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Superfund and Natural Resource Damages Litigation Committee Newsletter

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MESSAGE FROM THE CHAIR: EPA AND ACCIDENTAL DISCHARGES FROM MINES: DÉJÀ VU ALL OVER AGAIN

Russ Randle
Squire Patton Boggs

In 1985, early in the Superfund program, the Environmental Protection Agency (EPA) learned the hard way from the Butler Mine Tunnel site in Pittson, Pennsylvania, that abandoned mines must be approached cautiously when trying to remedy hazardous substance discharges. In August 2015, almost 30 years later, at the Gold King Mine in Colorado, work by EPA's contractor apparently triggered the accidental discharge of about three million gallons of acid mine wastewater into the Las Animas River. Like Butler Tunnel, the television footage looked dreadful, and EPA was widely criticized for its actions.

Because abandoned mining sites will play an increasingly large role in the future Superfund program, some comparisons of the incidents are in order. Those comparisons suggest that at the line level EPA has forgotten key lessons, including:

- The large scale of mining sites compared to most sites EPA has addressed in the past;
- The absence of safe access to abandoned mine works;
- The unpredictability of large volumes of water moving through abandoned mine workings, many of which resemble a jumble of broken rock rather than the undisturbed aquifers EPA often addresses;
- The need for robust and well-tested emergency response measures when dealing with such sites.

A review of the infamous Butler Tunnel case might have reminded EPA to tread carefully when dealing with such sites. According to EPA and court records, in late July 1979, the Butler Mine Tunnel suddenly discharged several hundred thousand gallons of oily and hazardous waste into the Susquehanna River in Pittston, Pennsylvania, creating a 35-mile-long oil slick. Several million gallons of such waste material had been illicitly poured down an air shaft of an abandoned anthracite coal mine, miles away from the tunnel mouth.

According to the Third Circuit,

> The site includes a network of approximately five square miles of deep underground mines and related tunnels, caverns, pools and waterways bordering the east bank of the Susquehanna River in Pittston, Pennsylvania. The mine workings at the site are drained by the Butler Tunnel (the "Tunnel"), a 7500 foot tunnel which feeds directly into the Susquehanna River. The mines are accessible from the surface by numerous air shafts or boreholes. One borehole (the "Borehole") is located on the premises of Hi-Way Auto

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Kirk O'Reilly, Carolyn McIntosh and Brian Ferrasci-O'Malley, Editors

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> Service, an automobile fuel and repair station situated above the Tunnel. The Borehole leads directly into the mine workings at the Site.

United States v. Alcan Aluminum Corp., 964 F.2d 252, 255–56, (3d Cir. Pa. 1992).
The state of Pennsylvania and then the federal government prosecuted the waste hauler and sent several people to prison. A costly emergency removal action—a river cleanup—ensued with money from the Clean Water Act's Oil Spill Trust Fund. Studies were undertaken to determine what, if anything, was needed to prevent an encore.

In 1980, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) was enacted, and the Butler Mine Tunnel was included as part of the original National Priorities List (NPL). In 1984, EPA declared the Butler Mine Tunnel—which drained the anthracite workings—one of the first NPL sites to be cleaned up and to pose no further threat. In late September 1985, Hurricane Gloria dumped six inches of rain on Pittston and the Butler Tunnel produced a 50-mile-long slick of oily waste into the Susquehanna River. Congress was in the midst of amending CERCLA. This environmental debacle featured prominently in a harsh congressional critique of EPA's early administration of CERCLA. Congressional ire was memorialized in section 105(e) of CERCLA:

> Whenever there has been, after January 1, 1985, a significant release of hazardous substances or pollutants or contaminants from a site which is listed by the President as a "Site Cleaned Up To Date" on the National Priorities List (revised edition, December 1984) the site shall be restored to the National Priorities List, without application of the hazard ranking system.

EPA officials were pilloried at congressional hearings. The tunnel was put back on the NPL without having to be re-scored under the hazard ranking system. Nearly a decade of studies ensued, resulting in a record of decision EPA adopted in 1996.

During the studies, EPA showed that it had learned some lessons that would have helped at the Gold King Mine. In 1988, a Pennsylvania state contractor was scheduled to inject large volumes of liquid slurry into the mine works in order to combat a preexisting subsidence problem. That contractor was unaware of the Butler Mine Tunnel site and the risk that its operations might create a new discharge—and substantial liability. EPA discouraged the activity (as did the study participants) and the contractor withdrew with the state's concurrence.

In 2005, construction was completed on the remedy—closing the boreholes and setting up a robust and dedicated response system for any further spill. Equipment was pre-positioned; warning systems put in place; fittings for booms and other containment equipment installed.

Sadly, EPA's assessment contractor at the Gold King Mine was not as cautious as those investigating the Butler Tunnel after the September 1985 discharge. Thankfully, no one was injured in the August 2015 unplanned discharge of acid mine wastewater, but public confidence in EPA's handling of the situation took a considerable beating.

As this is written, a number of congressional hearings into the Gold King discharge have occurred, and more may be scheduled. Beyond the likely grandstanding by various members, the point of the inquiries is to learn what happened, why, and how to prevent similar incidents from future cleanup efforts. Many of the lessons had already been learned by EPA once, and forgotten. As the Superfund program pays increasing attention to abandoned mines, these lessons needs to be re-learned and consistently applied.

Russ Randle, *Chair, Superfund and Natural Resource Damages Litigation Committee.*

EXPRESS RESOLUTION OF CERCLA LIABILITY NOT NECESSARY TO TRIGGER CERCLA CONTRIBUTION STATUTE OF LIMITATIONS

Christopher Smith
Squire Patton Boggs

With all of the briefing completed, the Ninth Circuit Court of Appeals is all set to resolve a dispute between Asarco LLC (Asarco) and the Atlantic Richfield Company (ARCO) over whether a judicially approved settlement of environmental liabilities that does not include express reference to the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. section 9601 et seq. (CERCLA) can trigger the statute of limitations for CERCLA contribution claims. *Asarco LLC v. Atlantic Richfield Company*, Case No. 14-35723 (9th Cir. 2015). The *Asarco* appeal arises from a decision by the District Court in Montana which held that Asarco had waited too long to bring its CERCLA contribution claim against ARCO. *Asarco LLC v. Atlantic Richfield Company*, 73 F. Supp. 3d 1285 (D. Mont. 2014). On appeal, Asarco is principally arguing that a judicially approved consent decree from 1998 (1998 decree) entered into between Asarco and the U.S. Environmental Protection Agency (EPA), which stemmed from environmental liabilities alleged under the Resource Conservation and Recovery Act (RCRA) and the Clean Water Act (CWA), could not serve to trigger the statute of limitations for a CERCLA contribution claim because there is no reference to CERCLA or resolution of CERCLA liability in the 1998 consent decree.

On August 24, 2014, in ruling on an ARCO motion for summary judgment, the district court considered the foregoing issue on triggering the statute of limitations for Asarco's contribution claim arising out of CERCLA. In its decision, the district court recognized that the foregoing issue "has not been addressed by the Ninth Circuit Court of Appeals, and in the two circuits which have addressed this issue, the Second and Third, conflicting conclusions were reached." *Asarco*, 73 F. Supp. 3d at 1286. These circumstances, i.e., a circuit split and an issue of first impression for the Ninth Circuit, present the parties with a unique opportunity to resolve a novel issue that could potentially cost the losing party up to $99M—a substantial sum by any measure.

Factual Background

The *Asarco* case arose out of the operations from a lead smelting plant run by Asarco from 1888 until 2001 in East Helena, Montana (site). ARCO is related to Asarco's operations through a predecessor, the Anaconda Company, which constructed and operated a zinc fuming plant on land leased from Asarco from 1927 to 1972. Asarco ended up purchasing the zinc plant from Anaconda in 1972 and continued to operate it until 1982. Operations at the site were alleged to have released numerous hazardous substances into the environment. In 1984, the EPA took interest in the site and added it to the National Priorities List (NPL). Eventually, Asarco and EPA entered in the 1998 decree. The 1998 decree served to resolve claims EPA had against Asarco for multiple alleged violations of RCRA and CWA. Under the terms of the 1998 decree, jurisdiction over all site-related remediation was transferred from the CERCLA program to the RCRA program.

