THE BUS RIDER'S UNION: THE SUCCESS OF THE LAW AND ORGANIZING MODEL IN THE CONTEXT OF AN ENVIRONMENTAL JUSTICE STRUGGLE

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I. INTRODUCTION

Many academics and activists consider the fight for environmental justice the single most important grassroots social movement of the last decade.[1] The environmental justice movement draws connections between race, poverty, and the environment. Environmental justice activists argue that because toxic, hazardous, and other undesirable facilities are disproportionately located in low-income communities of color, residents in these neighborhoods unfairly bear the adverse health and quality of life impacts caused by the associated pollution.[2] Although competing studies disagree over whether statistics prove this conclusion, the movement gained significant national attention when President Clinton signed the Executive Order on Environmental Justice in 1994.[3] The Executive Order, while creating no new substantive law or right to environmental justice, forces all federal agencies to implement strategies that address environmental justice concerns during their daily operations. Certain state agencies in states such as California, New York, and Massachusetts have adopted separate environmental justice policies.

This paper discusses what role lawyers should play in what are largely independent, localized grassroots campaigns fought in and by poor communities of color. In recent decades, progressive lawyers have been criticized as outsiders who, while perhaps well intentioned, often end up dominating, changing, and even undermining the efforts of the social movements they seek to assist.[4] Furthermore, critical legal studies

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[1] *See* LUKE W. COLE & SHEILA R. FOSTER, FROM THE GROUND UP 10 (2001), EILEEN GAUNA & CLIFFORD RECHTSCHAFFEN, ENVIRONMENTAL JUSTICE: LAW, POLICY, AND REGULATION XIX (2002).

[2] *See* ROBERT BULLARD, DUMPING IN DIXIE: RACE, CLASS, AND ENVIRONMENTAL QUALITY (1990).

[3] Exec. Order No. 12,898, 59 Fed. Reg. 7629.

[4] *See, e.g.,* Richard Toshiyuki Drury & Flora Chu, *From White Knight Lawyers to Community Organizing: Citizens for a Better Environment-California,* 5 RACE, POVERTY, & THE ENV'T. 52 (1995) (arguing that litigation can often be a disempowering tool that negatively impacts community groups), William P. Quigley, *Reflections of*

scholars have challenged the sacred premise that legal mechanisms can achieve meaningful social change.[5] One of the most promising ideas to emerge from this dialogue is a new community-based approach to progressive lawyering that combines legal advocacy and grassroots action.[6] Termed "law and organizing", this conceptual model "privileges movement politics over law reform efforts and suggests that lawyers should facilitate community mobilization rather than practice in the conventional mode."[7]

This paper adds to the growing field of environmental justice and law and organizing through an analysis of the use of legal tactics in the Bus Rider's Union (BRU) struggle. A project of the Labor/Community Strategy Center, BRU is a grassroots environmental justice organization committed to improving public transportation in Los Angeles.[8] Confronted with a regional Metropolitan Transit Authority (MTA) that significantly cut bus funding to fund extraordinarily expensive rail projects, BRU organized a grassroots campaign to restore and improve MTA's bus service. As part of its strategy, BRU sued MTA, alleging that MTA's transit policies were racist and violated Title VI of the Civil Rights Act. The parties eventually settled and signed a groundbreaking consent decree. As part of the consent degree, MTA agreed to substantially improve bus service; and, perhaps most importantly, to establish a Joint Working Group to develop policy for the implementation of the decree. BRU currently sits on the Joint Working Group as the court appointed "class representative" of the city's bus riders.

Numerous theories exist for how lawyers should integrate the fields of law and organizing in practice. This paper proposes that the way BRU integrated legal tactics into its campaign can serve as one model for how lawyers can successfully engage grassroots environmental justice groups. In the BRU case, lawyers were retained simply as legal counsel, and did not step out of this limited role. While this may appear contradictory to the nature of law and organizing, restricting a lawyer's role may actually ensure an organization's continued viability. BRU existed before the attorneys were hired, explicitly guided the lawsuit, and remained strong

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Community Organizers: Lawyering for Empowerment of Community Organizations, 21 OHIO N.U. L. REV. 456-63 (1994).

[5] *See, e.g.,* Richard Delgado and Jean Stefancic, Failed Revolutions: Racial Reform and the Limits of Legal Imagination (1994) (analyzing the limits of schieving social reform through the law); Joel Handler, Social Movements and the Legal System: A Theory of Law Reform and Social Change (1978) (arguing that law reform efforts are incapable of producing fundamental social change.)

[6] Scott L. Cummings & Ingrid V. Eagly, *A Critical Reflection on Law and Organizing*, 48 U.C.L.A. L. REV. 443 (2001).

[7] *Id.*

[8] For more information, visit www.busridersunion.org. (Last visited Dec. 2, 2002).

once the consent decree was reached. In fact, BRU's continued organizational strength has proved crucial to the enforcement of the consent decree, as MTA has repeatedly appealed the interpretation of the decree, most recently to the Ninth Circuit Court of Appeals.

