

Science & Technology Committee Newsletter
Vol. 3, No. 1, December 2002

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MESSAGE FROM THE CHAIR

Terry F. Quill
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On behalf of the Special Committee on Science and Technology leadership, I am pleased to welcome you to a new year of Committee activities involving science and technology in the practice of law. I am also pleased to present our Committee Newsletter. We are coming off a very successful year in which we addressed a number of legal issues related to science and technology, including the use of science in litigation, scientific and legal issues related to homeland security, the science underlying California's Prop. 65, and genomics in litigation, to name a few cutting-edge issues. We plan to pick up where we left off and address some issues left on the table last year (such as the Data Quality Act, toxicogenomics and dioxin). We will also continue to look for new hot topics in science and law that we can address in our Newsletter or in conferences. In that regard, please send us your ideas.

I would like to repeat our theme from last year: This is your Committee and the Committee leadership would like to respond to your information needs, provide a forum for you to share your expertise in the area of science and technology, and accommodate your desire to become more involved in the Committee. We are delighted to have the opportunity to assist and work with you on matters involving science and technology in the practice of law. Those matters form the basis of our practices and we feel we have much to share and learn. Our Committee will be

successful only to the extent you get involved. If you are not yet a Committee member, please join us. If you wish to become more active in our committee or just want to share your ideas, please give us a call. The Committee chair and vice-chairs are listed below with contact information.

Our Committee addresses a broad range of health, technology and scientific issues that underlie much of environmental, energy and resource law. Our Committee can provide a valuable service to legal practitioners throughout our Section and the ABA. This year we plan to continue our outreach efforts to our Committee members, work more with other Section committees and collaborate with other ABA sections. We are working with the Committee on Pesticides, Chemical Regulation and Right-To-Know to conduct a teleconference this December on the Data Quality Act. We are also planning in the next month or two to conduct a conference or workshop concerning dioxin. We will keep you posted on these and other Committee activities. In that regard, we intend to utilize our Committee list serve to better communicate with you. We hope to have that up and running soon.

Again, welcome to an exciting and fruitful year. Please enjoy your newsletter.

2002-03 Committee Leadership

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Please feel free to contact the vice-chairs or me at any time.

EDITOR'S INTRODUCTION

Elliot Eder

This marks the first Science and Technology Committee Newsletter for the 2002-2003 year. With the re-launch of this publication last year, there has been so much interest expressed in writing articles that Sarah Brozena, a fellow vice-chair of the Committee, has graciously agreed to be co-editor of the newsletter. In addition to her fine lawyering at the American Chemistry Council, Sarah brings both science and editorial background to the endeavor. Welcome, and many thanks.

This is the second recent issue to focus on litigation themes that are of interest to the Section in general and to committee members in particular.

- P For openers, Beth Davis and Stan Green from Womble Carlyle, Sandridge & Rice, and Brian Heim from International Paper Company, discuss *Science Issues in Mold Litigation*.
- P Thad Lightfoot, from The Environmental Law Group in the Twin Cities, evaluates the impact of the Ninth Circuit's *Carson Harbor Village* decision on passive migration issues in CERCLA and RCRA litigation.
- P Jim Payne, from U.S. Department of Justice, is helping us navigate cyberlaw with *E-Filing: Coming Soon to a Federal Court Near You*. Jim discusses how electronic filing protocols in federal courts affect environmental, energy and natural resource cases.
- P Susan Tighe-Litherland and Robert Chapin, both at Weston Solutions in Austin, share their litigation consulting experiences in *Technical Issues in Litigation Involving Chlorinated Solvent Releases*.
- P We conclude the issue with a case study for lawyers looking for a useful overview of allocation issues in PCB cases. Bill Lowenbach, who consults on environmental, health and safety issues in the Washington, D.C. area, has gone back-to-basics with *Allocation of PCB Sources at a Scrap Metal Yard*.

Upcoming newsletters will focus on legislative developments and on administrative/regulatory issues that are of keen interest to committee members. If you have a special interest or idea in either area, we would welcome your topic submission. Simply send an e-mail to sarah_brozena@americanchemistry.com. Meanwhile, enjoy the holidays.

SCIENCE ISSUES IN MOLD LITIGATION

Elizabeth B. Davis
Brian E. Heim
Stan B. Green

Mold and the health impacts and property damage it may allegedly cause are rapidly gaining public attention. Publicity from the media and debate within the scientific and legal communities have prompted significant litigation surrounding mold and its alleged health effects, and the number of mold-related insurance claims are on the rise. Through the increased litigation, the debate among medical and legal experts rages. At the same time, many state and federal legislators across the country are working to develop some structure to protect against mold-related impacts.

For the uninitiated, mold is a type of fungus that occurs naturally both indoors and out. Indoor molds can develop outdoors and travel indoors or develop indoors. Molds that

originate outdoors travel indoors through open doors, windows or ventilation systems (either airborne or on clothing or other items). Molds also can originate indoors if they have a moist environment, oxygen and organic material on which to feed. Molds have no chlorophyll and cannot produce their own food. Common carbon-based construction materials can serve as a food source for mold, including drywall, insulation, carpets, drapes and glues. See, Harriet A. Burge et al., *Moisture, Organisms, and Health Effects in Moisture Control in Buildings*, 84-85 (Heinz R. Treschel ed., 1994).

Concerns regarding indoor air quality have grown in recent decades. One reason is the change in building construction. Partly in response to the energy crisis in the 1970s, today's building construction is tighter and more energy efficient, and modern construction relies less on the introduction of fresh outside air. These factors, when combined with excessive moisture, can contribute to the potential for increased biological contaminants such as mold and fungi in indoor air. When presented with opportunistic conditions of low airflow and high moisture, mold can develop and flourish. See, *Mold Remediation in Schools and Commercial Buildings*, U.S. EPA, Office of Air and Radiation, EPA 402-K-01-001, March 2001 (www.epa.gov/iaq/molds/index.html).

Potential Health Effects

The extent to which molds may cause health problems remains an unsettled question in the scientific and medical communities. Those who contend that mold adversely impacts human health implicate two distinct constituents of mold as the cause of negative health effects: 1) mold spores, which are present in most forms of mold; and 2) mycotoxins – compounds that help the mold digest food sources, such as wood – which are typically found in *Stachybotrys*, *Aspergillus* and *Penicillium* molds. Mold spores have been linked to allergies and upper respiratory irritations. According to the EPA, mycotoxin exposure has been linked generally to symptoms such as runny nose, cough, congestion, headaches, nose-bleeds, dermatitis, and other cold and flu-like symptoms. See, <http://www.epa.gov/iaq/biologic.html>. Hundreds of different mycotoxin compounds exist, which scientists are currently attempting to identify and differentiate.

EPA recognizes some potential health impacts from exposure to molds. A 1994 EPA publication discusses the potential health effects of biological air pollutants generally and molds specifically:

Biological agents in indoor air are known to cause three types of human disease: infections, where pathogens invade human tissues; hypersensitivity diseases, where specific activation of the immune system causes disease; and toxicosis, where biologically produced chemical toxins cause direct toxic effects. In addition, exposure to conditions conducive to biological contamination (e.g., dampness, water damage) has been related to nonspecific upper and lower respiratory symptoms

However, mycotoxins are contained in some kinds of fungus spores, and these can enter the body through the respiratory tract Skin is another potential

route of exposure to mycotoxins. Toxins of several fungi have caused cases of severe dermatosis.

Indoor Air Pollution: An Introduction for Health Professionals, Co-sponsored by: The American Lung Association, EPA, The Consumer Product Safety Commission, and The American Medical Association. U.S. Government Printing Office Publication No. 1994-523-217/81322, 1994 (author's parenthetical).

Even so, the presence of mold in a building does not necessarily mean that an occupant will either be exposed to it or suffer any adverse health effects. For a building occupant to be exposed to indoor mold, the mold spores or fragments must be released into the air and inhaled, ingested or otherwise contacted. Even then, most people are exposed to molds every day, and most suffer no adverse effects. See, *Mold Remediation in Schools and Commercial Buildings*, EPA, Office of Air and Radiation, EPA 402-K-01-001, March 2001 (<http://www.epa.gov/iaq/molds/index.html>).

Even if an individual is exposed to mold, the full effect of exposure to molds is uncertain and the subject of extensive scientific study and debate. As set out in another EPA publication:

Although some mycotoxins are well known to affect humans and have been shown to be responsible for human health effects, for many mycotoxins, little information is available, and in some cases research is ongoing. For example, . . . preliminary reports . . . suggested an association between pulmonary hemorrhage and exposure to *Stachybotrys chartarum*. Review of the evidence of this association at CDC resulted in a published clarification stating that such an association was not established.

Mold Remediation in Schools and Commercial Buildings, Appendix B, EPA, Office of Air and Radiation, EPA 402-K-01-001, March 2001.

Regulatory Developments

At this time, there are no established standards governing mold exposures. Neither the United States Environmental Protection Agency (EPA) nor the United States Centers for Disease Control (CDC) have promulgated regulations regarding mold exposure. The Occupational Health and Safety Act also does not prescribe permissible exposure limits for mold spores or mycotoxins. In fact, in December 2001, OSHA withdrew its Notice of Proposed Rulemaking concerning indoor air quality. That proposed rule aspired to establish standards for contaminants present in indoor air in the workplace, including molds and fungi.

Nevertheless, efforts are underway in the United States House of Representatives to pass a mold bill. In the proposed United States Toxic Mold Safety & Protection Act of 2002, HR 4855, EPA is required to issue guidelines by 2004 which, among other things:

- P Help determine if mold could be a potential health hazard for those individuals living in a housing or building;
- P Establish professional standards for professional mold inspectors, remediators, and testing labs;
- P Require state licensing and certifying of remediators, labs, inspectors, risk assessors, and industrial hygienists; and
- P Protect toxic mold remediators and inspectors from dangerous health hazards that result from performing their jobs.

Passage of the mold bill is questionable. However, it indicates increased awareness of and sensitivity to toxic mold issues.

Notwithstanding the absence of federal regulations, the State of New York has drafted guidelines for assessing and remediating mold in buildings. In 1993, the New York City Department of Health (DOH), the New York City Human Resources Administration (HRA), and the Mount Sinai Health Occupational Clinic convened an expert panel on *Stachybotrys atra* in indoor environments. The result was the 1993 publication of guidelines (updated in 2000), entitled "Guidelines on Assessment and Remediation of Fungi in Indoor Environments." The document addresses health issues, environmental assessment, remediation, and health hazard communication relating to indoor mold issues. It provides the only instructive policy and is cited extensively by those addressing remediation goals for mold cleanups. The document can be found at <http://www.ci.nyc.ny.us/html/doh/html/epi/moldrpt1.html>.

Diagnosis v. Determining Cause

The key issue in mold litigation is causation, and most cases will ultimately boil down to the classic battle of the experts. At this time, attempts to distinguish between litigation symptoms brought on by a common cold or allergy and those brought on by mycotoxin exposure can be challenging. There is not an accepted scientific method for distinguishing the signs of actual mycotoxin exposure.

For example, in the recent and highly publicized case, *Mary Ballard, et al. v. Fire Ins. Exchange, et al.*, No. 99-05252, health effects were alleged as a result of exposure to *Stachybotrys* mold. In that case, plaintiffs alleged that they and their three-year-old son grew ill when their homeowners' insurer refused a claim to replace a buckled sub-floor caused by leaky plumbing. Ultimately, the house had to be torn down because mold impacts were too extensive to remediate. However, the medical science behind the claimed personal injuries did not withstand a *Daubert/Robinson* challenge.