In 2005, Asarco filed for chapter 11 bankruptcy protection. The United States and the state of Montana filed proofs of claim in the bankruptcy proceedings for monies to continue the remediation of the site. During the proceedings, the United States, the state of Montana, and Asarco entered into two settlement agreements regarding the site, including one agreement that took the form of a judicially approved consent decree (2009 decree). The 2009 decree operated to resolve all of Asarco's environmental liabilities related to the site. In exchange, Asarco was required to transfer all of its property rights and interest in the site to a trust as well as to fund the trust with $99M to fully remediate the environmental contamination at the site. Asarco emerged from bankruptcy in November 2009, when its plan for reorganization was approved by the bankruptcy court.

The complaint in the *Asarco* case was filed in June of 2012. In the complaint, Asarco is seeking contribution from ARCO pursuant to section 113 of CERCLA for the $99M Asarco paid in bankruptcy to fully remediate the environmental contamination at the site.

CERCLA Statute of Limitations

When CERCLA was enacted in 1980, it did not include any statute of limitations. *Velsicol Chemical Corp. v. Enenco, Inc.*, 9 F.3d 524, 528 (6th Cir. 1993). In fact, CERCLA did not even include a claim for contribution like the one at issue in the *Asarco* case. It was not until 1986, when CERCLA was amended by the Superfund Amendments and Reauthorization Act (SARA amendments) that a statute of limitations was codified and a contribution claim (and accompanying statute of limitations for contributions claims) was established.

Congress stated that the purpose of the CERCLA statutes of limitations was to provide for "timely clean up of affected sites and to ensure replenishment of the fund, cost recovery actions must commence in a timely fashion." *Illinois v. Grigoleit Co.*, 104 F. Supp. 2d 967, 975 (C.D. Ill. 2000), *quoting U.S. v. Navistar Intern. Transp. Corp.*, 152 F.3d 702, 706 (7th Cir. 1998). Applying that purpose to CERCLA contribution claims, Congress stated, in the SARA amendments, that the statute of limitations for contribution claims is three years and is triggered upon the entry of a judicially approved settlement. 42 U.S.C. section 9613(g)(3)(B) ("No action for contribution for any response costs or damages may be commenced more than 3 years after . . . entry of a judicially approved settlement with respect to such costs or damages."). CERCLA is silent as to whether a judicially approved settlement must include reference to CERCLA or resolve CERCLA liability in order to trigger the statute of limitations period to begin to run.

Circuit Split

CERCLA's silence on this point has led to a circuit split between the Second Circuit and the Third Circuit—the only two Circuits to weigh in on this specific issue.

The Second Circuit takes the narrow view on CERCLA's silence. In *Consolidated Edison Co. of New York, Inc. v. UGI Utilities, Inc.*, 423 F.3d 90, 95 (2d Cir. 2005), the Second Circuit interpreted CERCLA "to create a contribution right only when liability for CERCLA claims, rather than some broader category of legal claims, is resolved." The judicially approved settlement agreement at issue, a voluntary cleanup agreement, in *Consolidated Edison* did not involve resolution of CERCLA claims and thus the agreement was silent on CERCLA. The court supported its holding that no contribution claim was ripe and thus no CERCLA statute of limitations had yet begun to run based on two principles: (1) the settling party did not resolve its liability for "response action[s]," which it characterized as a "CERCLA-specific term describing an action to clean up a site or minimize the release of contaminants in the future"; and (2) some of the legislative history provided that section 113 "clarifies and confirms the right of a person held jointly and severally liable *under CERCLA* to seek contribution from other potentially liable parties." *Id*. at 95–96 (emphasis in original). On those bases, the court held that "section 113(f)(3)(B) does not permit contribution actions based on resolution of liability for state law—but not CERCLA—claims." *Id*. at 96.

Since *Consolidated Edison*, the Second Circuit has had the opportunity to revisit the issue. In *W.R. Grace & Co.-Conn. v. Zotos International, Inc.*, 559 F.3d 85 (2d Cir. 2009), the court affirmed its holding in *Consolidated Edison*. Presented with similar facts, i.e., a judicially approved settlement agreement (a consent order) to reimburse a regulator's costs of investigation and to remediate the site at issue, the court denied the plaintiff an opportunity to pursue a CERCLA contribution

claim because the settlement agreement was silent and thus did not resolve the plaintiff's CERCLA liability. *Id.* at 91.

The Third Circuit takes the broad view on CERCLA's silence. In its *Trinity Industries, Inc. v. Chicago Bridge & Iron Co.*, 735 F.3d 131 (3d Cir. 2013), the court "expressly rejected the Second Circuit's interpretation of [section] 113(f)(3)(B)." *Asarco*, 73 F. Supp. 3d at 1290. The plaintiff in *Trinity Industries* sought CERCLA contribution based on a judicially approved settlement, a consent order, absolving it of liability under Pennsylvania state law statutes. The court held "[n]otwithstanding the rule adopted by the Court of Appeals for the Second Circuit and various district courts . . . [section] 113(f)(3)(B) does not require resolution of CERCLA liability in particular." *Trinity Industries*, 735 F.3d at 136. Support for its holding came from the plain language of CERCLA. *Id*. (CERCLA "requires only the existence of a settlement resolving liability to the United States or a state 'for some or all of a response action.' Section 113(f)(3)(B) does not state that the 'response action' in question must have been initiated pursuant to CERCLA—a requirement that might easily have been written into the provision.")

Issue of First Impression

Based on the split of authority in the Second and Third Circuits; how is the Ninth Circuit likely to resolve the issue? One can only speculate. However, based on the most recent decision out of the Second Circuit on the issue, the speculation militates in favor of the broad view, i.e., that a judicially approved settlement agreement does not necessarily need to expressly invoke or resolve liability under CERCLA in order to trigger the statute of limitations for CERCLA contribution claims. The most recent decision out of the Second Circuit that casts doubt on holdings in *Consolidated Edison* and *W.R. Grace* is *Niagara Mohawk Power Corp. v. Chevron U.S.A., Inc.*, 596 F.3d 112 (2d Cir. 2010). In a footnote in *Niagara Mohawk*, the court acknowledged "the *Consolidated Edison/W.R. Grace* problem[.]" *Id*. at 126 n.15.

In the same footnote, the court in *Niagara Mohawk* went on to quote language offered by EPA in an amicus brief in the case:

> The United States was not a party to *Consolidated Edison* and believes it was not correctly decided. Section 113(f)(3)(B) applies where a PRP has resolved *its liability to* … a State for some or all of a response action or for some or all of the costs of such action. The settlement of federal and state law claims other than those provided by CERCLA fits within [section] 113(f)(3)(B) as long as the settlement involves a cleanup activity that qualifies as a 'response action' within the meaning of CERCLA [section] 101(25) . . .

Niagara Mohawk, 596 F.3d at 126 n.15 (internal citation omitted and emphasis in original). The court ultimately left the Consolidated Edison/W.R. Grace problem unresolved since the judicially approved settlement in Niagara Mohawk clearly encompassed CERCLA liability. *Id*. The *Niagara Mohawk* comments, even limited to a footnote were not lost on the court in the *Asarco* case. *Asarco*, 73 F. Supp. 3d at 1290 (quoting *Niagara Mohawk*, 596 F.3d at 126 n.15).

Given the background and appeal of the *Asarco* case, it is evident that the district court in Montana followed the Third Circuit's broad view on CERCLA's silence. In doing so, the court considered both circuits and found the Third Circuit's view comports with congressional intent as well as with CERCLA precedent. *Asarco*, 73 F. Supp. 3d at 1291 ("This Court agrees with the Third Circuit and the *Niagara Mohawk* panel.").

The concession of the Second Circuit in *Niagara Mohawk* combined with the express rejection of the Second Circuit's interpretations by the Third Circuit provide the instruction on which direction the Ninth Circuit may lean on the subject. Then combine the congressional intent identified by the court in *Asarco* and it seems like a betting individual would put its money on ARCO to survive appeal and responsibility for $99M in cleanup costs that Asarco has spent for the site.