Additionally, this paper argues that while the combination of law and community organizing has a certain surface appeal and ideological panache, lawyers should be wary of acting as organizers themselves unless they are willing to fully commit to long term empowerment of a community. While law and organizing scholarship contains a diversity of approaches to the practical integration of legal and organizing strategies, some proponents encourage lawyers to effectively become organizers themselves.[9] This is a dangerous proposition. Lawyers and community organizers often have different goals. Lawyers, especially those from outside the community, are issue-oriented and often leave the community once a victory has been achieved. Community organizers, on the other hand, focus on leadership development and community empowerment. A real fear is that a lawyer will become an important part of the grassroots campaign, only to leave once the fight is over, creating a gaping hole in the organizational power structure and potentially undermining the organization's growth and effectiveness.

In order to develop this argument, this paper is divided into four sections. The first section gives a brief overview and discussion of the law and organizing movement. The second section tells the BRU story, and analyzes the role lawyers and legal tactics played in the campaign. The third and fourth sections offer lessons that may be learned by lawyer and organizations respectively.

II. A Critical Examination of the Law and Organizing Movement

A. The Evolution of Law and Organizing

Although lawyers have played an integral role in social movements, such as the fight for civil rights, welfare rights, environmental protection, and union representation, they have been subject in recent times to two fundamental criticisms. First, lawyers who join the fray tend to dominate, disrupt, and otherwise negatively impact the movements they seek to aid.[10] This can be attributed to a number of factors, including an individual lawyer's sense of self-importance, a lawyer's general presumption that law provides the best means to correct social problems, and the gen-

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[9] *See, e.g.*, Gerald P. Lopez, Rebellious Lawyering; One Chicano's Vision of Progressive Law Practice 74-78 (1992) (advocating that lawyers engage in education and promote self-help)

[10] Cummings & Eagly, *supra* note 6, at 457-60.

eral loss of momentum movements encounter once the battle enters the courtroom.[11] Some critics further assert that lawyers actively oppress vulnerable communities and clients even more by forcing them to rely on the lawyer's expertise. Ron Chisom, a seasoned civil rights activist, concludes that, "Lawyers have killed off more groups by helping them than ever would have died if the lawyers had never showed up."[12]

Second, and perhaps more importantly, critics have challenged the viability of law as a vehicle for creating social change.[13] The critical legal studies movement, which regards its work as a self-conscious effort to strengthen the connection between law and social justice, concluded that the dominant legal regime perpetuates inequities that form the roots of social injustice. Some legal scholars, such as Joel Handler, argue that public interest litigation is an incrementalist reform strategy that cannot "disturb the basic political and economic organization of modern American society."[14] Others, like Richard Abel, Lucie White, and Jennifer Gordon, have offered a stronger argument against litigation-centered strategies.[15] Not only were these strategies ineffective, they were also potentially damaging to social movements because they tended to reinforce subordinated groups' feelings of powerlessness.[16]

Against the backdrop of these criticisms, legal scholars and activists began searching for a new way to work for social change. Not surprisingly, the legal community turned to the models used by grassroots and community groups, such as the Association of Community Organizations for Reform Now (ACORN), traditional labor unions, and civil rights organizations.[17] Inherent in a grassroots or community organizing model is the recognition that poor communities, especially those of color, lack many of the avenues that wealthy communities enjoy to voice their concerns and participate in decisions that impact them. Consequently, grassroots organizing focuses on community mobilization, as opposed to legal tactics, as the means to effect social change. Community organizers devote much time and effort to developing leadership within the community and building numbers of members willing to actively participate in the struggle. While grassroots and community organizations may utilize legal strategies for specific campaigns, the larger goal is to build a powerful, informed, and involved community.

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[11] *Id.*

[12] Quigley, *supra* note 4, at 457.

[13] Cummings & Eagly, *supra* note 6, at 451-54.

[14] Handler, *supra* note 5, at 232-33.

[15] Cummings & Eagly, *supra* note 6, at 455-456.

[16] *Id.* (also at 455-456)

[17] ACORN was launched as Arkansas Community Organizations for Reform Now in 1970 by organizers from George Wiley's National Welfare Rights Organization. It has since changed its full name to the Association of Community Organizations for Reform Now, keeping the acronym.

By integrating elements of grassroots organizing into their practice, and by explicitly coordinating their efforts with organizations rooted in the community, lawyers could theoretically address the two major criticisms of traditional progressive law. First, by working either as organizers or with existing community groups, lawyers could engage the community with more sensitivity. Not only would lawyers gain a greater understanding of the community's needs, they would also be perceived with less animosity or contempt as outsiders. Second, lawyers could coordinate more closely with their client communities, as well as employ effective tactics such as political protests and letter-writing campaigns, to augment legal strategies. This would make their work more effective.

