement of this and other factors for assessing the reliability of expert testimony, it is beyond question that these factors do not apply in all instances and are not automatically determinative in any event. *See, e.g., Kumho Tire Co.*, 526 U.S. at 150-51; *Bitler*, 400 F.3d at 1233. Defendants have not, moreover, identified any means of “testing” Dr. Wing’s literature search and review. They also have not pointed to any omissions in his literature review or any other errors in the method



Dr. Wing used to arrive at his conclusions. My review of Dr. Wing's report also failed to disclose any reason to doubt the reliability of his methodology.

Defendants disagree with the conclusions Dr. Wing reached based upon his review. This fact does not render his method or conclusions unreliable under Rule 702. Their further allegation that Dr. Wing was biased in his review based on his involvement in the *TMI* litigation is a matter that goes to his credibility and the weight to be accorded his opinions.

#### **4. Dr. K. Shawn Smallwood**

Dr. Smallwood is an ecologist who specializes in systems ecology. Systems ecologists assess ecological conditions, pressures and vulnerabilities across large geographic areas using a multi-disciplinary approach that identifies and integrates information relevant to the assessment. Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 27 [hereinafter "Smallwood Report"] at 1.

Dr. Smallwood holds a Ph.D in ecology and has extensive professional experience in systems ecology. *See id.* & Smallwood curriculum vitae. His research, including the results of a six-year study of pocket gophers, has been published in peer-reviewed journals. *See id.*

For this action, Dr. Smallwood performed a study to evaluate the role of soil bioturbation, or soil turnover due to biological activity, as a mechanism for exposing Rocky Flats contaminants to winds that could transport them to other locations, including off-site. As part of his study, Dr. Smallwood made three visits to the Rocky Flats site over a three month period to evaluate the activities of pocket gophers, other burrowing animals and plants at specific waste disposal areas identified by Defendants, DOE and its contractors at the plant site, including the area in and around the 903 pad. In a lengthy and detailed expert report, Dr. Smallwood reported his observations of "abundant" animal burrowing and soil excavation in and around the 903 pad, in

buried waste trenches and in other areas of known soil contamination at the plant site.

Smallwood Report at 3-14.

Dr. Smallwood synthesized the information gathered during his site visits with information obtained through an extensive literature review on burrowing animals and soil and other physical and biological characteristics of the Rocky Flats Plant and environs to assess the impacts of burrowing animals on soil contamination at Rocky Flats and beyond. *Id.* at 14-44. Based on this study, Dr. Smallwood concluded that the hazardous materials released, spilled, dumped and buried at the site by Defendants had been and would continue to be redistributed and brought to the surface through bioturbation of soils, where these materials could be entrained by the characteristic high winds in the area and transported to other locations, including off-site. *Id.* at 14, 45-49. He concluded this exposure pathway had not been adequately studied or monitored in the past. Finally, he concluded that, as a result of the process of bioturbation, a substantial quantity of toxic material released at Rocky Flats likely had been transported off-site, and that people off-site and downwind of the plant site “have been and continue to be at risk of exposure to dangerous materials generated by Rocky Flats operations.” *Id.* at 49.

There is apparently no dispute that Dr. Smallwood has published the core elements of his Rocky Flats study and site-specific research in eight separate articles in established scientific journals. He has also presented key elements of his Rocky Flats study to several peer conferences. *See* Pls.’ Cons. *Daubert* Resp. at 85-86 & n.66.

Defendants assert all of Dr. Smallwood’s proffered testimony should be stricken for a variety of reasons, none of which have merit. Defendants protest, for example, that Dr. Smallwood’s testimony does not “fit” this action because Dr. Smallwood did not relate his

opinions directly to the Class Area. This argument assumes a requirement that does not exist. It is or should be undisputed that the Class Area is located downwind of the Rocky Flats plant and its potential sources of soil contamination. Dr. Smallwood's proffered testimony regarding the processes by which contaminant-bearing soils from Rocky Flats are available for dispersion to downwind areas, and his conclusions regarding the current and future risk of continuing exposure to plutonium and other toxic materials through this process, are relevant to the interference element of Plaintiffs' nuisance claims and will assist the jury in deciding them.

Defendants also assert that Dr. Smallwood is not qualified to render any opinions relating to the fate and transport of Rocky Flats contaminants through the process of bioturbation and wind entrainment because he is not qualified to quantify the amount of plutonium or other dangerous contaminants transported to off-site locations, to model the alleged dispersion of these air-borne contaminants, or to quantify radiation doses or the resulting health risk. This argument errs in assuming that any or all of these tasks are a prerequisite to forming the opinions set forth in Dr. Smallwood's report. Defendants provide no scientific or legal support for these assumptions and none is apparent to me. Dr. Smallwood's conclusions regarding the past dispersion of contaminant-bearing soils made available through bioturbation and the risk of future exposure through this pathway all flow from and are part of his analysis of the process of bioturbation at the plant site and the biological and physical characteristics of the Rocky Flats site. These subjects and analyses are all within Dr. Smallwood's area of expertise. His conclusion, for example, that quantities of dangerous materials from Rocky Flats have been transported off-site through the process set out in his report is based on his calculation of the fraction of contaminant-bearing soils that is made available for wind dispersion each year, a subject that is within his area of expertise.

Defendants' challenge to Dr. Smallwood's qualitative description of this amount as "substantial" goes to the weight of his testimony and may be addressed on cross-examination.<sup>37</sup>

Defendants contend Plaintiffs intend to elicit trial opinions from Dr. Smallwood on the potential health risk to Class members from off-site releases of Rocky Flats contaminants, and that he is unqualified to testify on this subject. Dr. Smallwood concluded in his report that the suspended and resuspended plutonium at Rocky Flats is respirable based on studies of plutonium uptake by three species of animals in the vicinity of Rocky Flats. Smallwood Report at 45. This conclusion is within his area of expertise.

The only other portion of Dr. Smallwood's report that touches on potential health risk is a short discussion on how the rate of soil bioturbation can be used to estimate airborne releases of specific contaminants in Rocky Flats soil. To illustrate how this could be accomplished, Dr. Smallwood provided a calculation, based on certain conditions and assumptions, regarding the amount of hexavalent chromium released from Rocky Flats and, in the calculation's final line, the predicted lifetime risk from the calculated releases. Dr. Smallwood's report made clear this was merely an "illustrative example" of how the rate of soil bioturbation could be used to estimate releases and risk. *Id.* at 46. Dr. Smallwood, as a systems ecologist trained to collect and integrate information from multiple disciplines, is qualified to illustrate how the information on soil bioturbation that he collected and generated can be used for these purposes.

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<sup>37</sup> Defendants also argue Dr. Smallwood's conclusions regarding future risk are unreliable and without foundation because the waste and disposal areas he examined in 1996 have all now been fully remediated. This factual assertion is largely unsupported in the pretrial record and is undoubtedly disputed by the parties. Whether Dr. Smallwood's study and conclusions are now incorrect because of evidence of changed conditions at the plant site is, moreover, a matter that the jury can decide in assessing the weight and credibility of his testimony.

In his expert report Dr. Smallwood also concluded that the ambient air monitoring stations on and off the Rocky Flats site were inadequate to detect and measure the past and chronic releases of contaminants caused by the resuspension of surface soils through soil bioturbation. *See id.* at 28. Defendants assert this opinion must be excluded because Dr. Smallwood is not qualified to testify as an air monitoring expert and because the opinion is based on insufficient facts and data. Dr. Smallwood is not, however, testifying as an expert on all aspects of Rocky Flats' air monitoring program, but only on whether the monitoring stations at Rocky Flats would capture the kind of contaminant releases that were the subject of his report. Dr. Smallwood has experience evaluating air monitoring programs, *see* Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 28 [hereinafter "Smallwood Dep."] at 65-66, and his work evaluating environmental surveillance and monitoring at nuclear weapons production facilities, including Rocky Flats, has been published in a peer-reviewed journal. *See* Pls.' Cons. *Daubert* Resp., Ex. 29 (Michael L. Morrison, K. Shawn Smallwood & Jan Beyea, *Monitoring the dispersal of contaminants by wildlife at nuclear weapons production and waste storage facilities*, 17 *The Environmentalist* 289 (1997)). He reported reviewing various information sources, including maps showing the locations of air monitoring stations, some air monitoring data, and other information, to support his opinion that the Rocky Flats air monitoring stations were too diffuse in the landscape and were not the appropriate height to detect the chronic release of materials through bioturbation. *See* Smallwood Report at 28; Smallwood Dep. at 56, 64. Dr. Smallwood is sufficiently qualified to testify regarding this subject under Rule 702, and his opinion is based on sufficient facts and data. That he does not specialize in evaluating air monitoring systems does not affect the admissibility of his opinion but rather its weight. *See, e.g., Ralston*, 275 F.3d at 970.

For the reasons stated above, I find Dr. Smallwood's proposed expert testimony satisfies the requirements for admission under Rule 702. Defendants' motion to exclude his testimony and the testimony of Drs. Goble, Clapp and Wing is denied.

**C. Motion to Exclude Plaintiffs' Expert Witness Testimony Relating to Damages**

Plaintiffs offered the testimony of four expert witnesses relating to damages: Drs. John Radke, James Flynn and Paul Slovic and Mr. Wayne Hunsperger. Mr. Hunsperger is Plaintiffs' primary damages expert, and he incorporates the work of Drs. Radke, Flynn and Slovic into his expert report and opinions.

Defendants move to exclude the proffered testimony of each of these witnesses on the grounds that each is unqualified, their proffered testimony will not assist the trier of fact and none used a reliable methodology. *See* Defs.' Am. Br. in Supp. of Mot. to Exclude Expert Witness Test. Relating to Damages (Doc. 1379) [hereinafter "Defs.' Mot. re: Pls.' Damages Experts"]. I address the admissibility of each expert's testimony in turn.

**1. Dr. John Radke**

Dr. Radke holds a Ph.D. in geography from the University of British Columbia. He has held teaching and research positions at Temple University and the University of Pennsylvania. He is currently a tenured professor at the University of California at Berkeley, where he holds appointments in the Department of Landscape Architecture and Environmental Planning, the Department of City and Regional Planning, and the Department of Geography. He is also the director of the Applied Environment Geographic Information Systems ("AEGIS") Laboratory at Berkeley, and has served as an associate dean of computing at the university.

Dr. Radke's proposed expert testimony reports on a three-phase market impact analysis he conducted to assess the effect of proximity to Rocky Flats on property values. *See* Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 23 [hereinafter "Radke Report"] at 2. To perform this analysis, Dr. Radke developed a computerized model that used multiple regression analysis to identify, quantify and explain differences in the value of properties near Rocky Flats and properties located elsewhere in the Denver area. *Id.* at 3.

Multiple regression analysis is a standard quantitative method for understanding the relationship between a "dependent variable," a variable to be explained, and "explanatory" or "independent" variables that are thought to produce or be associated with changes in the dependent variable. *See* Daniel L. Rubinfeld, *Reference Guide on Multiple Regression*, in *Reference Manual on Scientific Evidence* 179, 181 (2d ed. 2000) [hereinafter "*Ref. Guide on Multiple Regression*"]. For his regression analysis, Dr. Radke established property value as the dependant variable and developed a large number of explanatory variables with a potential to affect property value. Dr. Radke's analysis, for example, incorporated standard variables regarding the physical attributes of the individual property being analyzed, such as the size of the parcel and the size, age and attributes of any buildings on it. Radke Report at 4, 11-12, 24, 32-33. Employing his expertise in geographic information systems ("GIS") and spatial modeling, Dr. Radke also developed and incorporated additional variables relating to location-based characteristics of the property, such as neighboring land use, employment levels, demographic data, crime and poverty, traffic volume, accessibility to open space, topography, viewshed and auto travel time to employment and other locations. *Id.* at 4, 12, 25-32, 33.

In Phase I of his study, Dr. Radke and his staff at the AEGIS laboratory measured the effect of proximity to Rocky Flats on the value of three categories of property: commercial properties, multi-residential properties and vacant land. *Id.* at 2, 23-32. His Phase I data set consisted of records for approximately 10,000 real estate transactions for these categories of property obtained from a commercial source. *Id.* at 23. The data set included all transactions in these categories that occurred from 1983 to the end of 1993. *Id.* Because there was not sufficient data to perform a year-by-year analysis for each property category, Dr. Radke pooled the sales records for each property category for this 11-year period. *Id.* at 5. For the period as a whole, Phase I of Dr. Radke's study reported mean undervaluations for Rocky Flats area properties of approximately 22 percent for multi-residential properties, 32 percent for vacant land and 53 percent for commercial properties. *Id.* at 6. The confidence level reported for these results ranged from 85 to 93 percent. *Id.* at 6-7.

In Phase II of his study, Dr. Radke analyzed the effect of proximity to Rocky Flats on the value of a fourth category of properties, single family residential properties. His data set consisted of sales records obtained from the Multiple Listing Service ("MLS") for the Denver area for the period of 1988 to 1995. *Id.* at 32. This data set contains almost 100 percent of the transactions involving single family residences in the Class Area, and was large enough to permit a regression analysis for each of these years that compared the sales prices for these Class Area properties to prices of randomly selected single family residential properties elsewhere in the Denver region. *Id.* at 32. Based on this analysis, Dr. Radke reported undervaluation attributable to proximity to Rocky Flats in each of these years ranging from 5.45 percent to 9.33 percent. The confidence levels for these results approached or equaled 100 percent. *Id.* at 6.



In Phase III of his study, Dr. Radke determined the actual number of properties and acreage of vacant land tracts in the Class Area and evaluated the loss in property value for each property category based on the results of Phases I and II of his study. *Id.* at 7, 47-48.

### *Qualifications*

Defendants argue Dr. Radke is not qualified to testify regarding his Rocky Flats study because he has not previously performed a multiple regression analysis regarding property values and has virtually no education or experience that is relevant to his study. This contention is based on a distorted account of Dr. Radke's deposition testimony. In fact, Dr. Radke testified that his collegiate and graduate level work included extensive course work and study in quantitative (statistical) analysis, which includes multiple regression analysis. He also testified that he teaches quantitative methods, including regression analysis, at the University of California at Berkeley, has performed multiple regression analyses on a number of occasions in the AEGIS lab and has performed a multiple regression analysis for the purpose of valuing property for instructional purposes. Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 24 (Radke Dep.) at 56-59, 85-86; Supplement to Defs.' Mot. to Strike Pls.' Expert Witnesses (Doc. 1426), Ex. 2 (Radke Dep.) at 171. As a result, Dr. Radke has expertise in the field of regression analysis. It is not necessary that he specialize in regression analyses regarding the value of real estate for him to qualify as an expert regarding the regression analysis he performed for this case. *See, e.g., Wheeler*, 935 F.2d at 1100 ("lack of specialization does not affect the admissibility of the opinion but only its weight"); *Stagl v. Delta Air Lines*, 117 F.3d 76, 81-82 (2<sup>nd</sup> Cir. 1997) (rejecting contention that specific expertise required when expert had general expertise in the relevant field). Dr. Radke's analysis and intended testimony also are based in part on his undisputed expertise in

geographic information systems, spatial modeling and computing. In light of Dr. Radke's education, experience and knowledge in these fields and in multiple regression analysis, I find Dr. Radke is qualified to testify regarding the matters addressed in his expert report.

*Relevance/fit*

Defendants maintain Dr. Radke's study and expert testimony, as well as the testimony of Plaintiffs' other damages experts, must be excluded because it is not relevant to and does not fit this action. Defendants' primary argument here is that Plaintiffs' damages experts assessed the diminution in property value based on the proximity of properties to Rocky Flats, instead of any diminution in these properties' value due to Defendants' alleged trespass or nuisance.

I am not persuaded by this argument. First, it assumes that proximity to Rocky Flats and Defendants' alleged trespass and nuisance are independent concepts. *See, e.g.*, Defs.' Mot. re: Pls.' Damages Experts at 8 ("Any property diminution caused by proximity to Rocky Flats is not actionable in this case.") This is not correct. There is a close relationship between proximity to Rocky Flats and the alleged trespass and nuisance, because proximity to the plant determines whether properties are subject to the off-site contamination and alleged risks that underlie these claims. It is for this reason that I previously held that "[e]vidence that class properties have a lower value than comparable properties not in proximity to Rocky Flats, coupled with evidence of Defendants' alleged contamination of these properties and mismanagement of Rocky Flats, is sufficient to allow the jury to infer that diminution in the value of class properties is the result of Defendants' activities and not the result solely of the proximity of these properties to the Plant." *Cook IX*, 273 F. Supp. 2d at 1210. The testimony of Dr. Radke and others regarding reduced property values based on proximity to Rocky Flats is, therefore, relevant to and "fits" this action,

and will assist the jury in deciding whether Defendants' alleged trespass and nuisance to the neighboring Class properties caused a diminution in these properties' value.

Defendants ignore this prior ruling and insist that the testimony of Dr. Radke and Plaintiffs' other damages experts should be excluded because, in effect, these experts did not determine whether some or all of the diminution in value they report might be the product of a general concern about the risk of living near a nuclear facility, as opposed to a response to Defendants' specific operations at Rocky Flats and the trespass and nuisance that allegedly resulted from these operations. Defendants may present evidence and argue to the jury that this is the case. *See Cook IX*, 273 F. Supp. 2d at 1210 n.39. The jury will also be instructed that they may only award damages caused by any trespass or nuisance they find was committed, and may not award damages based only on a property's proximity to Rocky Flats. Mem. Op. re: Jury Instructions, Attach. A ("Start of Trial Instructions"), No. 3.24 (Dec. 7, 2006). The fact remains, however, that the properties allegedly harmed by Defendants' tortious conduct are proximate to Rocky Flats, which renders evidence that these properties have a diminished value relevant to the jury's determination of damages.

In addition, in terms of Dr. Radke's regression analysis, Defendants' complaint would have required Dr. Radke to develop and include additional explanatory variables that differentiated between any price effect caused by generalized concerns about proximity to a nuclear facility and any effect caused by Defendants' alleged misconduct in operating this particular nuclear facility. Even if this were possible,<sup>38</sup> the Supreme Court and other courts have

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<sup>38</sup> Defendants do not suggest how or even if Dr. Radke could have modified his statistical analysis to quantify or differentiate between the price effect of proximity to Rocky Flats and the trespass and nuisance allegedly created by Defendants' activities there and any price effect

held that the actual or alleged omission of explanatory variables from a regression analysis normally affects the weight of the analysis, but does not render it inadmissible. *See Bazemore v. Friday*, 478 U.S. 385, 400 (1986); *Watson v. City of Kansas City*, 857 F.2d 690, 695 (10<sup>th</sup> Cir. 1988); *Cullen v. Ind. Univ. Bd. of Trs.*, 338 F.3d 693, 701 n.4 (7<sup>th</sup> Cir. 2003). A regression analysis “that includes less than all measurable variables” may also be sufficient to prove a plaintiff’s case. *Bazemore*, 478 U.S. at 400 (internal quotation omitted). This is a matter for the finder of fact to decide. *See, e.g., Maitland v. Univ. of Minn.*, 155 F.3d 1013, 1017 (8<sup>th</sup> Cir. 1998) (it is for the finder of fact to consider any omitted variables in determining the weight to accord study results). Thus, there is no merit to Defendants’ contention that Dr. Radke’s regression analysis must be excluded because it does not include additional variables.

Defendants also maintain that exclusion is required under *Koger v. Reno*, 98 F.3d 631 (D.C. Cir. 1996). In *Koger*, the D.C. Circuit considered whether the district court was clearly erroneous in an age discrimination suit in finding at the close of a non-jury trial that the plaintiffs had failed to carry their burden of proving discriminatory intent. *Id.* at 632, 634. The sole evidence offered in support of discrimination at the stage of promotion was a regression analysis showing that younger employees in general had a greater chance of promotion than older employees. *Id.* at 636-37. The district court found this evidence was not sufficient to prove discriminatory intent because it did not show a disparity in promotions that disfavored employees who were 40 or older and thus protected under the ADEA. *Id.* at 637. This decision, therefore, speaks to the probative weight and sufficiency of a regression analysis to the finder of fact, and not to whether an analysis is relevant and admissible under Rule 702.

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based on the proximity to a generic nuclear facility that did not have this history.

At this point, Defendants also have not presented anything more than speculation that all or some of the diminution in property values measured by Dr. Radke may be attributable to what they call “non-actionable” factors, such as generalized aversion to nuclear facilities, rather than to Defendants’ “actionable conduct” of operating this particular nuclear facility in a manner that imposed a trespass and/or nuisance on neighboring properties. Even if Defendants had presented evidence supporting this view, moreover, this consideration would go to the weight and sufficiency of Dr. Radke’s testimony to prove the damages caused by Defendants’ conduct, and not to the separate question of whether Dr. Radke’s testimony is relevant and admissible under Rule 702.

Defendants cite six cases as establishing that an expert’s analysis on damages “is *inadmissible* under *Daubert*” if it does not distinguish “the impact of a defendant’s actionable conduct . . . from a defendant’s non-actionable conduct.” Defs.’ Mot. re: Pls.’ Damages Experts at 9-10 (emphasis in original). First, because of the close relationship between the proximity of a property to Rocky Flats and the alleged trespass and nuisance, I do not believe this case presents the clear-cut distinction between “actionable” and “non-actionable” conduct that was present in the cases cited by Defendants. Second, Defendants have again confused the issues of admissibility of evidence and its sufficiency to prove a material issue, as five of the cited cases do not address the admissibility of the expert’s analysis under *Daubert* or otherwise, but rather consider the sufficiency of this evidence to prove different matters. See *Schmidt & Schmidt, Inc. v. Nordisco Corp.*, 969 F.2d 410, 415 (7th Cir. 1992) (cited in Defs.’ Mot. re: Damages Experts at 9-10); *City of Vernon v. S. Cal. Edison Co.*, 955 F.2d 1361, 1372 (9th Cir. 1992) (same); *Isaken v. Vermont Castings, Inc.*, 825 F.2d 1158, 1165 (7<sup>th</sup> Cir. 1987) (same); *Farley Transp. Co. v. Santa Fe*

*Transp. Co.*, 786 F.2d 1342, 1352 (9<sup>th</sup> Cir. 1985) (same); *In re Oracle Sec. Litig.*, 829 F. Supp. 1176, 1181 (N.D. Cal. 1993) (same). I am not persuaded that the one cited case that does exclude an expert's damages analysis under *Daubert*, *In re Executive Telecard, Ltd. Sec. Litig.*, 979 F. Supp. 1021, 1025-26 (S.D.N.Y. 1997), establishes the general rule asserted by Defendants or requires exclusion of Dr. Radke's study.<sup>39</sup>

Defendants also argue that Dr. Radke's proffered testimony and that of Plaintiffs' other damages experts does not fit and therefore must be excluded because: (1) none of their opinions states in so many words the date or period on which the "injurious situation became complete and comparatively enduring," which is the date on which damages are to be measured in this case pursuant to § 930 of the Restatement (Second) of Torts, *Cook IX*, 273 F. Supp. 2d at 1210, and (2) the experts otherwise fail to couch their analysis and conclusions in the same language as Restatement § 930. These experts' opinions, however, all pertain to diminution in Class Area property values (which is the measure of damages for prospective invasions under Restatement § 930) during the period (1989-1992) that Plaintiffs assert is the proper time for damages to be measured. There is no basis, therefore, for Defendants' assertion that this expert testimony does not "fit" the issues to be decided in this action.

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<sup>39</sup> Nor am I persuaded by Defendants' argument that exclusion is required by the discussion of damages apportionment in the Reference Manual on Scientific Evidence. See Robert E. Hall & Victoria A. Lazear, *Reference Guide on Estimation of Economic Losses in Damages Awards*, in *Reference Manual on Scientific Evidence* 277, 305-07 (2d ed. 2000). Even assuming I was bound by these authors' views, their discussion concerns cases in which it was relatively undisputed that something more than the defendant's actionable conduct had caused at least part of the claimed damages. That is not the case here. The authors' discussion also does not appear directed at the admissibility of a damages analysis, but rather at its sufficiency to prove damages caused by a defendant's actionable conduct.

Finally, Defendants argue that Dr. Radke's study and testimony and that of Plaintiffs' other damages experts is irrelevant because it is over or under-inclusive of the Class in one or more respects. Some of these arguments are based on misconceptions regarding Plaintiffs' burden of proof, including that Plaintiffs are required to prove the diminution in property value at the time each class member purchased their properties. *See* May 2005 Order at 17-18 (Defendants bear burden of proving any setoff for Class members purchasing their properties at a discount). Others improperly assume that only transactions involving class members are probative of the diminution in Class property values. There is no basis for excluding Dr. Radke's regression analysis and testimony on these grounds.

#### *Reliability*

Defendants do not dispute that the type of regression analysis performed by Dr. Radke, referred to as hedonic price modeling, is an accepted and reliable method for assessing the effect of a variable on property values. *See, e.g., In re Polypropylene Carpet Antitrust Litig.*, 93 F. Supp. 2d 1348, 1359 (N.D.Ga. 2000) ("Regression analysis is a well-worn statistical technique used in a variety of contexts to examine the nature of the relation, if any, between two or more variables."). They assert, however, based on the testimony of their rebuttal expert witness, Dr. Daniel McFadden, that Dr. Radke's study and proffered testimony are unreliable and hence inadmissible under Rule 702 because Dr. Radke made two "fundamental methodological errors" in performing his analysis.

The first alleged error concerns Dr. Radke's application of "factor analysis" to account for and eliminate the problem of multicollinearity. Multicollinearity exists when two or more of the "independent variables" in a regression model are perfectly or highly correlated with each other.

*See Ref. Guide on Statistics* at 166; *Ref. Guide on Multiple Regression* at 197, 224. The existence of multicollinearity can cause regression parameters to be estimated imprecisely and thus interfere with the predictive power of the regression analysis. Radke Report at 4; *see Ref. Guide on Multiple Regression* at 197, 224; *In re High Fructose Corn Syrup Antitrust Lit.*, 295 F.3d 651, 660-61 (7<sup>th</sup> Cir. 2002).

Dr. Radke considered some of the location-based characteristics included in his regression to be highly correlated. To counter this influence, he applied an unquestionably established statistical technique, factor analysis, to extract the common variation shared by the correlated variables. *See* Radke Report at 4, 19-20; Jae-on Kim & Charles W. Mueller, *Introduction to Factor Analysis* 9-10 (1978). The result of this process was the development of composite variables to replace the highly correlated variables in the regression analysis. Radke Report at 4.

Defendants' expert, Dr. McFadden, a Nobel award winner in econometrics, disagreed with Dr. Radke's use of factor analysis to reduce multicollinearity among the explanatory variables. *See* App. to Defs.' Mot. re: Pls.' Damages Experts (Doc. 1373), Ex. 10 [hereinafter "1999 McFadden Aff."] at 44-45. In his view, factor analysis was unnecessary to improve the predictive power of the regression and could worsen it by introducing bias. *Id.* Defendants do not indicate whether Dr. McFadden provided some alternative method for dealing with multicollinearity, or whether he believed it was not a concern in a regression analysis to determine the relationship between property value and proximity to Rocky Flats.

Defendants cite no authority, other than Dr. McFadden's opinion, that Dr. Radke's use of factor analysis was unsound. In addition, as noted earlier, disputes regarding the failure to include variables in a regression analysis affect the probativeness of the analysis' results, but not its



admissibility. *Bazemore*, 478 U.S. at 400; *see Watson*, 857 F.2d at 695. Dr. Radke's omission of highly correlated explanatory variables and replacement of them with consolidated variables derived through factor analysis falls within this rule. Other courts, moreover, have admitted expert testimony in the face of expert disagreement regarding the proper treatment of multicollinearity in the regression analysis. *See In re High Fructose Corn Syrup Antitrust Litig.*, 295 F.3d at 660-61 (refusing to second-guess district court's admission of regression analyses that addressed multicollinearity in different ways). I see no reason for a different result here.