Conclusion

The *Asarco* decision should be heard by the Ninth Circuit in the following months, resolving the circuit split. If the Ninth Circuit follows the less likely path of the Second Circuit, then Asarco may get the opportunity to recoup some the $99M it has paid to remediate the environmental contamination at the site. More likely, if the Ninth Circuit follows the path of the Third Circuit, then Asarco will be left in the position for which it bargained in its bankruptcy proceedings, i.e., out-of-pocket $99M to resolve environmental liabilities that it recognized years ago it was strictly liable for in the 1998 decree.

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BEYOND THE PRICE-ANDERSON ACT: *COOK V. ROCKWELL INTL. CORP.* AND LITIGATING "LESSER OCCURRENCES" AS RADIOACTIVE STATE LAW TORTS

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In a groundbreaking opinion, on June 23, 2015, a Tenth Circuit panel ordered a $1 billion judgment in a 25-year-old law suit over plutonium contamination from the Rocky Flats nuclear weapons plant. The panel held that the Price-Anderson Act (PAA) does not preempt state tort claims arising from "lesser occurrences" that do not rise to the level of a "nuclear incident," necessary to recover under the act.

The Rocky Flats plant sits in the windswept foothills of the Rocky Mountains just 16 miles northwest of downtown Denver. From 1952 until its closure in 1992, the United States built nuclear weapon parts at the plant. Dow Chemical Company and later Rockwell International Corporation operated Rocky Flats under contract with the United States until 1989. Dow and Rockwell released plutonium off-site throughout their operation of the plant.

At 9:00 am on June 6, 1989, acting on whistle-blower tips and clandestine aerial surveillance, the FBI raided the heavily guarded plant and served search warrants on Department of Energy and Rockwell representatives. The raid, dubbed "Operation Desert Glow," uncovered evidence of environmental crimes related to the mishandling of special nuclear material. Subsequent investigations revealed that plutonium had contaminated neighboring properties and leaked into nearby bodies of water. Ultimately, in 1992, Rockwell plead guilty to criminal violations of the Resource Conservation and Recovery Act and the Clean Water Act, paying $18.5 million in fines. The plant was shut down later that year. But by then, it was too late. The value of neighboring properties had plummeted under the glare of national media coverage and public anxiety about the health risks related to radioactive contamination.

Two years earlier, in 1990, property owners had filed suit in the District Court for the District of Colorado against Rockwell and Dow, alleging Colorado trespass and nuisance torts, and seeking recovery under the PAA. In 1993, the district court certified the class. 151 F.R.D. 378, 382, 388–89 (D. Colo. 1993). Nearly ten years of litigation followed until 2003, when the district court ruled that state-law standards of care would govern the case, and that Colorado's public nuisance laws did not require the plaintiffs to prove that the plutonium contamination posed an actual health risk, only that it would cause a reasonable person to suffer anxiety sufficient to interfere with his or her use and enjoyment of the property. 273 F. Supp. 2d 1175, 1197–99, 1201–09 (D. Colo. 2003). In 2006, after a four-month trial, a jury found that the plaintiffs had proven that a nuisance from plutonium contamination had caused a substantial and unreasonable interference with the use and enjoyment of the plaintiffs' properties. The jury awarded the plaintiffs nearly $1 billion, including compensatory damages, punitive damages, and prejudgment interest. On June 2, 2008, the district court entered judgement "on all claims by Plaintiffs . . . pursuant to the [PAA], Colorado law, and the Restatement (Second) of Torts § 930." Final Judgment at 3–4 (June 2, 2008).

However, the Tenth Circuit reversed, holding that the plaintiffs must satisfy the substantive requirements of both the PAA and the underlying state laws in order to recover damages. 618 F.3d 1127, 1138–42 (10th Cir. 2010). The court stated that the PAA requires plaintiffs to prove that a "nuclear incident" within the meaning of the act occurred. Specifically, the panel held that the plaintiffs must prove not only an "interference" with the use of their property (the Colorado state nuisance law standard), but also a "loss of use" akin to contamination that would require an evacuation (the PAA "nuclear incident" loss of property standard). 618 F.3d at 1141–42. Because the district court had instructed the jury otherwise, the Tenth Circuit vacated the judgment and remanded the case to the district court.

On remand, the plaintiffs abandoned their PAA claim and moved for reinstatement of the nuisance jury verdict and judgment, reasoning that the jury was properly instructed on Colorado nuisance law, and that those claims were not preempted by the PAA. 790 F.3d 1088, 1091 (10th Cir. 2015) (describing the plaintiffs' decision to abandon their PAA claims as "judicial jiu-jitsu"). However, the district court dismissed the motion both on procedural grounds, and because the PAA preempted all claims "stemming from the hazardous properties of special nuclear material" regardless of whether the case involved a "nuclear incident." 13 F. Supp. 3d 1153, 1159 (D. Colo. 2015).

The plaintiffs appealed, and the Tenth Circuit reversed, ordering the district court to enter judgment for the plaintiffs on remand. First, the Tenth Circuit held that the defendants had waived any preemption arguments during their initial appeal. 790 F.3d 1088, 1093–94 (10th Cir. 2015). Second, the court held that the PAA did not preempt the plaintiffs' state nuisance law claim. *Id.* at 1094–99.

Appreciating the Tenth Circuit's opinion requires an understanding of the PAA and the federal nuclear safety regulatory regime. The civilian nuclear industry is subject to comprehensive federal regulation. Atomic Energy Act of 1954, as amended, 42 U.S.C. §§ 2011 et seq. (providing for the licensing of private construction, ownership, and operation of commercial nuclear power reactors for energy production); Energy Reorganization Act of 1974, as amended, 42 U.S.C. §§ 5801 et seq. (establishing an independent nuclear safety regulator); Price-Anderson Act, as amended, 42 U.S.C. §§ 2014 et seq. The "federal government has occupied the entire field of nuclear safety concerns, except the limited powers expressly ceded to the states." *PG&E Co. v. State Energy Res. Conservation & Dev. Comm'n*, 461 U.S. 190, 212 (1983).

Initially, the private sector failed to invest in nuclear power generation due to fears that a nuclear

accident could expose private suppliers to vast liabilities beyond the resources of industry and private insurance. Accordingly, in 1957, Congress passed the PAA to serve the dual purposes of protecting the public and encouraging the development of a private nuclear energy industry. *See* 42 U.S.C. § 2012(i). The PAA addressed those concerns by limiting private industry's liability, while simultaneously ensuring private insurance and public funds would be available to compensate the victims of any nuclear incident.

Specifically, the act limited liability resulting from a "nuclear incident." 42 U.S.C. § 2210(e). The act indemnified private suppliers for "public liability" damages above levels covered by required insurance contracts. 42 U.S.C. 2210(c)-(d). Following the Three Mile Island incident and subsequent litigation, Congress created a federal cause of action known as a "public liability action," vesting federal courts with jurisdiction over such actions, providing for removal to federal court of similar state law claims, and establishing authority for federal courts to consolidate and manage claims arising out of a nuclear incident. 42 U.S.C. § 2014(n) and (hh). A "public liability action" is defined as "any suit asserting public liability," and "public liability" is defined as "any legal liability arising out of or resulting from a nuclear incident." 42 U.S.C. § 2014(w) and (hh). A "nuclear incident" is an occurrence that causes a specific type of injury: "bodily injury, sickness, disease, or death, or loss of or damage to property, or loss of use of property." 42 U.S.C. § 2014(q). "Together, then, 'a public liability action' is a suit in which a party asserts that another party bears any legal liability arising out of an incident in which the hazardous properties of radioactive material caused bodily injury, sickness, or property damage." 790 F.3d 1088, 1094–95 (10th Cir. 2015) (quoting *Controneo v. Shaw Env't & Infrastructure, Inc.*, 639 F.3d 186, 194 (5th Cir. 2011)). The amendments provided that "the substantive rules for decision in such action shall be derived from the law of the State in which the nuclear incident involved occurs, unless such law is inconsistent with the provisions of" section 2210. *Id.*