B. Current Law and Organizing Theory

This paper offers a simplistic picture of the law and organizing movement. In reality, the field itself contains a myriad of perspectives regarding exactly how law and organizing should be merged into practice. For example, Steve Bachman argues that lawyers could be used to encourage people to join a lawsuit, as legal representation adds legitimacy to the campaign or issue.[18] David Luban contends that lawyers must maintain a "subordinate role" when working with organizing groups and to assist in a legal capacity only when "a legal strategy fit a street strategy."[19] In recent times, scholars such as Gerald Lopez and Lucie White have articulated a vision of law and organizing in which lawyers more directly act as organizers and employ community organizing techniques to empower communities.[20]

In an attempt to categorize the variety of approaches, Jennifer Gordon has articulated "three interesting and under-explored possibilities for how to use law" in grassroots organizing work.[21] First, community organizations can use the promise of lawyers and legal help to entice new members to join the group. The possibility of a lawsuit or other legal tactics may legitimize the organization and attract those reluctant to participate. Second, law can be used as a "measure of injustice." For example, as part of an educational campaign, workers and community members would be encouraged to discus their own personal experiences in order to highlight the discrepancies between legal ideas and legal realities. The purpose of this strategy would be to identify key areas for future political action. Third, law can be used tactically as part of a larger

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[18] *See* Steve Bachman, Bachmann & Weltchek: ACORN Law Practice, 7 Law and Pol'y 29, 33 (1985).

[19] David Luban, Lawyers and Justice: An Ethical Study 389 (1988).

[20] Cummings & Eagly, *supra* note 6.

[21] Jennifer Gordon, *We Make the Road by Walking: Immigrant Workers, the Workplace Project, and the Struggle for Social Change*, 30 HARV. C.R.-C.L. L. REV. 428-37 (1995).

campaign in which the ultimate goal is not to win the specific battle, but to build power among underrepresented groups.

> According to Scott L. Cummings and Ingrid V. Eagly:
> Although the contours of law and organizing remain fluid one thing is clear: The law and organizing movement has created a decisive break in poverty law scholarship and firmly established the idea that building connections with community organizations is a critical component of social change advocacy.[22]

Furthermore, while the concept of law and organizing has surface appeal and may offer great hope for progressive lawyers and suffering communities alike, it is largely untested.[23] The remaining discussion is devoted to the discussion of the BRU struggle as an example of a workable model for the integration of law and organizing and the lessons that may be learned from it.

III. The Bus Rider's Union Campaign: A Model of Law and Organizing

A. The Bus Rider's Union: An Introduction

Initiated in 1992, The Bus Rider's Union (BRU) is a project of the Labor/Community Strategy Center. The Strategy Center defines itself as a "multiracial think tank and act tank" based in Los Angeles.[24] As an organization operating in one of the largest, most diverse, and most influential cities in the world, the Strategy Center's work focuses on rebuilding a multiracial left with experimental theory, practice, and forms of organization.[25] According to its mission statement, BRU "promotes environmentally sustainable public transportation for the entire population of Los Angeles."[26] Additionally, BRU is "committed to the fight against racism, class oppression, sexism, and the oppression of immigrants."[27] From 1994 to the present, BRU has grown rapidly and now includes nearly 3,000 dues-paying members and over 50,000 self-identified members that ride the buses.[28]

B. Urban Transportation as an Environmental Justice Issue

The Los Angeles Metropolitan Transit Authority (MTA), with a current budget of nearly 2.6 billion dollars, coordinates public transporta-

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22 Cummings & Eagly, *supra*, note 6 at 468.
23 *Id.*
24 Eric Mann, *Radical Social Movements and the Responsibility of Progressive Intellectuals,* 32 Loy. L.A. L. Rev. 762 (1999).
25 *Id.* at 763.
26 *Supra*, note 8.
27 *Id.*
28 *Id.*

tion in one of the most geographically complex cities in the nation.[29] Beginning in the 1980's, MTA began construction of a rail network to link outlying suburban areas with downtown L.A. As originally proposed in 1980, MTA planned to spend 183 billion dollars over 30 years to build the 400-mile network of rail and subway lines.[30] Although the budget was eventually scaled back to approximately 70 billion dollars over twenty-years, it remains one of the largest-public works program in the United States.

From its commencement, criminal activity, massive cost overruns, and construction disasters have plagued the project.[31] Several MTA officials have been charged with illegal activities, including participating in an insurance kickback scheme.[32] Some criticized the close political and professional connections between MTA board members and the project engineer and construction firms as inappropriate and potentially illegal.[33] In what has become an infamous example of the mismanagement of the rail project, a large portion of the red line collapsed in 1995, causing a huge sinkhole to develop in the middle of Hollywood.[34] After surveying the debacle in Hollywood, State Senator Tom Hayden denounced the Red Line as "criminal folly" and demanded an immediate halt to this "cursed project."[35]

As the cost overruns became apparent, MTA began reducing bus service and proposing bus fare increases. Bus routes were cut, the frequency of buses operating along remaining routes decreased, and most importantly, in 1994, MTA voted to end the monthly bus pass.[36] As the majority of bus riders in Los Angeles are poor people of color who use public buses as their primary or only means of transportation, the decrease in bus service had real impacts on their lives. Bus riders waited longer for buses, took several buses to compensate for the loss of bus lines, and endured larger crowds while riding the buses. The end of the monthly pass, as proposed, would have been especially disastrous. In 1992, the monthly pass was $42, and the one-way fare was $1.10.[37] As-

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[29] http://www.mta.net/press/pressroom/facts.htm (last visited on Nov. 1, 2002).