The second methodological flaw alleged by Defendants concerns Dr. Radke's use of an established statistical technique known as "weighted least squares" estimation in Phase II of his analysis.<sup>40</sup> Dr. Radke stated he used this technique to balance the influence of 100 percent sampling inside the Class Area and 4 percent sampling in the greater Denver area, so as to ensure that the regression results reflected the property market of these two areas. Radke Report at 45; *see App. to Defs.' Mot. re: Pls.' Damages Experts (Doc. 1373), Ex. 4 (Radke Dep.) at 393-95.* Dr. McFadden asserts this is a blatant statistical error because, he asserts, use of this technique, as opposed to "ordinary least squares," contradicts the Gauss-Markov theorem and is only appropriate to correct for heteroscedasticity.<sup>41</sup>

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<sup>40</sup> Although Defendants assert this as a general criticism of Dr. Radke's study, both Dr. Radke and Dr. McFadden discuss this technique only in relation to Phase II of the study. *See Radke Report at 45; 1999 McFadden Aff. at 54.*

<sup>41</sup> Heteroscedascity exists "[w]hen the error associated with a multiple regression model has a nonconstant variance; that is, the error values associated with some observations are typically high, whereas the values associated with other observations are typically low." *Ref. Guide on Multiple Regression at 223.*

Plaintiffs do not dispute that if the conditions of the Gauss-Markov theorem are met, one of which is that the data are homoscedastic, then ordinary or unweighted least squares is the best technique to employ. *See* Aug. 2, 2005 Tr. at 416. It also appears undisputed that use of weighted least squares is a proper method for correcting for heteroscedasticity of data. *Id.* What is not clear is whether the data here were, in fact, heteroscedastic or whether Dr. McFadden is correct that weighted least squares can *only* be used if this condition is met, so that use of this technique in any other circumstances is improper under accepted statistical principles. Neither party addressed these questions adequately in their briefing and argument.<sup>42</sup>

The ultimate question here, however, is whether the use of weighted least squares, even if technically improper, so undermined Dr. Radke's use of an otherwise reliable methodology that his Phase II study must be deemed unreliable and inadmissible under Rule 702. *See Paoli*, 35 F.3d at 746 (flaw in expert's method only warrants exclusion "if the flaw is large enough that the expert lacks good grounds for his or her conclusions;" internal quotation omitted). Defendants argue the alleged error had this effect, because when Dr. McFadden ran Dr. Radke's Phase II analysis with ordinary rather than weighted least squares, he found no property value effect whatsoever due to proximity to Rocky Flats.

In fact, the record reveals that Dr. McFadden modified Dr. Radke's analysis in several significant respects in addition to using an unweighted regression. *See* 1999 McFadden Aff.

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<sup>42</sup> Plaintiffs asserted that Defendants' expert Dr. Kenneth Wise testified at deposition that the Phase II data might well be heteroscedastic, but the deposition excerpt referenced and provided by Plaintiffs does not include this statement. *See* Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 37 (Wise Dep.) at 64. Dr. McFadden and Defendants both assert use of weighted least squares in the absence of heteroscedasticity violates fundamental regression principles, and cite some statistical authority to this effect, but did not include copies of this authority in the exhibits supporting their motion.

at 55; Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 36 [hereinafter "McFadden Dep.,"] at 85-89.

These additional modifications included using ordinary rather than stepwise regression, eliminating factor analysis, adding one or more explanatory variables and revising Dr. Radke's proximity variables "in order to obtain direct estimates of the impact of the FBI raid and publicity." 1999 *McFadden Aff.* at 55; *see* *McFadden Dep.* at 85-89.<sup>43</sup> Under these circumstances, it is not possible to determine if any effect can be attributed to Dr. Radke's allegedly improper use of weighted rather than ordinary least squares estimation.<sup>44</sup>

After careful consideration of the parties' arguments and the reports of Drs. Radke and *McFadden*, I am persuaded that Plaintiffs have carried their burden of demonstrating that

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<sup>43</sup> Dr. *McFadden* reported making similar modifications to Dr. Radke's Phase I study as well. *See* 1999 *McFadden Aff.* at 49; *McFadden Dep.* at 85-89.

<sup>44</sup> The last "correction" Dr. *McFadden* made to Dr. Radke's analysis is also instructive. It is clear from this correction and other elements of Dr. *McFadden*'s report that he assumed that the question to be determined was the "price effects of the 1989 FBI raid." 1999 *McFadden Aff.* at 59; *see id.* at 24-25; Exs. to Pls.' Mem. in Opp'n to Defs.' Mot. Under R. 37(c)(1) (Doc. 1024), Ex. E (*McFadden* expert report) at 5-6, 13-14. Towards this end, Dr. *McFadden* criticized Dr. Radke's study for not focusing on property values before and after the FBI raid and for not taking steps to eliminate any proximity-related discount that existed before the raid. *See, e.g.,* 1999 *McFadden Aff.* at 24-25. Dr. *McFadden* apparently took these corrective steps in his revision of Dr. Radke's model. The measure of damages in this case, however, is not the price differential before and after the FBI raid, it is the difference in price but for Defendants' alleged trespass and nuisance on designated properties in proximity to Rocky Flats. *See, e.g., Cook IX*, 273 F. Supp. 2d at 1209-10. While one of Dr. Radke's objectives in his study was to determine if there was a causative link between the FBI raid and depressed real estate values, *see Radke Report* at 3, the majority of his study and conclusions are focused on determining the market impact, if any, of Rocky Flats on area property values over time, *see, e.g., id.* at 6-8; App. to Defs.' Mot. re: Pls.' Damages Experts (Doc. 1373), Ex. 4 (*Radke Dep.*) at 442 (study measured effect of proximity to Rocky Flats, not just effect of the FBI raid there). As a result, Dr. Radke's regression model is more consistent with the "but for" question and measure of damages than the narrower and legally erroneous "before and after" the FBI raid question and damages measure assumed by Dr. *McFadden*. The lack of price effect reported by Dr. *McFadden* in his revised regressions, therefore, may be explained as much or more by his redefinition of the question to be answered than by his correction of Dr. Radke's alleged methodological errors.

Dr. Radke's study and testimony are sufficiently reliable to be admissible under Rule 702. The alleged errors in Dr. Radke's otherwise reliable methodology do not rise to a level that warrants exclusion, but rather bear on the probativeness of his testimony and his credibility.<sup>45</sup> Dr. Radke explained the basis for his use of factor analysis and least weighted squares in his report and deposition, and Defendants may test his explanation and assumptions on cross-examination and through Dr. McFadden's rebuttal testimony. *See United States v. Cavely*, 318 F.3d 987, 997-98 (10<sup>th</sup> Cir. 2003) (challenges to the assumptions underlying expert's testimony go the weight of expert's testimony, not its admissibility).

*Disclosure issues*

Finally, Defendants argue Dr. Radke's expert testimony must be excluded as a discovery sanction or under *Daubert* because he did not produce certain information requested by Defendants. This contention has an extensive history in this case, which is relevant to my decision here.

This history begins in August 1996 when Plaintiffs timely served Defendants with Dr. Radke's lengthy and detailed expert report. Defendants subsequently requested by letter that Plaintiffs and Dr. Radke provide documents and computer files in forty-four enumerated categories to enable Defendants "to evaluate" his report. Defs.' Mot. to Compel (Doc. 992), Ex. B (Letter dated Jan. 13, 1997, from S. Jonathan Silverman to Merrill G. Davidoff) at 1. Some of these requests were relatively specific, while others were extremely broad and/or would have required Dr. Radke to create new documents and databases for Defendants. *See id.*

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<sup>45</sup> The same is true of Defendants' additional arguments that Dr. Radke erred in his calculation of damages to vacant land due to proximity to Rocky Flats and that Dr. Radke's control area may be biased in one or more respects.

In response to these informal discovery requests, Plaintiffs and Dr. Radke provided Defendants with extensive computerized data, documents, direction and explanation in nine separate transmittals. Dr. Radke reported that he and his staff devoted over 300 hours to this effort. *See* Pls.' Mem. in Opp'n to Defs.' Mot. Under R. 37(c)(1) (Doc. 1023), Attach. (Radke Decl.). Plaintiffs repeatedly requested that Defendants pay for the expert fees and other costs of producing these materials, but Defendants refused.

In March, 1997, after Defendants' informal discovery requests and Plaintiffs' responses, Defendants deposed Dr. Radke for two days. A month later, Defendants' expert, Dr. McFadden, issued a thirty-page rebuttal report to Dr. Radke's study. *See* Exs. to Pls.' Mem. in Opp'n to Defs.' Mot. Under R. 37(c)(1) (Doc. 1024), Ex. E [hereinafter "McFadden Report"]. In it, Dr. McFadden asserted Dr. Radke had made several important methodological errors, as previously described. He also complained that Dr. Radke had not produced certain documentation that the National Science Foundation and major journals required be retained and made available regarding published economic studies so that interested scientists could replicate the studies.<sup>46</sup> *Id.* at 4. Nonetheless, Dr. McFadden reported that he had "examined the methodological, statistical, and technical procedures followed by Dr. Radke," *id.* at 4, and that an

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<sup>46</sup> Specifically, Dr. McFadden criticized Dr. Radke for not maintaining a log of certain portions of his analysis that he performed interactively and for providing incomplete documentation on the method he used to sample single-family residential sales in the control area, the models he used to construct certain location-based variables, and details on certain of his damages calculations. *See* McFadden Report at 4, 6, 8, 18, 29.

associate was able to replicate Dr. Radke's Phase I regression analysis and his Phase II analysis and results, *see id.* at 2, 15, 21.<sup>47</sup>

Several months later, Defendants moved to exclude Dr. Radke's report and expert testimony under Rule 702 and *Daubert*. Defs.' Mot. to Strike Pls.' Experts (Doc. 981). In support of their motion, Defendants argued, based on their evaluation of Dr. Radke's report, the additional information he produced and Dr. McFadden's rebuttal report, that Dr. Radke's intended expert testimony was neither relevant nor reliable. Defs.' Br. in Supp. of Mot. to Strike Pls.' Experts (Doc. 984) at 29-36. Notably, Defendants did not assert that Dr. Radke's expert report or subsequently produced documentation was inadequate for any purpose.<sup>48</sup>

Shortly thereafter, Plaintiffs sought to depose Dr. McFadden regarding his rebuttal report. Defendants responded by filing a motion for protective order to postpone Dr. McFadden's deposition. The basis of this motion was Defendants' assertion that Plaintiffs should be compelled to produce additional information regarding Dr. Radke's analysis before Dr. McFadden was deposed. *See* Defs.' Mot. to Compel and for Protective Order (Doc. 992). Defendants detailed seven categories of information they believed should be produced, all of which they asserted

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<sup>47</sup> In his deposition, Dr. McFadden explained that he used "replicable" to mean that "I can take someone's description background documentation in which they say what they have done and, by using their descriptions and their data and so forth, I can reproduce mechanically what they did." Exs. to Pls.' Mem. in Opp'n to Defs.' Mot. Under R. 37(c)(1) (Doc. 1024), Ex. G (excerpts from McFadden deposition) at 179.

<sup>48</sup> This motion to strike was itself later stricken. *See supra* note 7.

should have been but were not produced in response to their previous informal letter requests.<sup>49</sup>

*See id.* at 1 & Ex. A.

Plaintiffs opposed Defendants' motions on various grounds, including Dr. Radke's testimony in deposition that the information already produced, *i.e.*, his expert report and the additional materials produced in 1997, were sufficient to enable a researcher knowledgeable in the field to understand Dr. Radke's methodology and reproduce the same results from his data (except for random variation in the sampling process). *See* Pls.' Resp. to Defs.' Mot. to Compel (Doc. 998), Ex. K (excerpts from Radke deposition) at 129. Plaintiffs further pointed to Dr. McFadden's rebuttal report and Defendants' motion to strike Dr. Radke's testimony as evidence that Defendants had more than sufficient information to evaluate and challenge Dr. Radke's work. In addition, Plaintiffs reported they had already produced much of the requested information to Defendants or that it was otherwise available to Defendants. They also reported that certain of Defendants' requests would unnecessarily require Dr. Radke to generate new documents or computer files and that Dr. Radke estimated it would require one full time staff person four months to search for and retrieve the additional, exceedingly detailed information Defendants sought from the University of California at Berkeley's back-up computer media. Pls.' Resp. to Defs.' Mot. to Compel at 3-7.

In a heated reply, Defendants characterized Plaintiffs' response as an admission that all of the information they requested had either been lost or destroyed. *See* Defs.' Reply in Supp. of Mot. to Compel (Doc. 1002). They further asserted that Rule 26 required Plaintiffs and

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<sup>49</sup> Defendants had not requested any of this information through interrogatories or the other traditional discovery methods authorized by the Federal Rules.

Dr. Radke to disclose the requested information and moved that Dr. Radke be precluded from testifying as a sanction for his alleged misconduct and failure to disclose. *See, e.g., id.* at 5, 10, 19, 27. Plaintiffs did not have an opportunity to respond to Defendants' latest assertions and request for sanctions before Defendants' motion was decided.

Essentially all of Defendants' motion was denied by Magistrate Judge Borchers, to whom all discovery matters were referred at that time, in an order entered on March 31, 1998. *See* Mem. Op. and Order (Doc. 1003) [hereinafter "March 1998 Order"]. The rationale for his decision on the motion to compel was that the information sought by Defendants did not exist and therefore could not be produced.<sup>50</sup> At two points, the magistrate judge speculated about whether it was possible to replicate Dr. Radke's work without certain of this information and, if not, that this might be a basis on which to exclude his testimony. *See id.* at 6, 7. He stated that sanctions were not available under Federal Rule 37, however, because no discovery order had yet been violated. *See id.* at 8-9. He also denied Defendants' request to postpone Dr. McFadden's deposition.

Defendants did not file any objections to the magistrate judge's order. Instead, some weeks later they filed a separate motion in the district court to exclude Dr. Radke's testimony under Rule 37(c)(1). Defendants based their motion on the magistrate judge's alleged findings that Plaintiffs had violated Rule 26(a)(2) by failing to produce the information sought by Defendants in their Motion to Compel and that this lack of compliance was neither substantially justified nor harmless. *See* Defs.' Mot. Under R. 37(c)(1) (Doc. 1004); Defs.' Mem. in Supp. of

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<sup>50</sup> Magistrate Judge Borchers granted the motion to compel with respect to some limited geographic data. *See* March 1998 Order at 7, 9.



Mot. Under R. 37(c)(1) (Doc. 1007). Plaintiffs opposed the motion on numerous grounds, including that Defendants had mischaracterized the magistrate judge's findings and order and were improperly attempting an end-run around his refusal to impose sanctions under Rule 37. Pls.' Mem. in Opp'n to Defs.' Mot. Under R. 37(c)(1) (Doc. 1023).

I denied Defendants' motion for sanctions, holding that it was premature because Plaintiffs had not yet sought to rely on Dr. Radke's expert testimony. *Cook v. Rockwell Int'l Corp.* (*Cook VIII*), 181 F.R.D. 473, 488-89 (D. Colo. 1998). I also found at that time that "[t]he facts relied on and relief sought in this motion are identical to the facts considered and the relief denied by the magistrate judge. Defendants' more appropriate course of action would have been to seek reconsideration or to file an objection to the magistrate judge's denial of Rule 37(c)(1) sanctions." *Id.* at 489 n.16.

Now, seven years later, Defendants have renewed their argument that Dr. Radke's testimony should be excluded under Rule 37(c)(1) as a sanction for his failure to provide the information requested in Defendants' January, 1998 Motion to Compel. I again deny Defendants' motion.

First, as I stated in 1998, the proper method for Defendants to raise this issue before me was to file an objection to the magistrate judge's denial of Rule 37 sanctions. Rule 72 requires a party to file any objection to a magistrate judge's order on a matter such as this within 10 days of being served with the order. Fed. R. Civ. P. 72(a). Defendants did not timely or otherwise file objections to the magistrate judge's order.<sup>51</sup> By failing to object, Defendants waived the right to

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<sup>51</sup> Even if Defendants' Rule 37 motion could be construed as an objection to the magistrate judge's order, it would have been untimely under Fed. R. Civ. P. 72(a) because it was filed nearly three weeks after service of the order.

challenge the magistrate judge's denial of Rule 37 sanctions and, necessarily, waived the right to seek the same relief before me through a separate motion for Rule 37 sanctions. *See* Fed. R. Civ. P. 72(a) (party that fails to timely object may not assert error in magistrate judge's ruling); *Frontier Refining, Inc. v. Gorman-Rupp Co.*, 136 F.3d 695, 706 (10<sup>th</sup> Cir. 1998) (failure to file timely objection waives right to appeal magistrate judge ruling); *Sunview Condominium Ass'n v. Flexel Int'l, Ltd.*, 116 F.3d 962, 964 (1<sup>st</sup> Cir. 1997) (party that fails to file timely objection to magistrate judge ruling may not resurrect issue in different venue).

Defendants' request for Rule 37 sanctions is also subject to denial on the merits. Defendants assert that the magistrate judge's March 31, 1998 order adjudicated and found that Dr. Radke's expert report was incomplete and therefore violated Rule 26(a)(2).<sup>52</sup> They further assert that the magistrate judge found this lack of disclosure was neither substantially justified nor harmless, which would trigger the automatic sanction of precluding Dr. Radke's testimony under Rule 37(c)(1).<sup>53</sup> *See* Defs.' Mem. in Supp. of Mot. Under R. 37(c)(1) (Doc. 1007); Defs.' Mot. re: Pls.' Damages Experts at 28-29 (incorporating 1998 Rule 37 motion). The magistrate judge, however, made no findings with respect to Dr. Radke's expert report or his compliance with Rule 26(a)(2). He also made no findings as to whether any lack of disclosure was substantially justified or harmless. Moreover, notwithstanding his misgivings about some of Dr. Radke's

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<sup>52</sup> As relevant here, Rule 26(a)(2) requires a party to produce a written report for each expert witness that contains "a complete statement of all opinions to be expressed and the basis and reasons therefor" and "the data or other information considered by the witness in forming the opinions." Fed. R. Civ. P. 26(a)(2)(B).

<sup>53</sup> Rule 37(c)(1) provides that "[a] party that without substantial justification fails to disclose information required by Rule 26(a) . . . is not, unless such failure is harmless, permitted to use as evidence at a trial, at a hearing, or on a motion any witness or information not so disclosed." Fed. R. Civ. P. 37(c)(1).

disclosures, the magistrate judge affirmatively denied Defendants' request for sanctions under Rule 37. Under these circumstances, there is no basis for asserting that the magistrate judge made findings that require the imposition of sanctions under Rule 37(c)(1).<sup>54</sup>

I have also examined Dr. Radke's expert report and disclosures in light of Defendants' complaints and find no violation of Rule 26(a)(2). Defendants assert Rule 26(a)(2) was violated, because, they argue, without the detailed working notes, intermediate results and computer records they requested, their rebuttal expert could not replicate all of Dr. Radke's results when he reviewed and tested the methodology set forth in Dr. Radke's expert report and other disclosures. Rule 26(a)(2)'s requirements that the expert's report include his opinions and reasoning and "the data or other information considered by the witness in forming the opinions" do not, however, require that the expert report contain, or be accompanied by, all of the expert's working notes or recordings. *Gillespie v. Sears, Roebuck & Co.*, 386 F.3d 21, 35 (1<sup>st</sup> Cir. 2004). Nor is there any suggestion in Rule 26(a)(2) that an expert report is incomplete unless it contains sufficient

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<sup>54</sup> Defendants also assert that the magistrate judge found that the information Defendants requested "no longer exist[ed]" or had "disappeared," thus implying that he had found some kind of misconduct or spoliation of relevant evidence by Dr. Radke or Plaintiffs. *See, e.g.*, Defs.' Mot. re: Pls.' Damages Experts at 28, 29; Defs.' Mem. in Supp. of Mot. Under R. 37(c)(1) at 1. In fact, the magistrate judge stated only that most of the material "does not exist," without addressing whether it had ever existed in the form requested by Defendants. *See, e.g.*, March 1998 Order at 4, 5, 7. Even these statements by the magistrate judge are subject to question, however, as the record before him was that most of the information at issue was available in the back-up files of the University of California at Berkeley's computing system or from third-party vendors, had already been produced, and/or existed in a form other than that requested by Defendants. Thus, the magistrate judge's statements that most of these materials did not exist at best oversimplified an admittedly complicated factual situation and at worst were clearly erroneous. Because Plaintiffs were the prevailing party under the magistrate judge's order, they had no reason or basis to file objections to the order to correct the magistrate judge's statements.

information and detail for an opposing expert to replicate and verify in all respects both the method and results described in the report.<sup>55</sup>

The purpose of Rule 26(a)(2)'s expert disclosure requirements is to eliminate surprise and provide the opposing party with enough information regarding the expert's opinions and methodology to prepare efficiently for deposition, any pretrial motions and trial. *See Sylla-Sawdon v. Uniroyal Goodrich Tire. Co.*, 47 F.3d 277, 284 (8<sup>th</sup> Cir. 1995); *Nguyen v. IBP, Inc.*, 162 F.R.D. 675, 682 (D. Kan. 1995). Dr. Radke's detailed, 82-page expert report (including appendices) and other disclosures were sufficient to enable Defendants to depose Dr. Radke, to retain a rebuttal expert who prepared a lengthy rebuttal report analyzing and critiquing Dr. Radke's methodology, and to file a motion to strike Dr. Radke's testimony based on this critique. Based on these circumstances and my own review of Dr. Radke's expert report, I find it complied with Rule 26(a)(2).

Defendants' argument also confuses the expert reporting requirements of Rule 26(a)(2) with the considerations for assessing the admissibility of an expert's opinions under Rule 702 of the Federal Rules of Evidence. Whether an expert's method or theory can or has been tested is one of the factors that can be relevant to determining whether an expert's testimony is reliable enough to be admissible. *See Fed. R. Evid. 702 2000 advisory committee's note; Daubert*, 509 U.S. at 593. It is not a factor for assessing compliance with Rule 26(a)(2)'s expert disclosure requirements.

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<sup>55</sup> Nor does Rule 26(a)(2) require that an expert report contain all the information that a scientific journal might require an author of a published paper to retain or all of the information that the authors of the Reference Manual on Scientific Evidence suggest can be helpful in resolving disagreements about statistical studies.

I have also considered Dr. McFadden's complaints regarding inadequate disclosure in deciding whether Dr. Radke's testimony satisfies the requirements for admission under Rule 702 and *Daubert*. I find these complaints do not warrant exclusion of Dr. Radke's expert testimony. First, Dr. McFadden's rebuttal report and various affidavits establishes that he was in fact able to evaluate, test and indeed replicate much of Dr. Radke's work and results, including his Phase I and Phase II methodology and his Phase II results. *See, e.g.*, McFadden Report at 2, 15, 21; 1999 McFadden Aff. at 4, 49, 55. Thus, Dr. Radke's methodology could be and was tested by Dr. McFadden, notwithstanding Dr. Radke's allegedly inadequate disclosures.

The gist of Dr. McFadden's complaints is that he was not able to replicate Dr. Radke's construction of some location-based variables or "verify" all of his regression results. Dr. McFadden blames both circumstances on inadequate disclosure by Dr. Radke, and presumably Dr. McFadden would have had more success in his efforts if Dr. Radke had produced all of the voluminous information requested by Defendants. Dr. Radke, however, testified that he produced sufficient information that "persons knowledgeable in the relevant disciplines" would be able to reproduce his methodology and results. Pls.' Mem. in Opp'n to Defs.' Mot. Under R. 37(c)(1) (Doc. 1023), Attach. (Radke Decl., dated June 11, 1998), ¶¶ 6, 9; Pls.' Resp. to Defs.' Mot. to Compel (Doc. 998), Ex. K (Radke Dep.) at 129. The dispute between the two experts about whether Dr. Radke's methods and results could be fully replicated, at all or from the information he provided, presents a jury question that requires consideration of both experts' qualifications and methodology.<sup>56</sup> Any suggestion that an opposing expert must be able to "verify" the

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<sup>56</sup> For example, Dr. McFadden's chief complaint concerns his inability to replicate Dr. Radke's use of GIS and gravity modeling techniques to construct certain location-based variables. It is unclear from the record, however, whether Dr. McFadden has experience or

correctness of an expert's work before it can be admitted also misstates the standard for admission of expert evidence under Rule 702. *See Bitler*, 400 F.3d at 1233 (not necessary for party to demonstrate expert is indisputably correct to establish reliability under Rule 702); *Paoli*, 35 F.3d at 744 (“evidentiary requirement of reliability is lower than the merits standard of correctness”). As a result of these considerations and the fact that Dr. McFadden admittedly was able to test and evaluate most of Dr. Radke's work, I find that his remaining complaints go to the weight and credibility of Dr. Radke's proffered testimony, and not to whether it is admissible.

Finally, Defendants' authority for excluding Dr. Radke's expert testimony under *Daubert* based on his allegedly inadequate disclosure does not withstand scrutiny. Defendants assert “[w]here, as here an expert has failed to document his work and make it available for review – thereby rendering his opinions non-replicable and non-testable – courts have consistently excluded such testimony under *Daubert*.” Defs.' Mot. re: Pls.' Damages Experts at 29 (citing *Reed v. Binder*, 165 F.R.D. 424 (D.N.J. 1996) and *Nguyen v. IBP, Inc.*, 162 F.R.D. 675 (D. Kan. 1995)). In addition to over-stating Dr. McFadden's actual complaints, this statement is not supported by either of the cited cases. Neither case addresses the admissibility of expert testimony under *Daubert* or Rule 702. Nor did the courts in these cases address a situation in which an expert's opinion was “non-replicable or non-testable” due to lack of disclosure. They instead considered whether expert reports that were grossly deficient in failing to provide multiple categories of information required by Rule 26(a)(2) warranted sanctions. *See Reed*, 165 F.R.D. at 429-31;

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expertise in these fields.

*Nguyen*, 162 F.R.D. at 679-82. In neither case did the court exclude the expert's testimony.<sup>57</sup>

Accordingly, neither case supports any element of the proposition for which they are cited, or Defendants' more general argument that Dr. Radke's regression analysis and testimony should be excluded for lack of adequate disclosure.

## **2. Dr. Paul Slovic and Dr. James Flynn**

Drs. Slovic and Flynn are social scientists associated with Decision Research Institute, a nonprofit research institute specializing in the study of human judgment, decision making and risk assessment. Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 25 [hereinafter "Slovic Report"] at 1; *id.*, Ex. 11 (Flynn curriculum vitae) at 1. Dr. Slovic, the President of Decision Research, holds a Ph.D. in psychology from the University of Michigan and is a professor of psychology at the University of Oregon. His lengthy curriculum vitae demonstrates that he has more than 30 years experience in researching human behavior in situations of risk, and is recognized as a leading authority in the field of risk perceptions and their effects on human decision-making. *See* Slovic Report at 1-2 & attach. (Slovic curriculum vitae). His work is extensively published and he has served as a consultant to numerous companies and government agencies. His experience includes service on the Board of Directors for the National Council on Radiation Protection and Measurements and the Board on Radioactive Waste Management of the National Research Council/National Academy of Sciences. *See id.*

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<sup>57</sup> In *Reed*, the court found barring the expert's testimony to be unduly harsh and instead required the party whose experts had made the inadequate disclosure to bear the fees charged by their experts for the discovery depositions. 165 F.R.D. at 431. In *Nguyen*, the court allowed the offending party to provide a supplemental disclosure to correct the deficiencies in the expert's report. 162 F.R.D. at 682.

Dr. James Flynn is a senior research associate at Decision Research who specializes in risk communications, survey research, socioeconomic impact assessment, community studies and public planning. Pls.' Cons. *Daubert* Resp., Ex. 11 (Flynn curriculum vitae) at 1. He has over 20 years experience directing, managing and conducting research in these fields for a wide range of federal, state and local governments and private-sector clients. *Id.* at 1-2. He has significant experience in the study of public perception of risk, especially regarding risks from radiation. *See id.* at 2-3. This experience includes surveys and other research performed for the U.S. Nuclear Regulatory Commission and the U.S. Department of Energy's Low Dose Research Program on Risk Communication. *Id.* at 2. Dr. Flynn's work in this and related fields is widely published. *See id.*; Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 12 [hereinafter "Flynn Dep.,"] at 212-14.

Drs. Slovic and Flynn prepared three expert reports regarding their intended expert testimony in this case. The first, authored by both experts, is their "Final Report: Rocky Flats Health and Housing Survey." Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 13 [hereinafter "Survey Report"]. It reports the results of a public opinion survey designed by Decision Research Institute and executed by the University of Maryland Survey Research Center to obtain information relating to the effects of the Rocky Flats plant on property values in the potentially affected communities of Arvada and Westminster (which include the Class Area). *See id.* at 1-3. In a second expert report, "Factors Influencing Risk Assessment, Risk Perception, and Risk Acceptance," Dr. Slovic describes the social and psychological factors that influence the perception and acceptance of risk in society and relates these factors to the perception and acceptance of risks associated with the release of radioactive materials from Rocky Flats. *See Slovic Report.* In a third report, titled "The June 6, 1989 FBI Raid at Rocky Flats, Colorado:



Risk, Media, and Stigma,” Drs. Flynn and Slovic present the results of an examination of Denver area newspaper stories resulting from the FBI raid and relate them to the perception of risk and the potential stigma associated with Rocky Flats. Exs. to Pls.’ Resp. to Defs.’ Mot. to Strike Pls.’ Experts (Doc. 1079), Ex. 8 [hereinafter “Media Report”]. The Survey Report and Media Report have been peer reviewed and published. See James Flynn, *et al.*, *Risk, Media, and Stigma at Rocky Flats*, 18 *Risk Analysis* 715 (1998).

Although Defendants seek to exclude all expert testimony by Drs. Flynn and Slovic, their arguments are directed almost exclusively to their proffered testimony regarding the public opinion survey that is the subject of the Survey Report. Accordingly, I will address the admissibility of this testimony first before addressing the admissibility of the expert testimony disclosed in the Slovic and Media Reports.