The panel held that the PAA did not preempt the plaintiffs' state nuisance law claims. It compared the PAA to the Class Action Fairness Act, stating that Congress had not preempted the field but simply "provided a forum and certain specific rules for larger cases while allowing smaller cases more or less to go their own way." 790 F.3d at 1094. While the panel acknowledged that the PAA established the exclusive form of recovery for radioactive injuries arising from "nuclear incidents," it held that the act did not bar recovery for radioactive injuries arising out of "lesser occurrences." *Id.* at 1098. The panel emphasized that the Supreme Court strongly disfavors field preemption absent a clear statement from Congress. *Id.* at 1094. Looking at the PAA's text, the panel stated, "Congress knows well how to preempt a field expressly when it wishes. . . . There's just nothing like that in the [PAA]." *Id.* at 1095. The panel stated Congress's different treatment of cases arising from "nuclear incidents" and "lesser occurrences" makes good policy sense. "Larger occurrences that qualify as nuclear incidents can threaten to bankrupt nuclear power providers and leave victims un-(or under-) compensated. . . . Meanwhile, smaller occurrences are less likely to raise the same concerns." *Id.* at 1096. The panel stated this distinction is supported by the legislative history, which focused on catastrophic accidents and managing any subsequent complex litigation. *Id.* at 1096–97. Finally, the panel stated that no other circuit had reached the question of whether the PAA preempts state law tort claims where the plaintiffs fail to assert that a "nuclear incident" occurred. Rather, the cases cited by the defendants all involved situations where a "nuclear incident" had already been proved. *Id.* at 1097–98.

The defendants plan to file a cert petition. They will emphasize that "every federal circuit . . . to consider whether the PAA preempts state causes of action for public liability arising out of or resulting from nuclear incidents has concluded that it has." 13 F. Supp. 3d 1153, 1157 (D. Colo. 2014) (citing decisions from the 3rd, 6th, 7th, 9th, and 10th Circuits). The Tenth Circuit's distinction between those cases, which all involved proof that

a "nuclear incident" occurred, and *Cook*, where the plaintiffs failed to prove a "nuclear incident" may not be supported by the text of the PAA. Indeed, the PAA defines a "public liability action" as "any suit *asserting* public liability," that is, "any legal liability arising out of or resulting from a nuclear incident." 42 U.S.C. §§ 2014(w), (hh) (emphasis added). The plaintiffs in *Cook* spent over 20 years asserting a "public liability action" under the PAA. Allowing them now to assert independent state law claims amounts to an end run around the liability limiting provisions of the PAA. In passing the PAA, Congress struck a balance between ensuring compensation for victims of nuclear incidents and fostering the development of a private nuclear industry by limiting liability for such losses. Allowing states to impose nuclear-related liability whenever plaintiffs purport to sue under state law claims could upset this balance.

The Tenth Circuit's decision in *Cook* lowers the bar for recovery from injuries related to radioactive contamination. If left in place, it could usher in a new era of litigation over "lesser occurrences," significantly increasing the legal costs of civilian nuclear power production in the United States.

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VAPOR INTRUSION: THE NEXT FRONTIER IN SITE REMEDIATION, BROWNFIELDS REDEVELOPMENT, AND REAL ESTATE TRANSACTIONS

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Editor's note: In June, EPA issued two technical guidance documents regarding vapor intrusion. *See OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* (June 2015), *available at* http://www.epa.gov/oswer/vaporintrusion/documents/OSWER-Vapor-Intrusion-Technical-Guide-Final.pdf; *Technical Guide for Addressing Petroleum Vapor Intrusion at Leaking Underground Storage Tank Sites* (June 2015), *available at* http://www.epa.gov/oswer/vaporintrusion/documents/PVI-Guide-Final.pdf. This article addresses the first of the two technical guidance documents. A fully footnoted version of this article is available from the authors.

On June 11, 2015, the U.S. Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response (OSWER) issued its long-awaited final technical guidance on vapor intrusion assessment. The *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* ("EPA VI Guidance" or "the Guidance") applies to all sites being evaluated by EPA, other federal agencies, state and tribal governments, and Brownfield grantees. It will have far-reaching consequences as approximately 400,000 to 900,000 individual contaminated sites across the United States may be directly impacted by the Guidance, which provides a "soup to nuts" framework for assessing and mitigating actual or potential vapor intrusion risks. As many of these contaminated properties are Brownfields that have been redeveloped, at any individual site scores or even hundreds of buildings may be built over contaminated soil or groundwater and therefore may require vapor intrusion assessments performed in accordance with the new EPA VI Guidance.

In addition to the EPA VI Guidance, property owners must deal with state and region-specific standards. For example, property owners in California must take into account recent vapor intrusion guidance issued by U.S. EPA Region 9 (Region 9) and the Regional Water Quality Control Board for the San Francisco Bay Region (SF Water Board) for properties contaminated with trichloroethylene (TCE). The Region 9 TCE Guidance establishes stringent numerical short-term action levels for TCE. The short-term TCE action levels and requirements for "accelerated" and "urgent" response actions—up to and including building evacuation—are based on Region 9's view that TCE is teratogenic (capable of causing birth defects). Region 9 believes that TCE may cause fetal heart malformations when women in their first trimester of pregnancy are exposed to even very low levels of TCE for even very short periods of time. There has been substantial scientific criticism of the underlying toxicological assessment upon which these conclusions about TCE risks are based.

Although these vapor intrusion policies from EPA headquarters, Region 9, and California have garnered significant attention, other regions and states are taking action on vapor intrusion, and more specifically risks of vapor intrusion in relation to TCE. For example, EPA Region 10 and many states including Massachusetts, Minnesota, New Hampshire, Connecticut, Alaska, and New Jersey have now published TCE standards.

The EPA VI Guidance states that it is intended to promote a consistent approach to addressing vapor intrusion risk across the country, while preserving flexibility for EPA Regions, states, localities, and tribes to address site-specific circumstances. *See* EPA VI Guidance, at xiii-xiv. As a result, the EPA VI Guidance likely will be viewed as a framework around which EPA Regions, states, localities, and tribes may craft or continue to apply their own policies, rather than a prescriptive federal policy that they all must follow. The particular approach that the various EPA regional offices and state and local environmental authorities like California Water Boards choose to follow, within the framework of the EPA VI Guidance, for any given property will be important. It will affect how efficiently properties can be remediated and closed in a manner that is protective of human health. It could also result in the reopening or revisiting of sites that have already been remediated and have either achieved no further action or are in the operations and maintenance phase. From a real estate redevelopment perspective, this uncertainty may be problematic for property owners who may have complied with costly cleanup orders, only to have the risk of additional remediation or mitigation requirements loom over potential real estate transactions as buyers, justifiably, will have concerns about future regulatory reopeners. This uncertainty also gives rise to concerns about potential toxic tort litigation involving claims of exposure to chemicals from vapor intrusion.

This article provides an overview of the vapor intrusion issue. It takes a closer look at the regulatory approaches reflected in the EPA VI Guidance, the Region 9 TCE Guidance, and the SF Water Board Interim TCE Framework. This article also examines the potential impacts of these policies on real estate transactions, government enforcement, and commercial and toxic tort litigation.

What Is the Vapor Intrusion Problem?

Vapor intrusion is the upward migration of volatile organic compounds (VOCs) in contaminated soil or groundwater into an overlying building. Common VOCs include TCE (a widely used industrial solvent), perchloroethylene (PCE) (widely used in dry cleaning), and gasoline and petroleum constituents (e.g., benzene). Vapor intrusion typically occurs when VOCs migrate into indoor air through penetrations in building foundations, such as cracks in a concrete slab, utility corridors, and elevator shafts. Subsurface vapors enter a building through these conduits when lower pressure inside a building creates a gradient that draws in such vapors from outside the building. Vapor intrusion is considered potentially harmful to human health because, once in a building,

vapors can be inhaled by building occupants, often unknowingly.