In the plaintiffs' personal injury claims centered upon allegations that they had suffered brain damage from *Stachybotrys* mold exposure. The defense asserted that the science presented by plaintiffs' expert was not sufficiently reliable to establish that molds can cause injuries to the central nervous system or that the mold in the plaintiffs'

home caused the brain injuries alleged. Plaintiff's epidemiological studies were largely inconclusive, and plaintiffs argued that scientific studies were not needed to prove general causation because testing subsequent to the epidemiological studies showed the existence of neurotoxins in the air of the home. The court excluded the mold expert's testimony and dismissed the personal injury claims. The court based the decision on the plaintiffs' failure to provide statistically valid epidemiological studies showing that mold exposure could affect brain function.

When scientific evidence is inadmissible, circumstantial evidence concerning the occurrence of symptoms and mycotoxin exposure may be the only evidence of causation. Therefore, the technical and scientific issues associated with demonstrating a causal connection between symptoms and exposure to mycotoxin are of significant interest in mold litigation cases.

Proving Causation and Related Science Issues

As the *Ballard* case illustrates, issues associated with proving causation are critical to mold cases. Essential elements of proving causation in a mold case are (i) reliable analysis and (ii) identifying the type and level of mold spores or mycotoxins to which the individual allegedly was exposed.

The Need to Sample

Normally, when mold is readily observed in a structure, it can be remediated without sampling. However, there are a number of circumstances when sampling may be necessary or appropriate. If a party seeks reimbursement or coverage under an insurance policy for the remediation costs, he or she may have to confirm the contamination to support the claim. Also, if an individual suspects mold contamination in a structure, and it is not detectable after a visual inspection, then sampling may be necessary to reveal evidence of mold spores. Additionally, if mold is being remediated and there is a question about how far the colonization extends, then surface sampling in combination may be useful to confirm that the complete mold colony has been remediated. Finally, if there are suspected adverse health impacts associated with mold, sampling should be undertaken to confirm the type or level of contamination.

Professionals experienced with mold issues and familiar with current guidelines should conduct any sampling. Even so, the available science regarding sampling and threshold levels of concern is incomplete and remains controversial. Although there are several available guidance documents, there are no clear benchmarks or standard values against which to compare testing results. Sampling without a specific purpose greatly increases the chances of generating useless data. If samples are taken, there should be a specific question that the sample results can help to answer.

Basic Sampling Methods

Sampling for mold spores can indicate whether the mix of indoor molds is typical or atypical of the outdoor mix, at least at the time the test is taken. Generally, indoor mold types should be similar to outdoor types and levels should be no greater than in outdoor areas. Conversely, the presence of certain species of mold indoors that are absent outdoors may indicate a mold program and degraded air quality.

Building on the growing awareness – or perhaps fear – of “toxic mold,” numerous mold test kits have come on the market. While of limited utility for litigation purposes, these basic test kits can be an inexpensive first step to determine the presence of mold, as well as the specific type of mold. A professional or a layperson can conduct these tests. If a non-professional performs the sampling, the reliability of the sampling obviously will be difficult to defend. Three common methods of sampling utilize tape-lift surface sampling, settling plates, and culturing. Each has its benefits and limitations.

Tape-Lift Surface Samples

Surface sampling is used to confirm the nature of suspected growth on environmental surfaces. The tape lift sample also can be used to measure the relative degree of biological contamination, and identify the types of microorganisms and other biological agents present. See American Conference of Governmental Industrial Hygienists (ACGIH), *Bioaerosols, Assessment and Control, Section 12.2.1*. Surface tape sampling “may help investigators decide if further sampling is indicated and may help them formulate recommendations for remediation.” *Bioaerosols, Assessment and Control, Section 12.1.3.3*. The tape lift method is analyzed by direct microscopy. Therefore, there is no need to grow the fungus in a culture media to identify it, and both the viable (living) and non-viable (dead) spores can be detected.

Settling Plate Techniques

It is uncertain whether a settling plate can help determine whether there is an airborne concentration of concern in a building. According to ACGIH, “settling plates do not collect airborne particles in a representative manner and do not reliably measure bioaerosol concentrations.” “The settling of particles by gravitation onto a culture plate or a microscope slide depends highly on particle size and is influenced strongly by air movement. Given the unpredictable and uncontrollable nature of ambient particle movement, investigators cannot directly relate the number of CFUs [mold colony forming units] on a settling plate . . . to the concentrations of the corresponding particles in the sampled environment.” *Bioaerosols, Assessment and Control [ACGIH 1999], Section 2.3.2.2*. For defensive air sampling, rather than relying on a settling plate, consider retaining a trained professional sampler.

Cultures

“Culture-based methods allow detection of only those organisms that are alive, in a condition to grow in culture, and able to successfully compete with the organisms in an environmental mixture. It is possible (and perhaps likely) that the majority of

microorganisms in a particular sample are not identifiable with culture-based methods. The species most readily cultured from a given environment may not be the most prevalent or the most important species present.” *Bioaerosols, Assessment and Control Section 6.1.2.2*. For example, slower-growers (like *Stachybotrys*) may be overgrown by molds that grow much more rapidly and thus may not be found by the culture technique. Therefore, as with settling plates, the usefulness of cultures in litigation is questionable.

Professional Air Sampling

Professional air monitoring may be necessary where previous sampling has confirmed the presence of mold and there is concern that mold spores have migrated through the subject building through the air handling system or through the ambient air. Air monitoring also may be necessary where the presence of mold is suspected, but cannot be visually located, such as mold growth behind walls. The sampler should be trained in proper air sampling methods for microbial contaminants. The sampler also should take care to use a laboratory specializing in mycology and to consult with the lab to ensure sample integrity during shipment.

Defensible Sampling Results

In mold-related litigation as in any other, reliable data exchanged between the adverse parties can go a long way toward resolving an issue. The use of a certified industrial hygienist or other experienced professional environmental sampler is imperative in mold litigation. Proper sampling and analytical methods and procedures must be followed and documented. Common sampling pitfalls that may occur during sampling include taking an inadequate number of samples and lack of outdoor control samples. It is also critical that consultants document that field sampling and laboratory equipment was sanitized prior to sampling and analysis. Chains of custody must be maintained and consulting or testifying experts retained to interpret and explain the results of the sampling.

Guidance Documents

There is also a plethora of helpful and not-so-helpful information on the Internet for plaintiffs, defendants, those searching for qualified consultants, or others concerned about mold in their surroundings. Two very helpful and extensively cited guidance documents in the literature on mold, and from which background information was drawn for this article, include EPA’s March 2001 “Mold Remediation in School and Commercial Buildings,” and the “Guidelines on Assessment and Remediation of Fungi in Indoor Environment” prepared by the New York City Department of Health, Bureau of Environmental & Occupational Disease Epidemiology. Both guidance documents are a good resource on mold assessment and remediation.

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REVERSAL OF FORTUNE: THE NINTH CIRCUIT AND PASSIVE MIGRATION AS CERCLA "DISPOSAL"

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Introduction

Congress enacted the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. §§ 9601-9675, in 1980 to address the problems posed by disposal of hazardous substances. CERCLA gives the U.S. Environmental Protection Agency plenary authority to respond to the release or threatened release of hazardous substances into the environment. Among the parties potentially responsible for such releases are persons that owned or operated a facility "at the time of [hazardous substance] disposal." CERCLA § 107(a)(2), 42 U.S.C. § 9607(a)(2). CERCLA incorporates the "disposal" definition from the Resource Conservation and Recovery Act (RCRA). See CERCLA § 101(29), 42 U.S.C. § 9601(29).

In the last ten years, five federal circuit courts have considered whether the movement of hazardous substances through soils and groundwater, known as "passive migration," constitutes "disposal" under CERCLA. The subject is critical for former owners who do not actively dispose of hazardous substances during their tenure at a contaminated site. Contaminants in soil and groundwater tend to spread. If passive migration constitutes disposal, CERCLA plaintiffs could easily establish that a former owner or operator owned or operated a site "at the time of disposal." Most former owners or operators would then be liable under CERCLA Section 107(a)(2). However, if some affirmative action by the former owner or operator is necessary to constitute disposal, proving CERCLA liability under Section 107(a)(2) becomes considerably more difficult.

This article discusses the split in the federal circuits regarding passive migration as disposal. The article begins by surveying the positions of the Second, Third, Fourth,

and Sixth Circuits on the question. Then the article focuses on the Ninth Circuit's odyssey in *Carson Harbor Village, Ltd. v. Unocal Corp.*, 227 F.3d 1196 (9th Cir. 2000), *rev'd en banc*, 270 F.3d 863 (9th Cir. 2001), analyzing the initial and *en banc* opinions. As the article explains, the Ninth Circuit ultimately adopted the interpretation of the Second and Third Circuits. The article concludes that the Second, Third, and Ninth Circuits have yet to decide whether passive migration constitutes disposal in cases where hazardous substances began leaking from a tank or drum *before* a former owner purchased a property, and then continued to spread while the former owner occupied the site.

Passive Migration As CERCLA "Disposal": A Brief Circuit Court History

The first federal court of appeals to consider the CERCLA liability of former owners or operators was *Nurad, Inc. v. Wm. E. Hooper & Sons*, 966 F.2d 837 (4th Cir.), *cert. denied sub nom. Munaw v. Nurad, Inc.*, 506 U.S. 940 (1992). In *Nurad*, the current site owner filed a CERCLA cost recovery action against a number of parties including Mumaw, a former owner who allegedly owned the property "at the time of disposal." *Id.* at 840. The current owner alleged that passive migration occurring during Mumaw's occupancy constituted "disposal" under CERCLA. The district court held that Mumaw was not liable because he did not actively manage leaking underground storage tanks, so "no 'disposal' of hazardous wastes took place on [his] watch." *Id.* at 844. The court of appeals reversed. *Id.* The court found that some terms in CERCLA's disposal definition were "primarily of an active voice," but others "readily admit to a passive component." *Id.* at 845. As a result, disposal may occur when hazardous waste leaked or spilled "without any active human participation." *Id.* CERCLA Section 107(a)(2), the court concluded, "imposes liability not only for active involvement in the 'dumping' or 'placing' of hazardous waste at the facility, but for ownership of the facility at the time that hazardous waste was 'spilling' or 'leaking.'" *Id.* See also *Crofton Ventures Ltd. v. G&H Partnership*, 258 F.3d 292, 299-300 (4th Cir. 2001) (holding that the district court erred in limiting CERCLA's disposal definition "to active conduct of the defendants," and that the leaking of buried drums constitutes "disposal" for purposes of establishing liability under CERCLA Section 107(a)(2)).

In 1996, the Third Circuit in *United States v. CDMG Realty*, 96 F.3d 706 (3d Cir. 1996), distinguished *Nurad* and held that passive migration of hazardous substances at a landfill site does not constitute CERCLA "disposal." The *CDMG* court first found that the terms "leaking" and "spilling" have meanings that require some active human conduct, and that the words surrounding "leaking" and "spilling" in the disposal definition – such as "discharge" and "deposit" – involve a "human actor." *Id.* at 714. However, because the court found that passive migration did not constitute "leaking" or "spilling," it did not determine whether the CERCLA disposal definition always requires "active human conduct." *Id.* A "leak" connotes an escape from a vessel through an opening, and the *CDMG Realty* court found that there was no evidence of any leaking during the former owner's term at the site. Similarly, *CDMG Realty* held that "spilling" suggests "a rapid torrent, not gradual passive migration over the course of several years." *Id.* The court also correctly held that CERCLA's "release" definition was broader than the definition of

“disposal” and that the release definition included the term “leaching,” which describes the migration of contaminants away from a point source. Because CERCLA includes the term “leaching” in the release definition but not in the disposal definition, the court concluded that Congress in enacting CERCLA “was aware of the concept of passive migration in landfills and . . . knew how to explicitly refer to that concept.” *Id.* at 715.