**a. Survey Report**

The Survey Report describes a public opinion survey Drs. Flynn and Slovic designed to assess the public’s perception of Rocky Flats and its effect on the desirability and value of properties in the Class Area (“Flynn/Slovic survey”). The survey’s target population was residents of the Denver metropolitan area and of Arvada and Westminster who had purchased or been actively involved in the housing market the previous five years or who planned to purchase a home in the area in the next few years. Survey Report at 1-2. The survey was conducted by telephone interview between August 31, 1995 and October 1, 1996. *Id.* at 2-3. All interviews were conducted by staff from the University of Maryland Survey Research Center Telephone Facility, *id.*, and neither the interviewers nor the respondents knew the identity of the party that

had commissioned the survey, Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 10 [hereinafter "Flynn & Hunsperger Resp.,"] at 12.

In the first half of the survey, the interviewer asked a series of questions to determine whether the respondent was part of the target population of actual or likely home buyers. Survey Report at 4. If so, then the interviewer proceeded to ask general questions about Arvada and Westminster, which encompass the Class Area, and another Denver area community. *Id.* Respondents were asked to rate the communities on a list of ten community characteristics and to answer open-ended questions about them. *Id.* None of the questions during this portion of the interview mentioned Rocky Flats. *Id.* at 5.

The second half of the interview was designed to isolate the respondent's perception of Rocky Flats. *Id.* at 6. It began with questions asking if the respondent had heard about the Rocky Flats nuclear weapons plant and where it is located relative to Denver. *Id.* The interviewer then asked the respondent to state up to three things that came to mind when they thought of Rocky Flats, and to provide an overall impression of the plant using a scale of "strongly positive" to "strongly negative." *Id.* Respondents were then asked if Rocky Flats made homes in the Arvada/Westminster area more or less desirable. *Id.* at 7. Next, they were asked whether they believed the existing two-mile buffer zone around the facility provided adequate protection or whether a 4-6 mile zone or some greater distance would be adequate. *Id.* at 9.

The interviewer then presented a progression of scenarios to respondents that were designed to determine how Rocky Flats would influence the decision to purchase a home. Respondents were first asked whether they would purchase an otherwise desirable house located 2-4 miles from Rocky Flats and, if not, whether they would purchase the same house at a distance

of 4-6 miles from Rocky Flats. *Id.* at 11. Respondents who answered “no” to both scenarios were then asked if they would purchase the same house at a distance of 4-6 miles from Rocky Flats at a \$5000 discount and, if that was refused, at a \$10,000 discount. *Id.* Respondents who were not willing to purchase with either discount were then given the opportunity to state the discount at which they would purchase the house. *Id.* at 11-12. Respondents who answered that they would not purchase a house within 4-6 miles of Rocky Flats at any discount were recorded as having rejected distance and price discounts for property within six miles of Rocky Flats.<sup>58</sup> *Id.* at 11-12. Respondents who were willing to purchase a house 4-6 miles from Rocky Flats at a discounted price of some amount were also asked if they would accept a house within 2-4 miles of Rocky Flats with the same or another discount. *Id.* at 12.

Finally, following these housing scenario questions, the interviewers asked respondents about their knowledge or opinions about specific issues involving Rocky Flats. Questions included whether the respondent believed Rocky Flats posed a health risk, whether it had affected the value of near-by properties and was safe, and whether they had heard about the FBI raid. *Id.* at 17-21.

The Survey Report included statistical summaries of the responses to each set of questions, generally distinguishing between residents of the Denver metro area and of the Arvada/Westminster area. Based on the survey results, most notably including that 46.2 % of Denver area residents reported they would not purchase a house within six miles of Rocky Flats at any price, Drs. Flynn and Slovic concluded that the history and reputation of Rocky Flats made

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<sup>58</sup>

The Class Area extends approximately six miles from Rocky Flats.

housing near the plant less desirable and caused downward pressure on property values in this area. *Id.* at 21-23.

#### *Qualifications*

Defendants assert neither Dr. Flynn nor Dr. Slovic has any credentials that qualify them to design, conduct or testify as an expert regarding a public opinion survey. This assertion is belied by both witnesses' extensive experience and training in decision-making and opinion research, including the design and performance of public opinion surveys. In fact, Defendants' rebuttal expert, Dr. Daniel Kahneman, testified that Dr. Slovic has made important contributions to this field. Supplemental App. to Defs.' Reply Br. in Supp. of Mot. to Strike Pls.' Experts (Doc. 1092), Vol. III, Ex. 12 [hereinafter "Kahneman Report"] at 2.<sup>59</sup> Defendants' further complaint that Drs. Flynn and Slovic are not experts in real estate valuation improperly assumes that such expertise was required to design and perform the public opinion survey and to testify regarding its results. I find Drs. Flynn and Slovic are qualified to testify as experts regarding the public opinion survey that is the subject of their Survey Report.

#### *Relevance/fit*

Defendants assert that expert testimony regarding the Flynn/Slovic survey and report is inadmissible under Rule 702 because it does not "fit" any issue in the case. I disagree. The survey and other work of Drs. Flynn and Slovic was directed at determining how the public perceived Rocky Flats and whether activities at the plant and publicity related to it had resulted in

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<sup>59</sup> Defendants submitted only short excerpts from Dr. Kahneman's rebuttal report in support of their June 2005 motion to exclude Plaintiffs' damages experts. *See* App. to Defs.' Mot. re: Pls.' Damages Experts (Doc. 1373), Ex. 17. Defendants previously submitted Dr. Kahneman's complete report, which is cited above and elsewhere in this opinion, in connection with their 1997 motion to strike Plaintiffs' experts.

a stigma that negatively affected the value of properties in the Class Area. *See* Hunsperger & Flynn Resp. at 2-4; Survey Report at 1, 21-23. Drs. Flynn and Slovic's testimony on their survey, therefore, is relevant to and will assist the jury in determining whether Rocky Flats, and Defendants' alleged misconduct there, caused a diminution in the value of properties in the Class Area.<sup>60</sup>

Defendants' true complaint regarding the Flynn/Slovic survey and their Survey Report is that Wayne Hunsperger, Plaintiffs' appraisal and lead damages expert, should not have relied on their survey results in reaching his own conclusions about the existence and especially the amount of damages caused by Defendants. This contention, however, goes to the reliability of Mr. Hunsperger's methodology in arriving at his opinions, and not to the relevance of the Flynn/Slovic survey to the issues to be decided in this case. The survey is relevant to and fits this case without reference to Mr. Hunsperger's use of it.<sup>61</sup>

#### *Reliability*

The Flynn/Slovic survey and Drs. Flynn and Slovic's analyses of its results have been peer reviewed and published, *see* James Flynn, *et al.*, *Risk, Media, and Stigma at Rocky Flats*, 18 Risk Analysis 715 (1998), which is an indicator of reliability under Rule 702. *See Daubert*, 509 U.S. at 593-94. The Survey Report and the more recent statement of Dr. Flynn and others, *see* Flynn & Hunsperger Resp. at 9-14, also makes a strong showing that the Flynn/Slovic survey was

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<sup>60</sup> To the extent Defendants dispute the relevance of the Flynn/Slovic survey results based on "mere proximity" and other arguments discussed above with respect to Dr. Radke's testimony, these arguments are rejected for the reasons stated there. *See supra* Section I.C.1.

<sup>61</sup> I address Mr. Hunsperger's use of the Flynn/Slovic survey results later in this opinion. *See infra* Section I.C.3.e.

conducted according to generally recognized survey principles as identified in the Federal Judicial Center’s Manual for Complex Litigation and Reference Manual on Scientific Evidence. *See* Manual for Complex Litigation, Fourth § 11.493 (2004); Shari S. Diamond, *Reference Guide on Survey Research*, in *Reference Manual on Scientific Evidence* [hereinafter “*Ref. Guide on Survey Research*”] 229 (2<sup>d</sup> ed. 2000).<sup>62</sup> Defendants, however, assert the survey design was unreliable in several respects and that all testimony regarding it must be excluded as a consequence. None of Defendants’ complaints warrants exclusion of this testimony.

Defendants first invoke the rebuttal report of their expert, Dr. Daniel Kahneman, to argue that the survey design was inherently biased and unrealistic in ways that resulted in inflated estimates of any adverse effect of Rocky Flats on neighboring property values. Even if these allegations had merit, the rule in the Tenth Circuit is that “[t]echnical and methodological deficiencies in the survey . . . bear on the weight of the evidence, not the survey’s admissibility.” *Harolds Stores, Inc. v. Dillard Dep’t Stores, Inc.*, 82 F.3d 1533, 1544 (10<sup>th</sup> Cir. 1996); *see also E. & J. Gallo Winery v. Gallo Cattle Co.*, 967 F.2d 1280, 1292-93 (9<sup>th</sup> Cir. 1992) (same). Alleged “deficiencies” that bear only on the weight of survey evidence under this authority include allegations that the survey questions did not accurately reflect market conditions and were “slanted, leading, and ambiguous.” *Harolds*, 82 F.3d at 1546 n.9. Thus, Dr. Kahneman’s

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<sup>62</sup> Relevant factors to be considered in determining whether the survey conformed to these standards include whether: (1) the survey was designed to address relevant questions; (2) the population was properly chosen and defined; (3) the sample chosen was representative of that population; (4) the data gathered was accurately reported; (5) the data was analyzed in accordance with accepted statistical principles; (6) the questions asked were clear and not leading; (7) the survey was conducted by qualified persons following the proper interview procedures; and (8) the process was conducted so as to ensure objectivity. *See* Manual for Complex Litigation, Fourth § 11.493; *Ref. Guide on Survey Research* at 236-72.

criticisms of the survey design are matters to be raised at trial and considered by the jury and are not grounds for excluding Drs. Flynn and Slovic's testimony regarding their public opinion survey.

My independent review of the Survey Report and Dr. Kahneman's rebuttal report confirms that his criticisms do not provide grounds for excluding testimony regarding the Flynn/Slovic survey. The sequence of the survey questions, for example, does not appear inherently biased, and any doubts on this score can be addressed through the traditional adversary process before the jury. While Defendants complain that the survey contains an upwards "anchoring bias" in its use of \$5000 and \$10,000 as initial discount options in the housing scenario portion of the survey, Dr. Kahneman only speculated that this could be the case. *See* Kahneman Report at 11. Drs. Flynn and Slovic, meanwhile, explained how and why these discount amounts were chosen, *see* Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 26 [hereinafter "Slovic Dep.,"] at 160-63; *id.*, Ex. 12 (Flynn Dep.) at 201-04, and Dr. Slovic disagreed that an upward anchor bias necessarily resulted from them, *see* Slovic Dep. at 162-63, 167-69. The dispute between these experts regarding possible upward anchor bias in the stated discount amounts and its implications goes to the weight of the survey evidence and does not warrant exclusion. Dr. Kahneman's additional concerns that the survey results might have been skewed by presenting an unrealistic representation of how Rocky Flats and any risks it poses would be considered in a house purchase decision similarly are matters that may be decided by the jury.

Defendants also assert the Flynn/Slovic survey is unreliable and must be excluded because it does not meet the guidelines for a contingent valuation survey performed as part of a natural resource damages assessment under the federal Oil Pollution Act. *See* Defs.' Mot. re: Pls.'

Damages Experts at 36-37 (citing Report of the NOAA Panel on Contingent Valuation, 58 Fed. Reg. 4601, App. I (Jan. 11, 1993)). The short answer to this assertion is that Defendants have failed to show these guidelines have any application here. The NOAA guidelines describe contingent valuation as a survey-based method for determining the economic value of “existence” or “passive-use” values in natural resources where there is no direct market or other behavioral evidence of that economic value. *See* 58 Fed. Reg. at 4602-03. Dr. Ralph C. d’Arge, Defendants’ rebuttal expert on this subject, and Dr. Slovic similarly agree that a contingent valuation survey is a survey that seeks to determine the economic value of something that is not ordinarily bought and sold and thus does not have a well defined market or market price. *See* Defs.’ Supplemental App. to Defs.’ Reply Br. in Supp. of Mot. to Strike Pls.’ Experts (Doc. 1092), Vol. III, Ex. 10 [hereinafter “D’Arge Suppl. Report”] at 3; Slovic Dep. at 207-08. There is a market for Class properties, and Drs. Flynn and Slovic designed their survey to assess that market’s response to problems at Rocky Flats. *See, e.g.*, Flynn & Hunsperger Resp. at 13-14 (survey directed at possible causal link between market effects and Rocky Flats). Drs. Flynn and Slovic also both testified that they did not design their survey to be a contingent valuation study, Slovic Dep. at 129; Flynn Dep. at 47, and Defendants have not cited to anything in the NOAA panel guidelines or other authority in the field suggesting it should be evaluated as a contingent valuation study. Hence, the NOAA panel guidelines have no application here.

Defendants also asserted in passing in their reply brief and more strongly at oral argument that the Flynn/Slovic survey and related testimony are unreliable because the group surveyed was not limited to persons already living in Arvada and Westminster or those who affirmed they would consider living there. Although Defendants stated that rebuttal expert Dr. d’Arge identified this



as a significant problem in his report, his criticism there was brief and only in the context of the survey's presumed status as a contingent valuation study directed at those claiming to have been damaged by Rocky Flats, *i.e.*, residents of Arvada and Westminster. *See* D'Arge Suppl. Report at 7, 10. Dr. d'Arge's testimony does not, therefore, support Defendants' much broader argument that the survey group was improperly large. Even if it did, I would find that this issue also goes to the weight to be accorded to the survey by the finder of fact.<sup>63</sup>

**b. Slovic Report**

Defendants argue Dr. Slovic's proffered testimony as disclosed in this separate report is inadmissible under Rule 702 because it will not assist the jury in deciding either liability or damages. I disagree. The testimony proffered in this report addresses risk perception generally and as it relates to Rocky Flats. *See* Slovic Report. Dr. Slovic's testimony on these subjects will assist the jury in understanding why the market has acted as Plaintiffs allege in response to the types of environmental problems reported at Rocky Flats. It is, therefore, relevant to the jury's determination of damages. There is also no question that expert testimony that seeks "to educate

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<sup>63</sup> Defendants' tardy assertion of this argument may be an attempt to seek exclusion pursuant to the Tenth Circuit's statement in *Harold* that a survey should be excluded "'when the sample is clearly not representative of the universe it is intended to reflect.'" 82 F.3d at 1544 (quoting *Bank of Utah v. Commercial Sec. Bank*, 369 F.2d 19, 27 (10<sup>th</sup> Cir. 1966)). As stated above, Defendants presented no evidence that the survey sample here was clearly unrepresentative, and I find no basis for excluding it on this ground.

In their reply brief, Defendants also argue that exclusion is required under *Harold* because the survey does not meet the criteria for the admission of survey evidence as an exception to the hearsay rule. *See* Defs.' Reply in Supp. of Mot. to Exclude Expert Witness Test. (Doc. 1411) at 23-24; *Harold*, 82 F.3d at 1544. This, of course, is not a challenge to the reliability of the survey or its admission under Rule 702, and, is a contention that should have been raised by the June 16, 2005 deadline for filing all motions challenging the admission of expert testimony. I nonetheless have considered it and find it to be without merit.

the factfinder about general principles, without ever attempting to apply these principles to the specific facts of the case” is admissible under Rule 702. Fed. R. Evid. 702 2000 advisory committee’s note. In light of these considerations, Dr. Slovic’s undisputed qualifications to testify on these subjects and the absence of any questions regarding the reliability of the methods he used in arriving at the opinions stated in this report, I find the expert testimony disclosed in the Slovic Report is admissible under Rule 702.

**c. Media Report**

Although Defendants’ motion seeks to exclude all expert testimony by Drs. Flynn and Slovic, Defendants’ briefing in support of their motion does not address the testimony proffered in these experts’ Media Report. When questioned on this point at oral argument, Defendants responded that the opinions and information disclosed in this report should be excluded because they concern the FBI raid and related publicity, all evidence of which, according to Defendants, is irrelevant to any issue in this action.

This contention is the subject of Defendants’ Motion in Limine No. 1, which is discussed below. I reject this contention with respect to the testimony disclosed in Drs. Slovic and Flynn’s Media Report for the same reasons I state below for denying Defendants’ Motion in Limine No. 1. *See infra* Section I.E.1. There is no question that Drs. Slovic and Flynn are qualified to undertake this kind of social science research and, as demonstrated by the peer review and publication of the Media Report, that their methodology was sound. Accordingly, the expert opinions expressed in the Media Report meet Rule 702’s requirements and are admissible.

### 3. Wayne Hunsperger

Wayne L. Hunsperger is Plaintiffs' primary property damages expert. He is a certified real estate appraiser and property consultant with more than thirty years of experience in valuing and appraising real property. *See* Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 19, Attach. (Hunsperger *vitae*). He is the president of Hunsperger & Weston, a Colorado-based real estate appraisal and consulting firm, and holds the highest designation (MAI) from the Appraisal Institute, the leading association of professional real estate appraisers. *Id.* at 2.

Mr. Hunsperger has particular knowledge and experience regarding the effect of hazardous materials on the value of real property and the valuation of environmentally impaired properties. He has written and taught extensively on these subjects for many years and has performed valuations of Superfund sites in Colorado and numerous other area-wide analyses of property affected by toxic waste sites. *Id.* at 3. Mr. Hunsperger's clients for this and other appraisal work have included the United States Department of Justice, the U.S. Environmental Protection Agency, the United States Army, the cities of Denver, Colorado Springs, and Aurora, and major banks and businesses. *Id.* He has also qualified and testified as an expert witness on property valuation issues in federal and state courts. *Id.* at 4.

In this action, Mr. Hunsperger and his firm conducted an analysis of real property in the Class Area to determine if Class property values had been impacted by Rocky Flats and, if so, to what extent. Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 19 [hereinafter "Hunsperger Report"] at 1, 2. The analysis incorporated five different, multi-disciplinary approaches to these questions: real estate market research; review of analogous case studies; analysis of market sales data and

information; multiple regression analysis; and review of public opinion surveys. *Id.* at 2. The latter two approaches incorporate the work of Dr. Radke and Drs. Flynn and Slovic.

Mr. Hunsperger's methodology and the results of his analysis are detailed in his exhaustive 260-page expert report and accompanying appendices. *See* Hunsperger Report. Based on consideration of all five approaches, Mr. Hunsperger concluded that Rocky Flats had diminished the value of property in the Class Area, and estimated the amount of this diminution in value, in 1995 dollars, at \$169 million for residential properties and \$21 million for vacant land. *Id.* at 259.

Defendants argue Mr. Hunsperger's proffered expert testimony is inadmissible in its entirety under Rule 702 for multiple reasons. Upon a thorough review of Mr. Hunsperger's report and careful consideration of the parties' arguments and other submissions, I find his proffered testimony is admissible. Mr. Hunsperger is unquestionably qualified to testify as proposed, his analysis is reliable within the meaning of Rule 702 and it will assist the jury in determining a fact in issue, namely damages. The basis for this decision and for rejecting Defendants' many contrary arguments is set out below.

Defendants begin their challenges to Mr. Hunsperger's testimony with the summary assertion that his entire approach is unreliable because it did not include a "mass appraisal" or utilize any of the three approaches traditionally used by professional appraisers for estimating the market value of properties, *i.e.*, the "Cost Approach," "Income Capitalization Approach," and "Sales Comparison Approaches." Defendants have not, however, pointed to any evidence stating that these methods are appropriate for investigating and assessing the diminution in property value caused by environmental concerns on an area-wide basis, or, even if they are, that these approaches are the exclusive methods for performing such an analysis. Mr. Hunsperger and

Plaintiffs, meanwhile, have presented evidence that the Appraisal Standards Board and authorities in the field recognize that “[e]stimating the effects of environmental contamination on real property value usually involves the application of one or more specialized valuation methods,” including the specialized methods utilized by Mr. Hunsperger in his analysis. Pls.’ Cons. *Daubert* Resp. (Doc. 1399), Ex. 42 (Uniform Standards of Professional Appraisal Practice (USPAP), Advisory Opinion 9 (2004)); *see id.*, Ex. 38 (Thomas O. Jackson, *Methods and Techniques for Contaminated Property Valuation*, *The Appraisal Journal* 311 (Oct. 2003)) [hereinafter “Jackson, *Contaminated Property*”].<sup>64</sup> In addition, an assignment such as this may be considered real estate consulting and/or market impact analysis, and thus may involve the use of methods and techniques other than the three traditional methods for appraising individual properties. *See* Hunsperger Report at 64; Pls.’ Cons. *Daubert* Resp. (Doc. 1399), Ex. 39 (Richard J. Roddewig, *Choosing the Right Analytical Tool for the Job*, *The Appraisal Journal* 320 (July 1998)). Accordingly, there is no merit to this challenge to Mr. Hunsperger’s work and proffered testimony.

Defendants next renew their arguments that the work of Mr. Hunsperger and Plaintiffs’ other damages experts is irrelevant for various reasons, including that Mr. Hunsperger did not specify that the diminution in value he determined was attributable to Defendants’ alleged trespass and nuisance towards the Class Area, as opposed to mere proximity to Rocky Flats. I addressed this and Defendants’ other relevance arguments earlier, in connection with Defendants’ arguments

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<sup>64</sup> At least one commentator has noted, in fact, that the value of environmentally impaired property “can rarely be estimated through one of the traditional approaches to value,” and that other approaches must be used. Jackson, *Contaminated Property* at 314.

to exclude Dr. Radke's testimony, and reject them here for reasons stated earlier. *See supra* Section I.C.1.<sup>65</sup>

Defendants also allege that each of the five approaches utilized by Mr. Hunsperger is deficient under Rule 702 for one or more reasons, and that these deficiencies alone or in combination require that his testimony be excluded. No one of these approaches stands alone, however, and all must ultimately be considered in the context of Mr. Hunsperger's study as a whole. With this consideration in mind, I examine each approach and Defendants' arguments in turn.

**a. Real estate market research**

In this portion of his study, Mr. Hunsperger conducted field research regarding the property market in the area around Rocky Flats, including the Class Area. This research consisted of interviews with a host of market participants, including representatives from eight municipalities, two counties, the State of Colorado, various quasi-public entities, residential lenders, mortgage insurers, real estate appraisers, realtors, builders and individual property owners, and review of documents relating to governmental land use policies and risks posed by Rocky Flats. *See* Hunsperger Report at 7-15, 78-120. The purpose of this research was to allow Mr. Hunsperger to form a qualitative opinion about the impact of Rocky Flats on the Class Area

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<sup>65</sup> In addition, I note that Mr. Hunsperger in fact specified that his study assessed the "stigma" effect of Rocky Flats, which did not "relate simply to proximity to Rocky Flats," Hunsperger Report at 74, but rather to "past, present and future risk associated with Rocky Flats, including the likelihood that the class area has been exposed to plutonium" from the site, *id.* at 71. This definition is consistent with Plaintiffs' claim for damages resulting from Defendants' alleged trespass and nuisance.

property market and values and to inform and support his other work in analyzing this impact. *See id.* at 78, 253.

Based on this research and his training and experience, Hunsperger concluded, among other things, that “the after effects of the 1989 FBI raid and proximity to the Rocky Flats Nuclear Weapons Plant combine to reduce the overall market demand for properties in [the Class Area]. The resulting loss in demand clearly places downward pressure on real estate prices.” Hunsperger Report at 15. Mr. Hunsperger did not rely on this market research approach to quantify any diminution in value caused by Rocky Flats.

There is no question that this type of field research is widely and properly used by real estate professionals in assessing the impact of environmental disamenities on property values. *See, e.g.,* Jackson, *Contaminated Property* at 311. Mr. Hunsperger is qualified by his training, knowledge and experience to engage in this kind of research.

Nor should there be any question that the results of Mr. Hunsperger’s research regarding the market’s perception of Rocky Flats and its impact on area property values will assist the jury. It is relevant to the jury’s determination of damages standing alone and as one of the bases for Mr. Hunsperger’s ultimate conclusion, based on the totality of his work, that Rocky Flats has caused a diminution in the value of Class properties.

Defendants nonetheless contend Mr. Hunsperger’s testimony regarding his market research is not admissible under Rule 702 because it does not quantify any diminution in property value due to a trespass or nuisance on the date on which the alleged injury became complete and comparatively enduring. This argument fails for the reasons stated earlier in this opinion. *See supra* Section I.C.1.

Defendants also argue that Mr. Hunsperger's proffered testimony regarding his market interviews and research must be excluded because it is an improper effort to admit hearsay testimony. Rule 703, however, states that if the facts or data relied upon by an expert are "of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject," then these facts or data need not be admissible in evidence in order for the expert's opinion or inference to be admitted. Fed. R. Evid. 703. Market research that includes interviews with market participants is a common component of a study regarding valuation of an environmentally impaired property, *see Jackson, Contaminated Property* at 318, and so the results of these interviews are "of a type reasonably relied upon by experts" in this field. Rule 703, therefore, permits Mr. Hunsperger to testify regarding the opinions and inferences he reached based on his interviews with market participants.

Rule 703 also provides that an expert witness may not disclose to the jury any inadmissible facts or data he relied upon without prior court approval. Fed. R. Evid. 703. If Mr. Hunsperger seeks to testify at trial regarding specific conversations he had with market participants, I will then consider whether this testimony should be admitted under Rule 703. His conclusions and findings based on these conversations, however, are admissible under both Rules 702 and 703 for the reasons just stated.<sup>66</sup>

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<sup>66</sup> Defendants cite excerpts from the trial transcript in "*Escamilla v. Asarco, Inc.*, No. 91 CV 5716 (D. Colo. 1993)," in support of their argument for exclusion of Mr. Hunsperger's market research testimony. Defendants err in identifying *Escamilla* as a case brought in the federal district court. It was brought and tried in Colorado state court. *See Escamilla v. Asarco, Inc.*, No. 91-CV-5716 (Dist. Ct. Denver Cty., Colo.). Defendants also did not attach the cited transcript pages to their motion, but I was able to locate them in a previous filing. *See* Defs.' Supplemental App. to Defs.' Reply Br. in Supp. of Mot. to Strike Pls.' Experts (Doc. 1092), Vol. III, Ex.13. Consistent with my just stated ruling, the state judge in that case only sustained objections to Mr. Hunsperger testifying about specific conversations he had with



**b. Analogous case study**

In this portion of his study, Mr. Hunsperger collected information regarding thirteen area-wide property studies, including academic, government-funded and litigation-related analyses, that examined the impact on neighboring properties of more than thirty sites posing contamination or other environmental concerns.<sup>67</sup> *See* Hunsperger Report at 121-77; *see also id.* at 16-22.

Mr. Hunsperger analyzed these studies and conducted follow-up interviews with most of their authors. *See id.* at 16, 121. His purposes in doing so were to identify appropriate methodologies for assessing the property effects of environmental problems, to examine the effects of environmental problems in other settings, to consider how the real estate market reacts to actual or perceived risk, to study how that reaction translates into an effect on property values and then to apply the results of this analysis to Rocky Flats and the neighboring Class Area. *See id.*

Based on his review and analysis, Mr. Hunsperger concluded, among other things, that multiple regression analyses and public opinion surveys are commonly used techniques for measuring market reaction to environmental conditions. *Id.* at 22, 176. He also concluded that in almost all cases properties suffer some loss in value due to actual contamination and/or proximity to a negative environmental condition, with the amount of the loss varying from nominal to as much as 50 percent. *Id.* at 22, 175-77. Based on the latter finding and his review of the individual case studies, Mr. Hunsperger further concluded that these studies indicated a likely 10 percent average diminution in the value of residential property across the Class Area following

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market participants. *See id.* He did not bar Mr. Hunsperger from testifying regarding his research process and the conclusions he drew from these interviews. *See id.*

<sup>67</sup> Two of the cited case studies addressed multiple sites. *See* Hunsperger Report at 141-43 (Case Study No. 7), 144-47 (Case Study No. 8).

the FBI raid. *Id.* at 177. Applying this percentage to the 1995 average sales prices for single family and attached residences in the Class Area, Mr. Hunsperger estimated the total loss in value to residential properties to be \$166 million in 1995 dollars. *Id.* Mr. Hunsperger considered this damages estimate in arriving at his final opinion on the amount of damages to residential properties in the Class Area. *Id.* at 259.

Defendants' primary challenge to Mr. Hunsperger's case study method is that it simply is not a valid or reliable property valuation methodology. Plaintiffs, however, have presented ample evidence that this method has been recognized and endorsed by the Appraisal Institute<sup>68</sup> and other authorities in the property valuation field for situations in which large numbers of properties are affected by an environmental risk or stigma. *See, e.g.*, Jackson, *Contaminated Property* at 311; Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 40 (Richard J. Roddewig, *Classifying the Level of Risk and Stigma Affected Contaminated Property*, *The Appraisal Journal* 98 (Jan. 1999)) at 98-99; Exs. to Pls.' Surreply re: Defs.' Mot. to Strike Pls.' Experts (Doc. 1116), Ex. 8 (Appraisal Institute, *Environmental Risk and the Real Estate Appraisal Process*, at M-9 to M-11 (Mar. 1994)).<sup>69</sup>

Defendants next contend Mr. Hunsperger's use of this methodology is unreliable because the case studies he utilized are neither representative nor demonstrably reliable, and do not include studies that found no damage from an environmental disamenity. In fact, however,

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<sup>68</sup> The Appraisal Institute is the non-profit corporation that sets professional standards for real estate appraisers and consultants.