There are three main technical approaches for addressing vapor intrusion. The first approach involves sealing the building (cracks and crevices in walls and floors) to prevent further migration of contaminated vapors. The second approach involves the installation of an engineered active or passive vapor mitigation system. The third approach involves remediating the source that is producing the contaminated vapors in the underlying soil and/or groundwater. The first two approaches involve mitigation only, while the third approach involves actual remediation of the source contamination. Remediation of the source typically involves technologies such as vapor extraction or in-situ bioremediation. These methods are often used in combination.

The installation of a vapor intrusion mitigation system, as a relative matter, is not significantly expensive—especially not compared with the legal and consulting costs involved in vapor intrusion investigations. The typical cost for installation of a sub-slab depressurization system, for example, is in the range of $10 to $15 per square foot. In some communities such as Mountain View, California, vapor mitigation systems are now included as part of the building permit process for buildings that are known or suspected to be near groundwater plumes. Additional real costs are likely to be incurred (1) over the life cycle of the building in the form of maintenance and operation of a vapor mitigation system or other remedial measures, and the internal costs of managing communications to affected tenants about vapor intrusion issues; (2) in connection with the investigation of vapor intrusion risk as part of or following site remediation; (3) in connection with commercial litigation over contractual responsibility for installation and "life-cycle" costs of vapor intrusion mitigation systems; and (4) in defending single-plaintiff or class action toxic tort claims alleging chemical exposure from vapor intrusion.

EPA VI Guidance

The new EPA VI Guidance has origins stemming back at least as far as 2002, when EPA OSWER published draft vapor intrusion guidance aimed at assisting EPA regional offices, states, and localities in evaluating potential and actual vapor intrusion risks in buildings (2002 Draft Guidance"). EPA subsequently was criticized by the federal Office of the Inspector General for failing to update the 2002 Draft Guidance to account for developments in toxicological studies, failing to provide guidance for vapor intrusion mitigation, and failing to recommend the "multiple lines of evidence" approach in evaluating vapor intrusion risks. It is apparent from the new EPA VI Guidance that EPA made a concerted effort to address these criticisms along with the many questions and comments it received from the public. One of the interesting features of the EPA VI Guidance is that the agency used multiple footnotes to respond to many of the questions it received through the public comment process by describing the precedent the Agency has followed in addressing specific issues.

The EPA VI Guidance has broad coverage. It is intended to apply to site investigations for residential and commercial properties undertaken under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), EPA's brownfields program, and by state agencies with delegated authority to implement CERCLA or RCRA where vapor intrusion may be of potential concern. *See* EPA VI Guidance, at 6–7. Specifically, EPA headquarters recommends the use of the document when (1) making "Current Human Exposures Under Control" environmental indicator determinations at RCRA corrective action facilities and National Priorities List sites under CERCLA (2) undertaking removal actions, remedial actions, pre-remedial investigations, remedial investigations, and five-year reviews under CERCLA; and (3) undertaking RCRA facility investigations and corrective actions and site investigations and cleanups at federal facilities

and Brownfield sites. *Id*. Indeed, at least one EPA regional office has issued an order requiring vapor intrusion mitigation under section 7003 of RCRA since the 2002 Draft Guidance was issued. On September 24, 2014, Region 4 issued what has been reported as the first RCRA order requiring vapor intrusion mitigation. Region 4 issued the order under section 7003 of RCRA, which is intended to address an imminent and substantial endangerment to health or the environment related to past waste handling activities. The order requires the U.S. Army to evaluate vapor intrusion risks associated with a former army installation in Forest Park, Georgia, determine the level of risk posed to residents, owners, employees, students, and invitees of properties surrounding Fort Gillem, and mitigate any unacceptable risk to those persons.

The Guidance lists specific pollutants for which vapor intrusion might be a concern. Categories of pollutants that are highlighted in the Guidance include:

- Chlorinated solvents (including TCE, PCE, vinyl chloride, carbon tetrachloride, benzene, toluene, ethylbenzene, and xylenes);
- Other types of compounds that are not as volatile, but may be cause for concern, including some polycyclic aromatic hydrocarbons (PAHs) (e.g., naphthalene), some PCB congeners, and elemental mercury.

Finally, the Guidance lists industrial and commercial sectors where vapor intrusion risk may be a concern, including manufacturing and chemical processing plants, warehouses, landfills, coal gasification plants, chemical handling and transfer facilities (e.g., rail yards), and gas stations. *See* EPA VI Guidance, at 23. Many of the sites in California's Silicon Valley that currently are being investigated for vapor intrusion risk under Region 9's TCE Guidance were previously semiconductor manufacturing sites, but are now high-end office complexes occupied by technology companies.

In addition to the Guidance, EPA has identified several other EPA resources that may be useful in evaluating vapor intrusion. Of particular interest is EPA's Vapor Intrusion Screening Level (VISL) calculator (http://www.epa.gov/oswer/vaporintrusion/guidance.html). The VISL calculator is a spreadsheet that devises screening level groundwater, soil gas, and indoor air contaminant concentrations relevant to the indoor air contamination pathway based on certain inputs. The calculator provides insights into how EPA or other agencies might evaluate which sites should be investigated in greater detail for vapor intrusion issues.

Aside from its own guidance, EPA notes that the Agency for Toxic Substances and Disease Registry (ATSDR), Department of Defense, Department of the Navy, and the U.S. Postal Service have all issued separate guidance on vapor intrusion.

Vapor Intrusion Assessment

The Guidance lays out a methodology for identifying and assessing vapor intrusion risks. In many cases, the responsible party does not own the building in question and it may be difficult to obtain legal access to take indoor air samples or sub-slab samples, which may disrupt occupants of the affected structures. And when legal access is granted, the challenge then becomes how to accurately determine whether a building in fact may have a vapor intrusion problem. The Guidance divides the vapor intrusion investigation into two general stages: (1) a preliminary analysis; and (2) if required, a more detailed investigation. At the preliminary investigation stage, the Guidance recommends reviewing "available and readily ascertainable" information about the site, potential pollutants, a site's occupants, and the buildings in question to develop an initial understanding of the potential for human health risk.

In the first step, the Guidance recommends, at a minimum, collecting the following information, which EPA explains may be available through documents (e.g., federal, state, tribal and local government records) or through interviews with

individuals knowledgeable about the facility or the site:

- History and descriptions of the types of operations and activities that occurred on or near the site and nearby properties.
- Information or records about the types of chemicals that may have been used or disposed at the site and nearby properties or are currently used and disposed at the site.
- Information about the site and nearby properties, such as the occurrence of odors, reports of dumping liquids, observations of unreported waste disposal practices, or other indications of chemical presence and release.
- Adverse physiological effects reported by building occupants (e.g., dizziness, nausea, vomiting, confusion).
- Evidence of subsurface intrusion of groundwater (e.g., wet basements) reported by building owners or occupants.

The Guidance emphasizes that the preliminary analysis should focus on developing an initial understanding of the potential for human health risks to be posed by vapor intrusion, which would typically be performed as part of an initial site assessment. EPA VI Guidance, at xiv. For example, it recommends indoor air testing when odors or other obvious indicia of intruding contamination are present, and identifies vapor intrusion screening levels as useful preliminary investigation tools to assess whether existing data indicate potential concerns or whether additional data would be helpful. Using initially collected information, including sub-slab vapor sampling data, it recommends developing a conceptual site model specific to the particular buildings being investigated. Thus, this approach generally allows for sampling to be done outside of a building when there are no obvious indicia of vapor intrusion, with models used to assess whether chemicals in the subsurface are migrating into indoor air.

At sites where numerous buildings may have a vapor intrusion problem (e.g., an off-site plume that extends beneath several commercial buildings, houses, and apartments), it may be difficult to gain access to sample indoor air in each building or soil gas underneath or near each building. In the context of a phased investigation, the EPA VI Guidance recommends a "worst first" approach to prioritize buildings for investigation. Factors that may be helpful in prioritizing buildings for investigation include:

- *Source Strength and Proximity*. Buildings overlying and near a source of vapors would generally be expected to have a greater potential for vapor intrusion than buildings that do not overlie a source. Where the subsurface vapor source is groundwater, buildings located over higher concentrations or shallower water levels would generally be expected to have a greater potential for vapor intrusion than buildings located over lower concentrations and deeper groundwater plumes.
- *Building Types and Conditions*. Buildings that are continuously occupied may pose a more immediate concern than buildings that are not occupied, all other factors being the same. Nonresidential buildings with bay-style doors that are routinely open (e.g., roll-up docks in a warehouse) may be better ventilated than other types of nonresidential buildings, providing greater potential for dilution of vapor-forming chemicals that enter the building via vapor intrusion.
- *Vapor Migration Ease*. Buildings overlying vadose zones consisting of coarse geological materials (e.g., gravel, boulders) generally would be expected to have a greater potential for vapor intrusion than buildings overlying vadose zones comprised of fine-grained materials (e.g., silts, clays), provided preferential migration routes (e.g., geologic fractures, utility corridors) are not present in the fine-grained layers.