[30] Mike Davis, L.A.'s Transit Apartheid: Runaway Train Crashes Buses, The Nation, Sept. 19, 1995.

[31] Eric Lichtblau, *MTA Investigates Treatment of Whistleblower*, L.A. Times, Mar. 10, 1995, at Metro-B.

[32] Eric Lichtblau & Richard Simon, *MTA Official Charged with Taking Kickbacks,* L.A. Times, July 22, 1995, at Metro-A; Richard Simon, *Ex-MTA Official Pleads Guilty to Kickbacks,* L.A. Times, Aug. 1, 1995, at Metro-B.

[33] Lichtblau, *supra* note 31.

[34] Larry Gordon & J. Michael Kennedy, *Street Vanishes in Subway Sinkhole,* L.A. Times, June 23, 1995, at Metro-B.

[35] Davis, *supra* note 30.

[36] Henry Chu, *Bus Fare Hike Ok'd But Token Cost Unchanged,* L.A. Times, July 14, 1994, at Metro-A.

[37] ERIC MANN, A NEW VISION FOR URBAN TRANSPORTATION 35 (1996).

suming that an average bus rider may ride the bus five or six times each day, the cost of using the public bus system without a monthly pass would severely strain the resources of L.A.'s poorest residents.[38]

The decrease in bus service, combined with increased public outrage over MTA's rail project troubles, created a classic environmental justice issue around which the Strategy Center could organize. BRU linked the cutting of bus service to poor people of color directly to the extravagant funding of a rail system designed to serve primarily wealthy white suburbanites. In short, BRU argued that MTA was stranding poor people in order to fund and subsidize an unnecessary rail system for those who owned alternative means of transportation. Adding insult to injury, MTA provided only outdated, dirty, heavily polluting diesel buses for poor and minority Angelenos to ride, while building a clean and new public transportation system for wealthy white citizens. Thus, the issue took on a green tint as the issue was framed in environmental, as well as social justice, terms.

C. The Integration of Law into a Grassroots Campaign

BRU is representative of grassroots environmental justice organizations in the sense that its seeks to build power among traditionally marginalized poor communities of color in order to fight for the long-term development of a better, cleaner, and more just public transportation system. Many of BRU's core organizers and leaders, such as Della Bonner, Pearl Daniels, and Ricardo Zelada, first joined as rank-and-file members. After they received training through the Strategy Center's National School for Organizing, they assumed important leadership positions. BRU relies on traditional grassroots strategies for influencing political decision making, such as protests, civil disobedience, participation during public meetings, and creative political theatre. In fact, BRU's core outreach strategy involves aggressively boarding buses throughout L.A. in order to advertise the campaign. These tactics ensure not only that the BRU is visible among the bus riders, MTA staff, and the rest of the L.A., but also that BRU understands riders' true concerns.

While grassroots strategies succeeded in building BRU's organizational strength and visibility, MTA dealt the campaign a significant setback when it decided in 1994 to completely eliminate the unlimited monthly pass and to raise adult fares from $1.10 to $1.35. Although the Strategy Center's organizing model does not prefer legal action as a tactic, the BRU coordinating committee drafted a proposal for a temporary

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[38] To further illustrate this point, consider the following example. Assume that an adult bus rider makes 15 bus trips a week. That would cost $66.00 per month (15 x 4 x 1.10= 66). If an adult bus rider makes 25 trips per week, the total cost would be 110.00 (25 x 4 x 1.10= 110).

restraining order to enjoin the MTA fare increases and monthly pass elimination.[39] The legal grounds were that MTA's policies were racist, and violated Title VI of the Civil Rights Act and the Fourteenth Amendment because MTA's decision would create "irreparable harm" to the class of low-income, minority bus riders. After BRU consulted with the NAACP Legal Defense and Educational Fund (LDF), LDF attorneys Connie Rice, Bill Lann Lee, and Robert Garcia agreed to litigate the case.