<sup>69</sup> The use and acceptance of the case study method to assess price effects also disposes of Defendants' related argument that the case studies considered by Mr. Hunsperger and any conclusions he drew from them are irrelevant and must be excluded from this action because they concern different properties in different markets and thus are not probative of damages here.

Mr. Hunsperger collected and reviewed studies from a variety of sources that examined properties across the country that were affected by relevant environmental conditions. The selected studies report a range of impacts on these properties, including negligible or no loss in value. *See* Hunsperger Report at 18-21, 123-63. Although Defendants speculate that Mr. Hunsperger's sample is not representative, they did not present expert or other evidence suggesting this was so.<sup>70</sup> The same is true with respect to Defendants' assertion that the case studies considered by Mr. Hunsperger may be unreliable because Mr. Hunsperger did not independently verify the validity and reliability of the multiple regression analyses and public opinion surveys that informed some of them.

Furthermore, to the extent Defendants' complaints here have any merit, they go to alleged weaknesses in the data relied upon by Mr. Hunsperger. Such weaknesses "go to the weight the jury should . . . give[] [his] opinions, they [do] not render [his] testimony too speculative as a matter of law" to be admitted. *Gomez v. Martin Marietta Corp.*, 50 F.3d 1511, 1519 (10<sup>th</sup> Cir. 1995); *see United States v. 14.38 Acres of Land*, 80 F.3d 1074, 1079 (5<sup>th</sup> Cir. 1996) (perceived flaws in expert's testimony, including that expert relied on an allegedly unreliable opinion by another expert, "are matters properly tested in the crucible of adversarial proceedings; they are not the basis for truncating that process."); *United States v. 0.161 Acres of Land*, 837 F.2d 1036, 1039-41 (11<sup>th</sup> Cir. 1988) (same with regard to expert opinion based on information regarding

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<sup>70</sup> In support of this argument Defendants reference a list of case studies summarized in an undated addendum to a seminar titled "Environmental Risk and the Real Estate Appraisal Process." *See* App. to Defs.' Mot. re: Pls.' Damages Experts (Doc. 1373), Ex. 22. Many of these case studies, drawn solely from professional literature, concern municipal landfills, electrical transmission lines, asbestos and other environmental risks of little or no relevance here. Several of the remaining case studies were considered by Mr. Hunsperger. Defendants made no showing that their case study list was itself complete or representative.

145 land sales where expert was not familiar with the specifics of the sales). This is particularly true given that Mr. Hunsperger's analagous case study method and conclusions are only part of the basis for his ultimate conclusions regarding the existence and amount of damages caused by Rocky Flats.

Finally, Defendants argue the damages estimate Mr. Hunsperger made based on this approach is unreliable because it is not reproducible. Mr. Hunsperger's report, however, sets out the process he followed in arriving at this estimate and identifies the information he considered in this process. *See* Hunsperger Report at 121-77. Mr. Hunsperger's discussion of the case studies in his report, including his comments relating and comparing many of them to the situation at Rocky Flats, adequately identifies the studies that he believed were most relevant to his analysis. *See id.* at 164-74. This information was or should have been sufficient to allow Defendants or their experts to evaluate and challenge Mr. Hunsperger's reasoning and results. *See Daubert*, 509 U.S. at 593. Defendants' disagreement with the conclusions Mr. Hunsperger reached based on this process and his knowledge and experience in the real estate field is not a basis for finding these conclusions unreliable. Mr. Hunsperger's proffered testimony regarding this portion of his study is reliable within the meaning of Rule 702 and is admissible. **c.**

### **Market sales analysis**

In this component of his study, Mr. Hunsperger considered market sales data and information to assess the possible impact of Rocky Flats on the price of single-family housing and vacant land in the Class Area. Hunsperger Report at 23-33, 178-220.

With respect to single-family housing, Mr. Hunsperger sought to compare the rate of appreciation or depreciation in housing prices over time within the Class Area with the rate of

price appreciation or depreciation in other metropolitan submarkets. *Id.* at 202. To accomplish this, Mr. Hunsperger obtained data from the MLS on residential sales from 1989 to 1995 in the Class Area, other non-mountain, suburban submarkets within Jefferson County and four other MLS submarkets. *Id.* Mr. Hunsperger used these data to calculate the compound appreciation/depreciation rate for this six-year period for condominium and detached single-family housing in each submarket. As part of this analysis, Mr. Hunsperger also commissioned a local marketing firm to compare the pricing of new home construction in the Class Area with comparable new residential construction in these same areas. *Id.* at 217-220.

Based on the results of both sets of comparisons, Mr. Hunsperger concluded that existing and new single-family residences in the Class Area had the lowest appreciation rates of the areas studied, which resulted in a loss in value relative to homes in other areas over the typical seven-year holding period. *Id.* at 30, 33, 256. He did not quantify the amount of this loss in this component of his study.

With respect to vacant land, Mr. Hunsperger obtained sales data on all vacant land sales in the Class Area and four other areas he viewed as similar for the period 1988 through 1995, and used these data to calculate an overall average price per acre for each area for each year. *See id.* at 178-92. Mr. Hunsperger also investigated the circumstances of a number of individual land sales in detail. *Id.* at 193-98.

Based on these vacant land sales data and investigations, Mr. Hunsperger concluded that vacant land within the Class Area had the lowest average price per acre of any of the five areas studied, with the average price differential ranging from 3 percent to 146 percent. *Id.* at 199. He also concluded the relatively low average price per acre for the Class Area was attributable to

several factors, including proximity to Rocky Flats. *Id.* Based on all of the data and information, he estimated the overall diminution in vacant land value attributable to proximity to Rocky Flats to be 30 percent. *Id.* at 199-200. He then applied this percentage diminution in value to estimate total damages to vacant land in the Class Area at \$21 million (in 1995 dollars). *Id.* at 200-01.

Defendants argue none of Mr. Hunsperger's conclusions or analysis as just described are admissible under Rule 702. Specifically, Defendants assert Mr. Hunsperger's analysis of residential sales data and relative rates of appreciation is irrelevant and that both his residential property and vacant land analyses are unreliable. I find no merit to these contentions.

Mr. Hunsperger's market sales analysis of residential sales is relevant because it supports his opinion that residential property has been diminished in value due to Rocky Flats and will assist the jury in deciding this issue more generally.

As to the reliability of this study, there can be no question that the analysis of sales data is a sound and accepted method for addressing real estate valuation issues, and that Mr. Hunsperger's method for calculating the relative rates of appreciation was also sound. Defendants assert Mr. Hunsperger's analysis of residential sales is nonetheless unreliable because he did not show his results were statistically significant, but they fail to provide any evidence or authority that significance testing is necessary or even possible for this type of market data analysis. Defendants' final challenge, that Mr. Hunsperger should have designed his residential sales analysis to focus more narrowly on the Class Area, is a matter that goes to the credibility and weight of Mr. Hunsperger's analysis, and does not render it inadmissible.

Defendants' primary challenge to the reliability of Mr. Hunsperger's vacant land analysis is that it is based on too few land sales with too much variance in pricing for any reliable conclusions

to be drawn. They do not dispute, however, that Mr. Hunsperger incorporated all available land sales data in his analysis, and that the methodology he used in his analysis and in reaching his conclusions is clearly stated and capable of testing.<sup>71</sup> Defendants' challenges to Mr. Hunsperger's vacant land analysis are matters to be raised through the adversarial process, and do not provide a basis for exclusion.

**d. Multiple regression analysis**

In this approach, Mr. Hunsperger considered and applied the results of Dr. Radke's multiple regression analysis. Hunsperger Report at 34-36, 221-24. Based on these results, Mr. Hunsperger concluded that diminution in property value is persistent within the Class Area and that the loss in value spiked after the 1989 FBI raid. *Id.* at 35, 222-23. He also used the annual diminution in value reported by Dr. Radke for 1988 through 1995 to calculate an 8 percent average loss in value during this period, which he used to calculate an area-wide diminution in value for single-family detached and attached housing in the Class Area totaling \$131 million (in 1995 dollars). *Id.* at 36, 223.

It is undisputed that multiple regression analysis is an accepted method for estimating the effects of environmental contamination and risks on real property. *See, e.g., Jackson, Contaminated Property* at 311. I previously examined Dr. Radke's regression analysis and found it admissible under Rule 702. *See supra* Section I.C.1. Contrary to Defendants' suggestion, there is no requirement that Mr. Hunsperger also be qualified as an expert in regression analysis in

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<sup>71</sup> "Testing" in this context means the method is capable of being challenged in some objective sense or can be reasonably assessed for reliability. *See Daubert*, 509 U.S. at 593; Fed. R. Evid. 702 2000 advisory committee's note. It does not mean that the method has been tested or "verified" and found to be correct. *See, e.g., Bitler*, 400 F.3d at 1233; *Paoli*, 35 F.3d at 744 ("evidentiary requirement of reliability is lower than the merits standard of correctness").

order to incorporate the results of this analysis in his own work. Mr. Hunsperger's application of Dr. Radke's results is also straightforward and capable of being tested. Accordingly, I find no basis to exclude Mr. Hunsperger's testimony based on the multiple regression component of his damages study.

**e. Review of public opinion surveys**

In this final approach to assessing the effect of Rocky Flats on area property values, Mr. Hunsperger reviewed the results of three public opinion surveys prepared for the City of Broomfield, City of Arvada and Rocky Flats Community Relations Department, respectively, that measured the public's perceptions of Rocky Flats and its effects on neighboring areas. Hunsperger Report at 37-62, 225-52. Mr. Hunsperger also commissioned a fourth, more in-depth opinion survey from Decision Research, which is the Flynn/Slovic survey discussed earlier in this decision. *Id.* at 37, 225. Two of the surveys were conducted soon after the 1989 FBI raid, and the others in 1994 and 1995. *Id.* at 37, 43, 45, 47.

Mr. Hunsperger considered the surveys' results to assess how the public perceived technological, environmental and/or health risks relating to Rocky Flats and the extent of their knowledge concerning these matters. *Id.* at 37-62, 225-52. Based on his review, Mr. Hunsperger concluded the surveys' results indicated that a large majority of the public held a negative perception of Rocky Flats, was concerned about health risks caused by the plant and believed that Rocky Flats had negatively affected property values in the area. *Id.* at 61-62, 251. He further concluded these negative perceptions and concerns were persistent and adversely affected area property values. *Id.*



Mr. Hunsperger also used the results of the housing scenario/discount questions from the Flynn/Slovic survey to estimate the average diminution in value to single-family homes in the Class Area as a result of apprehension about Rocky Flats. *Id.* at 251-52. Based on this calculation and the estimated number of residential properties in the Class Area, Mr. Hunsperger estimated the total diminution in value to residential Class properties to be approximately \$210 million (in 1995 dollars). *Id.* at 252. Mr. Hunsperger considered this estimate, along with the estimates derived from the multiple regression and analogous case study approaches, in arriving at his final conclusion that concerns about Rocky Flats had diminished the value of residential properties in the Class Area in the amount of \$169 million (in 1995 dollars). *Id.* at 259.

Although Defendants seek to exclude all of Mr. Hunsperger's proffered testimony regarding the public opinion survey approach, they only challenge one aspect of that approach: Mr. Hunsperger's use of the responses to the housing scenario/discount questions in the Flynn/Slovic survey to generate an estimate of damages to residential properties in the Class Area. Defendants' arguments focus on the reliability of this approach to estimating diminution in property value.

With respect to the reliability question, Plaintiffs have presented evidence that real estate professionals can and do use the results of public opinion surveys in assessing the effect of environmental stigma on real property values. *See* Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 43 (Albert R. Wilson, *The Need for Standards in the Application of Statistical and Survey Research to Real Estate Valuation Practice* 13-15 (2002) (reporting that formal market surveys are "frequently undertaken to demonstrate quantitatively how market participants did or might behave

in a transactional setting” and proposing standards based on the *Reference Guide on Survey Research*); Hunsperger Report at 123-24, 138-40, 157-59 (identifying several cases in which survey research was used in assessing the effect of an environmental disamenity on property value). This evidence includes a decision by the New Mexico Supreme Court affirming admission of a public opinion survey that asked respondents to estimate the percentage value increase or decrease to real property caused by a local environmental disamenity, and holding that the plaintiffs’ property expert could rely on the survey results in quantifying the diminution in value of the plaintiffs’ property. *City of Santa Fe v. Komis*, 845 P.2d 753, 757, 758-59 (N.M. 1992). The Tenth Circuit has also affirmed that public survey results may be admitted and relied upon by an expert to estimate damages. *See Harolds*, 82 F.3d at 1546. Thus, Mr. Hunsperger’s use of a public opinion survey as part of his process for estimating damages for diminution in property value is in concept a reliable methodology under Rule 702.<sup>72</sup>

I previously found over Defendants’ objection that the Flynn/Slovic survey was sufficiently reliable under survey research criteria to be admissible. *See supra* Section I.C.2.a. Defendants argue Mr. Hunsperger’s use of the Flynn/Slovic survey results is nonetheless unreliable and inadmissible because Drs. Flynn and Slovic testified they did not design the survey specifically to estimate diminution in property value. I disagree. While Drs. Flynn and Slovic testified at deposition and in subsequent affidavits that they did not design their survey to measure the precise

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<sup>72</sup> Defendants contend Mr. Hunsperger is not qualified to use the survey results in any fashion because he is not an expert in designing, administering or interpreting raw data from public opinion surveys. Mr. Hunsperger, however, need not be qualified as an expert in these matters in order to incorporate the Flynn/Slovic survey results in his own work, particularly when I have already found that the survey is relevant, reliable and admissible in its own right. *See supra* Section I.C.2.a.

diminution in property value in the Class Area, they also testified that they knew when they designed the survey that Mr. Hunsperger intended to use its results in his valuation work, that Mr. Hunsperger consulted with Dr. Flynn about how he planned to use the survey results for this purpose, and that Drs. Flynn and Slovic agreed then and as of the date of their 1999 affidavits that Mr. Hunsperger's use of the survey results to estimate diminution in value was logical and reasonable. *See* Flynn Dep. at 106-08; Slovic Dep. at 139-41; Exs. to Pls.' Surreply re: Defs.' Mot. to Strike Pls.' Experts (Doc. 1116), Ex. 11 (Flynn Aff.), ¶¶ 6-9, & Ex. 12 (Slovic Aff.), ¶¶ 6-10. Therefore, far from undermining the reliability of Mr. Hunsperger's use of the survey results, Drs. Flynn and Slovic's testimony tends to support it.

Defendants also argue or at least strongly imply that Mr. Hunsperger's use of the housing scenario/discount portion of the survey is unreliable because Drs. Flynn and Slovic did not design their survey as a contingent valuation survey meeting the NOAA panel guidelines. The unstated assumption in this argument is that results from a public opinion survey, especially one that includes hypothetical questions, cannot be used by a real estate expert to estimate diminution in property value unless it is a contingent valuation survey meeting these requirements.

Defendants did not produce any evidence in connection with this *Daubert* motion supporting this assumption. The only evidence in the record that I am aware of that might support it is a statement by defense rebuttal expert Dr. d'Arge to the effect that any survey containing hypothetical valuation questions by definition is a contingent valuation survey that should be evaluated under the NOAA panel guidelines. *See* D'Arge Suppl. Report at 4.<sup>73</sup>

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<sup>73</sup> The excerpt of Dr. d'Arge's supplemental report submitted by Defendants in support of this *Daubert* motion did not include this statement. I instead reviewed the complete copy of Dr. d'Arge's supplemental report as submitted by Defendants in connection with their

Dr. d'Arge does not provide any support of this assertion, however, and, as noted earlier, there is nothing in the NOAA panel guidelines that suggests they apply in this situation. *See supra* Section I.C.2.a. I will not make a finding that contingent valuation methodology and standards apply here, and render Mr. Hunsperger's use of the Flynn/Slovic survey results unreliable and inadmissible, based solely on Dr. d'Arge's statement. The jury can hear from both Mr. Hunsperger and Dr. d'Arge regarding the alleged deficiencies in the survey design as relevant to quantification of damages and make its own determination.<sup>74</sup>

Defendants next argue again that Mr. Hunsperger's use of the housing scenario/discount survey responses was unreliable because the survey design included anchor bias and other design defects that render its "discount" results unreliable. As discussed earlier, the assertion of anchor bias is speculative and it and Defendants' other complaints of this nature go to the weight to be accorded to the survey results and testimony based on them. *See supra* Section I.C.2.a.

Defendants also argue that, even if Mr. Hunsperger could in principle utilize the Flynn/Slovic survey results in estimating damages, his calculation of the estimated diminution in residential property values from these results is arbitrary and involves too great an analytical gap between the survey results and his conclusions to be reliable. In particular, Defendants complain

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1997 motion to strike Plaintiffs' experts. *See* Defs.' Supplemental App. to Defs.' Reply Br. in Supp. of Mot. to Strike Pls.' Experts (Doc. 1092), Vol. III, Ex. 10. For reasons described earlier, I have not conducted a comprehensive review of the enormous record in this case to locate all materials that may be relevant to the issues decided here.

<sup>74</sup> It is also important to reiterate that Mr. Hunsperger did not rely solely or even primarily on the results of Drs. Flynn and Slovic's housing and discount scenarios to estimate damages, but rather based his damages estimate on the totality of his analysis, which included analyses based on market sales data, that is the actual performance of individuals in the market, and other relevant information.

about the manner in which Mr. Hunsperger incorporated into his calculations the 46.2% of respondents who indicated they would not purchase a residence within six miles of Rocky Flats at any price.

I have considered Defendants' arguments on this point and conclude Mr. Hunsperger's calculations are sufficiently reliable to be admitted. Mr. Hunsperger employed a reasoned and transparent analytical process to estimate class-wide diminution in value based on the mean discounts reported by Drs. Flynn and Slovic from their survey's results. *See* Hunsperger Report at 251-52. While there is room for disagreement on some of the steps taken or omitted in this process, Mr. Hunsperger's calculations were not arbitrary and were rationally connected to the survey results. To the extent there are analytical gaps in Mr. Hunsperger's calculations, they are not so great that they render his calculations unreliable and inadmissible. Defendants' criticisms, therefore, again go the weight of Mr. Hunsperger's testimony on this approach, not its admissibility.

For the reasons stated above, I find Mr. Hunsperger's proffered testimony regarding his public opinion survey approach, including his use of the Flynn/Slovic survey results as part of his damage quantification effort, is sufficiently reliable to be admitted under Rule 702. This approach and its contribution to Mr. Hunsperger's overall damages estimate, even if as "shaky" as Defendants allege, are matters that may be presented to the jury and tested through the adversarial process. *See Daubert*, 509 U.S. at 596 ("Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence."). The jury will make the ultimate determination of

whether Mr. Hunsperger's work in its entirety is credible and persuasive as to the amount of any damages suffered by the Class.

Overall, I find Mr. Hunsperger employed "the same level of intellectual rigor that characterizes the practice of an expert in the relevant field" in his property impact study and the opinions he formed based on it. *See Kumho Tire*, 526 U.S. at 152. His expert testimony is admissible under Rule 702.

**D. Defendants' Motion to Exclude Plaintiffs' Expert Witness Testimony Relating to Conduct and Associated Motions in Limine**

Plaintiffs intend to offer evidence at the class trial regarding Defendants' allegedly pervasive mismanagement of radioactive and toxic materials at Rocky Flats, including expert testimony from Drs. Robert Budnitz and Thomas Cochran.<sup>75</sup> In seven overlapping motions in limine and a *Daubert* motion, Defendants move to exclude all testimony by Drs. Budnitz and Cochran and most of Plaintiffs' other "conduct evidence" primarily on the ground that it is irrelevant. Defendants also assert Drs. Budnitz's and Cochran's proffered testimony must be excluded because neither is qualified and their testimony is unreliable.

Defendants' motions in limine regarding conduct evidence encompass all of the relevance/fit arguments asserted against Drs. Budnitz's and Cochran's proffered expert testimony. Accordingly, I discuss these motions in limine first, and then address Defendants' additional arguments for exclusion of Drs. Budnitz's and Cochran's testimony.

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<sup>75</sup> Plaintiffs originally designated a third expert witness, Dr. D. Warner North, to testify regarding Defendants' conduct at the plant, but notified Defendants and the court in July, 2005, that they did not intend to call him. *See* Pls.' Cons. *Daubert* Mot. at 94 n.83.

### 1. Motions in limine to exclude conduct evidence (Nos. 6-12)

In Motions in Limine Nos. 6 through 12, Defendants seek to exclude virtually all evidence regarding Defendants' conduct and practices at the Rocky Flats plant. *See* Defs.' Mots. in Limine Nos. 6-12 (Docs. 1359-65). Although Defendants assert other grounds for exclusion in these motions, a key tenet of each is Defendants' contention that evidence concerning their conduct at the Rocky Flats plant is only relevant and admissible if it relates directly to an incident that Plaintiffs can prove caused plutonium to be released to the entirety of the Class Area. *See id.*

As described earlier in this decision, Defendants' asserted relevance standard misreads both Rule 401 of the Federal Rules of Evidence and the law of the case regarding the issues to be tried. *See supra* Section I.A. To review briefly, Rule 401 declares a liberal relevancy standard that incorporates notions of both materiality and probativity. *McVeigh*, 153 F.3d at 1190. A fact is material or "of consequence" under Rule 401 "when its existence would provide the fact-finder with a basis for making some inference, or chain of inferences, about an issue that is necessary to a verdict." *Id.* Limiting evidence concerning Defendants' conduct at the plant to incidents that directly or indisputably caused plutonium contamination to the entire Class Area is contrary to this standard and the law of the case, which in fact establishes multiple issues to which "conduct evidence" may be relevant. *See supra* Section I.A and discussion herein.

Rule 401 also sets a "very low" bar for the degree of probative value required under the rule, so that "even a minimal degree of probability - *i.e.*, 'any tendency' - that the asserted fact exists is sufficient to find the proffered evidence relevant." *Id.* (quoting Rule 401). Defendants therefore err in their assumption that evidence must be highly probative or even conclusive regarding a consequential fact before the evidence can be found relevant under Rule 401.

Many of Defendants' arguments against the relevance of Plaintiffs' conduct evidence fall away once their improper relevance standard is removed. My additional reasons for denying each of Defendants' conduct-related motions in limine are set out below. Because these motions seek exclusion of broad, overlapping categories of evidence, my decisions and rationale are necessarily broad as well. Issues relating to discrete items of evidence falling within these categories may arise at trial and will be decided then.

**a. Defendants' Motion in Limine No. 6**

In this motion Defendants seek an order barring Plaintiffs, their witnesses and attorneys from offering or mentioning any evidence related to the use of substances other than plutonium at Rocky Flats, including evidence that any non-plutonium hazardous or toxic substances from Rocky Flats were released into the environment or created a risk of harm. *See* Defs.' Mot. in Limine No. 6 (Doc. 1359) at 1. This motion is denied for the following reasons.

Defendants first assert all evidence relating to substances other than plutonium at Rocky Flats is irrelevant, principally because it is undisputed that Plaintiffs' trespass claims and part of their nuisance claims relate solely to plutonium. Consistent with their pleadings, however, Plaintiffs' pre-trial statement of claims declares that their nuisance claims are based in part on "threatened future releases of plutonium *and other hazardous substances.*" Pls.' Statement of Claims (Doc. 1419) at 4 (emphasis added). Hence, evidence regarding Defendants' use and disposal of hazardous substances other than plutonium at Rocky Flats is relevant to the future risk component of Plaintiffs' nuisance claims.

Defendants argue this category of evidence is nonetheless irrelevant because Plaintiffs will not be able to prove that any non-plutonium toxic substances used at the plant pose a continuing



risk of harm to the Class as a whole. This contention is without merit, as it relates to the sufficiency of this evidence, and not to whether it is relevant and admissible under the Federal Rules of Evidence.

Evidence regarding Defendants' alleged misconduct in handling, storing and disposing of hazardous substances other than plutonium is also probative of a second element of Plaintiffs' nuisance claim, which is whether Defendants acted negligently or intentionally in causing any unreasonable and substantial interference with the use and enjoyment of property. *See Cook IX*, 273 F. Supp. 2d at 1202 (stating elements of nuisance claim). For purposes of the class trial, this element requires Plaintiffs to prove (among other things) that Defendants' negligent or intentional conduct caused Class members to be exposed to plutonium released from the plant and/or that their conduct created conditions at the plant that pose a demonstrable risk of future harm to the Class Area. *See* May 2005 Order at 4-6; Start of Trial Instructions, No. 3.6. Evidence tending to show a pattern of negligent misconduct by one or both Defendants in the handling of dangerous materials at Rocky Flats is relevant and admissible to show that Defendants acted negligently in the particular acts that injured the Class. *See Elliot v. Turner Constr. Co.*, 381 F.3d 995, 1004 (10<sup>th</sup> Cir. 2004) (evidence tending to establish a pattern of negligence by defendant in overall project admissible regarding defendant's alleged negligence in specific aspect of project that injured plaintiff); *Silkwood v. Kerr-McGee Corp.* (“*Silkwood II*”), 769 F.2d 1451, 1455-56 (10<sup>th</sup> Cir. 1985) (in a personal injury suit against operator of nuclear facility, “jury may permissibly infer from a pattern of negligence likely to cause a particular injury that such negligence did indeed cause the injury”); *see also Bradbury v. Phillips Petroleum Co.*, 815 F.2d 1356, 1364 (10<sup>th</sup> Cir. 1987) (evidence of a pattern of trespass and property damage by defendant admissible to

prove recklessness and other elements of plaintiff's claims, even though none of the other incidents involved injury to the plaintiff and were dissimilar in other respects). As a result, evidence that Defendants had a pattern of negligence in handling plutonium and other dangerous substances at the plant is material and probative of Plaintiffs' nuisance claims even if some of the misconduct alleged by Plaintiffs did not itself cause the Class Area to become contaminated or pose a risk of future harm there.

Evidence regarding Defendants' use and disposal of hazardous substances other than plutonium is also relevant to the generic causation question to be decided by the jury<sup>76</sup> and to the jury's determination of any punitive damages. *See Silkwood II*, 769 F.2d at 1455-56 (evidence of general pattern of misconduct meeting punitive damages standard sufficient for jury to infer same type of misconduct caused plaintiff's injuries and justified punitive damages award). Thus, evidence of Defendants' conduct relating to non-plutonium hazardous or toxic substances at Rocky Flats is relevant to several facts of consequence to the determination of this action.<sup>77</sup>

Defendants also argue that all evidence regarding non-plutonium substances must be excluded pursuant to Federal Rule of Evidence 404(b), which bars admission of "evidence of other crimes, wrongs or acts" when offered to show the defendant's bad character and that the defendant likely acted in conformity with that character in connection with the conduct at issue. Fed. R. Evid. 404(b); *see, e.g., United States v. Maden*, 114 F.3d 155, 157 (10<sup>th</sup> Cir. 1997). By

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<sup>76</sup> *See supra* note 10 and accompanying text.

<sup>77</sup> Because Defendants' alleged pattern of misconduct in their handling, storage and disposal of hazardous or toxic substances in the aggregate is relevant to the issues just noted, I also reject Defendants' assertion that evidence of Defendants' alleged misconduct must be evaluated for relevance on a substance-by-substance basis.

its terms, however, the Rule only applies to evidence of “other” bad acts, that is bad acts that are extrinsic to the acts at issue in the suit. *See* Fed. R. Evid. 404(b); *Elliot*, 381 F.3d at 1004; *see generally* 2 Jack B. Weinstein & Margaret A. Berger, *Weinstein’s Federal Evidence* § 404.20[2][b] (2<sup>nd</sup> ed. 2005) (collecting and summarizing cases). “Evidence is extrinsic if it involves an act wholly apart from and not intricately related to the asserted claim.” *Elliot*, 381 F.3d at 1004. Here, as just described, Defendants’ alleged mishandling of hazardous and toxic materials other than plutonium at Rocky Flats is not “wholly apart” from the asserted claims and is in fact related to them. Rule 404(b) might be appropriately invoked if Plaintiffs sought to introduce evidence that Defendants mishandled plutonium or other toxic materials at some facility other than Rocky Flats, but it does not apply to evidence of their alleged negligence in handling these materials at Rocky Flats.