The *CDMG Realty* court found that its interpretation was consistent with CERCLA’s liability provision. Had Congress intended to include passive migration as disposal, the court reasoned the statute would make all current and former facility owners or operators liable. As a result, “there would be no need for the separate responsible party category of current owner or operator.” *Id.* at 715. In addition, the court held that the innocent owner defense supported its interpretation of the “disposal” definition, because the defense was available only if a defendant purchased the property “after the disposal.” If disposal included passive migration, “the defense would almost never apply, as there would generally be no point ‘after disposal.’” *Id.* at 716. Finally, the *CDMG Realty* court opined that its holding was consistent with CERCLA’s “polluter pay” policy because “[t]hose who owned previously contaminated property where waste spread without their aid cannot reasonably be characterized as ‘polluters.’” *Id.* at 717.

Relying upon *CDMG Realty*, the Second Circuit in *ABB Indus. Sys. v. Prime Tech., Inc.*, 120 F.3d 351 (2d Cir. 1997), held that passive migration does not constitute disposal under CERCLA. Rather than “reinventing the wheel,” the Second Circuit simply summarized and adopted the Third Circuit’s rationale in *CDMG Realty*. *Id.* at 358. For the reasons set forth in *CDMG Realty*, the Second Circuit held that CERCLA disposal does not include the “gradual spreading of hazardous chemicals already in the ground,” *id.*, and that “prior owners and operators of a site are not liable under CERCLA for mere passive migration.” *Id.* at 359.

The Sixth Circuit reached the same conclusion in *United States v. 150 Acres of Land*, 204 F.3d 698 (6th Cir. 2000). Citing *CDMG Realty* and *ABB Industrial Systems*, the Sixth Circuit rebuffed the passive migration as disposal theory in favor of “the better view” that the CERCLA disposal definition envisioned “spills occurring by human intervention.” 204 F.3d at 705. The *150 Acres of Land* court offered three reasons for its holding: 1) the words in the disposal definition other than “spilling” or “leaking” are active terms, so even the potentially passive words “should be interpreted actively”; 2) “release” is defined more broadly than “disposal” under CERCLA, because “disposal is included within release”; 3) CERCLA’s statutory scheme suggests that “‘disposal’ [should] stand for activity that precedes the entry of a substance into the environment and ‘release’ [should] stand for the actual entry of substances into the environment.” *Id.* at 706. If human activity was not involved in “whatever movement of hazardous substances occurred on the property,” a former owner is not liable under CERCLA Section 107(a)(2). *Id.* See also *Bob’s Beverage, Inc. v. Acme, Inc.*, 264 F.3d 692, 697-98 (6th Cir. 2001) (citing *150 Acres of Land* in rejecting passive migration theory and denying CERCLA cost recovery claim against former owner where there was no evidence that human conduct resulted in additional contamination of the property).

The Ninth Circuit Reverses Itself: *Carson Harbor Village, Ltd. v. Unocal Corp.*

In one of the most recent and unusual passive migration cases, the Ninth Circuit initially held in a two-to-one decision that passive migration of hazardous substances constituted CERCLA disposal, and then reversed itself in an *en banc* opinion. The case, *Carson Harbor Village, Ltd. v. Unocal Corp.*, 227 F.3d 1196 (9th Cir. 2000), *rev'd en banc*, 270 F.3d 863 (9th Cir. 2001), first increased the split in the circuits by adopting the sweeping position that all passive migration constitutes disposal under CERCLA. The Ninth Circuit then dramatically narrowed the split by withdrawing the initial decision and determining that the migration of tar-like substances through soil does not meet CERCLA's disposal definition.

The Initial *Carson Harbor* Opinion

Carson Harbor involved a CERCLA cost recovery action by the current owner of a mobile home park against several parties, including the former owner. 227 F.3d at 1199. The district court held that the former owner was not liable under CERCLA, because there was no evidence of disposal when the former owner held the property. The Ninth Circuit initially reversed, holding that CERCLA disposal "includes passive migration" and allowing the claim against the former owner to proceed. *Id.* at 1210.

In the initial *Carson Harbor* opinion, the Ninth Circuit observed that the circuits were split on the question whether passive migration constituted disposal under CERCLA. *Id.* at 1206 & n.16. Stepping boldly into the breach, the court found that the terms "discharge," "spill," and "leak" used in the disposal definition had "well-recognized passive meanings," and that "[s]ince the prescribed definition includes passive migration by its own terms, we are bound to give effect to that definition." *Id.* at 1206-07. In addition, the court observed that, consistent with CERCLA's remedial objectives, it should construe the disposal definition broadly and reject the "strained reading" that disposal required "active human conduct." *Id.* at 1207. Citing *Nurad*, the initial *Carson Harbor* declared that construing "disposal" to include passive migration is "entirely consistent with [CERCLA's] liability regime." *Id.* Although it termed the *CDMG Realty* opinion "thoughtful," the Ninth Circuit found that the Third Circuit's rationale "conflicts with the plain meaning of the passive terms included in the [disposal] definition" and was inconsistent with "the well established principle that remedial statutes are to be broadly construed to effectuate their salutary purposes." *Id.* at 1208-09. As a result, the Ninth Circuit held that the CERCLA "disposal" definition includes the passive migration of tar and slag material through soil. *Id.* at 1210.

The initial *Carson Harbor* opinion embraced *Nurad*, squarely rejected *CDMG Realty*, *ABB Industrial Systems*, and *150 Acres of Land*, and widened the acknowledged circuit split over passive migration. The Ninth Circuit's decision was controversial. One commentator declared that the opinion "simply pushes the statutory definitions and structure too far," and reopened the entire passive migration debate. Ranen Schechner, Note, *Putting The Remedial Cart Before The Statutory Horse: The Ninth Circuit Reopens Debate On CERCLA's Definition Of Disposal*, 29 B.C. ENVTL. AFF. L.

REV. 69 (2001). After the initial *Carson Harbor* opinion, it appeared that only a Supreme Court decision could harmonize the federal circuit courts on the passive migration question. See *id.* at 109-10 (calling for the Supreme Court to “grant certiorari to the next [CERCLA] section 107(a)(2) case that comes up for review and answer the question of passive disposal”).

The *Carson Harbor en banc* Opinion

In February 2001, five months after issuing the initial opinion, the Ninth Circuit granted a motion for rehearing *en banc* and withdrew the initial opinion. 240 F.3d 841 (9th Cir. 2001). Counsel argued the case before eleven Ninth Circuit judges in June 2001, and the court filed its *en banc* opinion on Oct. 24, 2001. 270 F.3d 863 (9th Cir. 2001). The *en banc* opinion applied the “the plain meaning of the terms used to define ‘disposal’” and concluded that there was no “disposal” during the former owner’s possession because “the movement of contamination . . . cannot be characterized as a ‘discharge, deposit, injection, dumping, spilling, leaking, or placing.’” *Id.* at 877-78. The Supreme Court, apparently convinced that the Ninth Circuit adequately harmonized the split in the circuits, denied a petition to review the *Carson Harbor en banc* opinion. 122 S.Ct.1437.

The *en banc* opinion reviewed federal circuit court precedent addressing the passive migration issue and found that the decisions “cannot be shoehorned into the dichotomy of a classic circuit split,” but evinced “a more nuanced range of views, depending in large part on the factual circumstances of the case.” *Id.* at 875. “[T]he cases fall in a continuum, with the Sixth Circuit taking an ‘active-only’ approach in *150 Acres of Land*; the Third Circuit, in *CDMG Realty* and the Second Circuit, in *ABB Industrial Systems*, addressing only the spread of contamination . . . [and] the Fourth Circuit in *Nurad*, concluding that ‘disposal’ includes passive migration, at least in the context of leaking underground storage tanks.” *Id.* at 876-77. The Ninth Circuit then analyzed the plain meaning of a CERCLA “disposal,” which involves a “discharge, deposit, injection, dumping, spilling, leaking or placing of solid or hazardous wastes on a property.” *Id.* at 878. Because “one can find both ‘active’ and ‘passive’ definitions for nearly all of these terms in any standard dictionary,” the court rejected “the absolute binary ‘active/passive’ distinction used by some courts” in favor of a factual analysis that examines whether “any of the terms fit the hazardous substance contamination at issue?” *Id.* at 878-79 (emphasis original).

Applying its fact-based test, the Ninth Circuit found the on-site contamination included tar and slag materials that moved through the soil by way of “gradual ‘spreading,’ ‘migration,’ ‘seeping,’ ‘oozing,’ and possibly ‘leaching.’” *Id.* at 879. Such migration did not fall within the plain meaning of “discharge, . . . injection, dumping, . . . or placing.” *Id.* Similarly, the migration of tar and slag materials did not constitute a “deposit,” “spilling,” or “leaking,” because a gradual spreading of contamination is not a deposit by a person, or a spill or leak from a vessel or container. *Id.* As a result, the court held that the gradual passive migration of contamination through soil is not a “disposal” for purposes of imposing liability under CERCLA Section 107(a)(2). *Id.*

The *Carson Harbor* court found that its *en banc* opinion was consistent with the CERCLA purposes of ensuring prompt cleanups and requiring that responsible parties bear the cleanup costs. *Id.* at 880-81. By concluding that disposal does not include passive soil migration but may include other passive migration, the court ensured that it could hold prior owners “responsible for migration of contaminants that results from their conduct *and* for passive migration” falling within the plain meaning of CERCLA’s disposal definition. *Id.* at 881 (emphasis original). In contrast, if it interpreted CERCLA to exclude all passive migration, “there would be little incentive for a landowner to examine his property for decaying disposal tanks, prevent them from spilling or leaking, or to clean up contamination once it was found.” *Id.*

In addition, the court found its interpretation avoided creating internal inconsistencies within CERCLA. If all passive migration constituted disposal, the statute need not distinguish among former and current owners or operators. *Id.* (citing *CDMG Realty*, 96 F.3d at 715). Had Congress intended “disposal” to include “only releases caused by affirmative human conduct,” the statute would have employed “a straightforward causation requirement” rather than a strict liability regime that applies to any person that owned or operated a facility “at the time of disposal.” *Id.* The court also declared that its interpretation of “disposal” preserved the role of the innocent landowner defense. If the court held that subsoil passive migration constituted disposal, the innocent landowner defense “would only be available to a small portion of the landowners who have no actual culpability in the disposal of hazardous substances.” *Id.* at 882-83. However, if it held that “disposal” included only actions caused by affirmative human conduct, all landowners able to present an innocent landowner defense would already be excluded from liability. *Id.* at 883. Instead, the Ninth Circuit declared that its interpretation of the “disposal” definition ensured “that a PRP with minimal responsibility – such as an owner without culpability but outside the technical parameters of the innocent owner defense – does not get stuck with more than his fair share of financial responsibility for cleanup.” *Id.* at 884.

Because the Ninth Circuit relied upon the plain meaning of the statute, the court opined that its inquiry into CERCLA’s legislative history need only determine that “there is no clearly contrary congressional intent.” *Id.* The court found no contrary intent in CERCLA as originally enacted in 1980, observing that the legislative history “confirmed that both EPA and the legislators understood that hazardous substances legislation would deal with a wide range of disposal events, not predicated upon an ‘active/passive’ dichotomy.” *Id.* at 886. The Ninth Circuit also found that its interpretation of the disposal definition was consistent with the legislative history of the 1986 Superfund Amendments and Reauthorization Act (SARA). SARA added the innocent landowner defense to CERCLA, and the court noted the floor statements of the member of Congress who authored the defense confirmed that the innocent landowner provisions were “unavailable to anyone who contributed, actively or passively, to the release of [a hazardous] substance.” *Id.* at 887.