Before the lawsuit was filed, BRU and the Strategy Center took steps to guarantee that they would control the lawsuit. All parties agreed that BRU and Strategy Center would act as lead plaintiffs and consult with the members of their respective organizations to ensure their concerns and desires were reflected in the legal proceedings. *Labor/Community Strategy Center LA MTA* was finally filed on Sept. 1, 2002. On that same day, the day that the fare increases were scheduled to go into effect and the monthly bus pass eliminated, Federal District Court Judge Terry Hatter heard arguments for both sides regarding the temporary restraining order. In a stunning decision, Judge Hatter issued a temporary restraining order, stopping MTA from increasing bus fares or abolishing the monthly pass for six months.[40]

The commitment to allowing plaintiffs to direct and be intimately involved in the lawsuit was realized immediately. The BRU members and organizers undertook tasks traditionally reserved for the attorneys themselves. According to Eric Mann, director of the Strategy Center:

> From the temporary restraining order in 1994 until we approached trial, the plaintiff's chosen Negotiating Committee . . .along with the Bus Riders Union elected Planning Committee and the Strategy Center staff organizers worked closely with the Legal Defense Fund attorneys to shape the argumentation of our case. We participated in the writing and editing of every draft of the memorandum of facts and law in preparation for trial . . . Our members wrote declarations and prepared themselves to be witnesses.[41]

Furthermore, many individuals worked to supply the "arcane proof" of discrimination necessary to win the case.[42] And finally, it was the Strat-

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[39] Eric Mann & Chris Mathis, *Civil Rights Consent Decree? Legal Rights for Left Strategy*, AhoraNow, Issue 4, p. 5, *available at (http://thestrategycenter.org/AhoraNow/consent_decree1.html)* (stating "It has not been our approach to place the fate of grassroots groups trying to expand the bounds of thinkable thought into the hands of a legal system that is rooted in the genocide of indigenous Americans, the wholesale enslavement of African peoples, and the denial of suffrage to women.").

[40] Henry Chu & Nora Zamichow, *Judge Blocks Bus Fare Hike, Sets Review*, L.A. Times, Sept. 2, 1994, at Metro-A.

[41] Mann & Mathis, *supra* note 39 at p. 4, part 2.

[42] *Id.*

egy Center organizers and BRU members, through the Negotiating Committee, that decided to proceed to trial once negotiations with MTA became deadlocked.[43] As Bill Lann Lee, one of the LDF lawyers, noted, the fact that BRU helped to develop the case ensured that it remained in control of the lawsuit.[44]

As the BRU members and organizers insisted on participating in such a hands-on manner, the role of the LDF lawyers changed slightly. Bill Lann Lee described the change as one from "advocates" to "partners."[45] This posed certain practical difficulties for the LDF attorneys. For example, explaining the intricate procedural rules governing the writing of declarations and memorandums of facts and law took time away from other endeavors. Additionally, relying on consensus decision-making regarding the structure and progress of the lawsuit made following strict timelines difficult. In general, the LDF attorneys needed to remain flexible and patient in order to maintain a positive relationship with the plaintiffs.

While the plaintiffs played a non-traditional role in the lawsuit, the LDF attorneys maintained a very traditional role as part of BRU. Although Bill Lann Lee, Connie Rice, and Robert Garcia had experience with grassroots organizations and their tactics, they did not step out of their role as attorneys. They did not, as some law and organizing scholars have suggested, combine law and organizing techniques in their work. When asked about LDF's integration of organizing techniques into its practice, Bill Lann Lee explained that they let the organizers do the organizing. Bill Lann Lee noted that they were hired by the agency to be advocates. Their responsibility was to act as advocates and provide proper legal representation.

In addition to the legal threat, BRU maintained direct grassroots pressure on the MTA board itself. BRU continued to aggressively organize in the community and to recruit new members into the group. BRU members attended every MTA board meeting in an attempt to convince the MTA board members to voluntarily vote to permanently reinstate the unlimited bus pass and lower fares. Many were afraid that even if the plaintiffs won on the merits in District Court, the decision might be reversed when MTA appealed to the Ninth Circuit.[46] Therefore, BRU used both the threat of the lawsuit and vigilant grassroots pressure to convince MTA to reconsider its positions.

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[43] *Id.*

[44] E-mail from Bill Lann Lee, Partner, Lieff, Cabraser, Heiman and Bernstein, LLP, to David Rice, Law student at UC Davis (Dec. 26, 2002, 06:15:08 PST) (on file with author).

[45] *Id.*

[46] *Id.*

Before both parties went to trial, the presiding judge directed the parties to enter into a mediation process, which eventually resulted in a groundbreaking consent decree. The settlement included four important provisions. First, the decree protected the unlimited monthly pass and dropped the monthly price from $49 to $42 and the bi-monthly price from $26.50 to $21. Second, MTA agreed to significantly reduce the amount of overcrowding through a "load factor" formula that limits the number of "standing only" passengers per bus. Third, MTA agreed to expand bus service to new areas, ensuring equal access to jobs and services. Fourth, and perhaps most significant, the decree created a Joint Working Group, composed partly of BRU members, to oversee the implementation of the consent decree. An attorney from Washington D.C., Donald Bliss, was selected to preside as special master over this process.