Notably, the Guidance advises that when sampling all buildings is not practical, but other lines of

evidence suggest that vapor intrusion may be occurring, the site management team may consider installing engineered exposure controls for vapor intrusion mitigation in buildings without baseline indoor air data (i.e., building mitigation as an early action).

When the conceptual site model suggests a viable route of exposure, EPA's VI Guidance states that a more thorough investigation may be warranted. It recommends the development of a vapor intrusion work plan to document a proposed investigation that includes buildings within 100 feet of subsurface contaminants.

The Guidance further suggests that the following lines of evidence may be useful in a vapor intrusion investigation:

- *Sources of Contamination.* Information regarding subsurface sources of contamination associated with vapor intrusion. Information sources could include site history, groundwater data, soil gas data, and comparison of data to vapor intrusion screening levels. Depending on the site, existing data may be adequate or additional sampling may be required.
- *Data.* Soil and groundwater data regarding vapor migration and attenuation.
- *Foundation Assessment.* Building foundation assessment to evaluate the structure's susceptibility to soil gas entry.
- *Interior Assessment.* Interior assessment, including indoor air sampling data and modeling to assess the presence of subsurface contaminants in indoor air and estimate the potential exposure levels to building occupants. Due to variability of indoor air and sub-slab data, multiple rounds of sampling over different seasons may be required.
- *Unrelated Sources.* Information regarding *other* sources of indoor air contamination, including building-specific indoor sources of VOCs such as products containing VOCs and outdoor sources such as ambient levels of VOCs in outdoor air.

The last line of evidence listed above is of critical importance to entities conducting vapor intrusion investigations. Vapor intrusion is not the only source of indoor air pollution, and indoor air contamination can also arise from the use of consumer products, occupant activities, combustion processes, and releases from building materials. Understanding the contribution of these alternative sources to background contaminant levels is essential to designing an effective and efficient program to reduce potential risks. In addition, ambient outdoor air often contains background levels of commonly used chemicals, so a comparison of indoor air results to outdoor air concentrations is commonly recommended and done.

Vapor Intrusion Mitigation

In addition to describing how to assess vapor intrusion risks, the EPA's VI Guidance describes monitoring and vapor intrusion mitigation systems. The Guidance notes that the National Contingency Plan prefers response actions that eliminate or substantially reduce the level of contamination in a source medium to acceptable levels. It recommends preemptive action when possible—such as installing engineering controls in buildings while the investigation is being conducted. The Guidance further:

- Summarizes the role of subsurface remediation in mitigating vapor intrusion,
- Provides an overview of engineered controls (i.e., vapor mitigation technologies) for existing and new buildings,
- Summarizes guidance about operating vapor mitigation systems,
- Summarizes guidance about documenting vapor mitigation systems,
- Describes and provides guidance about institutional controls (ICs), and
- Provides guidance about exit strategies (e.g., termination of subsurface remediation, vapor building mitigation system operation, and associated ICs).

Region 9 TCE Guidance

Background

The Region 9 TCE Guidance recommends "action levels, investigation approaches and response measures to address 'inhalation exposures to TCE in indoor air from the subsurface vapor intrusion pathway.'" Region 9 TCE Guidance, at 1. The recommendations "address a particular concern for TCE" and "women in the first trimester of pregnancy." This concern arises because of Region 9's conclusion that animal testing shows a potential for cardiac malformations in the developing fetus. *Id.* This conclusion has been heavily criticized as not supported by sound science. To address this specific teratogenicity concern, the Region 9 TCE Guidance adopts short-term response action levels (RALs). Many mature Superfund sites have installed remedies, which are now in a operations and maintenance mode. These sites are being revisited at the time of the five-year review and EPA is requiring that vapor intrusion be investigated again.

Relying on the September 2011 Toxicological Review of Trichloroethylene in Support of the Integrated Risk Information System ("IRIS Review") in setting short-term exposure limits, the Region 9 TCE Guidance concludes that "women in the first trimester of pregnancy" are a particularly sensitive population for TCE short-term inhalation exposure due to the "potential for cardiac malformation to the developing fetus." *Id*. Region 9 has claimed that there is a significant public health threat posed by *very short* periods of exposure (i.e., "as limited as 24 hours") to *very* low concentrations of TCE in indoor air. Accordingly, the Region 9 TCE Guidance requires extreme measures at Superfund sites in cases where short-term exposure to TCE cannot be promptly reduced through measures such as adjustment of the heating and ventilation system. These more extreme measures include the evacuation of workers from buildings. The guidance also provides "interim response action levels" for short-term TCE exposure that are to be used in "making site-specific decisions regarding the investigation of and response to TCE vapor intrusion." *Id*. It requires "prompt" responses to concentrations as low as 2 µg/m3 of TCE in residences and 7 µg/m^3 of TCE in commercial buildings for a 10-hour workday. *Id.* at 3–5. A "prompt" response is described as completing and confirming all necessary mitigation measures within a few weeks. *Id.* The short-term exposure guidelines require "urgent" responses, including the possibility of temporary relocation of workers in a building with concentrations as low 6 µg/m^3 in residences and 21 µg/m^3 in commercial buildings for a 10-hour workday. *Id.*

Indoor Air Testing Triggered by Groundwater TCE Levels

At some of the Superfund sites in the south San Francisco Bay region (South Bay Superfund Sites), Region 9 has directed responsible parties to test indoor air in all buildings located over groundwater plumes containing 5 parts per billion or more of TCE. If Region 9 takes this approach throughout the region, the policy could require thousands of buildings to be tested. CH2M Hill, a nationally-recognized consultant, estimates that monitoring vapor intrusion for a 7,000 square foot commercial building could cost between $159,000 to $238,000 per building. Those estimates account for only the cost of testing and do not include the cost to install a vapor mitigation system. With thousands of commercial buildings located over TCE plumes, the cost of monitoring vapor intrusion in Region 9 alone could be in the hundreds of millions of dollars.

Flawed Science Underlying Region 9's Guidance

The Region 9 TCE Guidance relies upon the TCE IRIS Review, which sets a "reference concentration"—a safe concentration for a lifetime exposure—for TCE based on studies of chronic health effects. But it did not establish toxicity values for short-term exposures. The main study cited in the IRIS Review, a 2003 study by a researcher named Paula Johnson, a doctor of veterinary medicine at the University of Arizona at Tucson, found an increased incidence of cardiac

defects in rats exposed to TCE. Although the IRIS Review acknowledged that the Johnson study had "important limitations" as a result of other evidence that TCE caused other chronic conditions, the IRIS Review relied on the Johnson study to support the reference concentration for long-term exposures.

In April 2012, the responsible parties at the Middlefield-Ellis-Whisman (MEW) Superfund Site in Mountain View, California submitted a technical white paper on TCE to EPA Headquarters that reviewed the 2011 IRIS Review (MEW White Paper). Authored by two well-respected toxicologists, the MEW White Paper challenged EPA's conclusion that TCE is a teratogen. The MEW White Paper also pointed out that neither EPA (headquarters and regional offices) nor any other federal agency has concluded that TCE causes teratogenic effects in people.