In the *Carson Harbor en banc* opinion, the Ninth Circuit describes the passive migration cases as a “continuum,” with the Sixth Circuit’s decision in *150 Acres of Land* at one end and the Fourth Circuit’s *Nurad* opinion at the other. *CDMG Realty* and *ABB Industrial Systems* occupy the center in the range of passive migration opinions. Implicit in the Ninth Circuit’s discussion is that *Carson Harbor*’s factual examination of whether “the terms fit the hazardous substance contamination at issue” carves out a new location on the passive migration continuum. In truth, the Ninth Circuit’s approach merely applies the analysis that the Third Circuit advanced in *CDMG Realty*, and the Second Circuit adopted in *ABB Industrial Systems*. All three courts of appeal decided that the gradual spreading of hazardous substances does not constitute a CERCLA “disposal.” Similarly, all three courts found they need not decide the question of whether the disposal definition always requires active human conduct. Finally, each of the courts notes that *Nurad* involved leaking underground storage tanks, but there was no evidence of “leaking” or “spilling” during the former owner’s tenure in the cases they decided. See *Carson Harbor*, 270 F.3d at 876, 879; *ABB Industrial Systems*, 120 F.3d at 357-58 & n.3; *CDMG Realty*, 96 F.3d at 714. See also *Crofton Ventures*, 258 F.3d at 299-300 (in which the Fourth Circuit citing *Nurad*, held that the district court erred in limiting CERCLA’s disposal definition “to active conduct of the defendants,” and that the leaking of buried drums constitutes “disposal” for purposes of establishing liability under CERCLA Section 107(a)(2)).

Conclusion

The Ninth Circuit, after opening a fissure in the federal courts of appeal on the passive migration issue, reversed itself in *Carson Harbor* and effectively narrowed the split. As a result, the Second, Third, and Ninth Circuits hold that passive migration of contaminants through soil is unlikely to constitute “disposal” under CERCLA. In such circumstances, former landowners will not be liable unless there is evidence during the former owner’s tenure of a discharge, deposit, injection, dumping, spilling, leaking, or placing of hazardous substances at the property. The Sixth Circuit goes even further, holding that a former landowner is liable under CERCLA only if there is actual human activity involved in the movement of hazardous substances that occurred on the property during the ownership period. Only the Fourth Circuit holds that passive migration alone constitutes disposal under CERCLA. Even *Nurad* and *Crofton Ventures*, however, involved hazardous substances leaking from containers such as underground storage tanks or buried drums.

Given the decisions in *Carson Harbor*, *ABB Industrial Systems*, and *CDMG Realty*, there is a presumption against passive migration as disposal under CERCLA in the Second, Third, and Ninth Circuits. These circuits, however, have yet to address the most difficult passive migration case. The case arises when hazardous substances begin leaking from a tank or drum *before* a former owner purchased the property, and then continue to leak while the former owner occupied the site. Will the Second, Third, and Ninth circuits apply the Sixth Circuit’s rationale in *150 Acres of Land*, hold that “human activity” is a prerequisite for CERCLA disposal, and determine that the former owner is not liable? Or will the courts adopt the Fourth Circuit’s approach in *Nurad* and

Crofton Ventures, find that the continued spreading of hazardous substances from the tank or drum is a “leak” constituting a “disposal,” and hold the former owner liable under Section 107(a)(2)? Fully twenty-two years after Congress enacted CERCLA, the question of passive migration as disposal remains a conundrum. One piece of the puzzle is clear: several federal courts of appeal are likely to continue to wrestle with the issue well into the future.

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E-FILING: COMING SOON TO A FEDERAL COURT NEAR YOU

James O. Payne, Jr.

“Much of my life now is e-mail based. I would love to file pleadings electronically with the court, send a copy to counsel, and have the same done for me,” former ABA President Robert Hirshon recently told the judiciary. *An Interview with ABA President Robert E. Hirshon*, *The Third Branch*, April 2002. The good news for attorneys is that soon they will be able to file, serve and access pleadings in federal cases from their office and home computers. The public will have on-line access at least to civil pleadings.

Already at least 10 federal district courts and 24 bankruptcy courts accept electronic filing of pleadings (e-filing) over the Internet. The federal judiciary's schedule is to bring all district, bankruptcy and circuit courts on-line with e-filing by 2005. The judiciary's Web page has the current schedule for individual courts. See www.uscourts.gov.

Practitioners in environmental, energy and natural resources law may find themselves in e-filing courts even sooner. Their cases often span the country, which increases the chance of encountering an e-filing court. Their cases are sometimes complex litigation. The earliest e-file pilots were complex litigation and included a private CERCLA cost recovery action and another environmental case. Practitioners may find e-filing has much to offer in handling the bulky discovery material and administrative records common in these cases.

This article provides a primer on e-filing, including changes in federal rules of procedure. It shows how e-filing evolved from electronic case file initiatives including steps to make courts accessible from home and office. Being familiar with this history may help in projecting future developments. The article describes the “roll out” of e-filing in federal district, bankruptcy and appellate courts scheduled for 2001-2005, and it lists practice tips.

A key practice tip is to be aware of courts issuing general orders requiring attorneys to delete or redact personal privacy information from pleadings – paper and electronic– in anticipation of on-line public access to pleadings. The article concludes with a message about the important role of attorneys in this new era of federal litigation.

Primer

What is e-filing? E-filing is the electronic filing of a pleading with a court. It can include electronic service of a pleading on other parties (e-service) and electronic notice of a court order or judgments (e-notice).

How does e-filing work? The attorney prepares a pleading using a word processor, and saves a copy of it in “portable document format” (PDF) using Adobe or similar software. The attorney scans other documents (e.g., attachments) to create PDF copies. The attorney signs onto the court’s e-filing Web page by entering the user ID and password received after completing the court’s on-site or on-line training. The Web page prompts the attorney to enter docket information and attach a copy of the PDF pleading and any attachment. When the attorney clicks the final “submit,” the court immediately sends an e-mail (or fax) notifying the attorney and other parties of the filing and providing a hyperlink to it. Filing and service is complete.

When can documents be e-filed? E-filing can usually be done up to midnight on the date the document is due. The court immediately provides notice of the e-filing by serving on all parties an e-mail notice with a hyperlink to the document. A party receiving the electronic service may add three days to respond, in the same manner as for service by mail under Civil Rule 6(e). On-line access to the e-filings is around the clock. If you learn you have not received an e-mail notice, notify the court and/or the appropriate parties.

What is needed for e-filing? You will simply need a computer with Internet service and Adobe or similar software. A user ID and password are obtained after completing the court’s training session. The password serves as the attorney’s signature for Civil Rule 11 purposes. A scanner will convert any attachments into Adobe format.

When will my local court accept or require e-filing? At least 10 district and 24 bankruptcy courts are already on line. The “roll out” schedule will continue through 2005 for district, bankruptcy and appellate courts. It depends on the court and judge whether e-filing will be allowed or required in a particular case.

Can the public access e-filed pleadings on the Web? Yes. The judiciary’s PACER service allows public access to electronic case files for a fee. See www.uscourts.gov (PACER).

How can I learn more? The judiciary’s Web page has links to individual court e-file programs (including on-line tutorials). See www.uscourts.gov (electronic

access/PACER). The judiciary's Web page also includes its newsletter, The Third Branch, which has many of the articles cited herein, as does ABA's Web page. The Web page for law library professionals, www.llrx.com, is rich with resources. State court e-filing is the main subject in the ABA's Judges Journal, Summer 2001 issue. The National Conference of State Courts has a guidebook on e-filing, at www.ncsconline.org (McMillan et al., *A Guidebook for Electronic Court Filing*).

The judiciary has two key institutions that are launching e-filing. The Judicial Conference (Conference) is the policy-making body for the federal judiciary and it decided to "roll out" e-filing to the courts. The Chief Justice chairs the Conference, which also includes the chief judge of each circuit, a district judge from each circuit and a judge from a specialty court. 28 U.S.C. § 331. The Conference recommends uniform court management practices. 28 U.S.C. § 331. With its advisory committees, it also develops amendments to the various federal rules of procedure and proposes them to the Supreme Court for adoption. 28 U.S.C. §§ 2072 (Rules Enabling Act), 2073.

The Administrative Office of United States Courts (AOUSC) carries out the policies of the Judicial Conference, including for e-filing. AOUSC provides administrative support to the judiciary and submits to Congress an annual report on "the state of the business of the courts." 28 U.S.C. § 604.

Rule Amendments

The Judicial Conference has ushered in e-filing with a series of amendments to federal rules of practice and procedure since 1991.

E-Filing Allowed by Civil, Criminal, Appellate Rules. The rules authorizing e-filing came close on the heels of rules authorizing fax filing. The federal rules in 1991 first allowed fax filing, subject to two conditions. The court had to adopt a local rule permitting the practice, and the Judicial Conference had to approve the local rule. See 1991 amendments to Civil Rule 5(e), Appellate Rule 25(a); Criminal Rule 49(d) (incorporates Civil Rule 5(e)); see e.g., *McIntosh v. Antonio*, 71 F.3d 29, 34-35 (1995) (complaint filed by fax was invalid in absence of local rule permitting fax filing pursuant to Civil Rule 5(e)).

By 1993 the federal rules allowed electronic filing on a par with fax filing. The court had to authorize the practice in a local rule approved by the Judicial Conference. See 1993 amendment to Civil Rule 5(e); 1991 amendment to Appellate Rule 25(a); Criminal Rule 49(d).

The 1996 amendments encouraged e-filing pilots in response to soaring use of computers and the Internet. The amendments clarified that electronic filings are treated the same as paper filings. The local rules no longer had to be approved by the Conference, though they had to be consistent with any technical standards issued by the Conference. See 1996 amendments to Civil Rule 5(e), Appellate Rule 25(a); Criminal Rule 49(d).

E-Service Allowed by Civil, Criminal Rules. The 2001 amendments to the Civil Rules allow parties in civil and criminal actions to serve pleadings electronically when consented to in writing by the person served. See 2001 amendments to Civil Rule 5(b) and Advisory Committee Notes; Criminal Rule 49(b) (incorporates Civil Rule 5(b)). The amendments do not apply to service of process. Service is “complete on transmission,” unless “the party making service learns that the attempted service did not reach the person to be served.” Civil Rule 5(b)(2)(D) and (3). A party may make service alternatively through participation in a court e-filing system that automatically serves counsel. Civil Rule 5(b)(2)(D).

A person’s consent to e-service “should include at least the persons to whom service should be made, the appropriate address or location for such service – such as the e-mail address or facsimile machine number, and the format to be used for attachments.” Advisory Committee Notes, 2001 amendment to Civil Rule 5(b). The written consent can be made electronically. The person who consents to service must “monitor the facility designated for receiving service” and “provide prompt notice of any address change.” *Id.* The Judicial Conference is preparing similar amendments to the Appellate Rules.

3-Day Rule Applied by Civil Rules. The 2001 amendments to the Civil Rules give a party receiving electronic service three additional days to respond, in the same manner as for service by mail. 2001 amendment to Civil Rule 6(e). The amendment is intended to allow time in case e-service miscarries and to encourage parties to consent. Advisory Committee Notes to 2001 amendment to Civil Rule 5(b). The Judicial Conference is preparing similar amendments to the Criminal and Appellate Rules.