Unfortunately, the excitement surrounding this decisive victory for BRU and bus riders in general has been short lived as MTA and BRU have consistently disagreed over the consent decree's interpretation and implementation. On several occasions, MTA has appealed Special Master Donald Bliss' rulings, most notably to the Ninth Circuit. During the decree enforcement process, BRU has remained steadfast in its mission to secure better public transportation for all Angelenos.

IV. Lessons For Lawyers

A. Know Your Role

One lesson that may be learned from this case study is that before working with a grassroots organization, lawyers should clearly determine the nature of the relationship and specifically the role they will play within the organization. This role may differ between organizations and even within the same organization over time. From the outset, the LDF attorneys knew that BRU hired them as advocates, not organizers. This meant that they should focus their attention on legal matters and proceedings and not become involved in organization building or campaign strategizing. The attorneys understood that the plaintiffs would aggressively direct the lawsuit, and that the plaintiffs expected to work closely with organizers and general members. As part of their agreement, the attorneys relinquished control over certain practices traditionally completed solely by legal professionals.

Understanding one's role is important for several reasons. First, lawyers will do a better job. They can allocate resources more efficiently and reach goals quickly. Second, attorneys will fully appreciate their tasks and responsibilities before agreeing to work on a particular case or with a particular group. This will prevent incompatibility between attorneys and organizations. Some attorneys may be uncomfortable surrendering intimate control over a lawsuit to general group members or

alternatively, may only desire to take a case if such working conditions exist. Fleshing these details out beforehand gives an attorney more information with which to make an informed and accurate decision. Third, and perhaps most critically, clearly defining an attorney's role is crucial to maintaining a positive working relationship with the organization. Considering the historic tensions between attorneys and grassroots organizations, fostering good feelings should always be a top priority. Miscommunication and misunderstanding often forms the root of strained relations. While these may be inevitable to a certain degree, attorneys who clearly understand their roles and what the organization expects of them are better equipped to meet their perceived responsibilities and please their organization.

Unfortunately, not all attorneys will encounter plaintiffs like BRU who will proactively define the attorney's role. Some groups may be less organized or internally conflicted over the role the lawyer should play. Other groups may have less experience working with attorneys and using legal tactics. Regardless, it is incumbent upon an attorney to gain the best possible understanding of what the organization expects of them before they begin their work. Additionally, attorneys should continually monitor both their own satisfaction and the organization's satisfaction with their working relationship. Part of the lawsuit's success can be attributed to the LDF attorneys' intent to follow the directives of BRU.[47] Obviously, this was made easier by the fact that, from the beginning, BRU made it clear that it would control the lawsuit.

B. Be Realistic About Your Commitment

Besides knowing one's role, attorneys should be honest about the level of commitment they have to the organizations with which they desire to work. They should be careful not to assume roles that they cannot fulfill. One of the most destructive things to a grassroots organization is for new members to take on leadership roles only to leave abruptly. Grassroots organizations, such as BRU, are difficult to build and to maintain. They chronically need volunteers, and lawyers trained in both organizing and legal tactics may be welcomed as valuable resources. However, before attorneys engage in filing a claim or starting a new campaign or outreach project, they must assess their dedication to the cause. This self-reflection is a critical first step attorneys must take before offering their services.

Although the BRU attorneys were not volunteers (they were paid both by BRU and LDF), they carefully considered their ability to follow the case to fruition. Bill Lann Lee explained that all three attorneys dis-

[47] Rojas, *supra* note 46.

cussed the nature of the claim, the possibility of appeal, and the length of time needed to reach a final resolution before agreeing to represent BRU.[48] He cautions attorneys against taking cases that might continue after they finish law school or their clinic.[49] Indeed, as an example of how long cases may last, more than seven years after the consent decree was signed, BRU still finds itself in court fighting MTA for full implementation. Although Robert Garcia, Connie Rice, and Bill Lann Lee do not currently represent the BRU, as they now work for different organizations, other LDF attorneys do.[50] This continued support is important not only because of the quality of attorneys and monetary support the LDF provides, but also because of the strong relationship built between BRU and LDF.

V. Lessons For Organizations

A. Maintain Control of the Lawsuit

The BRU case is an excellent example of the reasons why grassroots organizations should direct legal tactics and how they can achieve this control. On a basic level, although an organization may have little legal knowledge, it is ultimately their campaign. They have the most invested and the most to gain from a successful outcome. They also have the most to lose. There may be a tendency to defer decisions to an attorney, especially if the attorney professes superior knowledge of the law. However, as the BRU case illustrates, there are many opportunities for non-lawyers to directly supervise legal decisions. Organizations should not shy away from demanding this level of control as it is in their best interest. Furthermore, allowing general members a role in the lawsuit creates a sense of ownership consistent with the spirit of grassroots organizing.

The BRU case offers several examples of how organizers and general members may collaborate directly with attorneys. BRU created several working committees, which discussed issues with the general membership before deciding how to proceed. Members and organizers wrote important legal documents and conducted important research in preparation for the trial. Furthermore, BRU helped to shape the argumentation and themes of the case. In total, the BRU members and organizers had a hand in much of the daily legal work. This ensured that they did in fact control the lawsuit.