The MEW White Paper reviewed the toxicological and epidemiological studies regarding congenital cardiac defects and TCE and found that more of those studies found *no* teratogenic effects than those that found any such effects. Furthermore, the studies that found any such teratogenic effects were all compromised by well-documented methodological and/or design flaws, rendering them of very limited value. Specifically, the MEW White Paper described the following concerns about the relevant studies:

- *Apples and Oranges*. Although there is no evidence in the 2011 IRIS Review that any of the noncancer data were evaluated for any period other than chronic exposure, Region 9 applied the same noncancer data to exposure periods of less than 24 hours without any critical scrutiny by peer reviewers.
- *Non-Random Results from Research Lab.* The MEW White Paper pointed out that all of the data showing a "positive" causal link in animals came from a single laboratory. That laboratory used a flawed methodology that was criticized by the scientific community, and the positive findings from that laboratory have not been replicated even by the same researchers. Moreover, a number of other studies found no cardiac teratogenic effects in animals even at doses approaching those used in the studies that reported finding effects.
- *Correlation Not Statistically Significant.* Several epidemiological studies report no statistically significant association between TCE exposure and cardiac teratogenic effects in humans. The only epidemiological studies that report teratogenic effects are based on study designs that are of limited value for evaluating a causal relationship.

The MEW White Paper also noted that a number of scientific and regulatory organizations had reviewed the many toxicological and epidemiological studies, and that none of those organizations shared Region 9's conclusion about a causal relationship. Therefore, the MEW White Paper urged EPA headquarters to conduct a thorough analysis of the available literature and issue a formal determination based on the weight of scientific evidence that would apply to all of EPA's regional offices. Neither EPA headquarters nor Region 9 has responded to the MEW White Paper.

Subsequently, in November 2014, the California Manufacturers & Technology Association (CMTA) sent a detailed letter to EPA headquarters raising additional concerns about the Region 9 conclusions about TCE risks. The CMTA letter presented a detailed technical assessment of the weight-of-evidence analysis for fetal cardiac malformations following TCE exposure prepared by Dr. Keith Tolson, Ph.D. According to Dr. Tolson, the weight of scientific evidence does not support a finding of teratogenicity for TCE. For that reason, CMTA concludes that toxicological information in the scientific literature does not support Region 9 short-term action limits for TCE. CMTA also notes the following:

- The risk assessment prepared by the EPA Office of Pollution Prevention (OPPT) and

published on June 25, 2014, does not agree with other evaluations of the same studies in the scientific literature.
- The OPPT risk assessment was not peer reviewed, despite substantial changes from a 2012 draft.
- The OPPT risk assessment does not conform to recommendations of the National Research Council for "risk of bias."
- The weight of evidence from available scientific studies does not support a causal association between TCE exposure and cardiac defects in humans.

For these reasons, CMTA urges EPA to perform an expedited definitive study on the teratogenic effects of TCE. CMTA notes that the Halogenated Solvents Industry Association (HSIA) offered to sponsor and fund such a definitive study, using methodology agreed to by an expert panel including representatives from federal agencies. CMTA further asks that until such a definitive study can be performed, EPA should convene a reputable external scientific panel to perform an expedited review of TCE risks. Finally, if TCE is determined to be a teratogen, CMTA suggests that EPA should adopt a national short-term TCE standard, subject to public notice and comment processes, to allow for public input and so that a cost/benefit analysis can be performed.

Notwithstanding these requests, Region 9 has moved forward in implementing its short-term TCE exposure levels at Superfund sites within its jurisdiction without responding to the detailed scientific criticisms from a number of respected toxicologists. And, to date, EPA headquarters has not responded to the HSIA offer to fund a definitive study of TCE risks, using a methodology derived by a national panel of experts. If rigidly applied, Region 9's policy could effectively result in the shutdown of businesses where contamination is present at very low levels. If extended beyond Region 9, to apply to Superfund sites in other EPA Regions, the course that Region 9 has charted could have significant ramifications to property owners around the country.

Key Differences Between EPA VI Guidance and Region 9 TCE Guidance

Short-Term Response Action Levels

The EPA VI Guidance provides a systematic approach to analyzing vapor intrusion at a site. It allows responsible parties and regulatory agencies to use sampling outside of a building and models to assess whether vapor intrusion may be occurring. By contrast, Region 9 TCE Guidance largely focuses on a single methodology for assessing vapor intrusion risks from a single chemical, TCE—the comparison of sampled indoor air TCE concentrations to the following short-term RALs:

Exposure Scenario	Accelerated RAL	Urgent RAL
Residential	2 $\mu g/m^3$	6 $\mu g/m^3$
Commercial/industrial (8-hour workday)	8 $\mu g/m^3$	24 $\mu g/m^3$
Commercial/industrial (10-hour workday)	7 $\mu g/m^3$	21 $\mu g/m^3$

For comparison, Region 9's response action level for commercial/industrial exposure (8 μg/m^3) is over **67,000** times more conservative than the Permissible Exposure Limit (PEL) established by the federal Occupational Health and Safety Administration (OSHA) for TCE (537,000 μg/m^3). *See* 29 C.F.R. § 1910.1000 Z-2 Table. Likewise, Region 9's response action levels are significantly higher than the Cal/OSHA PEL of 135,000 μg/m^3. *See* 8 C.C.R. § 5155, Table AC-1.

Thus, in states like California that are in Region 9, use of the Region 9 TCE Guidance could result in evacuation of a workplace in a commercial building where TCE exceeds 21 or 24 μg/m^3 because it is migrating into the structure from a subsurface source, whereas in a neighboring commercial building, workers may lawfully be exposed to TCE at levels up to 135,000 μg/m^3 without any mandatory personal protective equipment. It is very difficult for business people to understand the striking disparity between the Region 9 short-term RALs for TCE and the federal and Cal/OSHA worker safety standards for TCE. EPA does not provide an explanation for the extreme divergence between the two sets of applicable standards, but has observed that the federal OSHA standards are much older and in need of updating. Referencing a statement on federal OSHA's website, the EPA VI Guidance states "OSHA recognizes that many of its permissible exposure limits (PEL) are outdated and inadequate for ensuring protection of worker health."

Practical Consequences Under the Two Policies

Based on how measured indoor air TCE levels compare to the short-term RALs, Region 9 outlines tiered response actions. Even where measured TCE levels are *below* the RALs, Region 9 recommends periodic confirmatory monitoring and additional site investigation. If indoor air concentrations are above the accelerated RAL, the Region 9 TCE Guidance requires that responsible parties implement mitigation measures to reduce indoor air contaminant levels to below RALs within weeks. Finally, if indoor air levels exceed the urgent RAL, Region 9 recommends prompt cessation of exposure while mitigation is taking place, including potential temporary relocation of those who occupy the building. Evacuation of commercial buildings that may have hundreds of workers is an extreme measure that underscores Region 9's concern about the health impacts of TCE.

The practical consequences of implementing the Region 9 TCE Guidance are of particular concern to landowners and tenants. The guidance requires very intrusive and often disruptive testing. This testing will often require access agreements and could very well interfere with owners' or tenants' business operations, especially at companies that conduct strategic operations under high security. The results of the testing are sometimes confusing and may even be alarming to tenants and other occupants. For example, the Region 9 TCE Guidance may require that a building that complies with all applicable occupational exposure guidelines under OSHA regulations be evacuated, or that disruptive remedial work be performed. And the Region 9 TCE Guidance may also require long-term operations and maintenance plans, or repeated testing. Building owners in Region 9 are understandably concerned about the economic impact on property values. Companies may be hesitant to locate their businesses in areas that have been extensively cleaned up and long understood to be safe for occupancy.