E-Notice Allowed by Civil Rules. The 2001 amendments to the Civil Rules allow a court to serve notice of orders and judgments electronically when consented to in writing by the person being served. See 2001 amendment to Civil Rule 77(d). The Judicial Conference is preparing similar amendments to the Criminal and Appellate Rules.

Bankruptcy Rules. The bankruptcy rules have been amended to allow for e-filing. See Bankruptcy Rules 7005 (e-filing, e-service), 9006(f) (3-day rule), 9022(a) (e-notice of judgment or order); see also Bankruptcy Rule 9014 (e-service of papers in contested matters) (scheduled to be effective Dec. 1, 2002).

Electronic Case File Initiatives

E-filing grew out of electronic case file initiatives by the judiciary including steps to make the courts accessible from homes and offices. A familiarity with this history may help in projecting future developments. See 28 U.S.C. § 612 (1989 legislation requiring AOUSC to submit to Congress an annual “long range plan” for automation, and providing a fund to carry out the plan).

On-Line Public Access to Court Dockets. In 1990, AOUSC began allowing public

access to district court dockets via modems. Most clients were law firms. AOUSC later called the system Public Access to Court Electronic Records, or "PACER." *Electronic Public Access at 10* The Third Branch, vol. 32, no. 9 (Sept. 2000). See P.L. 101-515, Title IV, § 404, Nov. 5, 1990, 104 Stat. 2132 (authorizing AOUSC to charge fees for services).

By 1996, PACER had nearly 30,000 users with 3 million requests per year. It was poised to go on the Web the following year. AOUSC had developed a similar on-line system for appellate courts, and had a free telephone service in which an automated voice gave appellate and bankruptcy docket information. *Technology Increases Public Access to Federal Courts*, AOUSC, July 24, 1996; *Current Electronic Public Access Programs in the Federal Judiciary*, AOUSC, July 24, 1996.

On-Line Public Access to Scanned Pleadings. In the mid 1990s, many courts began scanning paper filings for circulation electronically within the courthouse. Some courts put the scanned filings on-line for public viewing over the Internet.

E-Notice of Bankruptcy Orders. In the mid 1990s, the judiciary began sending electronic notices of orders and judgments to counsel in four bankruptcy courts (Electronic Bankruptcy Noticing). Electronic noticing was intended to reduce the judiciary's burden of mailing 55 million notices per year in bankruptcy cases.

E-File Pilots. In the mid 1990s, several courts began e-filing pilots to manage complex cases or classes of cases. Initially, the pilots used automated docket systems kept separately by vendors. Later, the pilots automated a court's own docket system.

In 1995 the Northern District of Indiana began a commercially-operated e-file pilot in a CERCLA private cost recovery case involving 23 plaintiffs and 1181 defendants. *Active Products Corp. v. A.H. Choitz & Co., Inc.*, 163 F.R.D. 274 (N.D. Ind. 1995) (adopting Complex Litigation Automated Docket or "CLAD" by LEXIS/NEXIS). "It would be impossible for this Court to manage a case of this magnitude utilizing traditional methods and preserve any kind of currency for the rest of its docket" *Id.*, at 279. The vendor would train counsel. *Pro se* litigants and members of the public could view e-filed documents at a free terminal at the court. See also *In re White Lung Ass'n*, 642 A.2d 837 (Table), 1994 WL 91257 (Del. Supr.) (denying writ of prohibition against CLAD in insurance asbestos cases) ("use of computers to access information is a commonplace feature of modern law office operation").

In January 1996 the U.S. Northern District of Ohio began an e-file pilot by automating its own docket system for new maritime asbestos cases. The court had a staggering maritime asbestos docket of 5000 cases per year, with 10,000 pleadings filed weekly and typically 100 defendants per case. AOUSC provided prototype software for the pilot. *Electronic Filing System Brings Order to Mountain of Documents*, The Third Branch, February 1996. Nine other courts soon began similar e-file pilots.

E-File Roll-Out, 2001-2005

The concept and tools for e-filing work, was the lesson drawn by AOUSC from the pilots. E-filing saves court resources and is simple for attorneys:

The system effectively makes the attorney the docketing and filing clerk. To file electronic documents ... the attorney prepares the document on a word processor, saves it in portable format (PDF), and submits it to the court via the Internet. A PDF file is used because it is much smaller than an image file and is fully text searchable. As the attorney submits the document, a menu provides guidance through the docket entry process.

Id.

Buoyed by the early success of the pilots, AOUSC announced that it would develop model software to bring e-filing across the judiciary. AOUSC pointed to similar developments for e-filing of tax returns and patent applications. E-filing would be a "seamless web" that would consolidate the judiciary's initiatives for electronic case files and remote public access to court information. *Electronic Case Files in the Federal Courts: A Preliminary Examination of Goals, Issues, and the Road Ahead*, Discussion Draft, March 1997, at 1.

In 2001, AOUSC began rolling-out its e-file system, which it called Case Management/Electronic Case Files or "CM/ECF." The system includes e-service and e-notice by the court via an e-mail to attorneys with a hyperlink to the document. The attorney has one-time free access to the document. Subsequent access is by fee. The public will have on-line access to pleadings, order and judgments in civil cases via PACER for a fee. The Judicial Conference is considering whether to allow on-line public access in criminal cases.

The roll-out schedule for district courts is 2002-2005, for circuit courts is 2003-2005, and for bankruptcy courts is 2001-2004. At least 24 bankruptcy courts and the following district courts have started e-filing: California Northern, New Mexico, District of Columbia, New York Eastern, Michigan Western, Ohio Northern, Missouri Western, Oregon, Nebraska and Pennsylvania Eastern.

Practice Tips

Obtaining User ID & Passwords. Courts typically provide an attorney with a user ID and password upon completion of on-site or on-line training. An attorney practicing in a distant court will want to learn whether the court will allow on-line training. An attorney taking on-line training might need to allow 7-10 days to receive the user ID and password in regular mail. An attorney practicing in several courts will need to keep track of separate user IDs, passwords and service arrangements.

Receiving E-Service and E-Notice. An attorney will want to make arrangements for someone to review service and notice e-mails when the attorney is not available. An attorney who consents to e-service and e-notice will not receive copies of pleadings, orders and judgments in the mail. The attorney can specify that service and notice e-mails go to multiple addresses, including addresses for co-counsel and office assistants. The attorney can later change the receiving addresses. The specifications are conditions of consent to e-service and e-notice under Civil Rules 5(b) and 77(d). The attorney will generally want to notify the court and other counsel upon learning of any miscarry of e-service or e-notice. See e.g., Civil Rule 5(b)(2)(D) and (3) (e-service is “complete on transmission” unless “the party making service learns that the attempted service did not reach the person to be served”); Criminal Rule 49(b) (incorporates Civil Rule 5(b)).

Complying with General Orders Requiring Deletion or Redaction of Personal Privacy Information from Pleadings. Counsel will want to routinely check each court’s Web site for any General Order or Notice requiring deletion or redaction of personal privacy information from paper and electronic pleadings. In the summer of 2002, at least 22 district courts issued a General Order or Notice requiring that attorneys delete or redact the following four “personal identifiers” from pleadings: Social Security numbers, dates of birth, financial account numbers and names of minor children. Some of the Orders and Notices may require more information to be deleted or redacted. Most warn that counsel and parties may be subject to the court’s disciplinary power for noncompliance. The courts include districts that have not begun e-filing. See, e.g., Idaho (General Order 174), Louisiana Eastern (Notice to Members of Bar), Oklahoma Northern (General Order GO-02-03) and Texas Southern (General Order 2002-7).

The General Orders and Notices state that they carry out the Judicial Conference’s Privacy Policy issued in September 2001 in anticipation of increased on-line public access to electronic case files. In 2000, the Conference had solicited public comments on its options for allowing public access to e-filings while protecting privacy. The ability to search the text of electronic case files through PACER was a special consideration. See generally Marquess, *Open Court? As Courthouses Rush to Put Filing Online, Easy Access to Legal Documents Has Many Worrying About Privacy Rights*, ABA Journal, April 2001.

The Conference’s Privacy Policy of September 2001 concluded that the public should have on-line access to electronic case files in civil and bankruptcy cases, and that pleadings should not contain the four “personal identifiers.” The Privacy Policy concluded that there should be no access to electronic case files in criminal cases, and that this policy should be reevaluated in two years. Appellate case files should be treated the same way in which the files were treated at the district court or agency below. See judiciary’s Web page (www.privacy.uscourts.gov).

The U.S. Supreme Court has recognized the “practical obscurity” of paper records in a courthouse, as compared to an electronic compilation of them., 489 U.S. 749, 762 (1989) (applying FOIA privacy exemption to maintain confidentiality of an FBI rap

sheet). “Plainly there is a vast difference between the public records that might be found after a diligent search of courthouse files, county archives, and local police stations throughout the country and a computerized summary located in a single clearinghouse of information.” *Id.*, at 764.

Using Electronic Links. Attorneys will want to be aware of opportunities for briefs and pleadings to include electronic links to attachments such as affidavits and unreported decisions and to documents in the court’s electronic case file such as an administrative record. Attorneys will also want to be aware of opportunities to include hyperlinks to matters on the web, though a consideration is that the addresses and content of Web pages may change over time. Local court rules and procedures might address the use of hyperlinks.

In 1997, the Federal Circuit found “much to commend” about a CD ROM brief submitted to it with electronic links to attached court opinions and record material including a video, 111 F.3d 883, 887 (Fed. Cir. 1997) (striking CD ROM brief due to prejudice to opposing party and lack of prior leave, but leaving paper version of brief unaffected). Judge Archer called for the Federal Circuit to develop local rules to allow e-filing of briefs including CD ROMs pursuant to the 1996 amendment to Appellate Rule 25(a). *Id.*

The Circuits that have adopted local rules allowing some form of e-filing include the First Circuit (Local Rule 32.1), Eighth Circuit (Local Rule 25A) and the Eleventh Circuit (11th Cir. R. 31-5). See Rothman, *E-Filing Appeals with Adobe Acrobat*, Law Library Resource Xchange Web page (www.llrx.com) (Oct. 2, 2000); Levy, *How to Handle an Appeal*, Practising Law Institute, § 5:6.7 (2001).

Managing Case E-Files. Law offices will need to evaluate how to maintain and archive outgoing and incoming electronic pleadings and notices, particularly since e-filings, e-services and e-notices will not be provided in paper.

Looking Ahead. Law offices will want to look ahead as technology advances. The practice of e-filing grew in the 1990s with advances in computer hardware and software and user comfort. Attorneys can expect ongoing developments. For example, the development of “extensible markup language” or “XML” format may create even more opportunities for electronic filing and document searching.

Role of Attorneys

Attorneys have a key role in the future of e-filing. The willing participation of attorneys led to the early success of the pilot in Northern District of Ohio, according to Chief Judge George White:

Much of our success with electronic filing must be attributed to the interest, input, and cooperation of participating attorneys and their staffs. Without their efforts, our program could not have succeeded. Any future electronic filing efforts will require a similar commitment from attorneys who are willing to take advantage of

technological advances to improve the practice of law.

The Honorable George W. White, Chief Deputy Clerk Chris Malumphy, *Electronic Filing: Shocking Developments*, The Federal Lawyer, June 1997, pp 40-41. The U.S. Department of Justice provides regular feedback to AOUSC on the roll out of e-filing.

Attorneys will have an important role in the new era of e-filing, which is coming soon to a court near you.

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TECHNICAL ISSUES IN LITIGATION INVOLVING CHLORINATED SOLVENT RELEASES

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Cases involving chlorinated solvents pose unique technical challenges during litigation. The typical questions asked of an expert witness in most contamination cases include: what material was released, what and where was the source of the release, how much was released, when was it released, and how was it released. Due to the ways in which chlorinated solvents have been used, the chemical nature of the chlorinated solvents, and their behavior in the environment, these questions may be difficult to answer, even in situations where a large amount of environmental information has been collected.