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[48] Lee, *supra* note 44.

[49] *Id.*

[50] The author notes that the BRU still contacts Bill Lann Lee, Connie Rice, and Robert Garcia for advice regarding the implementation of the consent decree.

B. Maintain the Integrity of the Organization

Throughout the lawsuit and ensuing battles over the consent decree, BRU has openly admitted that the lawsuit is only one part of a larger campaign. While the suit was pending, BRU remained focused on building its grassroots membership and visibility within Los Angeles. The organizers made sure that they did not concentrate all their efforts on the lawsuit. They continued their primary outreach strategy of boarding buses and speaking directly to the bus riders. Organizers were aware that lawsuits can last years, zapping the energy from a grassroots movement.[51] Thus, BRU continued to apply grassroots political pressure on MTA by attending public meetings, contacting individual MTA board members, and taking its message to the streets. It did not stop being a grassroots organization just because it filed a lawsuit.

BRU's focus on maintaining its organizational integrity paid immediate dividends, as MTA has challenged in court, implementation of certain portions of the consent decree. Because of its strength, BRU has remained vigilant in holding MTA accountable both in the courtroom and in the sphere of public opinion. Part of their street strategy is to loudly complain about how MTA is "dragging their feet" in order to reduce the amount of courtroom battles. If MTA receives enough negative press, it may forgo legal challenges to the consent decree. Without a strong organization, BRU would be unable to continue to fight the battle it allegedly won with the consent decree. Taking a lesson from BRU, grassroots organizations should not forgo the maintenance and growth of their organization while engaged in a legal battle. Legal tactics do not always produce positive results for grassroots environmental justice organizations. Their power comes from grassroots political pressure.

VI. Conclusion

Judging from the recent establishment of bus riders unions in Vancouver, British Columbia and the Bay Area, the creation of just, clean, and affordable transportation is an issue with which people are concerned. The BRU campaign offers not only a workable campaign model, but also one possibility for integrating progressive lawyering into a grassroots environmental justice struggle. Perhaps the most important lessons to be learned from the BRU case study are that lawyers must clearly understand their roles and that grassroots environmental organizations must explicitly direct the lawsuit. Implementing these two strategies will help ensure positive legal results and relations.

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[51] *Id.*

SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL JUSTICE: SAME PLANET, DIFFERENT WORLDS?

*Emily Fisher**

I. INTRODUCTION

Scholars have criticized the term sustainable development as aspirational at best, and as "the latest in a succession of restrictive. . .politically correct expressions" at worst.[1] If profit has historically been a proxy for social good,[2] the chance that principles of sustainable development will translate into real benefits for environmental justice communities seems unlikely within the prevailing economic structure. Even more troubling is the possibility that "green" developments do harm to these communities by serving a market-based system that puts dollar capital over human capital.

Part I of this paper will address some of the challenges in defining sustainable development and related criticisms of sustainability. Despite arguments that sustainable development is at best a lofty ideal incapable of real application, I will attempt to find a more practical definition of sustainable development for purposes of this discussion. A functional definition of sustainable development must also include principles of equity.

Part II will introduce the basic principles of environmental justice and argue that the success of the environmental justice movement requires incorporation of sustainable development principles. Unsustainable commercial activity has complicated many environmental and social problems. In particular, unsustainable practices of cost-externalization have played a significant role in the creation of distributive injustice.

Part III discusses the major obstacles to combining the environmental justice and sustainability movements. The movements often appear to exist at opposite ends of the economic spectrum, and both attempt to function in an economic system that fails to value natural and human capital. This flaw in our current interpretation of capitalism misleads

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[1] M. CLARK , *Domestic Futures and Sustainable Residential Development*, 33 FUTURES 817, 819 (2001), *available at* http://www.elsevier.com/locate/futures.

[2] Robert Collin, Forever Wild, Forever Free: Sustainability and Equity, Virtual Lecture at Mercer University Law School (March. 13, 2000) (transcript available at www.law.mercer.edu/elaw/collin.html).

communities into ongoing bargains between economic benefit and ecological well-being.

Part IV will address what role the legal community and local governments might play in making the benefits of sustainable development more available across the board. As in the environmental justice movement, perhaps one of the most important tasks is community building and clearing channels for community voices to be heard. Community leaders will need the cooperation of local governments. Lawyers can generally be more useful to communities as negotiators and facilitators than as litigators.

This paper will analyze sustainable development as an ideal and as it is put into practice, attempting to find common ground where sustainability and environmental justice ideals can not only coexist but have a synergistic effect. Communities seeking to address environmental concerns and develop sustainably must be able to decide not only what burdens they will reject, but what benefits they will insist upon.