The SF Water Board's Interim Framework for TCE Vapor Intrusion Assessment

Adding to the mix, on October 16, 2014, the SF Water Board issued its own draft vapor intrusion guidance document for TCE contaminated sites under the jurisdiction of the Water Board entitled *Interim Framework for Assessment of Vapor Intrusion at TCE-Contaminated Sites in the San Francisco Bay Region*. The California Department of Toxic Substances Control (DTSC) has also issued a guidance document on vapor intrusion and a guidance document on TCE specifically, which tracks Region 9's approach. *See* DTSC, *Guidance*

for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Oct. 2011), *available at* http://www.dtsc.ca.gov/AssessingRisk/upload/Final_VIG_Oct_2011.pdf; DTSC Human and Ecological Risk Office, *Health-based Indoor Air Screening Criteria for TCE* (Aug. 23, 2014), *available at* http://www.dtsc.ca.gov/AssessingRisk/upload/Final_VIG_Oct_2011.pdf. Key highlights of the SF Water Board Interim TCE Framework and some commonalities and differences between the Region 9 approach include the following:

- *EPA Short-Term Action Limits.* The SF Water Board will use the values for accelerated and urgent action issued by Region 9 in July 2014. For commercial sites with an 8-hour workday, however, this is a not-to-exceed number of 8 µg/m3 for accelerated response with urgent action at levels above 24 µg/m3 (including building evacuation if levels cannot be promptly reduced).
- *Step-Wise Approach.* The SF Water Board will use a step-wise approach, not immediately requiring indoor air testing, as Region 9 appears to favor. Under the step-wise approach, it is still possible to eliminate costly indoor air sampling by testing soil vapor and groundwater and comparing them to default values. If the default levels are exceeded, site-specific (Johnson & Ettinger) modeling is conducted to determine whether an indoor air investigation will be required.
- *Triggers for Indoor Air Sampling.* The SF Water Board has published a table of values for groundwater (coarse-grained vs. sand or less than 10 feet below ground surface), soil gas that will trigger indoor air testing. The chart also denotes the residential and commercial environmental screening levels for TCE in indoor air. Of key interest is the fact that the SF Water Board will use the value of 140µg/l in groundwater as a screening value for testing indoor air in off-site buildings where soil conditions are sandy, not the 5 µg/l level used by Region 9 at the South Bay Superfund sites. Even higher values apply to a mixed fine- and coarse-grained soil. These values will substantially limit the number of buildings that have to be tested, compared with the Region 9 approach at the South Bay Superfund sites where every building overlying a TCE plume at 5 µg/l or greater requires mandatory indoor air sampling.
- *No Automatic Reopener But Redevelopment May Trigger Review.* A representative for the SF Water Board indicated that it will not routinely seek to reopen closed TCE sites, noting that the agency already has a considerable caseload with the existing open sites. The interim framework notes, however, that during property transfer, a Phase II assessment may reveal that TCE or PCE remain at a site at levels that are no longer protective of human health, which could trigger review under the framework.
- *Vapor Mitigation Systems Will Depend on the Level of Risk.* The SF Water Board will look at the amount of contamination in deciding what type of vapor intrusion threat is posed and what type of vapor mitigation system is needed. It will look at duration. Passive systems that can remain "fail-safe" over many years or decades are preferred due to their reliability. This is somewhat different from Region 9's preference for active sub-slab depressurization systems.
- *Long-Term O&M of Vapor Mitigation Systems.* The SF Water Board Interim TCE Framework discusses the need for a long-term O&M plan for vapor mitigation systems, noting that responsible entities may include a homeowner's association or property manager. The issue of who is going to operate and maintain mandatory vapor mitigation systems has been controversial, with some landowners refusing to take responsibility as they consider these to be remedial systems that should be operated by the responsible parties who caused the contamination, just as systems such as groundwater pump-and-

treat are handled.

- *Vapor Intrusion at Closed Landfills.* These sites are given special consideration because of their inherent risks.

Public Reaction to EPA's Vapor Intrusion Policies

Manufacturers of TCE and companies with TCE in their products have been the most vocal and organized group opposing EPA's continued reliance on controversial toxicological data, which many argue could lead to unnecessary and costly cleanups. According to press reports, in November 2014 the Halogenated Solvents Industry Alliance, Inc. (HSIA) met with White House officials to discuss their concerns with a draft version of the EPA VI Guidance. HSIA subsequently filed a request to correct EPA's IRIS assessment for TCE, on the basis of flawed science. EPA responded to that request in a letter from EPA's Office of Environmental Information, advising HSIA that EPA is continuing to review the information that HSIA provided and that EPA anticipates responding to the group's request no later than March 24, 2015. EPA ultimately rejected this request.

As noted above, the California Manufacturers & Technology Association has also expressed concern over the Region 9 TCE Guidance and stated its view that the weight of scientific evidence does not support the Region 9 RALs. To address this need for confirmatory toxicology data, HSIA offered to fund a definitive study of TCE with methodology agreed upon by government agencies including EPA, the National Toxicology Program, and ATSDR. EPA has not accepted the offer to fund a definitive study. CMTA also requested that EPA accept HSIA's offer to fund a definitive study of TCE with methodology mutually agreed upon by government toxicologists and external scientists. It is understood that performing such a study could take more than a year. On that basis, CMTA has asked EPA to conduct an external peer review of the Johnson study on which the Region 9 RALs are based. To date, there has been no indication from EPA that it will accept HSIA's offer or that it will conduct an external peer review of the Johnson study.

In June 2014, Senators Vitter, Inhofe, and Crapo sent a letter to EPA raising concerns over EPA's chemical risk assessment on TCE. The senators emphasized that EPA's reliance on the Johnson study was problematic, stating that the nature of the study was "fundamentally flawed." The letter went so far as to state that EPA's inclusion of the Johnson study "clearly deviates from any notions of working toward the National Academy of Sciencies' recommendations for higher scientific standards." The letter stated that the request for peer reviews of the study contained leading questions that favored the study's use. In addition, the letter called into question the role of Dr. Stan Barone as the peer-review coordinator, suggesting he had conflicts of interest and had worked on previous TCE evaluations and publications that supported the Johnson study.

Some environmental groups have argued that neither the EPA VI Guidance nor the Region 9 TCE Guidance go far enough in ensuring that at-risk sites will be evaluated for vapor intrusion. One of those groups, the Center for Public Environmental Oversight is urging agencies to require indoor air testing as the default approach to investigate potential vapor intrusion problems.

Conclusion

Vapor intrusion long has been a focus of concern for state and federal environmental agencies. But in recent years, EPA has shown a renewed interest in this issue at Superfund and other contaminated sites. The EPA VI Guidance now provides a framework with recommendations for addressing vapor intrusion risks. Within this framework, however, the specific approaches employed at a given site can lead to very different outcomes. For example, while the EPA VI Guidance suggests a multiple line of evidence approach (which allows for conclusions based on modeling), the Region 9 TCE Guidance and the SF Water Board's Interim Framework favor air testing inside buildings

at sites with a risk of TCE vapor intrusion, and set RALs at levels for which risks may still be uncertain. Therefore, investigation, mitigation, and remediation at TCE sites in Region 9 and the SF Water Board jurisdiction may vary greatly from the responses at sites with different chemicals of concern or in other jurisdictions.

Regardless of which view or approach ultimately predominates around the country, as more states begin to develop their own vapor intrusion guidance using the framework and recommendations from the EPA VI Guidance and the Region 9 TCE Guidance, the impact of this increasing and overlapping regulatory scrutiny of vapor intrusion risk no doubt will increase costs associated with addressing vapor intrusion at TCE-contaminated properties. Beyond the costs of simply investigating and mitigating vapor intrusion risks at properties undergoing site investigation and cleanup, more dramatic cost impacts may be seen at formerly contaminated sites that have been cleaned up and redeveloped, but fall under renewed EPA scrutiny during the Superfund Five Year Review when the agency may decide to investigate vapor intrusion risk. In addition, the impact likely will result in an increase in the number of toxic tort actions alleging vapor intrusion, and perhaps citing the Region 9 short-term exposure levels. Indeed, there has been an increase in the number of toxic tort lawsuits alleging vapor intrusion in the last five years, and a number of class actions involving vapor intrusion have already been certified. *See, e.g.*, *Ebert v. Gen. Mills, Inc.*, 2015 WL 867994 (D. Minn. Feb. 27, 2015); *Stoll v. Kraft Foods Global, Inc.*, 2010 WL 3613828 (S.D. Ind. Sept. 6, 2010).

Given these enormous cost implications and the sheer number of sites around the country potentially implicated, VI risk assessment, and perhaps TCE indoor air risk levels in particular, may be a more appropriate subject matter for notice-and-comment rulemaking under the Administrative Procedures Act, in a transparent process that includes input from the regulated community, well-accepted science, and an economic cost-benefit analysis.

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