Background Information

An overview of the chemistry of chlorinated solvents and their behavior in the environment may be helpful to understand some of the technical difficulties associated with cases involving releases of these chemicals.

Chlorinated solvents include a class of compounds with short carbon chains and one or more chlorine atoms. A variety of chlorinated solvents have historically been used for a number of different commercial and industrial purposes, including the dry cleaning of clothes, degreasing and cleaning of parts and machinery, and as a feed material for the formation of other chemicals. The two chlorinated solvents that appear to be the most prevalent in environmental litigation are tetrachloroethene and trichloroethene. This is due to their widespread use and their persistence in the environment.

Tetrachloroethene is also known as: tetrachloroethylene, perchloroethylene, PCE or "perc." All of these names refer to the same chemical; an ethene (2-carbon) molecule with four chlorine atoms. PCE is the most common dry cleaning fluid used today, and

has (and is) also used as an industrial degreaser and cleaner. Trichloroethene is also known as trichloroethylene or TCE. TCE is an ethene molecule with three chlorine atoms attached and has (and is) used primarily for industrial degreasing and parts cleaning. For the sake of clarity and focus, this article uses the term chlorinated solvent to specifically refer to PCE and TCE since these are the chlorinated solvents most commonly encountered in environmental litigation.

Density. Chlorinated solvents are heavier than water and petroleum products. For comparison, a gallon of water weighs about 8.3 pounds, a gallon of gasoline weighs about 6.2 pounds, a gallon of PCE weighs about 13.5 pounds, and a gallon of TCE weighs about 12.0 pounds. Unlike common petroleum products that will float on the water's surface, chlorinated solvents like PCE and TCE will sink in water until they reach a natural or artificial barrier. Due to the density and low solubility, these chlorinated solvents are also referred to as Dense Non-Aqueous Phase Liquids (DNAPL). As will be discussed later, the presence or absence of DNAPL is also a significant area of discussion in litigation matters involving chlorinated solvents.

Solubility. PCE and TCE are sometimes listed from a chemical point of view as "non-soluble" because they do not readily dissolve in water. However, from an environmental standpoint, sufficient chlorinated solvent will dissolve in groundwater to create a potential environmental problem. The solubility of PCE in water is around 200 milligrams per liter (mg/L), and the solubility of TCE in water is around 1,100 mg/L. For liquids, mg/L is essentially the same as parts per million (or ppm). For comparison, the drinking water standard for both chemicals is 0.005 mg/L. This value is the same as 5 micrograms per liter (ug/L) or 5 parts per billion (ppb). To put this concentration in perspective, a nice-sized residential swimming pool contains approximately 10,000 gallons of water. To mix up a batch of 5 ppb PCE solution, you would add slightly less than 190 milligrams, or less than 5 drops of the solvent to the swimming pool.

Viscosity. Chlorinated solvents are less viscous than water. Viscosity is an indication of the resistance of a fluid to flow under certain conditions. At ambient pressures and temperatures, the viscosity of water is about 1.0 cP (centipoise), the viscosity of gasoline is about 0.5 cP, the viscosity of PCE is about 0.8 cP, and the viscosity of TCE is about 0.5 cP. Fluids with high densities and low viscosities, like chlorinated solvents, will flow more quickly than water through a porous media. As an example, if a glass of water, a glass of gasoline, and a glass of TCE were poured out on a surface such as concrete, the gasoline and TCE will move faster through the concrete, resulting in a greater mass of the liquid reaching the soils below the concrete. If enough liquid was released it would move completely through the soil to the groundwater. When the gasoline reached the groundwater table it would float and spread on the water's surface. In the case of PCE and other chlorinated solvents (DNAPLs), the groundwater does not act as a barrier to further vertical migration. The PCE (or other chlorinated solvent) may be temporarily retarded at the groundwater table, but would then continue migrating downward until the quantity was exhausted, or the PCE reached a layer that was relatively impermeable to the PCE.

Volatility. Chlorinated solvents are considered volatile organic compounds, or VOCs, indicating they have relatively high vapor pressures at ambient temperatures. As the vapor pressure of a substance increases, the amount of material that passes from a liquid or solid phase to a gas phase increases. Compounds with vapor pressures that exceed 1 millimeters of mercury (mmHG) can be found in relatively high concentrations in the vapor phase in the vicinity of the liquid chemical. The vapor pressures of PCE and TCE are 14 mmHG at 20°C, and 57.8 mmHG, respectively. The volatile nature of the chlorinated solvents will result in elevated concentrations of the solvent in the soil vapors. In some cases these vapors can be used to locate sources of chlorinated solvents, but also can migrate in the soils and along subsurface utilities, in some cases a significant distance from the original source.

Partitioning. The partition coefficient measures the tendency of a chemical to be distributed between a solution and a solid phase. In the environment, the solid phase that “attracts” the chemical is usually organic materials, such as decayed plant residues that are incorporated into the soil. A high partition coefficient indicates a strong attraction to other organic-containing materials, including soils. In the case of chlorinated solvents that are released in the environment, partitioning results in a distribution between the soil and groundwater. Additionally, PCE and TCE will bind tighter to soil with higher natural organic content, e.g., clays and silts. The bond is less strong in sands, which typically have lower natural organic content. This partitioning results in a mass of the chlorinated solvent being “stuck” on the soil. The mass associated with the soil is typically much greater than the mass dissolved in the groundwater. The solvent that is associated with the soil continues to be released into the groundwater over a long period of time. The partitioning, combined with the DNAPL character of the chlorinated solvents, makes remediation of chlorinated solvent sites more difficult than the remediation of sites contaminated with other types of chemicals.

What Was Released?

This is typically the easiest question to answer with cases involving chlorinated solvents. Unlike petroleum products, which generally contain a number of different individual chemicals (i.e. benzene, toluene, ethylbenzene, etc.), chlorinated solvent products primarily contain just one chemical compound. For example, if PCE was being used at a facility, the material that was purchased and subsequently released to the environment was most likely pure PCE. Typical Material Safety Data Sheets for PCE list the percentage of PCE in the product as 100% or >99%. Although PCE may contain trace levels of TCE, the presence of PCE at concentrations in excess of TCE is generally a good indication that the released material was PCE. Although there are products which contain both PCE and TCE, from an environmental standpoint, the products which most frequently result in contamination with PCE and TCE are generally pure products. Based on this, sample results from soil and/or groundwater taken from the source area can generally be used to determine with a high degree of confidence what chlorinated solvent was released.

What Was the Source of the Release?

While the legal definition of a release is quite lengthy, in “non-regulatory” terms, a “release” has occurred when a chemical is no longer in the container that it was supposed to be in. For the purpose of this discussion, a release would include a spill (accidental or otherwise) to a porous surface or soil, or an escape of the liquid or solution from a sewer line or other subsurface structure. Although releases of chlorinated solvents to air occur, air issues are not being considered in this discussion.

The term “source of release” is often used in two different manners. First, as the general location or property where the release of the chemical occurred (e.g., “the source of the release was the dry cleaners on Main Street”), and second, as the specific location where the chemical escaped into the environment (e.g., “the source of the release was a crack in the sewer line leading from the dry cleaners on Main Street”). For the purpose of this discussion, we will use the term “source of the release” to refer to the specific location where the chemical escaped into the environment.

In virtually every situation, the highest concentrations of a chlorinated solvent will be found at the location of the release of the chlorinated solvent. At first glance, this would seem to make defining the source location relatively easy. Unfortunately, practical factors often complicate this issue.

Types of Samples. There are three general types of samples that can be used to investigate the presence of chemicals in the subsurface environment: soil, groundwater, and soil vapor. Because of the solubility and volatility of chlorinated solvents, groundwater and/or soil vapor data are generally the most efficient means to locate the source or sources of chlorinated solvents. With sufficient data, the source or sources of the chlorinated solvents can be highlighted by finding the highest concentrations of chlorinated solvents in the groundwater and/or soil vapor.

Issues with Soil Samples. The absence of chlorinated solvent concentrations reported in soil samples from potential source areas has frequently been used in an attempt to demonstrate that a certain area or property was not a source of identified groundwater contamination. Migration of a chlorinated solvent, in a liquid phase (DNAPL), results in a path of residual chlorinated solvent on the soils where it migrates. Even when the material released is a solution of the chlorinated solvent in water, due to partitioning, soil in the vicinity of the release and along the migration path would be expected to have elevated concentrations of the chlorinated solvent. Although the lack of measurable chlorinated solvent in soils is a useful fact in an attempt to show that a certain property was not a source, it cannot be used alone to eliminate a property or area as a source. Conversely, the presence of measurable solvent in soil samples is a good indicator of a source location. In practice, soil samples frequently do not provide accurate data regarding the source location. Frequently, we see non-detectable levels in the soils and cannot locate a soil source, even when the general source of the contamination is fairly obvious based on groundwater data. There are several reasons for this apparent inconsistency:

- P The area of affected soil may be very small. For example, a spill of DNAPL on gravel or sand may not spread out very much. Finding a 4-square foot-size area where someone supposedly dumped a bucket of TCE within a one-half acre (20,000+ square feet) property may be extremely difficult.
- P The source of the release may be under a building or other permanent structure. Releases that have migrated through the concrete floor, or through a joint in a sewer line, may not be particularly accessible to sampling equipment.
- P Sample collection sometimes involves drilling or pushing a tool into the ground, which may create heat that can drive off any volatile chlorinated solvent that was there.
- P Laboratory preparation of soil samples sometimes results in release of volatiles. Using traditional methods, a soil sample from the field is placed into a glass jar and placed in a cooler for shipment to the laboratory. The laboratory then opens the jar and obtains a portion of the sample for testing. This procedure can result in another opportunity for loss of volatiles from the soil sample. There are fewer opportunities for loss of volatiles from water samples.

DNAPL. Experiments have shown that even small changes in the permeability of a layer of soil can divert chlorinated solvent migrating as a DNAPL. Even below the water table, DNAPL will not be greatly influenced by the groundwater flow direction due to the differences in density of the two fluids, but will follow the sloping contour on top of the lower permeability layers. Slight variations in subsurface stratigraphy can influence the flow path in ways that are difficult to predict without a large amount of information. That said, in general, soil layers slope in the same direction as the groundwater flow. Because the DNAPL is being pulled down under the influence of gravity, it typically does not move significant distances upgradient from the source through the soils.

Multiple Sources and Release Mechanisms. There are typically multiple release events and release mechanisms at facilities which have used chlorinated solvents. In addition to accidental spills, releases often occur during transfer of the solvent from one container to another, through overflow or washing into a drain or sink, and from improper disposal of wastes. This type of pattern results in multiple “sources” associated with one facility and at times confusing environmental data. A release through a sanitary or storm sewer can result in a source which appears to be upgradient of the site of the chlorinated solvent usage. In addition to multiple release events and/or mechanisms from a facility, there are frequently also multiple facilities in a particular area. More than one dry cleaner in a strip shopping center or multiple dry cleaners in nearby shopping centers are not unusual.

How Much Was Released?

Theoretically, one gallon of TCE could result in contamination of close to 300 million gallons of groundwater at the drinking water limit of 0.005 mg/L. In the environment it

would not be possible for one gallon of TCE to contaminate this much groundwater for a number of reasons including “losses” to the soils (due to adsorption and partitioning), and vapor (due to volatilization). As discussed above, it is difficult to obtain accurate information regarding the concentration of the solvent in the soils. In general, it is not possible to calculate accurately the volume of solvent that was released at a site. With sufficient information and assumptions regarding partitioning and other factors, it is sometimes possible to provide an estimation or range of the volume of solvent released for a particular site.