Defendants argued at length against this conclusion at oral argument, asserting that evidence of a pattern of conduct at Rocky Flats is neither relevant nor intrinsic to Plaintiffs’ claims. This argument ignores Plaintiffs’ allegation that Defendants’ mishandling of non-plutonium substances created conditions at the plant that pose a risk of future harm to the Class. It also fails to address squarely the Tenth Circuit’s decision in *Elliot*. In that case, the Tenth Circuit considered whether Rule 404(b) barred admission of evidence that the defendant had been negligent in various acts at a job site separate from the act that injured the plaintiff. 381 F.3d at 1003-04. The Tenth Circuit found the Rule did not apply to this evidence of additional negligent conduct, reasoning that evidence of a pattern of negligence by the defendant at the particular job site was directly related and therefore intrinsic to the question of the defendant’s negligence in causing the plaintiff’s injury. *Elliot*, 381 F.3d at 1004. The same is true in this case.

In addition, even if I were to find Rule 404(b) applicable here, it would not bar admission of evidence relating to Defendants' alleged mismanagement of non-plutonium materials. Rule 404(b) is a rule of inclusion and allows evidence of "other" bad acts to be admitted so long as the evidence is not offered to prove bad character or a propensity to act as alleged. *See, e.g., United States v. Sarracino*, 131 F.3d 943, 949 (10<sup>th</sup> Cir. 1997); *Maden*, 114 F.3d at 157. For the reasons stated earlier, evidence regarding Defendants' management of toxic materials other than plutonium is relevant to multiple issues to be decided in the class trial, and therefore serves other proper purposes as permitted by the rule. Accordingly, even if Rule 404(b) were applicable here, I find no basis for excluding all evidence relating to non-plutonium substances pursuant to it.

Finally, Defendants argue this category of evidence must be excluded under Rule 403 because its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues and misleading the jury and by considerations of undue delay or waste of time. Defendants' arguments in this regard are premised largely on their contention that all such evidence is irrelevant to the matters to be decided by the jury, which is incorrect for the reasons stated above. Balancing the probative weight of this category of evidence against Defendants' concerns, I find no basis under Rule 403 for the blanket exclusion sought by Defendants.

**b. Defendants' Motion in Limine No. 7**

In this motion, Defendants seek to exclude "evidence related to employee health and safety at Rocky Flats" on the ground that all such evidence is irrelevant, would be unduly prejudicial to Defendants, and constitutes evidence of past bad acts inadmissible under Rule 404(b). Defs.' Mot. in Limine No. 7 (Doc. 1360) at 1; July 28, 2005 Hr'g Tr. (Doc. 1434) at 40. This motion is denied.

I agree with Defendants that the general issue of worker health and safety at Rocky Flats is not part of this action, but the blanket exclusion Defendants seek is unnecessary and overbroad. First, the exclusion is unnecessary because there is no indication in the record that Plaintiffs intend to try the issue of worker health and safety.<sup>78</sup> Second, the relief sought by Defendants is overbroad because some evidence that might be described as “relating to” worker health and safety may be relevant if, for example, it concerns plutonium escaping containment in the workplace and being released to the environment or Defendants’ pattern of conduct in handling plutonium and other hazardous substances at the plant. Specific evidence “relating to” worker health and safety may also be relevant in other ways that I cannot anticipate in the abstract. Thus, while some or even most evidence in this broad category of evidence may indeed be irrelevant to this action, this does not justify the blanket exclusion requested by Defendants.

I also am not persuaded that admission of any evidence relating to worker health and safety poses a danger of unfair prejudice and confusion of the issues that outweighs its probative value. This question cannot be decided in the abstract as proposed by Defendants. For the reasons stated in the previous section, I also find no merit in Defendants’ contention that Rule 404(b) applies here and bars admission of all evidence falling into this category.

**c. Defendants’ Motion in Limine No. 8**

In this motion Defendants seek to exclude all evidence “related to releases, incidents and conditions that occurred wholly within buildings at Rocky Flats” on the ground that such releases, incidents and conditions, by definition, could have no off-site environmental effect and hence are

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<sup>78</sup> Nor would I allow Plaintiffs to do so given the nature of the claims they have asserted.

irrelevant to both the trespass and nuisance claims. Defs.' Mot. in Limine No. 8 (Doc. 1361) at 1. Defendants also argue that admission of any such evidence would be unfairly prejudicial under Rule 403 and would violate Rule 404(b)'s stricture against admission of propensity evidence.

Once again, the blanket exclusion Defendants seek is overbroad. By Defendants' account, this motion would bar, among other things, all evidence regarding plutonium fires that were contained within buildings, all conditions in buildings that raised criticality concerns and numerous other incidents that resulted in a loss of containment of plutonium or tend to show a pattern of mishandling plutonium and other hazardous substances. For the reasons described earlier, evidence of this sort is relevant, at minimum, to the question of whether Defendants were negligent in causing any interference with Class members' use and enjoyment of property. Some of the evidence Defendants seek to exclude in this motion may also be probative as circumstantial evidence of past releases (*e.g.*, evidence of plutonium in ductwork venting to the outside environment) or of waste storage and disposal practices that resulted in conditions that pose a continuing risk of future harm to the Class.<sup>79</sup> Because this evidence is intrinsic to Plaintiffs' claims and theory of the case, it is not evidence of prior bad acts subject to Rule 404(b).<sup>80</sup> Finally, I am not persuaded that the probative value of this category of evidence is substantially outweighed by the danger of unfair prejudice or confusion of the issues.

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<sup>79</sup> Defendants assert that the demolition of these plant buildings and the on-going plant cleanup have eliminated this possibility and therefore render evidence of incidents and releases within these buildings irrelevant. Plaintiffs dispute this assertion, which in any event goes to the sufficiency of Plaintiffs' evidence on this point, not its relevance.

<sup>80</sup> Even if Rule 404(b) were applicable here, I would also find, as stated earlier, that this evidence is offered for a proper purpose and is therefore admissible under the rule.

Defendants assert all evidence relating to releases that occurred solely within buildings also must be excluded pursuant to Magistrate Judge Borchers's 1994 ruling in a discovery dispute that Dow need not produce information regarding releases within a building that affected only employees within the building. Mem. Op. & Order (Doc. 327) at 2. The context for this ruling and its basis is not clear from Judge Borchers' order, however. More importantly, the scope of this action, and with it the evidence relevant to Plaintiffs' property damage claims, has evolved in the years since Judge Borchers' order. My determination, based on the current status of this action and the issues to be decided in the class trial, is that evidence of releases, incidents and conditions occurring solely within buildings may be relevant to one or more of these issues as described above. Defendants' motion to exclude all evidence in this category is, therefore, denied.

**d. Defendants' Motion in Limine No. 9**

In this motion, Defendants seek to exclude all evidence or references relating to what they call "inventory difference" and what Plaintiffs and others refer to as "material unaccounted for" or "MUF." Defs.' Mot. in Limine No. 9 (Doc. 1362) at 1. MUF refers to plutonium, uranium and other radioactive materials that cannot be accounted for by plant operators. *See Cook v. Rockwell Int'l Corp.* ("Cook VI"), 907 F. Supp. 1460, 1463 (D. Colo. 1995). The existence and quantity of MUF at any given time is determined by comparing the quantity of these materials that accounting records report present at the site with the quantity of materials determined to be on hand through physical inspection and analysis. *See* Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 7

(Cochran MUF Report) at 3 (citing DOE definition). It is undisputed that the cumulative MUF during Defendants' operation of Rocky Flats is more than 2,600 pounds.<sup>81</sup>

Defendants argue that evidence concerning MUF is irrelevant to Plaintiffs' trespass and nuisance claims because Plaintiffs cannot prove that any MUF was released to the environment where it was or could have been transported to the Class Area. Defendants also argue affirmatively that all MUF for the site can be largely explained by accounting errors, errors or omissions in estimating the amount of plutonium contained in waste shipped off-site and by the unreported presence of plutonium-containing residue in processing equipment and the like. They further assert MUF data is irrelevant because, according to their experts and a government contractor, the data cannot be used to estimate the quantity, if any, of the unaccounted for plutonium that was released to the environment.<sup>82</sup>

Defendants' assertion that Plaintiffs must be able to prove MUF was or could be released to the Class Area to establish its relevance once again improperly applies a standard of proof to determine relevancy. *See* Fed. R. Evid. Rule 401 (relevant evidence is evidence "having *any tendency* to make the existence of any fact that is of consequence . . . more or less probable than it would be without the evidence;" emphasis added.); *see generally* Charles Alan Wright &

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<sup>81</sup> This is not the first time questions concerning MUF evidence have arisen in this litigation. In 1995, I found the DOE in contempt for failing to produce documents relating to MUF. *Cook VI*, 907 F. Supp. at 1463-64, 1468; *see also Cook v. Rockwell Int'l Corp.* ("*Cook VII*"), 935 F. Supp. 1452 (D. Colo. 1996)(discussing additional issues relating to production or access to DOE's MUF documents).

<sup>82</sup> It bears mentioning that much of the debate in this action about MUF and whether it includes any unreported releases to the on- or off-site environment are the result of the federal government's decision to classify and withhold much potentially explanatory MUF-related information.



Kenneth W. Graham, Jr., 22 Fed. Practice and Procedure: Evidence § 5165 at 50-51 (1978 & Supp. 2006) (“judge may not consider the weight of the evidence in determining relevance” under Rule 401); *see also supra* Section I.A (discussing relevancy standard). Under the proper, Rule 401 standard, MUF evidence is relevant because it has a tendency to make the existence of several facts of consequence more or less probable than they would be without this evidence.

For example, Defendants’ inability to account for 2,600 pounds of plutonium in their Rocky Flats operations is relevant to the question of whether Defendants were negligent in their management of plutonium and its risks, which bears on the “intent or negligence” element of Plaintiffs’ nuisance claim. In *Silkwood*, the Tenth Circuit found that a nuclear plant operator’s inability to account for as little as 23 pounds of plutonium was “notable” evidence of a pattern of gross negligence relevant to a claim arising from the off-site release of plutonium. *See Silkwood II*, 769 F.2d at 1455-56 (affirming award of punitive damages on claim for property damage caused by contamination of off-site property). That Defendants cannot account for 2,600 pounds of plutonium and other radioactive materials is unquestionably relevant to their care, or lack thereof, in managing these materials.

MUF-related data is also relevant to determining whether plutonium from Rocky Flats has been released into the environment, where it either has or may in the future be transported by natural forces to the Class Area. This relevance is demonstrated by various investigators’ use of MUF data in estimating the amount of plutonium released during the 1957 fire and other events, and by the efforts of RAC and earlier investigators to account for MUF and to utilize MUF data to assess whether any portion of it might represent unreported releases to the environment. *See Cochran MUF Report* at 11-13 (identifying studies); Defs.’ Mot. in Limine No. 9, Ex. 2.

Contrary to Defendants' assertions, it is not necessary for MUF data to produce quantitative estimates of unreported plutonium releases for MUF data to be relevant to this issue. Defendants' contention that MUF may be accounted for through means other than unreported releases goes to the weight and sufficiency of this evidence with respect to releases, not its relevance.

In addition, the existence and amount of MUF for the site is relevant to the generic causation question to be answered by the jury and to the credibility of witnesses testifying about matters such as the amount of plutonium released from Rocky Flats and its associated risks.

I have also considered Defendants' contention that all MUF-related evidence should be excluded under Rule 403 because its probative value is substantially outweighed by its potential to create unfair prejudice or confusion of the issues. I am not persuaded either that MUF evidence has the lack of probative value argued by Defendants or that the risk of unfair prejudice or confusion is large enough to outweigh substantially this value. Finally, I find no basis for exclusion under Rule 404(b) for the reasons stated earlier.

**e. Defendants' Motion in Limine No. 10**

In this motion, Defendants seek to exclude all evidence or direct or indirect mention of "past risks that never materialized," which they describe as the risk of fires, criticality events<sup>83</sup> or other events at Rocky Flats that might have resulted in plutonium or other toxic materials being released into the environment if they had occurred. *See* Defs.' Mot. in Limine No. 10 (Doc. 1363) at 3, 8; *see id.* at 1-2. Defendants include in this category all evidence regarding at least one event that did occur, the 1969 fire at the plant, that would describe how close the fire

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<sup>83</sup> A criticality event occurs when too much fissible material is unintentionally brought together and forms a critical mass, which creates an uncontrolled nuclear chain reaction. *See* Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 6 (Cochran Overview Report) at 28.

allegedly came to causing a catastrophic environmental disaster. *Id.* at 5. The focus of this amorphous motion, however, appears to be testimony or evidence regarding Defendants' management of plutonium-related risks and how their operating practices may have contributed to the creation of such risks. *Id.* at 3-4, 5-6, 10.

Defendants argue this and other "past risk" evidence is irrelevant because none of these potential events or catastrophic consequences occurred, and they cannot occur now, because the conditions giving rise to these risks have been eliminated through the plant shut-down and subsequent cleanup. They further argue that such evidence should be excluded under Rule 403 because it would unfairly prejudice Defendants, confuse the jury and waste trial time and resources.

This motion is denied. Defendants are free to argue that Rocky Flats does not pose a risk of current or future harm to the Class Area (as relevant to Plaintiffs' nuisance claims) because the plant has been dismantled and all on-site conditions that might give rise to such off-site harm have been fully abated through the site cleanup. Whether the cleanup is in fact complete and has removed all plutonium and other toxic materials that might be remobilized and pose a current or future risk to the Class Area is disputed, however, and thus presents a factual issue to be decided by the jury. I will not do as Defendants suggest and usurp the jury's function by deciding this factual issue in the context of Defendants' evidentiary motions.

I further find that evidence regarding "past risks" and Defendants' management of them is relevant to this action. For the reasons stated earlier, the degree of care Defendants exhibited in managing plutonium and other dangerous substances at the plant is relevant to whether Defendants acted negligently in creating conditions that resulted in plutonium being released to

the Class Area or created conditions that could lead to future harm. *See supra* Section I.D.1.a. Evidence of these matters is also relevant to the generic causation question and the jury's determination of any punitive damages. *See id.*

The probative value of this general category of evidence is not substantially outweighed by the risk of unfair prejudice or confusion of the issues. While there may be specific items of evidence within this poorly defined category that require a different analysis, I will not exclude all evidence within it based on this possibility. Any complaints regarding specific items of evidence will be addressed at trial.

**f. Defendants' Motion in Limine No. 11**

In this motion, Defendants seek to exclude all evidence of plutonium-related incidents and practices that "Plaintiffs cannot prove impacted (or could someday impact) the entire Class Area." Defs.' Mot. in Limine No. 11 (Doc. 1364). This category of evidence includes, according to Defendants, all evidence or mention of the 1969 fire and other "minor" plutonium fires at the plant and all evidence or mention of Defendants' handling, use and storage of plutonium during the many years of plant operation. *See id.* at 5-10. Defendants contend all such evidence is irrelevant and/or subject to exclusion under Rules 403 and 404(b).

This motion is founded on the proposition that only evidence that can and has been linked directly to a past or potential release of plutonium that affects the Class as a whole is relevant to this action. This proposition is incorrect for all of the reasons stated earlier in this decision. *See supra* Section I.A. Defendants also err in suggesting that an item of evidence must "prove" a consequential fact in order to be relevant. *See supra id.*; Section I.D.1 (introduction).

For the reasons stated above with respect to Defendants' overlapping motions, evidence relating to Defendants' handling, use and management of plutonium, including fires and other incidents that occurred in the course of this conduct, is relevant to multiple issues in this action. It also does not as a category pose a risk of prejudice or confusion warranting exclusion and is not "bad character" evidence presented for an improper purpose. Because this category of evidence is relevant and not subject to exclusion on the cited bases, Defendants' motion is denied.

**g. Defendants' Motion in Limine No. 12**

In their final conduct-related motion in limine, Defendants seek to exclude all evidence that does not apply to the Class as a whole. This motion is based on Defendants' contention that the relevant and admissible evidence in this class action is evidence "that would be admissible in each of the individual trials for each class member, were such trials to occur." Defs.' Combined Reply in Supp. of Mots. in Limine (Doc. 1410), Tab 12, at 1. As a result, Defendants argue, all evidence relating to "incidents, conditions, occurrences or activities that do not impact the entire class" must be excluded. Defs.' Mot. in Limine No. 12 (Doc. 1365) at 4. As examples of evidence that should be excluded under this motion, Defendants identify evidence concerning the release of plutonium or other toxic materials via surface or ground water to some but not all of the Class Area and all expert evidence that does not specifically study and assess the whole of the Class Area. *See id.* at 7-9.

Defendants' legal contention and the relevancy standard Defendants advance based on it finds no support in Rule 401 or the law relating to class trials. *See supra* Section I.A. There is no logic to or basis for Defendants' assumption that because Plaintiffs must prove liability and damages for the Class as a whole, only evidence that applies to each and every Class member is

relevant and should be admitted. The question is whether the evidence as a whole proves class-wide liability and damages, not whether specific items of evidence do. *See id.*

There is ample evidence within this broad category of evidence that is relevant and admissible in this action for all of the reasons stated above and elsewhere in this decision. Accordingly, I deny Defendants' motion to exclude this category of evidence.

## **2. Motion to exclude expert testimony by Dr. Robert Budnitz**

Dr. Robert Budnitz is a former senior officer with the United States Nuclear Regulatory Commission (NRC) and a frequent consultant to the NRC, DOE, and other domestic and foreign government agencies on nuclear safety issues. *See* Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 1 [hereinafter "Budnitz 903 Pad Report"], Attach. A (Budnitz statement of qualifications).

Dr. Budnitz has extensive academic credentials and professional experience in the field of nuclear energy and safety, including, as most pertinent here: participation in the development of NRC's fire regulations and guidance for nuclear facilities; evaluating and investigating nuclear waste management programs at Three Mile Island, the Hanford Nuclear Reservation and other federal facilities for the NRC, DOE and/or its contractors; and chairing a special committee created by the National Academy of Sciences to study management of nuclear waste. *See id.*; Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 3 [hereinafter "Budnitz Dep."] at 380-81, 390-94, 621-23. For several years Dr. Budnitz also managed the largest division within the DOE's Lawrence Berkeley Laboratory, Budnitz 903 Pad Report, Attach. A at 2, which he testified carried out a wide range of activities in research and engineering development that covered most of the disciplines involved in managing a facility such as Rocky Flats, *see* Budnitz Dep. at 307-08. He has published

approximately 90 articles and reports, most of which relate to nuclear safety, monitoring and/or waste management. *See* Budnitz 903 Pad Report, Attach. B (list of publications).

Dr. Budnitz authored two expert reports for this case, one covering the major Rocky Flats fires of 1957 and 1969 and other incidents, *see* Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 2 [hereinafter "Budnitz Fires Report"], and another concerning waste management practices associated with the 903 pad plutonium releases, *see* Budnitz 903 Pad Report. Both of these reports also discuss and state conclusions regarding Dow's management and safety practices from 1945-69 and how they contributed to the 1969 fire and plutonium releases from the 903 pad. In addition, Dr. Budnitz contributed a discussion of criticality concerns during Defendants' Rocky Flats operations to a report authored primarily by another of Plaintiffs' experts.<sup>84</sup> *See* Pls.' Cons. *Daubert* Resp., Ex. 21 at 62-64.

Defendants seek to exclude Dr. Budnitz's proffered testimony as disclosed in these expert reports on the grounds that his testimony is entirely irrelevant, he is not qualified to testify on these subjects, his intended testimony will not assist the jury and his testimony is not reliable. To the contrary, I find Dr. Budnitz and his proposed testimony meets each of these Rule 702 requirements and is therefore admissible. More specifically:

I reject Defendants' challenge to the relevance of Dr. Budnitz's proffered testimony for the reasons stated in connection with Motions in Limine Nos. 6-12 discussed above.

I reject Defendants' challenge to Dr. Budnitz's qualifications because their arguments are based on an incomplete and distorted account of his knowledge, experience, training and

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<sup>84</sup> Plaintiffs notified the court before trial that they did not intend to call this second expert, Dr. D. Warner North, at trial. *See supra* note 75.

education in the relevant fields. A review of Dr. Budnitz's complete statement of qualifications and related deposition testimony, none of which is challenged by Defendants, reveals he is thoroughly qualified to testify as disclosed in his expert reports.

Defendants' argument that Dr. Budnitz's testimony will not assist the jury also fails. It is premised on Defendants' contention that Dr. Budnitz's testimony is no more than a summary of documentary evidence that the jury could just as easily review and digest itself to reach any relevant conclusions. Safety and operating practices at a nuclear production facility are, however, highly specialized matters not within the province of an ordinary juror. They are, therefore, a proper subject for expert testimony. *See, e.g., United States v. Mulder*, 273 F.3d 91, 101-102 (2<sup>nd</sup> Cir. 2001) (expert testimony concerning matters that are not well known or commonly understood is admissible); *see generally* 4 *Weinstein* § 702.03[1] (collecting cases). Dr. Budnitz is an expert in these matters, and it is clear from a fair reading of his reports that he drew extensively on his specialized knowledge and experience to review, analyze and summarize available information and to reach conclusions regarding the adequacy of Dow's safety and waste management practices. It was also perfectly proper for Dr. Budnitz to consider documentary evidence and pre-existing investigative reports in evaluating Dow's conduct, and to interpret and summarize the information he collected through this process to assist the jury in understanding these practices and the bases for his conclusions about them. One of Defendants' experts, Dr. Frank J. Blaha, similarly reviewed and summarized historic documentary materials in his own report regarding waste management practices at Rocky Flats. *See* Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 30.



Dr. Budnitz's evaluation and conclusions also satisfy Rule 702's reliability requirement. Dr. Budnitz assessed Defendants' conduct according to the practices and standards of care in the industry, including the overarching "ALARA" principle that radiation exposures and impacts should be kept "as low as reasonably achievable." *See, e.g.*, Budnitz Dep. at 571-72; Budnitz 903 Pad Report at 41-50 (concluding Dow failed to utilize readily available measures that would have prevented offsite releases of plutonium from the 903 pad and assessed its impact once it occurred); Budnitz Fire Report at 2 (comparing fire-safety practices at Rocky Flats with practices at other AEC facilities managed by different contractors). This assessment was based on Dr. Budnitz's extensive experience and expertise in safety and risk management at nuclear facilities. While Defendants argue Dr. Budnitz should also have evaluated their conduct according to unspecified federal regulatory standards or written safety procedures, neither sets the standard of care in this case. *See Cook IX*, 273 F. Supp. 2d at 1199 (state law standard of care governs action); Mem. Op. on Jury Instructions, Section II.B (regarding Defendants' proposed nuisance Instruction No. 7). At best, Defendants' contentions here go to the weight of Dr. Budnitz's testimony regarding Defendants' conduct, and do not affect its reliability and admission under Rule 702.

### **3. Motion to exclude expert testimony by Dr. Thomas Cochran**

Dr. Thomas Cochran is a senior scientist and the director of the nuclear program at the Natural Resources Defense Council, Inc. (NRDC). Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 6 [hereinafter "Cochran Overview Report"], Attach. (Cochran curriculum vitae) at 1. He received his master's degree and Ph.D in physics from Vanderbilt University, where his master's level work involved health physics and his Ph.D dissertation was in nuclear physics. *Id.* at 4. Dr. Cochran

has written several books, including two on U.S. nuclear weapon production facilities, and more than fifty articles, reports and papers on nuclear facilities, nuclear weapons, and arms control, including on plutonium toxicity and radiation protection standards. *See id.* at 6-15. Dr. Cochran has been an advisor to the DOE and NRC, including service on the DOE's Environmental Management Board and the NRC's Advisory Panel for the Decontamination of the Three Mile Island Unit 2 and its Safety Goals Workshop. *Id.* at 2-3. He has testified on numerous occasions before Congressional committees on nuclear energy, weapons and waste. *See id.* at 3.

Dr. Cochran authored two expert reports in this litigation, an overview of Rocky Flats operations and health and safety practices, particularly as they relate to actual or potential off-site releases of plutonium, and another on plutonium inventory differences at Rocky Flats. *See Cochran Overview Report; Pls.' Cons. Daubert Resp.* (Doc. 1399), Ex. 7 [hereinafter "Cochran MUF Report"]. More specifically, in his Overview Report, Dr. Cochran provides a basic primer on nuclear weapons and their manufacture, including the technical subjects of radioactivity and radiation, plutonium and health physics (health effects of exposure to radiation); discusses the major known releases of plutonium from Rocky Flats and Dow and Rockwell's waste management practices; and concludes based on his review and analysis that both Defendants operated Rocky Flats without proper regard for the hazards posed by plutonium and other toxic substances present there. *See Cochran Overview Report.* In his MUF Report, Dr. Cochran defines and explains MUF, summarizes the history of MUF accounting at Rocky Flats and concludes, based on his analysis, that Dow was grossly negligent in failing to account for such a large amount of plutonium and that the amount of MUF at Rocky Flats casts doubt on official

estimates of the quantity of plutonium released to the off-site environment. *See* Cochran MUF Report.

Defendants seek to exclude Dr. Cochran's proffered expert testimony for much the same reasons they advanced with respect to Dr. Budnitz's testimony, and I reject them for much the same reasons stated above.

First, Dr. Cochran's testimony regarding Defendants' operations and MUF at Rocky Flats is relevant for the reasons stated earlier in connection with Defendants' motions in limine. His proffered testimony providing an overview of nuclear weapons design, plutonium weapons fabrication and processing at Rocky Flats, the ALARA principle, health physics and the characteristics and risks of radioactivity and plutonium, *see* Cochran Overview Report at 1-23, will assist the jury by providing helpful background on these complex technical matters, which are not within the common knowledge of most jurors. His intended testimony regarding off-site releases of plutonium, criticality, MUF and pondcrete, based on his review and analysis of relevant documentary materials and including the conclusions he drew from this analysis, *see id.* at 23-30; Cochran MUF Report, will also assist the jury.

Dr. Cochran also has sufficient knowledge and experience concerning both the general and specific subjects addressed in his reports, including MUF and events that caused off-site releases, to qualify as an expert under Rule 702. *See, e.g.,* Cochran Overview Report, Attach. (Cochran curriculum vitae); Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 8 [hereinafter "Cochran Dep."] at 16, 40-42, 97, 101, 106. Defendants' complaint that Dr. Cochran does not specialize in some of these matters again bears on the weight of his testimony and does not render it inadmissible. *See, e.g., Ralston*, 275 F.3d at 970.

Finally, as to reliability, Dr. Cochran utilized his knowledge and experience to assess Defendants' Rocky Flats operations against industry standards and practices, including the ALARA principle. *See, e.g.*, Cochran Overview Report at 14-15; Cochran Dep. at 218-22. The bases for his conclusions are clearly stated and his conclusions flow logically from them. While Defendants and their experts apparently believe Dr. Cochran should have employed different standards and reached different conclusions, this does not render his methods and conclusions "unverifiable" as Defendants suggest or require exclusion of his testimony. I find Dr. Cochran employed the same level of intellectual rigor in his work on this case that characterizes the practice of an expert in this field. For this reason and the others stated above, Dr. Cochran's proffered testimony is reliable and otherwise admissible under Rule 702.

**E. Defendants' Additional Motions in Limine**

Defendants filed nine motions in limine in addition to those discussed in the previous section. Like Defendants' other motions in limine, these motions and their supporting arguments push the limits of in limine consideration. While I have decided these motions based on the arguments they present, discrete evidence falling within these motions may require additional consideration during trial, and warrant different treatment, depending on the specific evidence offered and circumstances as they develop at trial.

**1. Motions to exclude evidence regarding the FBI raid, grand jury investigation and Rockwell's guilty pleas (Nos. 1-3)**

In these motions, Defendants seek to exclude all evidence and mention of the FBI raid of Rocky Flats in 1989, its underlying allegations and attendant publicity; all evidence and mention of the subsequent grand jury investigation, its outcome and the resulting controversy; and all

evidence relating to Rockwell's 1992 guilty pleas to environmental crimes at Rocky Flats, all conduct underlying these pleas and all publicity regarding them. *See* Defs.' Mots. in Limine Nos. 1-3 (Docs. 1354-56). Defendants argue all such evidence is inadmissible because it is irrelevant to any issue of consequence, constitutes improper propensity evidence barred by Rule 404(b) and/or poses such a danger of unfair prejudice and waste of trial time that it should be excluded under Rule 403.

These motions are denied in part and granted in part. The fact of each of these events, and the conduct and alleged conduct that were the subject of the FBI raid, the grand jury investigation and Rockwell's guilty pleas, are relevant to issues to be decided in the class trial. These events are interwoven with virtually everything that occurred at or concerning Rocky Flats between the late 1980s and early 1990s. It would be impossible to tell the story of Rocky Flats, and thus provide the jury with a context for other relevant testimony and evidence, without mention of the FBI raid and its aftermath. The criminal investigation also scrutinized or touched on much of Rockwell's conduct relating to hazardous substances at the plant during the plant's last years of operation. As described earlier, evidence of this conduct is relevant to whether Rockwell acted negligently with respect to these substances and any harm suffered by the Class, whether conditions at the plant pose a risk of future harm and punitive damages. *See supra* Section I.D.1. Much of the publicity surrounding the FBI raid and its aftermath is also relevant to the issue of compensatory damages because it goes to the market's knowledge of environmental concerns and conditions associated with the plant.