When Was it Released?

Practitioners often would like to tie the presence of chlorinated solvents to a release that occurred during a particular time period when their client was not involved in the operations. The time of the release can be one of the most difficult questions to answer for a number of reasons. Without some unusual information, it is difficult to ascertain exactly when a release began and when it ended. Some of the technical issues associated with evaluating the time of the release are discussed below:

Lack of Documented Release. Although use of a product at a facility can be documented through purchase records, inventories, and interviews with workers, documentation of releases are not always available. One hundred percent of the dry cleaners that we have ever investigated have had chemical evidence of a release (PCE in soil and/or groundwater samples); however, probably less than one third of these have had any documented spill. This discrepancy probably does not arise from the dry cleaner operators’ selective memories, but more likely because the releases that caused the contamination were not in their minds “spills,” or did not occur where they could be observed.

For example, even drips of PCE to concrete over even a relatively short period of time can result in PCE reaching the soil. Anecdotal reports from dry cleaner workers suggest that drips were almost unavoidable during some activities, such as moving loads of clothes from one machine to the other (for transfer-type operations), or changing the filters used to filter the PCE prior to reuse. One of the major sources of releases through the sanitary sewer lines resulted from overflows of water containing PCE and even pure PCE from the PCE/water separator. At a facility that used TCE for degreasing, the parts were rinsed into the sink after being cleaned with TCE. Even this apparently minor amount of TCE being released to the sanitary sewer line resulted in an area of groundwater containing low levels of TCE that was almost 800 feet long. These historically routine methods of operation would not have been considered a spill or release by the operators, but often did result in contamination of soil and groundwater.

“Fingerprinting” Difficulties. Fingerprinting of petroleum products can sometimes provide significant information regarding the time period when a release occurred. By looking at ratios of various chemicals within a petroleum product or crude oil, the source of the material can sometimes be ascertained. In addition, the relative degradation can be evaluated, and the age of the spill can sometimes be estimated fairly accurately. Additives (such as tetraethyl lead and methyl tert-butyl alcohol) have historically been

used to enhance the performance of petroleum products. Determining the presence of these additives at the location of a petroleum product spill can provide useful information regarding the time frame of the release, because these chemicals were often added only over specific periods of time.

Conversely, chlorinated solvents are essentially pure products and typically do not contain additives or impurities that could be used to evaluate the period of a release. Very low concentrations of stabilizers, inhibitors, and binders are sometimes used in chlorinated solvents, but these are not usually identified in environmental samples and/or may not be specific to certain periods of production.

Degradation. The closest thing to “fingerprinting” for releases of pure chlorinated solvents is the presence and concentration of degradation products. The primary path of degradation of PCE and TCE in the environment is due to the subsequent removal of chlorines from the ethene molecule leading to the formation of TCE (if the source material was PCE); then to cis-1,2-DCE; then to vinyl chloride. Subsequent degradation can result in formation of ethene, carbon dioxide, and water.

Unlike petroleum products, which degrade fairly predictably and relatively rapidly in an aerobic (oxygenated) environment, the specific subsurface conditions can significantly affect the degradation rate of chlorinated solvents. PCE and TCE degrade more efficiently under anaerobic (low or no oxygen present) conditions. Most water table aquifers have some dissolved oxygen and do not present the ideal conditions for degradation of PCE and TCE. The rate of degradation will depend on a variety of factors that may change over time, including the redox potential of the aquifer, the amount of dissolved oxygen, the presence of anaerobic bacteria, and the amount of organic matter and nutrients that are available to those bacteria. For example, during a recent site assessment the authors investigated a release from dry cleaner that had commingled with a release of gasoline from an adjacent service station. The bacterial degradation of the organic material in the gasoline created anaerobic conditions and served as an alternate carbon source for the chlorinated solvent degrading bacteria. And, as a result the PCE was degraded in this area at a faster rate. The result was that the concentrations of the PCE were much lower in the immediate vicinity of the gasoline release than farther downgradient where less organic material and higher oxygen levels were documented.

Some information regarding the period of release can be gained from a review of the ratios of the degradation products to the original material. The presence or absence of a particular breakdown product can indicate that a particular parent product was present. Depending on the site-specific information, this evaluation of the parent product and degradation compounds can provide useful information regarding the age of the release. However, in many cases this information may result in qualitative conclusions such as “it looks fairly recent,” or “it looks fairly old.” In many cases, this is useful. In a case where an operator was in the middle of three or more operators and/or the time periods of interest are fairly short (or close together), the information may not be adequate to confirm or refute participation in the contamination of a certain party.

Therefore, estimating the age of a release based on the current concentrations and a constant rate of degradation is usually not a straightforward calculation. Under ideal laboratory conditions, the solvents may degrade fairly rapidly, but in the field we have observed releases that are in excess of 10 years old with few degradation products.

Distance from source. One of the most helpful pieces of information to assist in identifying the time period of a release is the distance from the release point. With this information, confirmation that there are not preferential pathways (such as utility lines), and information about the hydrogeology, some conclusions can generally be drawn. The time of the release can be estimated based upon the average flow rate of the groundwater from the approximate source area to the downgradient edge of the plume. However, the groundwater flow equations are based on the chemical and physical properties of water and do not account for specific contaminants. The outcome of this type of investigation will likely be an opinion that the releases had to have started so many years ago due to the distance from the site, or that releases could not have occurred so many years ago because contamination is not found at a certain distance. This type of evaluation, in addition to good groundwater quality information, requires information regarding the affected groundwater aquifer.

Conclusions

A number of technical issues can make it difficult to answer the basic questions in litigation involving chlorinated solvents. As with most technical issues, more data generally provide a higher degree of confidence in the conclusions that can be drawn. In addition to operational and environmental information, information regarding subsurface structures is critical in the evaluation. Rarely in these cases are the answers to the questions going to be straight forward or will “proof” of a certain position be found in the available information. More likely, the environmental practitioner will need to look at all of the pieces of the puzzle to provide opinions regarding the various issues.

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ALLOCATION OF PCB SOURCES AT A SCRAP METAL YARD

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Introduction

Polychlorinated biphenyls (PCBs) have been produced on an industrial scale since 1930, with particularly large volumes made in the 1950s through the 1970s. Major

applications were as: insulating and cooling agents for electrical transformers and rectifiers, heat transfer fluids, hydraulic fluids, lubricants, printing inks, adhesives, flame retardants, microencapsulation of dyes for carbonless duplicating papers, plasticizers, and coatings and resins. As a result of their widespread use, PCBs are commonly found at waste sites. Their need for remediation/removal is a frequent basis for environmental litigation.

This article examines how analytical data concerning PCBs and other materials can be used to allocate costs using a contaminant mass methodology. It uses experiences at a scrap metal yard as a framework for discussing common allocation and science-based issues associated with PCB contaminated scrap metal sites. With concentrations of individual PCB congeners and other marker compounds, it often is possible to determine critical data about the facility's history, including the sources and in some cases the timing of contamination. When the data yield a calculation of contaminant mass, it frequently provides the simplest way to allocate remediation costs where similar types of waste were disposed. A critical mass of parties often view such a methodology as fundamentally fair, because it can provide a reliable, transparent and consistent basis for assigning responsibility. Thus, it has emerged as a straightforward method for allocating costs among potentially responsible parties (PRPs) who had sent capacitors, PCB contaminated transformers, and other PCB contaminated scrap materials to a facility.

To illustrate this allocation method, the article will focus on experience at a particular (but, alas, an anonymous) site. This site is a metal scrap yard that has operated from at least the 1950s. It consists of two separate yards – a “Main Yard” and a “Secondary Yard.” Historically, ferrous and nonferrous metals were recycled in the Main Yard; nonferrous metals were recycled in the Secondary Yard. Site operations included collecting ferrous and nonferrous metal from industrial and domestic sources and sorting, cutting, and crushing metals. PCB containing capacitors and PCB contaminated transformers were known to have been sent to the site. Process equipment (all potentially containing PCBs) including bailers, shears, as well as a variety of ancillary equipment used to handle scrap materials are operated at the site. In addition, a copper wire reclamation incinerator was operated from 1971 to 1987.

Approaches to and Difficulties of Allocation of PCB Sources

Commercial PCB products are in fact complex mixtures of individual chlorinated biphenyls and are known as Aroclors, which come in a variety of grades and concentrations. In some cases, it may be possible to allocate remediation responsibility based on identification of the Aroclor alone. For example, the uses of Aroclor 1248 are associated largely with hydraulic and heat transfer media. PRPs that can be associated with such uses (e.g., disposal of die casting equipment, heat exchangers) reasonably can be assumed to be responsible for such contamination. The real world, however, is seldom so simple. PCB contamination at most waste sites – particularly at metal scrap yards – is complex, resulting from multiple releases over time. In such cases, it was difficult to state with precision the likely source of each Aroclor grade removed from the

site based on knowledge of Aroclor grade and concentration alone.

An additional complicating factor is that, while Aroclors are extremely stable compounds, there are two processes by which the compositions of PCB mixtures are changed (commonly referred to as “weathering”) upon release into the environment – fractionation and biodegradation. These processes complicate the effort to identify the source of specific Aroclors in an allocation.

Historic Use of PCBs

PCBs in Capacitors: PCB containing dielectric fluids (generically known as Askarels) in liquid-filled capacitors accounts for the largest single historic use of PCBs (~40 percent). Askarels for capacitors were of three types: Type D 2233 A (biphenyl that has been chlorinated to a content of 42 weight percent); Type D 2233 B (biphenyl that has been chlorinated to a content of 54 weight percent); Type D 2233 C (a mixture of approximately 75 percent Type D 2233 B and trichlorobenzene). In 1976, 90 to 95 percent of all impregnated capacitors manufactured in the United States were of the PCB type. Before 1952, Aroclor 1254 was the standard fluid for capacitors; Aroclor 1242, which has better electrical properties, was used after 1952. Aroclor 1016, a purified version of Aroclor 1242 (having still better electrical properties), was introduced in 1971. Replacement capacitor fluids that do not contain PCBs came into use in the late 1970s and early 1980s (IPCS 1993).

PCBs in Transformers: The use of PCB containing dielectric fluid in liquid-filled transformers accounts for the second largest historic use of PCBs (~ 30 percent). Unlike the most common dielectrics for capacitors, PCB-containing transformer dielectric fluids are not pure PCBs, but are mixtures of Aroclors and chlorinated benzenes. Generally, transformer Askarel fluids are mixtures of Aroclors (45 percent – 80 percent) and trichlorobenzene or tri/tetrachlorobenzenes (20 percent – 55 percent). Additional compounds (epoxides) were also used at low concentrations as stabilizers. Askarel Type E consists solely of Aroclor 1242. Aroclor 1260 was the predominant Aroclor in use prior to September 1971 when the Aroclor component was changed to Aroclor 1254. Aroclor 1242 also found use as a transformer dielectric fluid in formulations (Inerteen) beginning in the 1970s. Trichloro- and tetrachlorobenzenes (and conceivably epoxide stabilizers) serve as marker compounds for transformer Askarels.

PCBs in Plasticizers: PCBs are highly compatible with many synthetic thermoplastic resins and plastic materials and were used to impart a wide range of properties. The use of PCBs as plasticizers represented the third largest historic use of PCBs (~ 18 percent). Aroclors were used as plasticizers in such products as paints and varnishes (particularly with chlorinated and cyclized rubber, polyvinyl chloride and acetate, cellulose, and epoxies), adhesives (particularly in hot-melt type and adhesive tape), inks (particularly inks of the inkpad type or for carbon paper); and sealants. Marker compounds for PCBs used as plasticizers are problematic, but physical examination of samples and analysis of potentially plasticized components may serve as suitable

marker compounds.