I am not persuaded that Rules 404(b) or 403 require that this general category of evidence be excluded. This evidence does not pertain to "other" bad acts by Rockwell, but rather relates to

an alleged pattern of misconduct by Rockwell that underlies Plaintiffs' claims. As such, Rule 404(b) and its bar against propensity evidence do not apply. *See supra* Section I.D.1. Defendants' concerns about the risk of prejudice can and will be addressed through appropriate limiting instructions, as discussed below.<sup>85</sup>

Defendants' Motions in Limine Nos. 1-3 are therefore denied to the extent they seek a blanket order excluding evidence regarding the fact of the FBI raid, the grand jury investigation and Rockwell's guilty pleas, the conduct and alleged conduct by Rockwell that were the subject of these proceedings, and publicity regarding this conduct and these events.

I am persuaded, however, that a subset of the evidence falling within the scope of these motions requires different treatment. That subset relates to the controversy concerning the Department of Justice's prosecution of Rockwell, including the so-called runaway grand jury. It is clear from the parties' motions and briefing that Rockwell intends to argue and present evidence that federal prosecutors ultimately exonerated it of all charges of environmental misconduct, except those to which it pled guilty.<sup>86</sup> Plaintiffs intend to rebut this contention by

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<sup>85</sup> Defendants also argue that all evidence and mention of the special grand jury proceedings must be excluded because the secrecy of these proceedings would otherwise be compromised. I will not admit evidence regarding matters occurring before the special grand jury. *See* Fed. R. Crim. P. 6(e)(2). However, the relief sought by Defendants is not required to protect grand jury secrecy.

In addition, some of Plaintiffs' evidence regarding Rockwell's conduct no doubt was presented to the grand jury. This fact does not bar its admission in this action, but whether this evidence was presented to the grand jury is irrelevant.

<sup>86</sup> Defendants relied heavily on this proposition in their various motions in limine to assert, as a matter of fact, that all allegations made against Rockwell in the criminal investigation were false. Plaintiffs dispute this fact as stated above.

introducing evidence that there are other, less innocent explanations for the prosecutors' failure to pursue additional charges against Rockwell.

The question of whether the U.S. Attorney and the Department of Justice (DOJ) properly discharged their duties in investigating and prosecuting Rockwell is not relevant to the matters to be determined in this action. Even if it were, the probative value of this evidence is substantially outweighed by its potential to confuse the issues and needlessly extend the length and complexity of the trial. Accordingly, I intend to bar Defendants from arguing or presenting evidence that the U.S. Attorney and the DOJ ultimately exonerated Rockwell from most of the conduct that had been alleged in the FBI search warrant. For the same reasons, I will not allow Plaintiffs to argue or introduce evidence relating to the runaway grand jury, the congressional investigation into the DOJ's prosecution of Rockwell or similar evidence that might tend to show that the Department of Justice acted improperly in failing to prosecute Rockwell more vigorously.

I will also instruct the jury that it should not view the fact that the FBI issued a warrant based on certain allegations, that the grand jury failed to issue indictments or that Rockwell did not plead guilty to additional crimes as evidence that Rockwell did or did not engage in additional environmental misconduct (*i.e.*, misconduct beyond that to which it pled guilty) during its tenure at the plant. The jury will be directed to make its findings based on the evidence of Rockwell's conduct presented at trial, and not on the fact that the FBI made or investigated certain allegations or the outcome of the criminal prosecution. *See* Start of Trial Instructions, Nos. 2.4, 2.5.

The line I have drawn between admissible and inadmissible evidence relating to the FBI raid and its aftermath should be viewed as a broad outline that may be refined as evidence is

presented and the trial unfolds. I also recognize that this line may raise questions regarding the admissibility of specific items of evidence, especially news accounts that might be used as a backdoor to introduce evidence about the controversy regarding the grand jury and the federal government's prosecution of Rockwell. Whether certain exhibits will be admitted or questioning permitted under this standard will likely be an exhibit-by-exhibit and question-by-question determination.

**2. Motions to exclude evidence regarding other lawsuits (Nos. 14 & 15)**

In their Motion in Limine No. 14, Defendants seek to exclude evidence or mention of any other lawsuits filed against either Defendant. Defs.' Mot. in Limine No. 14 (Doc. 1367). In their Motion in Limine No. 15, Defendants seek this same relief with respect to a specific criminal proceeding against Rockwell in connection with its operation of a facility in Santa Susana, California. Defs.' Mot. in Limine No. 15 (Doc. 1368). In response, Plaintiffs have represented that they do not intend to present evidence of or mention the Santa Susana proceeding at trial. This concession renders Defendants' Motion in Limine No. 15 moot, and it is denied on this basis.

With respect to Motion in Limine No. 14, Plaintiffs assert that they intend to present evidence regarding two other lawsuits against Defendants: the criminal proceeding against Rockwell that resulted its 1992 guilty pleas as described in the preceding section and *Church v. Dow Chemical Co.*, No. 75-M-1162 (D. Colo.), which also concerns Rocky Flats. I will therefore construe Motion in Limine No. 14 as a motion to exclude evidence and reference to these two law suits.

The fact of both of these suits is relevant to this action because both are part of the history of Rocky Flats. It is not possible to tell that story and provide a context for other relevant



testimony and evidence in this case without reference to them. Rockwell's 1992 guilty pleas and associated legal proceedings are also relevant for the other reasons stated in the preceding section. *See supra* Section I.E.1 (regarding Defendants' Motion in Limine Nos. 1-3). As Defendants admit in the subject motion, evidence regarding the 1975 *Church* litigation is also relevant to issues such as when the public (market) was aware of environmental concerns and risks at Rocky Flats. *See* Defs.' Mot. in Limine No. 14 at 3 n.4 (asserting Defendants may seek to introduce evidence regarding the *Church* litigation for this purpose).

I therefore deny Defendants' Motion in Limine No. 14 to exclude all evidence of other lawsuits, but hold Plaintiffs may only present evidence regarding the criminal proceedings against Rockwell as provided in my ruling on Defendants' Motions in Limine Nos. 1-3. With respect to the *Church* litigation, Plaintiffs may present evidence and reference the fact of this litigation only. I find no basis under Rule 403 for excluding the evidence just described because the probative value of this evidence is not substantially outweighed by the risk of unfair prejudice or confusion of the issues. Defendants' concerns in this regard will be mitigated by my instructing the jury that it should not consider the fact of either lawsuit, or the allegations made therein, in deciding whether Dow or Rockwell engaged in any of the conduct alleged by Plaintiffs in this action. *See* Start of Trial Instructions, Nos. 2.4 - 2.6.

**3. Motions to exclude evidence involving the Department of Energy (Nos. 4 & 5)**

**a. Defendants' Motion in Limine No. 4**

In this motion Defendants seek an order prohibiting Plaintiffs from presenting any evidence or making any reference to the DOE's general indemnification obligations under the

Price-Anderson Act, *see Cook IX*, 273 F. Supp. 2d at 1182-83, or any specific agreement to indemnify Defendants for costs arising from their operation of Rocky Flats, including the damages sought in this action. *See* Defs.' Mot. in Limine No. 4 (Doc. 1357) at 1-2. Defendants assert all such evidence is irrelevant and should also be excluded pursuant to Rule 403 and Rule 411. I disagree and therefore deny Defendants' motion.

A great deal of the evidence in this case concerns studies, reports and investigations conducted by or for the DOE concerning waste management practices at Rocky Flats and the plant's actual or threatened impact on off-site properties. A number of the anticipated witnesses at trial are DOE officials and employees or frequent consultants or expert witnesses for the DOE. Much of this DOE-related evidence is critical to the determination of liability in this action. Evidence that the DOE is Defendants' indemnitor is relevant to showing the DOE's interest and stake in the outcome in this litigation, which in turn is relevant to the credibility of these witnesses and the trustworthiness of other evidence originating with or within the control of the DOE.<sup>87</sup>

I am not persuaded that the probative value of this evidence is substantially outweighed by the risk of undue prejudice or confusion of the issues as required for exclusion under Rule 403. The jury is fully capable of distinguishing between the DOE and Defendants, and whatever risk exists that the jury will improperly consider DOE's "deep pockets" in determining damages does

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<sup>87</sup> Defendants urge that I follow the district court in *Hanford*, which excluded evidence of DOE indemnification as irrelevant in a recent trial. *See In re Hanford Nuclear Reservation Litig.*, No. CV-91-3015, Order re: Final Pretrial Conf. (Doc. 1874) at 8 (E.D Wash. Apr. 18, 2005). My understanding is that this case presented somewhat different issues than are presented here. Nonetheless, to the extent my decision that evidence of DOE's indemnification is relevant is inconsistent with the *Hanford* court's decision, I respectfully disagree with that decision.

not outweigh the probative value of this evidence with respect to the credibility of DOE witnesses and other evidence.<sup>88</sup>

Defendants' reliance on Rule 411 is also misplaced. This rule provides, as relevant here:

Evidence that a person was or was not insured against liability is not admissible upon the issue whether the person acted negligently or otherwise wrongfully. This rule does not require the exclusion of evidence of insurance against liability when offered for another purpose, such as . . . bias or prejudice of a witness.

Fed. R. Evid. 411. Assuming Rule 411 applies to evidence of statutory indemnification obligations, it does not bar the admission of such evidence when it is offered for a purpose other than proving the defendant's conduct was wrongful. *See id.*; *see, e.g., Conde v. Starlight I, Inc.*, 103 F.3d 210, 214 (1<sup>st</sup> Cir. 1997); *Corbett v. Borandi*, 375 F.2d 265, 268 (3<sup>rd</sup> Cir. 1967). Here, as just described, evidence of DOE's indemnification is offered for and is relevant to the possible bias or prejudice of DOE-related witnesses and evidence. Accordingly, Rule 411, even if applicable here, does not require exclusion of this evidence.

**b. Defendants' Motion in Limine No. 5**

In this motion Defendants seek an order prohibiting Plaintiffs from presenting any evidence or making any reference to the DOE's classification of documents, its declassification review process and its conduct in response to discovery requests in this case. *See* Defs.' Mot. in Limine No. 5 (Doc. 1358) at 1. Defendants contend all such evidence is irrelevant and, even if it were relevant, should be excluded because it is unfairly prejudicial to them and could cause jury confusion.

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<sup>88</sup> Indeed, it is equally plausible to assume a jury, taxpayers all, would have the opposite reaction to DOE's indemnification. My experience teaches me that jurors do neither.

This motion is denied. This case is unusual in that the DOE, a non-party, controls a great deal of the information and documents describing operations and events at Rocky Flats. Much of this information is relevant to the issues to be decided in this case, but is not available because it is classified as secret by the DOE. It is not possible for the parties to present their cases without mentioning that relevant information is classified and unavailable for use at trial.

The jury is also entitled to know the efforts Plaintiffs, or Defendants for that matter, made to obtain access to this information and why they are unable to present all of the evidence they sought. This information will assist the jury in understanding and evaluating the information, documents and other relevant evidence that is available and presented at trial regarding Rocky Flats operations and events. Defendants' concerns about undue prejudice and confusion can and will be addressed through an appropriate limiting instruction. *See* Start of Trial Instructions, No. 1.9.

Discrete issues concerning specific evidence in this category will be resolved as they emerge during trial. The blanket order in limine sought by Defendants is not feasible or appropriate.

**4. Motion to exclude certain lay witness testimony (No. 13)**

Defendants here move to exclude all testimony by three lay witnesses identified by Plaintiffs: Len Ackland, W. Gale Biggs and Stuart Poet. Defs.' Mot. in Limine No. 13 (Doc. 1366).

Len Ackland is a journalism professor and author of a book on the history of Rocky Flats. Plaintiffs state they intend to call him to testify about the information about Rocky Flats that was available to the public based on the knowledge he acquired about media coverage of Rocky Flats

during his book research.<sup>89</sup> Pls.' Cons. Mem. in Opp. to Defs.' Mots. in Limine (Doc. 1395) at 31. Plaintiffs also indicate Mr. Ackland may testify about the difficulties he personally encountered during his research in trying to obtain Rocky Flats-related documents and information from the DOE and other government sources. *Id.*

Dr. Gale Biggs is a meteorologist and citizen activist who participated in several groups and projects addressing environmental issues at Rocky Flats, including the Rocky Flats Scientific Monitoring Panel (later known as the Citizens Advisory Board) appointed by Governor Romer and the Citizen's Soil Sampling Committee of the Health Advisory Panel. Plaintiffs report that Dr. Biggs will testify about the historical events surrounding his involvement with Rocky Flats, including the fact that the Governor's panel found Rocky Flats' environmental monitoring systems inadequate in various ways. *Id.* at 32.

Stuart Poet is a scientist who participated in the first soil sampling study that found plutonium from Rocky Flats in soil in the Class Area. Plaintiffs report that he will testify regarding the history, events and findings of this study. *Id.*

Each of these witnesses' proffered testimony is relevant to facts of consequence to the determination of this action. I am not persuaded by Defendants' arguments that the probative value of this evidence is substantially outweighed by the danger of unfair prejudice or confusion of the issues, if any, that might result from its presentation.

Defendants also argue the testimony of each of these witnesses must be excluded because it consists entirely of lay opinions that do not meet the requirements of Federal Rule of

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<sup>89</sup> Plaintiffs state they will not ask Mr. Ackland to testify to the truth of any statements found in media coverage, but rather only that these media statements were available to the public. *Id.*

Evidence 701. Rule 701 provides that a lay witness may testify in the form of opinions or inferences when these opinions or inferences are: “(a) rationally based on the perception of the witness, (b) helpful to a clear understanding of the witness’ testimony or the determination of a fact in issue, and (c) not based on scientific, technical, or other specialized knowledge within the scope of Rule 702.” Fed. R. Evid. 701.

Rule 701 by its terms only concerns opinion testimony by a lay witness, and thus has no application to lay witness testimony that is factual in nature. *See United States v. Caballero*, 277 F.3d 1235, 1247 (10<sup>th</sup> Cir. 2002) (testimony regarding facts experienced or observed by witness proffers no opinion, lay or expert). The anticipated testimony of Mr. Ackland, Dr. Biggs and Mr. Poet, as described by Plaintiffs, is largely if not entirely factual in nature and thus is not subject to the requirements for admission of lay opinion testimony.<sup>90</sup> If these witnesses offer any opinion testimony at trial, I will decide at that time whether it is admissible under Rule 701.

For the reasons stated above, Defendants’ motion to exclude these witnesses’ testimony is denied.

##### **5. Motion to exclude evidence regarding remediation costs (No. 16)**

In this motion, Defendants seek to exclude all evidence or mention of the actual or estimated cost of dismantling and cleaning up the Rocky Flats plant and plant site, and to exclude evidence of costs incurred by Defendants to remediate environmental conditions at the site during

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<sup>90</sup> That each of these witnesses may have specialized knowledge in journalism or science does not automatically require that their testimony be reviewed as lay or expert opinion testimony under Rule 701 or 702. *See* Fed. R. Evid. 701 2000 advisory committee’s note (Rule 701 “does not distinguish between expert and lay *witnesses*, but rather between expert and lay *testimony*.”) (emphasis in original); *Caballero*, 277 F.3d at 1247 (“Witnesses need not testify as experts simply because they are experts – the nature and object of their testimony determines whether the procedural protections of Rule 702 apply.”).

their periods of operation. *See* Defs.’ Mot. in Limine No. 16 (Doc. 1369). This motion is granted.

Plaintiffs assert this cost evidence is relevant to inform the jury of the severity of contamination and the difficulty of cleaning it up, which they contend are relevant to the question of whether the plant poses a continuing threat of off-site releases. Evidence regarding the cost of remedial efforts at the plant, however, is at best indirect evidence of these matters and has relatively little probative value with respect to the material question (in the nuisance context) of whether conditions arising from Defendants’ Rocky Flats operations pose a future risk of harm to the Class.

The low probative value of this evidence must be balanced against the risk of unfair prejudice and confusion of the issues it presents. I find this risk is significant, because the sheer cost of just the post-operation cleanup, reportedly estimated to be as high as \$7.6 billion, may overwhelm and inflame the jury and distract it from consideration of other, more probative evidence. As a result, I find the risk of undue prejudice and confusion posed by this evidence substantially outweighs its low probative value, and therefore exclude it pursuant to Rule 403.

## **II. Plaintiffs’ *Daubert* Motion and Motion in Limine**

In their *Daubert* motion, Plaintiffs move to exclude the testimony of five of the eighteen or more experts designated by Defendants and to limit the testimony of six other defense experts in certain respects. *See* Pls.’ Mem. in Supp. of Mot. to Exclude Test. of Certain Defense Expert Witnesses (Doc. 1351) [hereinafter “Pls.’ *Daubert* Mot.”]. In their motion in limine, Plaintiffs seek to exclude certain additional expert and lay evidence. *See* Pls.’ Omnibus Mot. in Limine (Doc. 1341) [hereinafter “Pls.’ Mot. in Limine”]. I address both motions below, beginning with

Plaintiffs' arguments to exclude or limit certain expert testimony, and then proceeding to their motion in limine.

**A. Request to Exclude Certain Expert Testimony in its Entirety**

Plaintiffs move to exclude all expert testimony proffered by defense witnesses Daniel Conway, John Dorchester, Geneva Smart and Dr. Jack Holl. I examine the proposed testimony of each witness in turn.

**1. Daniel Conway**

Daniel Conway is an urban economist and the president, principal and director of economic and market research for a Denver area firm. He holds an Urban Land Economics degree from the University of Wisconsin, has served as an honorarium instructor at local universities and has published many articles on various topics. App. to Pls.' Mot. to Exclude Test. of Certain Defense Expert Witnesses (Doc. 1352) [hereinafter "App. to Pls.' *Daubert* Mot."], Tab 3 at 13-14, Tab 4 at 27-28 (Conway statement of qualifications).

In 1996, Mr. Conway authored a 14-page expert report in this litigation opining that the Rocky Flats plant had not adversely affected the value of undeveloped real estate and improved commercial real estate in the Class Area. See App. to Pls.' *Daubert* Mot. (Doc. 1352), Tab 3 [hereinafter "Conway Report"]. Mr. Conway stated the basis of this opinion was his "experience and the data typically relied upon by developmental forecasters." *Id.* at 1. These data reported employment growth, population growth, household formations, retail/commercial construction and the addition of office and industrial space in the Class Area and surrounding communities from 1980 to 1996. *Id.* at 1-2. Mr. Conway concluded that, in terms of these "indicators," undeveloped properties and developed commercial properties in the Class Area performed at least



as well, if not better, than those in the northwest Denver area, Jefferson County and the Denver metro region. *Id.* at 1. Based on this conclusion, he further opined that Rocky Flats had had no effect on the value of undeveloped and commercial properties in the Class Area from the plant's 1954 inception through 1996. *Id.*

In 2004, Mr. Conway authored a supplemental expert report updating his 1996 report and conclusions to include data from 1997 through mid-2004. App. to Pls.' *Daubert* Mot. (Doc. 1352), Tab 4 [hereinafter "Conway Suppl. Report"]. In it Mr. Conway reiterated his opinion that Rocky Flats had not adversely affected the value of undeveloped and commercial properties in the Class Area. *Id.* at 1. Mr. Conway further reported that he had recently interviewed and/or reviewed the deposition transcripts of a number of public officials, developers, builders and other stakeholders doing business in the Class Area and that these interviews and depositions demonstrated that Rocky Flats had not diminished the pace of development and construction in the Class Area or negatively impacted the value of homes, commercial buildings or land in the area. *Id.* at 25.

The proponent of an expert witness has the burden of demonstrating that the expert's testimony is sufficiently reliable to be admitted under Rule 702. *See Mitchell*, 165 F.3d at 781-82; *Ralston*, 275 F.3d at 970 n.4. "The expert's assurance that the methodology and supporting data is reliable will not suffice" to carry this burden. *Mitchell*, 165 F.3d at 781.

Plaintiffs move to exclude Mr. Conway's testimony on the ground that neither he nor Defendants have demonstrated that his opinion regarding Rocky Flat's effect on Class Area property values is the product of a reliable methodology. I agree and find Defendants have not

carried their burden of demonstrating that Mr. Conway's testimony is sufficiently reliable to be admitted under Rule 702.

As just described, Mr. Conway's opinion that Rocky Flats has had no adverse impact on the value of undeveloped and commercial properties in the Class Area is based primarily on his evaluation of five "indicators." Although he states these indicators are "typically relied upon by development forecasters," Conway Report at 1; Conway Suppl. Report at 1, neither he nor Defendants provide any support, other than Mr. Conway's assurance, for this statement. Nor do Mr. Conway and Defendants explain how the work of "development forecasters" relates to the question of whether Rocky Flats has affected Class Area property values.

Fundamentally, therefore, Mr. Conway and Defendants have failed to show that Mr. Conway's methodology of determining and comparing the rate of population, job and development growth in the Class Area, Jefferson County and the Denver metro area provides a reliable basis for his expert opinion that Rocky Flats has not negatively affected property values in the Class Area. The question to be decided by the jury is not whether Rocky Flats (or, more properly, Defendants' trespass and/or nuisance) negatively affected growth and development in the Class Area, but whether the *value* of residential, commercial and undeveloped property in the Class Area has been harmed by this conduct. While the rate of growth and development in the Class Area may have some relevance to this question, Mr. Conway and Defendants do not explain that relevance or, more importantly, demonstrate how a comparison of these data for a limited period of time is a reliable method for opining that Rocky Flats has had no adverse impact on property values in the Class Area. Without a linkage between these "indicators," real estate values, and Rocky Flats, there is, in the words of the Supreme Court, "simply too great an

analytical gap between the data and the opinion proffered” for Mr. Conway’s testimony to be admitted. *Joiner*, 522 U.S. at 146.

To the extent Mr. Conway relied on his experience to reach his conclusions on value, Rule 702 requires that he ““explain how that experience leads to the conclusion reached, why that experience is a sufficient basis for the opinion, and how that experience is reliably applied to the facts.”” *United States v. Fredette*, 315 F.3d 1235, 1240 (10th Cir. 2003) (quoting Fed. R. Evid. 702 2000 advisory committee’s note). Mr. Conway did not provide this explanation and therefore no showing was made that his proposed testimony rests on a reliable foundation as required by Rule 702.<sup>91</sup> *See id.*

Defendants argue that certain of Mr. Conway’s testimony regarding the pace of development in the Class Area relative to other areas should be admitted because it rebuts anticipated testimony from Plaintiffs’ expert Wayne Hunsperger on this point. It is not clear to me from a review of the portions of Mr. Hunsperger’s expert report cited by Defendants that he intends to testify regarding the pace of development, job growth and the like in the Class Area. *See* Defs.’ Resp. to Pls.’ Mot. to Exclude Test. of Certain Defense Witnesses (Doc. 1398) [hereinafter “Defs.’ Resp. to Pls.’ *Daubert* Mot.”] at 37 (citing Hunsperger Report at 63, 252). If

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<sup>91</sup> Mr. Conway’s reliance in his 2004 supplemental report on the interviews and review of deposition testimony he later conducted does not change this conclusion. Neither this methodology nor the results of it were disclosed as a basis for Mr. Conway’s expert opinion in his 1996 report. Supplementing Mr. Conway’s report some eight years later to include this methodology and material exceeds the bounds of permissible supplementation of expert testimony under the Federal Rules. *See infra* Section II.B.1 (regarding challenge to Dr. Whicker’s supplemental expert disclosures). A party that fails to disclose information as required by Rule 26(a) is not permitted to use such information at trial unless the party’s failure to disclose was substantially justified or harmless. Fed. R. Civ. P. 37(c)(1). As Mr. Conway’s improper supplementation to include this additional material is neither substantially justified nor harmless at this late stage of the case, I will not consider it here.

Mr. Hunsperger does so testify, then I will consider whether Mr. Conway may testify in rebuttal on this point. Mr. Conway may not, however, testify regarding his valuation conclusions, because I find them unreliable for the reasons stated above.

Plaintiffs' motion to exclude the proffered testimony of defense expert Daniel Conway is, therefore, granted except as it may be relevant and appropriate in rebuttal.

## **2. John Dorchester**

John Dorchester holds a Masters Degree in Land Economics, the MAI (Member Appraisal Institute) designation from the Appraisal Institute and the CRE (Counselor of Real Estate) designation from the Counselors of Real Estate. He has forty-five years of experience in real estate valuation, is a past president of the American Institute of Real Estate Appraisers (now known as the Appraisal Institute) and has served on the International Valuation Standards Committee for many years. *See* App. to Pls.' *Daubert* Mot. (Doc. 1352), Tab 6 [hereinafter "Dorchester Report"] at 1-5 to 1-6.

In 1996, Mr. Dorchester and his company authored a 142-page expert report (not including appendices) directed at the question of "whether there was a basis for plaintiffs' claims that real property in the property class area had been economically harmed by operations and management of the Rocky Flats Plant." *Id.* at 1-5. Mr. Dorchester authored a 9-page supplement to this report in 2004. App. to Pls.' *Daubert* Mot. (Doc. 1352), Tab 7 [hereinafter "Dorchester Suppl. Report"]. In both, Mr. Dorchester concluded Defendants' operation of Rocky Flats did not cause a decrease in property values or other economic harm in the Class Area. Dorchester Report at 7-15; Dorchester Suppl. Report at 9. According to his expert reports, Mr. Dorchester also intends to testify and render opinions on a number of other diverse topics, including the

history of operations at Rocky Flats, the risks posed by the plant, the nature of the Class property claims and whether the named Plaintiffs suffered economic harm with respect to their individual properties. *See, e.g.*, Dorchester Report at 7-1 to 7-16.

Plaintiffs have moved to exclude all of Mr. Dorchester's intended testimony on the ground that he failed to demonstrate that the methodologies he used in reaching his valuation opinion are reliable and that other aspects of his intended testimony are either irrelevant or beyond his expertise as an appraiser.<sup>92</sup>

Mr. Dorchester's 1996 report is difficult to review and analyze under the Rule 702 criteria because it rambles and perseverates through numerous topics, some of which have only marginal relevance to the issues addressed in the report. The relationship of much of Mr. Dorchester's prolix discussion to his conclusions regarding Rocky Flats' effect on property values is also difficult to discern in many instances.

As best I can determine, Mr. Dorchester set out the methodologies he used to determine whether operations at Rocky Flats have caused any economic harm to the Class in Chapter 3 of his report. *Id.* at 3-14 to 3-16. Although he listed six different study methods there,<sup>93</sup> they break down into three separate analyses: (1) analysis of the pace and pattern of development around Rocky Flats; (2) analysis of news reports and anecdotal data; and (3) analysis of real estate prices

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<sup>92</sup> Although the discussion that follows focuses on Mr. Dorchester's 1996 expert report, it applies equally to the opinions set forth in Mr. Dorchester's 2004 supplemental report.

<sup>93</sup> The admissibility of Mr. Dorchester's seventh listed study, an analysis of the named Plaintiffs' claims, and the conclusions he drew from it is addressed separately below.

and price trends in the vicinity of Rocky Flats. *See id.* at 5-1 to 5-52.<sup>94</sup> Mr. Dorchester provided additional information about these analyses and his conclusions based on them in Chapters 4, 5 and 7 and Appendix L. I examine the reliability of Mr. Dorchester's proffered testimony regarding each of these analyses in turn.

Mr. Dorchester's development-related analysis consisted of a lengthy examination of the history of development in the Denver metropolitan area and in the vicinity of Rocky Flats, as well as a discussion of some of the factors that might explain this history. *Id.* at 3-14; *see id.* at 4-1 to 4-23, 5-1 to 5-36. Based on this analysis, Mr. Dorchester concluded the pattern of development in the vicinity of Rocky Flats "appears to be reasonable and understandable" and "do[es] not evidence a reluctance of the market to develop towards or in proximity to Rocky Flats." *Id.* at 7-3. Based on his analysis of demographic and economic data, Mr. Dorchester further concluded that "the rate and nature of growth in the property class area are not consistent with indicators of economic harm" identified in his report. *Id.* at 7-4.

The difficulty with this development-based analysis, as with Mr. Conway's proffered testimony, is that neither Mr. Dorchester nor Defendants link this analysis to land values or the key damages issue to be decided by the jury: whether there is a difference between the actual value of the Class Properties and the value these properties would have had but for Defendants'

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<sup>94</sup> An additional study methodology reportedly undertaken by Mr. Dorchester, titled "analysis of expert opinion," consisted of his interviews with unnamed "Denver area real estate experts," government officials and agency staff personnel and "others who could furnish information about Rocky Flats." Dorchester Report at 3-16. In Chapter 5, however, where Mr. Dorchester reported on how he conducted his overall study and the results it produced, he did not discuss this method, how it was implemented or any conclusions he drew from it. The only further mention of this "expert opinion analysis" methodology in the 1996 report that I could locate is a single summary paragraph in the report's conclusion to the effect that these interviews confirmed Mr. Dorchester's conclusions. *Id.* at 7-5.

alleged trespass and nuisance through operation of Rocky Flats. Mr. Dorchester, like Mr. Conway, provided no authority or explanation demonstrating that analysis of development patterns and related demographic and economic data is a reliable or accepted method for answering this question. It was Defendants' burden to prove that Mr. Dorchester's development-based analysis is a reliable method for assessing the effect of an externality, such as Rocky Flats, on the *value* of affected properties.<sup>95</sup> Defendants failed to carry that burden with respect to this portion of Mr. Dorchester's study.<sup>96</sup>

Defendants also failed to carry their burden with respect to Mr. Dorchester's second methodology, his analysis of news reports and anecdotal data. Mr. Dorchester reported he gathered 950 articles regarding Rocky Flats that were published in Denver newspapers between 1951 and 1989. *Id.* at 5-38. He explained he collected and reviewed this information "to identify the nature, extent, and types of information that was publicly available" regarding Rocky Flats at

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<sup>95</sup> Defendants assert the reliability of all of Mr. Dorchester's methods is established by Mr. Dorchester's statements in a supplemental declaration that the methods he used are "the most appropriate and generally expected" research methodologies for testing for economic harm to real property. *See* Defs.' Resp. to Pls.' *Daubert* Mot. (Doc. 1398) at 45 (quoting Ex. 26 (Dorchester Decl.), ¶ 2.11). I could not verify Mr. Dorchester's reported statements, however, because the declaration included in Defendants' appendix does not contain the quoted language or address the reliability of Mr. Dorchester's methodology. *See id.*, Ex. 26. More importantly, even if Defendants had submitted a declaration by Mr. Dorchester to this effect, it would not be sufficient to establish the reliability of his methodology. *See, e.g., Mitchell*, 165 F.3d at 781 ("The expert's assurance that the methodology and supporting data is reliable will not suffice."); Fed. R. Evid. 702 2000 advisory committee's note ("The trial court's gatekeeping function requires more than simply 'taking the expert's word for it.'").

<sup>96</sup> Mr. Dorchester's proffered testimony on the history or pattern of development in the vicinity of Rocky Flats may, however, be admissible in rebuttal to testimony by Plaintiffs' witnesses on these issues. *See supra* Section II.A.1 (regarding use of Mr. Conway's testimony in rebuttal).

various points in time. *Id.* at 5-36 to 5-38; *see id.* at 3-14 to 3-15. He then concluded “it is apparent that the [publicly available] information did not deter development from occurring in the Rocky Flats environs, nor does it appear that it reduced development timing.” *Id.* at 7-4. He also reported that discussions with “various experts,” who were not identified, confirmed these conclusions. *Id.* at 7-5.

Neither Mr. Dorchester nor Defendants link his review of newspaper articles and his conclusions regarding their effect on development in the vicinity of Rocky Flats to his opinion that the value of Class properties has not been diminished by Defendants’ operations at Rocky Flats. Mr. Dorchester’s reported but unsubstantiated discussions with unspecified “experts” also do not provide a reliable basis for these conclusions. *See* Fed. R. Evid. 2000 advisory committee’s notes (“The trial court’s gatekeeping function requires more than simply ‘taking the expert’s word for it.’”). Accordingly, Defendants have failed to carry their burden of demonstrating that this analysis was a reliable method for determining whether Defendants’ alleged misconduct has negatively affected the value of Class properties.

In his third approach to assessing any economic harm caused by Defendants’ Rocky Flats operations, Mr. Dorchester performed a number of price studies for Denver, the northwest Denver metropolitan area and the Class Area and environs. *Id.* at 5-39 to 5-51. Mr. Dorchester’s basic methodology, which he refers to as his “time series methodology,” *see id.*, App. L, was to determine the average price of homes sold in these various markets from the early 1970s through 1994 using MLS and other available data. *See id.* at 5-39. He then examined the price trend in each analysis area to determine average price variability and to compare this variability to what he expected to occur with normal market shifts over time. *Id.* at 5-40. According to



Mr. Dorchester, any “unexplained variation” or “shock” in these price trends would indicate that an “abnormality, such as adverse economic effects of a contaminating situation or event, may have occurred.” *Id.*; *see id.* at L-3. Mr. Dorchester concluded that his price trend series for the Class Area and environs showed “no observable ‘shocks’ that would evidence significant changes in pricing” that might be attributable to Rocky Flats. *Id.* at 7-6; *see id.* at 5-48, L-6 to L-7.

Plaintiffs’ first complaint is again that Mr. Dorchester and Defendants have not carried their burden of demonstrating that Mr. Dorchester’s time series methodology is a reliable method of showing whether and to what extent Rocky Flats and Defendants’ conduct there has affected real property values in the Class Area. They also argue that his method of examining pricing trends to identify “shocks” to Class property values, especially before and after the FBI raid, is too subjective to yield reliable results and is not consistent with the “but for” measure of damages that governs this action.

Defendants cite a footnote in the Reference Manual on Scientific Evidence and two antitrust cases as establishing that use of a time series analysis to detect market reaction is a generally accepted methodology. Defs.’ Resp. to Pls.’ *Daubert* Mot. (Doc. 1398) at 47 (citing *Ref. Guide on Multiple Regression* at 191 & n.31; *Allapattah Servs., Inc. v. Exxon Corp.*, 61 F. Supp. 2d 1335, 1348 (S.D. Fla. 1999); *In re Indus. Silicon Antitrust Litig.*, No. 95-2104, 95-1131, 96-2003, 96-2111, 96-2338, 1998 WL 1031507, at \*2–3 (W.D. Pa. Oct. 13, 1998)). The cited authorities have some relevance, but are not conclusive. The cited passage in the Reference Manual, for example, states only that “moving average time-series models” are “appropriate when nonlinearities are important.” *Ref. Guide on Multiple Regression* at 191 & n.31. The Reference Manual further states that “the expert should be prepared to explain why any

chosen method . . . was more suitable than the alternatives.” *Id.* at 191. The question here is whether Mr. Dorchester has sufficiently explained his pricing method and why it is suitable and reliable to assess whether Defendants’ alleged misconduct at Rocky Flats affected Class property values. This is a close question but I find Mr. Dorchester and Defendants provided enough explanation and authority regarding this form of analysis to demonstrate its reliability within the meaning of Rule 702. Plaintiffs’ complaint that Mr. Dorchester’s method of looking for pricing “shocks” is subjective and inconsistent with the “but for” measure of damages has some merit, but I find it goes to the weight to be accorded Mr. Dorchester’s testimony, and does not render his testimony inadmissible.<sup>97</sup> Accordingly, I find Mr. Dorchester’s proffered expert testimony regarding the pricing studies he performed and the conclusions he reached based on them, as set forth in the subsection of Chapter 5 titled “Real Estate Prices and Price Trends” and in related portions of his 1996 report, is admissible. Plaintiffs’ motion to exclude this portion of his testimony is denied.

Plaintiffs also seek to exclude Mr. Dorchester’s testimony regarding each of the named Plaintiffs’ properties. As disclosed in his expert report, this proffered testimony consists of Mr. Dorchester’s summary of each named Plaintiff’s deposition testimony and document production regarding their Class property or properties, *see* Dorchester Report at 6-1 to 6-6, followed by commentary and the conclusion for each that there is no basis for finding any economic harm to their properties attributable to Rocky Flats. *See id.* at 7-6 to 7-13. For each

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<sup>97</sup> If Plaintiffs are concerned that Mr. Dorchester’s testimony on pricing trends might confuse the jury into applying something other than the “but for” damages measure, they may propose a limiting instruction addressing this concern.

property, Mr. Dorchester based the latter conclusion “on the other studies we performed” and the absence “of evidence to the contrary.” *See id.* at 7-8 to 7-12.

Plaintiffs argue that the opinions offered by Mr. Dorchester based on this process are unreliable because his review was cursory and based on incomplete information. They also contend his discussion regarding each of the named Plaintiffs’ properties is irrelevant because he did not rely on it in stating his ultimate conclusions regarding the lack of economic harm to each property. I agree on both points and therefore find Mr. Dorchester’s proffered expert testimony on this subject inadmissible.

The remainder of Mr. Dorchester’s testimony as disclosed in his expert report is also excluded because it is irrelevant and/or beyond his area of expertise. In Chapter 1 of his report, for example, Mr. Dorchester provided a verbose statement of his assignment as well as his interpretation of the Plaintiffs’ damages claims as stated in their Second Amended Complaint and a 1993 Declaration filed by Plaintiffs’ expert Wayne Hunsperger. This discussion is not evidence, is out-of-date and is beyond Mr. Dorchester’s expertise as a property appraiser.

In Chapter 2 of his report, Mr. Dorchester set out a 19-page “brief” history of Rocky Flats. This history begins with Rocky Flats’ origins in the Cold War, discusses the site selection process, reports on historical operations at the Plant, includes 12 pages opining on Rocky Flats’ many positive contributions to the local and Denver area economy and its lack of negative effect on development or the environment, and closes with a discussion of the “history of public controversy surrounding Rocky Flats.” *Id.* at 2-1 to 2-19. Testimony on these subjects is beyond Mr. Dorchester’s appraisal expertise and is not relevant to his opinion regarding alleged diminution in Class property values. Contrary to Defendants’ assertion, this

historical summary is in no way similar to the half-page, bare-bones account of Rocky Flats' history in Mr. Hunsperger's expert report. *Compare* Dorchester Report at 2-1 to 2-19 *with* Hunsperger Report at 73.

Plaintiffs' motion to exclude Mr. Dorchester's testimony is granted in part and denied in part as stated above.

### **3. Geneva Smart**

Geneva Smart is a Certified Residential Appraiser in Colorado and Senior Residential Appraiser member of the Appraisal Institute. She has 20 years of residential real estate appraisal experience in Boulder County and surrounding areas.

For this litigation, Ms. Smart authored a 14-page expert report in which she opined that Rocky Flats has not had a negative effect on the value of the named Plaintiffs' individual properties or the value of other residential properties in northeast Jefferson County. App. to Pls.' *Daubert* Mot. (Doc. 1352), Ex. 12 [hereinafter "Smart Report"] at 9, 14. Ms. Smart stated in her report that these conclusions were based on her review of area maps, Plaintiffs' depositions, certain property appraisals, the Denver and Boulder area MultiList Services, and Jefferson County Assessor Records, as well as telephone interviews with officials with the Jefferson County Assessor's Office, Jefferson County Mapping Office, and Jefferson County School Administration. *Id.* at 2. She also cited as sources her years of experience in the area and discussions with real estate agents, homeowners and appraisers over the years. *Id.* at 2, 11. Plaintiffs move to exclude Ms. Smart's proffered testimony on the ground that it is biased and based on a cursory, inadequate and therefore unreliable methodology.

Ms. Smart's deposition testimony regarding the bases for her conclusions demonstrates that her methodology was indeed unreliable for purposes of offering an expert opinion. Ms. Smart reported in her deposition that she informed defense counsel at their first meeting, before she was retained as an expert witness or done any investigation, that she believed Rocky Flats had not negatively affected property values. App. to Pls.' *Daubert* Mot. (Doc. 1352), Ex. 13 [hereinafter "Smart Dep."] at 26, 160. Her primary method of confirming this conclusion before writing her report was to review approximately 100 appraisals made between 1988 and 1993 by a single company that were selected for her by Defendants. *Id.* at 32, 45-46, 56-57. The conversations with various Jefferson County officials she cites in her expert report were minimal and did not address any potential property value effects of Rocky Flats. *Id.* at 81-85, 143-44, 147-50 (regarding contacts with Jefferson County's Assessor's office, mapping office and School District).

Ms. Smart also testified that her use of the MultiList database of home sales and conversations with real estate agents or home owners consisted only of her impression of these sources over the years, and did not include any systematic or scientific survey or even any inquiry in connection with her expert report. *See id.* at 151-154 (Multilist and conversations with realtors); 182-84 (conversations with homeowners). Ms. Smart testified she did not rely on the deposition transcripts she reviewed, *id.* at 144, or some of the few interviews she had with appraisers because they did not support her previously announced conclusion, *see id.* at 154-60.

Ms. Smart also does not explain how her experience in the area allowed her to reach her conclusions. Her deposition, in fact, reveals that she had only performed one appraisal in the Class Area in the previous five years and that she knew very little about Rocky Flats and the

problems ascribed to it that might affect area property values. *See id.* at 95-100, 152-53. As a result, it is unclear how her appraisal experience would allow her to opine that there was no value effect attributable to a property's proximity to Rocky Flats. *See, e.g., Fredette*, 315 F.3d at 1239-40 (expert opinion is unreliable when there is no clear link between expert's experience and the conclusions reached).

Finally, neither Ms. Smart nor Defendants produced evidence demonstrating that her reported use of these sources and overall methodology are consistent with the level of intellectual rigor that characterizes the practice of an expert in the relevant field of property appraisal and valuation. *See Kumho Tire*, 526 U.S. at 152 (stating standard for reliability determination).

Under these circumstances, I find Defendants have not carried their burden of establishing that Ms. Smart's proffered expert opinions are based on sufficient facts and data and are the product of a reliable methodology reliably applied. As a result, I find her expert testimony is inadmissible under Rule 702.

#### **4. Dr. Jack M. Holl**

Dr. Jack M. Holl is a historian who, with Dr. Richard Hewlett, prepared a 45-page expert report in this case. App. to Pls.' *Daubert* Mot. (Doc. 1352), Tab 11 [hereinafter "Holl/Hewlett Report"].<sup>98</sup> This report discloses that the majority of Dr. Holl's proffered testimony consists of information regarding the "Dawn of the Nuclear Age" before and during World War II, *id.*

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<sup>98</sup> Defendants originally designated Dr. Hewlett as an expert witness and disclosed his expert report in 1996. *See* App. to Pls.' *Daubert* Mot. (Doc. 1352), Tab 10. Defendants state that Dr. Hewlett's health subsequently deteriorated and will prevent him from testifying at trial. Defendants have designated Dr. Holl, a former colleague of Dr. Hewlett, to testify in his stead. The Holl/Hewlett Report, produced as a supplemental report in 2004, appears to be a somewhat edited version of Dr. Hewlett's 1996 expert report.

at 3-11, the United States' efforts immediately after the war to maintain its nuclear monopoly and develop a nuclear weapons stockpile, *id.* at 11-19, and the acceleration and expansion of the United States' nuclear weapon program in the late 1940s and early 1950s in response to international crises, the Soviet Union's development of nuclear technology and the discovery of Soviet espionage directed at the United States' nuclear weapons program, *id.* at 20-27. The remainder of Dr. Holl's intended testimony describes the federal government's decision to construct a new nuclear weapons fabrication plant, its decision to build this plant at the Rocky Flats site, and the construction and subsequent expansion of the Rocky Flats plant. *See id.* at 27-38.

Plaintiffs move to exclude all testimony on these subjects. They assert the proffered expert testimony of Dr. Holl is irrelevant to their property damage claims, or, to the extent it has any probative value, that this value is outweighed by the danger of unfair prejudice and juror confusion because this testimony seeks to play on jurors' patriotic sentiments by suggesting that Defendants' operations at Rocky Flats were so beneficial to national security that any harm caused to the plant's neighbors should be disregarded. Plaintiffs also contend Dr. Holl's account of the Cold War arms race will not assist the jury and will waste valuable trial time because the jury does not need an expert's assistance to understand that the Rocky Flats plant played a role in protecting national security during the Cold War.

I grant this motion in part and deny it in part. One of the issues to be decided in this case in connection with Plaintiffs' nuisance claims is whether any proven interference with Class members' use and enjoyment of property is unreasonable. Under Colorado law and the Restatement (Second) of Torts, determination of this issue requires the jury to consider whether

the gravity of the harm caused by Defendants' conduct outweighs the utility of that conduct. *See Cook IX*, 273 F. Supp. 2d at 1202. To assess the utility of Defendants' conduct, the jury must consider several factors, including the primary purpose of Defendants' conduct and the social value of that purpose, *i.e.*, the extent to which achievement of this purpose generally advances or protects the public good. *See* Restatement (Second) of Torts § 828 & cmt. e; *see also* Mem. Op. re: Jury Instructions, Section II.B (discussing Restatement § 828 in connection with Defendants' proposed nuisance Instruction No. 6). Consideration of the primary purpose of the Rocky Flats plant and the social value of that purpose is thus relevant to this action.

As I understand the parties' arguments, it is undisputed that the primary purpose or mission of Rocky Flats was to produce nuclear weapon components and that this mission advanced the public good by protecting national security. Defendants nonetheless apparently intend to introduce a great deal of evidence on this subject, including the expert testimony set forth in the Holl/Hewlett Report.

Dr. Holl's proffered testimony regarding the "dawn of the nuclear age" in World War II, the origins of the Cold War armament race and related Soviet espionage, has little to no probative value here. Whatever probative value this testimony might have in providing a background to the federal government's decision to construct and operate Rocky Flats is substantially outweighed by the danger of unfair prejudice and confusion of the issues, and will needlessly waste trial time. This is particularly true given the lack of dispute regarding Rocky Flats' mission and the social



value of that mission, and the capability of a lay jury to understand this mission and its value without expert assistance.<sup>99</sup>

Dr. Holl's proffered testimony regarding events directly relating to the establishment, siting and operation of Rocky Flats does not present these concerns to the same degree. In addition, testimony on these subjects may be relevant to help explain the plant's operations over time, as demonstrated by the proffered testimony of Plaintiffs' expert Dr. Cochran on these subjects. *See* Pls.' Cons. *Daubert* Resp. (Doc. 1399), Ex. 6 (Cochran Overview Report).

Accordingly, I grant Plaintiffs' motion to exclude expert testimony by Dr. Holl on the background, "pre-Rocky Flats" subjects set out in the Holl/Hewitt Report at pages 1-27. Dr. Holl may, however, testify regarding the history of Rocky Flats' creation and expansion as generally set out beginning on page 27 of the Holl/Hewitt report under the title "Project Apple-Establishing Rocky Flats" and continuing to the end of the report.

## **B. Request to Limit Certain Expert Testimony**

### **1. Dr. Ward Whicker**

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<sup>99</sup> Defendants argue Dr. Holl's testimony regarding the beginnings and nature of the Cold War threat to national security is highly probative and admissible because a showing that events at Rocky Flats resulted from national security needs will prove that these events were reasonable, and thereby defeat Defendants' nuisance claims. *See, e.g.*, Defs.' Resp. to Pls.' *Daubert* Mot. (Doc. 1398) at 58-60. This is not correct. As stated above, the reasonableness of any interference with Plaintiffs' use and enjoyment of property depends on the balance between the utility of Defendants' conduct and the harm it causes. The utility of Defendants' conduct, in turn, depends on more than just the social value it provided, and includes consideration of whether Defendants took all steps practicable to avoid all or part of the harms they allegedly caused. *See* Restatement (Second) of Torts § 828; *see generally* Mem. Op. re: Jury Instructions, Section II.B (discussing Defendants' proposed nuisance Instruction No. 6). The undisputed fact that Rocky Flats served national security needs is not, therefore, determinative of the reasonableness of the alleged interference.

In 1991, Defendants retained Dr. F. Ward Whicker, a professor in Colorado State University's Department of Environmental and Radiological Health Sciences, to sample and measure the distribution and transport of plutonium and other radionuclides in the off-site environs of the Rocky Flats plant and to assess related human exposure to these substances. Upon receiving additional funding from the Colorado Department of Public Health and Environment, Dr. Whicker extended this sampling program to include certain on-site areas. App. to Pls.' *Daubert* Mot. (Doc. 1352), Tab 17 [hereinafter "Whicker Report"].

Defendants designated Dr. Whicker as one of their expert witnesses, and in November, 1996, disclosed his intended expert testimony in a voluminous report as required by Rule 26(a). In his expert report, Dr. Whicker described his sampling study, provided the data generated by it and interpreted these data to state conclusions regarding the spatial distribution and environmental transport of plutonium and americium in the soils and vegetation on and adjacent to Rocky Flats.<sup>100</sup> *Id.* at 2. Plaintiffs deposed Dr. Whicker concerning his expert testimony as disclosed in this report in April, 1997.

Subsequently, in 2004 and 2005, Defendants produced additional statements by Dr. Whicker describing his intended expert testimony. The first, produced in August, 2004, is titled "Supplemental Expert Report." *See* App. to Pls.' *Daubert* Mot. (Doc. 1352), Tab 18 [hereinafter "Whicker Suppl. Report"]. In it, Dr. Whicker discussed and stated opinions on a number of topics beyond his sampling study and its results, including: the difficulty of measuring

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<sup>100</sup> In his report, Dr. Whicker also provided the preliminary results of an on-going study designed to measure the potential magnitude of human exposure to plutonium released from Rocky Flats and of studies to assess the level of plutonium and other radioactive substances in Great Western Reservoir sediments and ambient natural background radiation levels along the Colorado Front Range. *See* Whicker Report at 1-2.

plutonium levels in soil; the procedures used and results generated by other, earlier studies that measured plutonium in Rocky Flats area soil; potentially relevant regulatory and other environmental standards for plutonium in soil and how plutonium levels near Rocky Flats compare to these standards; potential changes in plutonium levels in soil over time; and the feasibility and justification for removing plutonium from Class members' properties. *See id.* at 2. Dr. Whicker stated his 1996 report was "the starting point" for these additional analyses and opinions. *Id.* at 1.

In a second supplemental submission, a declaration dated January 14, 2005, Dr. Whicker set out additional discussion and opinions, including opinions relating to the effect of soil disturbance on measurements of plutonium concentrations in soil and whether it was possible to demonstrate scientifically that plutonium from Rocky Flats remains on Class properties that have been disturbed through development, agriculture or landscaping. *See App. to Pls.' Daubert Mot.* (Doc. 1352), Tab 19 [hereinafter "First Whicker Decl."]. In a final declaration, dated March 16, 2005, Dr. Whicker expanded on the opinions stated in his January 2005 declaration and responded to arguments made by Plaintiffs in response to it. *See Defs.' Reply to Pls.' Resp. to Objs. to Identification of Stip. Facts* (Doc. 1330), Ex. 3 [hereinafter "Second Whicker Decl."].<sup>101</sup>

Plaintiffs have moved to exclude testimony regarding portions of Dr. Whicker's 2004 supplemental report and 2005 declarations on the ground that the proffered testimony was

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<sup>101</sup> Defendants submitted Dr. Whicker's declarations in support of objections to a proposed stipulation (based on Defendants' admissions) that the Class Area was contaminated with plutonium from Rocky Flats. *See Defs.' Objs. to Identification of Stip. Facts* (Doc. 1315); *Defs.' Reply to Pls.' Resp. to Objs. To Identification of Stip. Facts* (Doc. 1330). Although Plaintiffs did not specifically identify Dr. Whicker's second declaration in their *Daubert* motion, their arguments there clearly encompass it.

not disclosed in his original 1996 expert report as required by Rule 26(a) and exceeds the bounds of supplemental expert disclosure permitted by the Rule 26(e). Specifically, Plaintiffs seek to exclude testimony by Dr. Whicker regarding: (1) the difficulty of measuring or detecting plutonium in soil, *see* Whicker Suppl. Report at 3-5; First and Second Whicker Decls. *passim*; (2) governmental or agency standards for permissible levels of plutonium in soil and how plutonium soil levels near Rocky Flats compare to these standards, *see* Whicker Suppl. Report at 9-10; (3) possible ways in which plutonium in soil can be disturbed, *see id.* at 11; First Whicker Decl., ¶¶ 11-12, 14, 17; Second Whicker Decl., *passim*; and (4) the unfeasibility of removing plutonium from Class properties, *see* Whicker Suppl. Report at 11-13.

Rule 26(a)(2) requires parties to produce a written report by each expert witness that includes “a complete statement of all opinions to be expressed [by that witness] and the basis and reasons therefor.” Fed. R. Civ. P. 26(a)(2); *see Miller v. Pfizer, Inc.*, 356 F.3d 1326, 1332 (10<sup>th</sup> Cir. 2004). This report must be “detailed and complete” and state “the testimony the witness is expected to present during direct examination, together with the reasons therefor.” Fed. R. Civ. P. 26 1993 advisory committee’s note. The expert’s report must be produced by the court-ordered deadline, which in this case was in November, 1996. A party that fails to disclose expert testimony in compliance with these rules may not present the expert’s testimony at trial unless the failure to disclose was substantially justified or harmless. *See* Fed. R. Civ. P. 37(c)(1).

Rule 26(e)(1) permits, indeed requires, that an expert supplement his report and disclosures in certain limited circumstances. Those circumstances are when the party or expert learns the information previously disclosed is incomplete or incorrect in some material respect.

*See* Fed. R. Civ. P. 26(e); *Jacobsen v. Desert Book Co.*, 287 F.3d 936, 953-54 (10<sup>th</sup> Cir. 2002).<sup>102</sup>

This provision is “not intended to provide an extension of the expert designation and report production deadlines” and may not be used for this purpose. *Metro Ford Truck Sales, Inc. v. Ford Motor Co.*, 145 F.3d 320, 324 (5<sup>th</sup> Cir. 1998). Permissible supplementation under the Rules instead “means correcting inaccuracies, or filling the interstices of an incomplete report based on information that was not available at the time of the initial disclosure.” *Kenner v. United States*, 181 F.R.D. 639, 640 (D. Mont. 1998); *see Beller v. United States*, 221 F.R.D. 689, 694-95 (D.N.M. 2003).

A supplemental expert report that states additional opinions or rationales or seeks to “strengthen” or “deepen” opinions expressed in the original expert report exceeds the bounds of permissible supplementation and is subject to exclusion under Rule 37(c). *Beller*, 221 F.R.D. at 695; *see Keener*, 181 F.R.D. at 641-42; *Minebea Co., Ltd. v. Papst*, 231 F.R.D. 3, 6 (D.D.C. 2005). “To rule otherwise would create a system where preliminary [expert] reports could be followed by supplementary reports and there would be no finality to expert reports, as each side, in order to buttress its case or position, could ‘supplement’ existing reports and modify opinions previously given.” *Beller*, 221 F.R.D. at 695. This result would be the antithesis of the full expert disclosure requirements stated in Rule 26(a).

The opinions and discussion in Dr. Whicker’s 2004 and 2005 supplemental disclosures that are challenged by Plaintiffs are improper supplements to his 1996 expert disclosures under

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<sup>102</sup> A party may also be ordered by the court to supplement or correct an expert’s disclosure to include information thereafter acquired. *See* Fed. R. Civ. P. 26(e). In this case, supplementation in accordance with the Rules was authorized by court order. *See* Minute Order (Doc. 1238) (June 17, 2004). The deadline for service of any supplemental expert reports was July 30, 2004 for Plaintiffs and August 6, 2004 for Defendants. *See id.*

these standards. I have reviewed these disclosures and Dr. Whicker's 1996 expert report and there is no question that Dr. Whicker's proffered testimony on the points identified by Plaintiffs are not attempts to correct inaccuracies in the 1996 report or to complete it based on information that was not available then. Rather, this testimony offers new or expanded opinions and discussion based largely on information that was available at the time of Dr. Whicker's initial disclosures. Such "supplementation" is not permitted under the Federal Rules.<sup>103</sup>

Defendants argue Dr. Whicker's supplemental disclosures are proper because they concern "topics expressly addressed" in his 1996 report. Defs.' Resp. to Pls.' *Daubert* Mot. (Doc. 1398) at 76. The 1996 report excerpts cited by Defendants, however, do not demonstrate that Dr. Whicker expressly addressed or provided opinions on the topics that are the subject of Plaintiffs' motion, but rather that he made a handful of mostly passing references to these subjects in the course of describing his sampling study and the conclusions he drew from it.<sup>104</sup> Moreover,

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<sup>103</sup> Neither party produced a complete copy of Dr. Whicker's 1996 report in their briefing on Plaintiffs' motion to exclude portions of his testimony. At my request, Defendants provided the court with a complete copy of this report for my review in deciding this motion. I have since discovered Defendants did not enter the complete report in the record at this time. In order to complete the record on this issue, I have directed the court clerk to enter the copy of Dr. Whicker's November 21, 1996 report that I received from Defendants on September 2, 2005 into the case record.