Hydraulic Media/Lubricants: The use of PCBs as hydraulic media/lubricants represents the fourth largest historic use of PCBs (~ 8 percent). Aroclor 1248 (typically with a phosphate ester such as tricresyl phosphate) was used most extensively as a hydraulic fluid. Other Aroclor products (*i.e.*, Aroclors 1242 and 1254) were also used in hydraulic media. In addition, the chemical stability and high density of Aroclors led to their use in a variety of applications including: internal lubricants for high compression air compressors, cutting oils (as chlorinated additives in the proportion of 5 to 10 percent of the cutting oil), high temperature oils, and extreme pressure lubricants. Tricresyl and other phosphate serves as a marker compound for PCB-containing hydraulic fluids. Marker compounds for lubricants are more problematic, but high molecular weight hydrocarbons may serve as suitable marker compounds.

Heat Transfer Media: PCBs also have found extensive use in indirect heating applications. Indeed, heat transfer media were sold under the registered trademark Therminol which was Aroclor 1248. Other Aroclors – 1242 and 1254 – also found application as heat transfer media. PCB containing heat transfer media were apparently used neat and had no serious competitors as nonflammable heat transfer fluids.

PCB Contamination of the Site

Extensive soil sampling for total PCBs and individual Aroclor product was conducted at both the Main and Secondary Yards of the Site. Significant amounts of debris – pieces and shavings of metal, plastic, rubber, wood, and brick – were typically found in excavated materials and samples. In addition, thirty (30) samples were reanalyzed for the purposes of more accurately quantifying individual Aroclor product concentrations; quantifying tri- and tetrachlorobenzenes isomer concentrations (used in transformer Askarels); quantifying tricresyl phosphate concentrations (used as a component of PCB containing hydraulic fluids); and identifying the presence of additional compounds that could be used to determine other contaminant sources. Analytical data were found to exhibit acceptable levels of accuracy and precision according to U.S. EPA quality control criteria.

These data provided an unusually detailed picture of the types and amounts of PCB products present at the Site. Aroclors 1242/1248 and Aroclor 1254 were the predominant PCB contaminants at the Site. (For the purposes of this analysis, concentrations of Aroclors 1242 and 1248 were combined into a single value using the greater of the reported concentrations due to the similarity of their chromatographic patterns.) The mean and median area-weighted concentrations of total PCBs at the Main Yard were approximately 24 mg/kg and 20 mg/kg, respectively. Not surprisingly, the primary areas of PCB contamination in the Main Yards were generally associated with those areas where scrap metals were mechanically cut and crushed. The mean and median area-weighted concentrations of total PCBs at the Secondary Yard were approximately 51 mg/kg and 30 mg/kg, respectively. In contrast to the Main Yard, there was no clear delineation of Aroclor product by area. The concentration of Aroclor 1260

was quite low at both yards.

Allocation Analysis

In general, the simplest method to allocate site remediation costs where similar types of wastes have been disposed is by contaminant mass. Such models are relatively easy to use in terms of data acquisition and computation requirements; in addition, they are transparent and easy to understand. Having knowledge of materials sent to the Site by waste generators, a good understanding of the Aroclor concentrations, and the presence/absence of marker compounds made allocation by contaminant mass the best choice as the basis for allocation at this Site. The allocation logic for this Site is shown in **Figure 1**.

The available data were used to assess the sources of PCB contamination of the Site as follows. Although Aroclors found use as dielectric fluids for transformers, Aroclors used for this purpose, until very recently, were mixtures of Aroclors and trichloro- and tetrachloro-benzenes. Thus, the compositions of PCB containing transformer dielectric fluids were either: a mixture of Aroclor 1260 and trichlorobenzene or tri-tetrachlorobenzene; a mixture of Aroclor 1254 and trichlorobenzene; a mixture of Aroclor 1242 and tri-tetrachloro-benzene; and Aroclor 1242 (after 1970). The presence of trichlorobenzene and tetrachloro-benzene is therefore a marker for transformer fluids. Tri- and tetrachlorobenzenes were present in about 42 and 19 percent of the reanalyzed samples, indicating that capacitor/transformer fluids contributed to the PCB contamination at the Site.

Aroclors 1242, 1248, 1254, and 1260 also found significant use as hydraulic fluids. Tricresyl phosphate, a typical ingredient of PCB-containing hydraulic fluids, was found in about ten percent of the re-analyzed samples. Aroclor 1248, used principally in hydraulic and heat transfer fluids, was found unequivocally in about three percent of the re-analyzed samples. Hydraulic/heat transfer fluids therefore contributed to the presence of PCBs at the Site.

The principal purpose of this analysis was to determine the amount of PCB contamination associated with transformer disposal. Using the allocation methodology shown below, approximately 50 and 18 percent of the Aroclor 1260 was estimated to be associated with Type A and Type B transformer Askarels, respectively. Another 17 percent of the Aroclor 1260 was estimated to be associated with hydraulic fluids. With regard to Aroclor 1254, approximately 17 percent of the Aroclor 1254 was estimated to be associated with Type D transformer Askarel, approximately 14 percent with hydraulic media, and approximately 18 percent with capacitors.

Because the focus of this work was PCB containing transformer fluids, allocation of Aroclor 1242 and Aroclor 1248 was somewhat problematic, since relatively little effort was made to distinguish between weathered 1248 and 1242. While no evidence was found to indicate the presence of the Type C (1242) transformer Askarel, the Aroclor 1242/1248 found at the Site could reasonably be associated with either capacitors or

heat transfer fluids based on historic usage patterns. **See Figure 2.**

Based on measured PCB concentrations and geostatistical analysis (*i.e.*, kriging), the relative masses of Aroclor 1242/1248, Aroclor 1254, and Aroclor 1260 were estimated to be fifty-eight (58) percent, thirty-seven (37) percent, and five (5) percent, respectively. Together with those immediately above, these data fixed the following values for contribution by PCB use as seen in **Figure 3.**

Conclusions

These results comported with data for transformers and capacitors known to have been sent to the Site. In addition, the relative percentages of individual Aroclors estimated are in accordance with known uses. Thus, for Aroclor 1260 use was largely expected to be associated with PCB example, contaminated transformers. Moreover, certain trends were clear

- P The mixtures of PCBs in the samples were consistent with the presence of PCB contamination resulting from multiple releases over time that were either mixed together by site operations or occurred at the same location.
- P Aroclor 1242 contamination could largely be attributed to sources other than transformers. Although Aroclor 1242 has been used in transformers, its relatively late introduction as a transformer dielectric fluid and the long lifetime of a transformer (annual failure rate of about 0.2%) made it unlikely that PCB contaminated transformers accounted for a significant portion of the Aroclor 1242 contamination present at the Site.
- P Aroclor 1248 contamination could largely be attributed to the presence of hydraulic or heat transfer fluids at the site.
- P Aroclor 1254 contamination was associated with transformer dielectric fluids. Based on the absence of marker compounds (tri- and tetrachlorobenzenes), a minor portion of the Aroclor 1254 contamination was associated with the disposal of PCB-contaminated transformer dielectric fluids.
- P Aroclor 1260 contamination was associated with transformer dielectric fluids. Based on the presence of marker compounds (tri- and tetrachlorobenzenes), it was apparent that the major portion of the Aroclor 1260 contamination (a minor component of the PCB contamination at the site) was due to the release of PCB-contaminated transformer dielectric fluids.

Beyond the immediate results for this Site, the above discussion illustrates the essential features of a useful methodology for allocating the costs associated with remediation of a PCB contaminated site. The method is straightforward, transparent, easy to apply and should be applicable to any PCB contaminated site where site where multiple releases of different Aroclors have occurred over time and allocation is necessary. A

particular strength of this method is that it is neither arbitrary nor capricious and can be readily understood.

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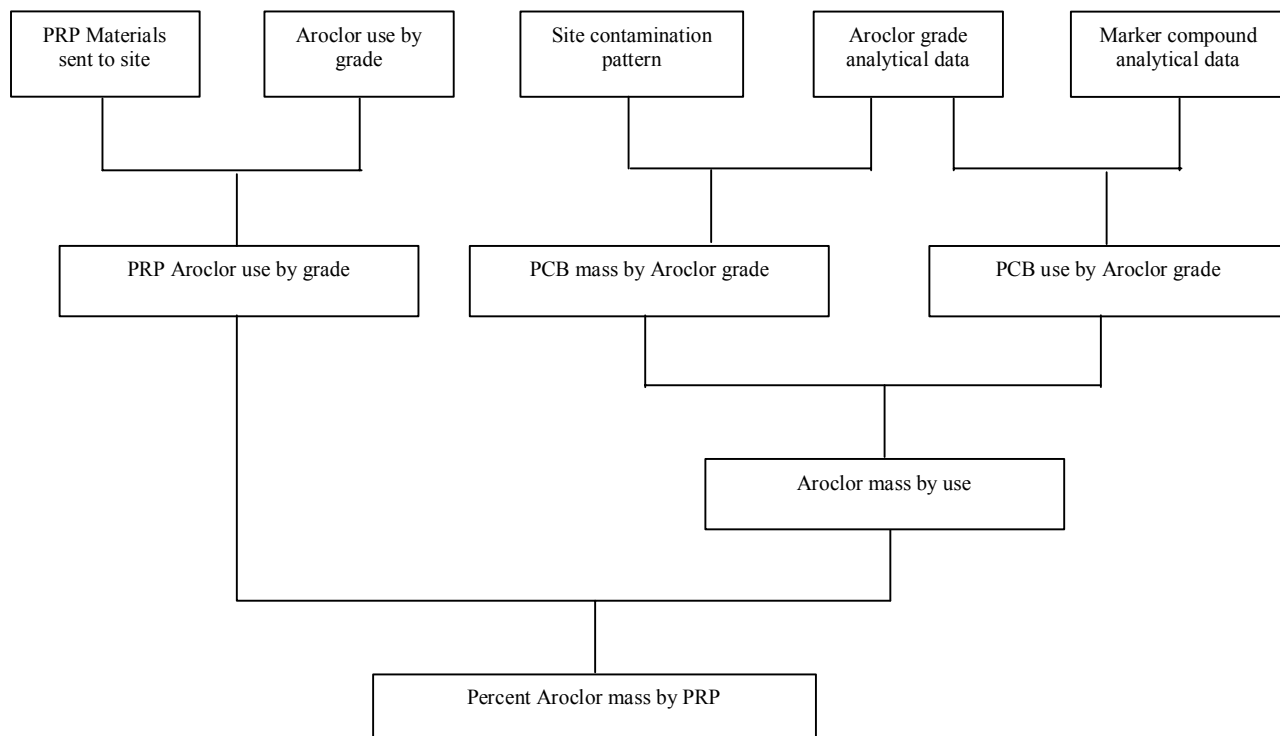


Figure 1 – Allocation logic.

Use		PCB use, percent			
		1242/48	1248	1254	1260
Transformer		0	0	17	68
Capacitor	}	83 ^a	0	18	0
Heat transfer fluids			83 ^a	14	-
Hydraulic media		17	17	59	17
Total		100	100	108	85

^a By difference.

Figure 2 – Historic usage patterns.

Use	Allocation of Site Remediation Costs	
Transformers		10%
Capacitors	}	
Heat transfer fluids		74%
Hydraulic media		16%
Total		100%

Figure 3 – Contribution by PCB.