<sup>104</sup> In addition, there are significant discrepancies between Dr. Whicker's report as disclosed in 1996 and some of the purported report excerpts cited, produced and relied upon by Defendants in opposition to Plaintiffs' *Daubert* motion. *Compare* 1996 Whicker Report, Chapter 2 (titled "Draft (11-19-96) Inventory Estimates of <sup>239</sup>Pu in Soil East of Rocky Flats") *with* Defs.' Resp. to Pls.' *Daubert* Mot. (Doc. 1398), Ex. 39A (expanded version of 1996 draft published in 7 *Technology* 497-507 (2000)); *compare* 1996 Whicker Report, Chapter 11 (data table titled "Americium-241 and Cesium-137 Activity Concentrations and Inventories at Macroplots Along the A Transect") *with* Defs.' Resp. to Pls.' *Daubert* Mot. (Doc. 1398), Ex. 39C at 276-285 (excerpt from article published in 76 *Health Physics* (Mar. 1999) that apparently discusses the data reported in Chapter 11 of Dr. Whicker's 1996 expert report).

even if Dr. Whicker had expressly addressed these topics in his 1996 report, supplementation would only be permitted under the Rules to correct inaccuracies in the 1996 report or to complete it based on information that was not available when the report was issued. *See Kenner*, 181 F.R.D. at 640; *Beller*, 221 F.R.D. at 694-95. Defendants make no showing that Dr. Whicker's 2004 and 2005 supplemental disclosures satisfy either circumstance.<sup>105</sup>

Defendants also argue my 2003 and 2004 rulings narrowing and defining the issues to be tried in this action constitute new information justifying Dr. Whicker's 2004 and 2005 supplemental disclosures. Court rulings, however, do not constitute new information justifying supplementation under Rule 26(e). Granting parties carte blanche to serve a supplemental round of expert reports setting out new and revised opinions based on pretrial rulings would undermine the expert disclosure requirements set forth in Rule 26(a).

Even if this were not the case, there is no merit to Defendants' suggestion that *Cook IX* and other pretrial decisions introduced new elements to the case that necessitated additional expert testimony. Dr. Whicker's supplemental disclosures were directed to the issue of whether the Class Area is contaminated with plutonium from Rocky Flats. This issue has been part of this case from the beginning because it is an element of Plaintiffs' trespass claim. Defendants' suggestion that they were not aware of this issue until the 2003 *Cook IX* decision is not credible. In fact, Defendants' decision to supplement Dr. Whicker's 1996 report to add opinions regarding matters such as the effect of soil disturbance on plutonium measurement and the reliability of pre-development soil sampling results to establish existing contamination, *see, e.g.*, First and Second

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<sup>105</sup> In addition, Dr. Whicker's 2005 declarations were not timely produced. The court-ordered deadline for Defendants to serve any supplemental expert disclosures was August 6, 2004. *See Minute Order (Doc. 1238)*.

Whicker Decls., appears to be the result of Defendants' tactical decision to dispute a previously conceded point - that the Class Area is in fact contaminated with plutonium from Rocky Flats. See Mem. Op. re: Jury Instructions, Section I.A.2 (discussing Defendants' representations on this issue). The Federal Rules do not permit a party to supplement previously disclosed expert testimony for such a purpose. See *Minebea*, 231 F.R.D. at 6 (Rule 26(e) does not permit parties to file supplemental reports whenever they believe such reports would be 'desirable' or 'necessary' to their case."); cf. *Schweizer v. DEKALB Swine Breeders, Inc.*, 954 F. Supp. 1495, 1509-10 (D. Kan. 1997) (party may not expand expert's opinions after disclosure deadline to defend summary judgment motion). Accordingly, I find Dr. Whicker's discussion and opinions in his 2004 and 2005 supplements as identified by Plaintiffs were not disclosed as required by Rule 26(a) and are not permissible supplements under Rule 26(e).

Pursuant to Rule 37(c)(1), Dr. Whicker may not testify regarding these matters unless the failure to disclose this testimony was substantially justified or harmless. See *Jacobsen*, 287 F.3d at 952-53. In determining whether either circumstance exists, I consider the following factors: (1) the prejudice or surprise to the party against whom the testimony is offered; (2) the ability of the party to cure the prejudice; (3) the extent to which introducing the testimony would disrupt the trial; and (4) the offering party's bad faith or willfulness. *Id.* at 953.

I find Defendants' violation of the expert disclosure rules with respect to Dr. Whicker was neither harmless nor substantially justified. Expert discovery closed years before Dr. Whicker's supplemental disclosures. At the time the supplemental report and declarations were served, the court and the parties were engaged in the lengthy and difficult process of narrowing and defining the issues to be tried and preparing for trial following more than a decade of discovery and



pretrial motions practice. Defendants' improper attempt to supplement and expand Dr. Whicker's expert testimony in the middle of this process, more than seven years after Dr. Whicker's testimony was disclosed and six years after Plaintiffs deposed Dr. Whicker based on this disclosure, prejudiced Plaintiffs in their preparation for trial. Reopening expert discovery to allow Plaintiffs to depose Dr. Whicker and designate a rebuttal expert if desired to cure this prejudice was not a just or viable option at this late stage of trial preparation, especially given the interrelated nature of much of the expert testimony in this case. Allowing introduction of Dr. Whicker's supplemental testimony under these circumstances would have disrupted the trial and possibly delayed it. Given the length of the anticipated trial and the busy schedules of both the court and trial counsel, abandoning the current trial date also would have likely necessitated yet another lengthy delay in this case. While I do not find Defendants acted in bad faith in failing to disclose Dr. Whicker's additional testimony in his 1996 report, their contention that they were not aware of the need for this testimony until after my 2003 decision in *Cook IX* is not credible.

For all of these reasons, I find Defendants' failure to disclose the supplemental testimony challenged by Plaintiffs was neither harmless nor substantially justified. Plaintiffs' motion to exclude this testimony is granted.

## **2. Laurie Van Court**

Laurie Van Court is a Colorado certified appraiser holding the MAI designation from the Appraisal Institute. She prepared a 30-page report for this litigation regarding the factors that may affect horse-related properties and businesses and how these factors may have influenced the value of the properties and horse businesses of named Plaintiffs Marilyn Cook, Loren and

Gertrude Babb, and Richard and Sally Bartlett. *See* App. to Pls.’ *Daubert* Mot. (Doc. 1352), Tab 15 [hereinafter “Van Court Report”] at 1-2.

Plaintiffs move to exclude Ms. Van Court’s proffered testimony on four subjects: the management of horse properties generally; the financial state of these Plaintiffs’ horse businesses; the value of Ms. Cook’s and the Babbs’ properties; and Ms. Cook’s alleged debts. Plaintiffs argue Ms. Van Court’s opinions on these subjects as disclosed in her report are irrelevant and unsupported.

Based on my review of Ms. Van Court’s expert report and excerpts from her deposition as provided by the parties, I grant Plaintiffs’ motion in part and deny it in part. I find Ms. Van Court’s intended testimony regarding Ms. Cook’s alleged debts, the Thigpen transactions, the horse business and the participation of Ms. Cook, the Babbs and the Bartletts in the horse business are irrelevant. They are therefore excluded except on rebuttal and then only if such issue or issues are raised by Plaintiffs. Ms. Van Court may testify regarding the real property owned by Ms. Cook, the Babbs and the Bartletts.

### **3. Expert testimony regarding the ability to abate plutonium contamination in the Class Area**

Several of Defendants’ experts offer opinions on the feasibility or desirability of removing plutonium contamination from the Class Area. *See* App. to Pls.’ *Daubert* Mot. (Doc. 1352), Ex. 9 [hereinafter “Frazier/Auxier Report”] at 3; Whicker Suppl. Report at 11-13.<sup>106</sup> Plaintiffs move to exclude testimony on this subject on the ground that it irrelevant and unfairly prejudicial and that the opinions offered represent personal views unsupported by any methodology.

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<sup>106</sup> The cited portion of the Dr. Whicker’s supplemental report is also excluded for the reasons stated in Section II.B.1 above.

This motion is granted. Whether it is feasible or desirable to abate the plutonium in the Class Area is not an issue to be decided in this action. *See Cook v. Rockwell Int'l Corp.* (“*Cook X*”), 358 F. Supp. 2d 1003, 1007-08 (2004). The relevant question with respect to abatement of plutonium contamination in the Class Area is rather whether abatement has actually occurred or is about to occur. *See id.* at 1013. Neither Dr. Frazier nor Dr. Whicker’s proffered testimony on abatement goes to this question, and instead consists of speculation about whether plutonium abatement might be feasible or whether removal of the plutonium would be less desirable than the status quo. To the extent this proffered testimony has any probative value in deciding whether abatement has occurred or is imminent, that value is substantially outweighed by the risk of unfair prejudice and confusion of the issues by the jury.

#### **4. Expert testimony regarding RAC and Chem Risk studies**

Studies conducted by ChemRisk and the Risk Assessment Corporation (“RAC”) regarding the Rocky Flats plant are among the scientific studies discussed and relied upon in the expert disclosures of at least four of Defendants’ expert witnesses: Drs. John Till, Chris Whipple, John Auxier and John Frazier. Plaintiffs move to limit these experts’ testimony with respect to the ChemRisk and RAC studies on the ground that repeated presentation of these studies through multiple experts would be prejudicial, needlessly cumulative and a waste of trial time. In further briefing on this motion, Plaintiffs clarified that they do not object to Defendants’ experts relying on the ChemRisk and RAC study results in reaching their conclusions, but rather seek to prevent repetitive presentations of the study reports themselves. *See Pls.’ Reply in Supp. of Daubert Mot.* (Doc. 1408) at 4.

This motion is granted. The original and/or supplemental reports of defense experts Drs. John Till, Chris Whipple and John Frazier (substituting for Dr. John Auxier and adopting Dr. Auxier's 1996 expert report) all describe and/or rely in varying degrees on the ChemRisk and RAC studies. *See* App. to Pls.' *Daubert* Mot. (Doc. 1352), Tab 14 [hereinafter "Till Report"]; *id.*, Tab 20 [hereinafter "Whipple Suppl. Report"] at 6-11; *id.*, Tab 1 [hereinafter "Auxier Report"], Chs. IX & X; *id.*, Tab 9 [hereinafter "Frazier Suppl. Report"] at 2-3. Each expert may rely on these studies to support their respective opinions and may reference them as appropriate in their testimony to support their opinions. They will not, however, be permitted to waste trial time by needlessly presenting cumulative testimony regarding the methodologies and findings of the ChemRisk and RAC studies. *See* Fed. R. Evid. 403; *Marsee v. United States Tobacco Co.*, 866 F.2d 319, 324 (10th Cir. 1989) (trial court has discretion to exclude repetitive and cumulative expert testimony).

The potential for such unnecessary cumulative testimony is demonstrated in particular by the overlap between what Defendants describe as Dr. Till's "foundation testimony" regarding the processes employed and the conclusions reached in the RAC study and underlying ChemRisk study, *see* Till Report, and Dr. Frazier's proffered testimony regarding the same subjects, *see* Auxier Report, Chs. IX & X. Dr. Whipple's intended testimony as set forth in his 2004 supplemental report does not present these same concerns to the extent it compares and contrasts the ChemRisk and RAC study processes with those employed by some of Plaintiffs' experts.

**C. Request to Exclude Certain Expert and Lay Evidence**

**1. Evidence of Class Area property values after 1992**

In both their *Daubert* motion and motion in limine, Plaintiffs argue that evidence regarding Class Area property values after 1992 should be excluded because it is irrelevant and prejudicial. *See* Pls.' *Daubert* Mot. at 5 (seeking to exclude certain testimony by Mr. Conway, Mr. Dorchester and Dr. Wise); Pls.' Mot. in Limine at 1-3. Plaintiffs separately challenge several exhibits included in Dr. Wise's expert reports on this same basis. *See* Pls.' *Daubert* Mot. at 19-22 (moving to exclude Exs. 5 & 8 of Dr. Wise's 1996 report and Exs. 6 & 9 of his 2004 supplemental report).

As Plaintiffs properly noted at oral argument, this motion addresses two categories of evidence that are subject to different analysis. The first category is evidence regarding absolute property values in the Class Area after 1992. The second is evidence regarding Class Area property values relative to property values in other parts of the Denver metro area after this date.

Absolute property values. Defendants seek to present expert and lay evidence that property values in the Class Area have increased in absolute terms since 1992, including the rate of appreciation in their value. Plaintiffs argue this evidence is not relevant to the jury's determination of damages because it does not comport with the "but for" measure of damages governing this action. More particularly, Plaintiffs assert that evidence of absolute property values and appreciation rates for Class properties, without comparison to the value and appreciation rate of other properties not affected by Rocky Flats, cannot assist the jury in deciding the difference (if any) between the actual value of the Class properties and the value these properties would have had but for Defendants' alleged trespass and/or nuisance. Plaintiffs further argue that admission of evidence regarding absolute Class property values and appreciation rates would be unfairly prejudicial and confusing, not only because it would invite the jury to ignore the

“but for” damages measure, but also because it would improperly suggest that no damages can have occurred, or that any damages have been erased, as a result of increasing Class Area property values.<sup>107</sup>

Defendants’ counter-argument centers on the jury’s determination of the point in time at which to measure any damages suffered by the Class. As explained in prior opinions and the jury instructions, this measuring point is the time when the injurious situation (allegedly) caused by Defendants became “complete” and “comparatively enduring.” *See, e.g., Cook IX*, 273 F. Supp. 2d at 1210 (citing Restatement (Second) of Torts § 930); May 2005 Order at 15-16; Start of Trial Instructions, No. 3.22. “Complete” in this context means the effects of Defendants’ alleged trespass or nuisance were known to their full extent. “Comparatively enduring” means there was no reason to expect that these effects will end at a definite time in the future. *See* Start of Trial Instructions, No. 3.22; Restatement (Second) of Torts § 930 cmts. b, d.

Plaintiffs assert this “CCE time” is the period between the FBI raid on the plant in June, 1989, and Rockwell’s guilty plea to environmental crimes in March, 1992. Defendants dispute that the injurious situation became complete and comparatively enduring at this or any other time. Nonetheless, they assert that evidence of absolute property values in the Class Area after 1992 is relevant and necessary for the jury to find damages if the jury determines that the CCE period

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<sup>107</sup> Plaintiffs do not object to expert testimony that is based on consideration of absolute property values and rates of appreciation or incidental mention of such data, but urge that charts and other evidence showing or highlighting the upward curve of absolute property values in the Class Area over time be excluded.

occurred sometime after 1992. Defendants further argue that this probative value outweighs the risk of prejudice, which can be abated by a limiting instruction if necessary.<sup>108</sup>

Plaintiffs have defined their claims based on the injurious situation becoming complete and comparatively enduring in the 1989-92 time period. *See, e.g.*, Pls.' Statement of Claims (Doc. 1419) at 5-6. Accordingly, the jury will be instructed to decide whether Plaintiffs have proved the injurious situation became complete and comparatively enduring in this time period. *See* Start of Trial Instructions, No. 3.22. If the jury finds Plaintiffs have not carried this burden, then no damages will be awarded. *See id.* Plaintiffs are the master of their claims and if they do not wish to give the jury the option of awarding damages based on a CCE time falling outside of the 1989-92 period, then Defendants cannot force that option on them.

As a result, any changes in absolute property values in the Class Area in the post-1992 period, without more, are not relevant to determining either the amount of any damages suffered by the Class or when the injurious situation allegedly caused by Defendants' Rocky Flats operations became complete and comparatively enduring. The relevant evidence on these questions is evidence of *relative* property values, that is how any changes in Class Area property values compare to changes in the value of properties not affected by Rocky Flats. Evidence of absolute property values, without this comparison, is not probative of these questions.

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<sup>108</sup> Defendants also argue that evidence of an increase in Class Area property values is relevant to the jury's determination of whether any interference with the use and enjoyment of Class properties is substantial as required to find liability for nuisance. This argument is based on statements in *Cook IX* that evidence that the interference caused property values to depreciate is relevant to determining whether the interference is substantial. *See* 273 F. Supp. 2d at 1209; *see also* Start of Trial Instructions, No. 3.9 (instructing the jury on this point). Evidence that property values have appreciated or depreciated is not relevant to the "substantial" interference determination in the abstract, however, but only if it is linked to a claimed interference in some fashion. *See* Start of Trial Instructions, No. 3.9.

I further find that any probative value that evidence of absolute property values and appreciation rates might have is substantially outweighed by the risk of unfair prejudice and juror confusion. Presentation of such evidence would distract the jury from the proper “but for” measure of damages and improperly suggest that Plaintiffs were not harmed or should bear any harm they suffered because their properties have appreciated in value in absolute terms.

This situation presents many of the same concerns considered by the Tenth Circuit in *Perlmutter v. United States Gypsum Co.*, 4 F.3d 864 (10<sup>th</sup> Cir. 1993), a product liability action brought by the developers of a shopping mall to recover the costs of asbestos removal from the company that made the asbestos-containing materials at issue. The defendants sought to introduce evidence of the large profit the plaintiffs received in selling the mall after the asbestos removal. *Id.* at 871. The Tenth Circuit affirmed the trial court’s exclusion of this evidence, finding that it was “potentially very prejudicial” because the jury could have understood it “to show that, despite any loss occasioned by the removal and replacement of [defendant’s asbestos-containing material], the Northglenn Mall project was very lucrative and the Developers benefited [sic] greatly. This might have persuaded the jury that the Developers could afford to bear any loss associated with the removal of [defendant’s material].” *Id.* These same considerations apply here, and substantially outweigh any probative value that evidence of Class Area absolute property values and appreciation rates might have.

Relative property values. As the preceding discussion makes clear, a different analysis applies to evidence of relative property values after 1992. Such evidence comparing property values in the Class Area with property values in areas not affected by Defendants’ alleged wrongdoing at Rocky Flats is consistent with and relevant to the “but for” measure of damages.



Evidence of relative property values is also relevant to determining whether the injurious situation caused by Defendants became “complete” and “comparatively enduring” between 1989 and 1992 as Plaintiffs allege.

Presentation of evidence of relative property values poses some risk of unfair prejudice and confusion of the issues in that a jury might view the mere fact of appreciating Class Area property values as an indication that the Class has not suffered any true harm from Defendants’ alleged conduct or is able to bear that harm. *See Perlmutter*, 4 F.3d at 871. I find this risk, however, does not substantially outweigh the probative value of this evidence as just described.

Accordingly, I grant Plaintiffs’ motion to exclude evidence of post-1992 property values in part and deny it in part. The motion is granted with respect to evidence of absolute property values in the Class Area after 1992 for the reasons stated above. It is denied with respect to post-1992 evidence of relative property values. Because evidence of relative property values still poses some risk of unfair prejudice and juror confusion, Plaintiffs may propose a limiting instruction addressing this concern.

These rulings also dictate the result of Plaintiffs’ motion to exclude the cited exhibits in Dr. Wise’s 1996 and 2004 expert reports. These exhibits compare property values and related sales information in the Class Area with that of properties in other areas and as such are evidence of relative property values. *See App. to Pls.’ Daubert Mot.* (Doc. 1352), Tab 21 (1996 Wise Report), Exs. 5, 8; *id.*, Tab 22 (2004 Wise Suppl. Report), Exs. 6, 9. Plaintiffs’ motion to exclude these exhibits is, therefore, denied.

## 2. Evidence of Class Members' knowledge of Rocky Flats problems

In both their motion in limine and *Daubert* motion, Plaintiffs move to exclude evidence intended to show that Plaintiffs or Class members knew or should have known about problems at Rocky Flats before they bought their property or before the FBI raid. *See* Pls.' Mot. in Limine at 8; Pls.' *Daubert* Mot. at 6 (referencing portions of Mr. Dorchester's expert reports). Plaintiffs argue such evidence is irrelevant and therefore inadmissible as a result of my prior rulings that the defenses of statute of limitations and assumption of the risk, and the closely related defense of coming to the nuisance, are not available in this action. *See Cook X*, 358 F. Supp. 2d at 1004, 1013; May 2005 Order at 19-20. Plaintiffs further assert such evidence is inadmissible even if relevant because its probative value (if any) is substantially outweighed by the danger that it will mislead and confuse the jury into improperly blaming class members for any harm they suffered.

Defendants argue that evidence of both actual and constructive Class member knowledge at the time they purchased their Class properties is relevant and admissible with respect to various issues beyond the rejected affirmative defenses. In reply and at oral argument, Plaintiffs acknowledged that such evidence might be relevant to some of these issues, and clarified that the relief they seek is confirmation that, consistent with my prior rulings, evidence concerning individual Plaintiffs' or Class members' actual or constructive knowledge of environmental and other problems at Rocky Flats cannot be offered to show or argue that Plaintiffs or the Class came to the nuisance or assumed the risk or that Plaintiffs' claims are barred by the statute of limitations. *See, e.g.*, Pls.' Reply in Supp. of Mot. in Limine (Doc. 1409) at 3-4.

Plaintiffs' motion is granted as narrowed in the preceding paragraph. Consistent with Colorado law and my prior rulings, Defendants are precluded from offering evidence or arguing

or suggesting to the jury that Plaintiffs' trespass or nuisance claims are barred because individual Plaintiffs or all or some of the Class knew or should have known of the alleged trespass or nuisance or related problems associated with Defendants' activities at Rocky Flats when they purchased their properties in the Class Area. Evidence concerning Plaintiffs' or Class members' actual or constructive knowledge will only be permitted if it is relevant and admissible for some other purpose, and if the risk of unfair prejudice and confusion of the issues does not substantially outweigh the evidence's probative value.

### **3. Evidence of Defendants' alleged compliance with regulatory standards**

In their motion in limine and *Daubert* motion, Plaintiffs also move to exclude evidence of Defendants' alleged compliance with state or federal regulatory standards at Rocky Flats. *See* Pls.' Mot. in Limine at 8-10; Pls.' *Daubert* Mot. at 7-8 (referencing portions of expert reports produced by Drs. Auxier, Frazier and Whicker). Plaintiffs contend this evidence is inadmissible because it is irrelevant to any claim or defense in this case and carries a high risk of unfair prejudice and jury confusion.

Plaintiffs' motions on this point are denied. Evidence that Defendants complied with relevant regulatory standards is relevant to the negligent conduct element of Plaintiffs' nuisance claims and to the issue of punitive damages.<sup>109</sup> *See Bayer v. Crested Butte Mountain Resort, Inc.*,

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<sup>109</sup> Defendants' further argument regarding the relevance of this evidence, namely their assertion that proof of compliance with state and federal regulatory standards conclusively establishes that the alleged nuisance was reasonable and therefore not actionable under Colorado law, was extensively briefed in connection the parties' proposed jury instructions. This argument, which I rejected, is addressed in the separate jury instruction opinion issued this date. *See* Mem. Op. re: Jury Instructions, Section II.B (regarding Defendants' proposed nuisance Instruction No. 7).

960 P.2d 70, 78 (Colo. 1998); *Silkwood v. Kerr-McGee Corp.*, 485 F. Supp. 566, 578-80, 584 (W.D. Okla. 1979), *rev'd in part on other grounds*, 667 F.2d 908 (10<sup>th</sup> Cir. 1982), *rev'd* 464 U.S. 238 (1984). I am not persuaded that the probative value of this evidence is substantially outweighed by the danger of unfair prejudice or jury confusion. Plaintiffs may, if they wish, submit a limiting instruction addressing their concern that the jury could mistakenly give such evidence undue weight.

**D. Request to Exclude Certain Lay Evidence**

**1. National security evidence**

Plaintiffs move to exclude evidence offered to show that Defendants' conduct was justified by the demands of national security. The scope of Defendants' intended evidence on this point is set forth in "Defendants' Statement Regarding National Security Evidence" (Doc. 1442), filed September 14, 2005, at my direction.

This motion in limine and Plaintiffs' arguments in support of it parallel those asserted in connection with Plaintiffs' motion to exclude expert testimony by Dr. Jack Holl regarding the Cold War armaments race and the role of the Rocky Flats plant in building the United States' nuclear weapons stockpile. I granted that motion in part and denied it in part. *See supra* Section II.A.4. I do the same with respect to this motion in limine for the reasons stated earlier. *See id.*

Accordingly, I exclude Defendants' proffered evidence regarding "Weapons Program and the Cold War" as reported in Section I of their September 14 statement, and deny Plaintiffs' motion to exclude evidence regarding the subjects set forth in the Sections II-V of Defendants' September 14 statement. I will, however, scrutinize any evidence that is ultimately offered on the

subjects set forth in Sections II-V to ensure that is otherwise admissible and is not needlessly cumulative.

## **2. Lay testimony by real estate agents**

Plaintiffs have moved to exclude certain lay testimony by Defendants' real estate agent witnesses. *See* Pls.' Mot. in Limine at 3-5. Plaintiffs do not object to these witnesses testifying about their personal knowledge of transactions in which they participated, including whether participants in these transactions expressed concerns or requested a discount because of problems associated with Rocky Flats. Rather, Plaintiffs have requested that I bar these real estate agent witnesses from generalizing from this personal knowledge to offer opinion testimony on whether and how problems at Rocky Flats affected the market for properties in the Class Area as a whole.

This request is governed by Federal Rule of Evidence 701, which provides that a lay witness may only offer opinion testimony if the opinion is: "(1) rationally based on the perception of the witness; (2) helpful to a clear understanding of the witness' testimony or the determination of a fact in issue; and (3) not based on scientific, technical, or other specialized knowledge within the scope of Rule 702." Plaintiffs contend that opinion testimony extrapolating the personal experience of these real estate agents to the market for Class Area properties as a whole does not meet Rule 701's requirements because the agents would then be giving opinions about transactions in which they did not participate, so that their opinions would not be "rationally based on the perception of the witness," and because this extrapolation from personal experience to generalized conclusions would require these witnesses to use their specialized knowledge as real estate agents.

Defendants respond that their real estate agent witnesses are entitled to testify regarding the facts of any transactions in which they participated, including the lack of effect Rocky Flats had on these transactions. This may be true, but it is not responsive to the issue presented, which is whether Rule 701 authorizes lay testimony by these witnesses that draws inferences or offers opinions on Rocky Flats' effect on the market as a whole, which indisputably includes transactions in which these witnesses did not participate. I find Rule 701 does not permit such testimony. The cases cited by Defendants do not go to this larger issue, and instead involve situations in which the lay witness was offering opinions about specific events or circumstances based on their personal participation or knowledge of these events or circumstances.

The analysis of the court in *Estate of Dunia v. Commissioner of Internal Revenue*, No. 6115-00, 2004 WL 1119603 (U.S. Tax Ct. May 20, 2004), is instructive here. In that case, the court considered whether a general partner in a venture that had purchased the land at issue could give lay opinion testimony regarding the value of the land at a time when the partnership did not own the property. The court held he could not because he lacked personal knowledge of the land in question at the valuation date, with the result that his lay opinion would necessarily have been "based upon the specialized knowledge derived from his experience as a real estate developer." *Id.* Similarly, while Defendants' real estate agent witnesses have participated in transactions in the Class Area, they could only state broad opinions encompassing transactions in which they did not participate, and the market as a whole, by drawing on their extrinsic and specialized knowledge as real estate professionals.

Accordingly, for the reasons stated above, I grant Plaintiffs' motion on this point and bar Defendants' real estate agent witnesses from opining on whether or how Rocky Flats and

Defendants' activities there affected any transactions in which these witnesses did not personally participate or how Rocky Flats affected the market for Class properties as a whole.

### **3. Lay testimony by Roy Thigpen**

Plaintiffs move to exclude testimony by lay witness Roy Thigpen. *See* Pls.' Mot. in Limine at 5-8. His anticipated testimony, as described by both parties, concerns his participation in real estate transactions with named Plaintiff Marilyn Cook in 1984-85. *See id.* at 5; Defs.' Resp. to Pls.' Mot. in Limine (Doc. 1394) at 18-24. Mr. Thigpen reportedly will testify that he purchased a parcel of land from Ms. Cook in December, 1984, but then defaulted on the loan in 1985, which allowed Ms. Cook to assume his mortgage and thereby re-acquire the property. Mr. Thigpen testified at deposition that he did not view the 1984 sale as an arms-length transaction, and that it was arranged by a mutual acquaintance with the intent that Ms. Cook would re-acquire the property, subject to the mortgage, to help her consolidate her debts. Plaintiffs seek to exclude this testimony on the grounds that it is irrelevant and would be unfairly prejudicial.

This motion is granted in part and denied in part. Mr. Thigpen's account of his 1984-85 dealings with Ms. Cook are of marginal relevance at best to any issue to be decided by the jury. It also poses a substantial risk of unfair prejudice, jury confusion and waste of trial time. His testimony is primarily a personal attack on Ms. Cook, who is but one member of a class of thousands. It would unnecessarily confuse the jury and consume trial time as Plaintiffs countered Mr. Thigpen's account with Ms. Cook's version of events and evidence drawing Mr. Thigpen's own credibility into question. What little probative value Mr. Thigpen's testimony might have is substantially outweighed by these risks and will therefore be excluded. However, if Ms. Cook

testifies regarding her dealings with Mr. Thigpen, Defendants may present Mr. Thigpen in rebuttal as appropriate.

**Conclusion**

For the reasons stated above, Defendants' motions to exclude expert testimony by Plaintiffs' experts (Docs. 1371, 1374, 1376/1380) were denied; Defendants' motions in limine Nos. 1-16 (Docs. 1354-69) were granted in part and denied in part; and Plaintiffs' motion to exclude testimony of certain defense expert witnesses (Doc. 1350) and omnibus motion in limine (Doc. 1341) were granted in part and denied in part. Each of these decisions was issued in summary form before trial in the bench rulings cited in the introduction to this memorandum opinion.

Dated this 7th day of December, 2006.

**s/John L. Kane**  
John L. Kane, Senior Judge  
United States District Court