II. What is Sustainable Development?

Sustainable development as a term is often intended to stand as proxy for something desirable; a better way of living than what we currently have. This kind of happy vagueness makes it an ideal political buzzword. Sustainability has successfully invaded the rhetoric of policy debate even where it has failed to produce substantive results.[3]

Politicians and policy makers are not alone in tossing these words around. For people who are even a little bit familiar with the language of sustainability, it might bring up an array of images: wind turbines, solar power, "natural foods" supermarkets, straw-bale houses, fair trade coffee, and hybrid Toyotas. Residents of Davis, California might think of the Village Homes housing development, with its edible landscaping, pedestrian-friendly layout, and competitive market edge.[4] While this list includes goods (especially alternative energy sources) that could certainly benefit broad segments of the population, it tends to sound like a catalog for the affluent who want all the luxury with less guilt. In this sense, "sustainable" becomes a marketing tool for any commodity paired with it, much like the word "green."

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[3] Lamont C. Hempel, *Conceptual and Analytical Challenges in Building Sustainable Communities, in* Toward Sustainable Communities: Transition and Transformations in Environmental Policy, 43 (Daniel A. Mazmanian & Michael E. Kraft, eds., 1999).

[4] The Smart Communities Network, a project of the U.S. Department of Energy states that Village Homes initially sold for the same price as others in Davis, CA, but on average, now sell for $11 more per square foot. *See* http://www.sustainabledoe.gov/landuse/village.html.

The problem with using sustainability as a marketing buzzword is that it then reinforces the very patterns of consumption and waste that it would claim to alleviate.[5] The niche market for so-called sustainable commodities and housing developments in the U.S. leaves little room for broader issues of environmental and social justice. Sustainability as a marketing concept thus serves to widen gaps between movements that should be connected.

A. Sustainable Development as Freedom

Beyond marketing and political buzzwords, there are other more helpful ways to understand sustainable development. Organizations from around the world have used the term in ways that may mean access to clean water and safe power in developing nations, community-based economic revitalization of depressed urban areas, localizing and protecting the food supply, and creating safe, affordable housing. Obviously this list may incorporate much or all of our earlier catalog of luxuries. More importantly, it captures a spectrum of environmental, economic, political and social issues in such a way that we begin to see their interconnection. In its broadest sense, sustainability has been described as an ecological reconception of freedom.[6] It seeks to promote long-term human flourishing over short-term gain. While some might interpret freedom as a right to consume as many resources as cash and credit will allow, along with a right to accumulate as much wealth as possible, these kinds of "freedoms" are enjoyable by an ever-shrinking percentage of the world's population.

A brochure promoting the Johannesburg World Summit on Sustainable Development (WSSD) described sustainable development as an effort requiring integration of action in three key areas. These include 1) economic growth and equity, 2) conserving natural resources and the environment, and 3) social development.[7] The WSSD emphasized that all sectors of society have a role to play in realizing the goals of sustainable development, identifying "Major Groups" whose active leadership and partnerships are crucial to putting sustainable development programs into action.[8]

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[5] *See* PAUL HAWKEN, THE ECOLOGY OF COMMERCE: A DECLARATION OF SUSTAINABILITY, xi - xiii (Harper Business 1993) (arguing that commerce and sustainability are antithetical by design).

[6] Hempel, *supra* note 3, at 68.

[7] UNITED NATIONS, JOHANNESBURG SUMMIT 2002: WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT 4 (2002), http://www.johannesburgsummit.org.

[8] *Id.* at 7. (Among the "Major Groups" identified were business and industry, farmers, children and youth, indigenous people, non-governmental organizations, women, workers and trade unions, scientific communities, and local authorities).

Dialogue on sustainable development may seem more fruitful outside of the U.S. at the moment, but dialogue is happening here as well. The Bay Area Alliance for Sustainable Development created a "Draft Compact for a Sustainable Bay Area" in July 2000, identifying three guiding principles much like those in the WSSD: the "Three E's" of prosperous economy, quality environment, and social equity.[9]

In 2000, Jackson State University held its "First Annual Freedom Colloquium" on the topic of sustainable development and environmental justice.[10] Panelist Minister Benjamin Muhammad described sustainability as a method of spurring economic growth without environmental degradation.[11] The ultimate question, in Muhammad's terms, is "whether or not you can have a growing economy and treat everybody fairly, treat everybody justly."[12] This question could be rephrased as whether all people are, at least theoretically, entitled to the same opportunities to flourish. Is freedom in the sense of access to basic requirements of life and pursuit of happiness only available to select pockets of the world's population? These questions are philosophical and even metaphysical in nature, and therefore what one might expect to hear from a minister. It is time, however, for more secular activists and policy makers to "get religion" in the sense of questioning the old, dysfunctional social order that assumes it will have to dump its mountains of waste somewhere, on somebody.

Also on the JSU Freedom Colloquium panel was Professor Robert W. Collin, who criticized what he termed "eco-fascism" in the environmental and sustainability movements.[13] Collin suggested that the absence of community voices, particularly minority communities, in sustainable development will move us toward "bioregionally based sustainability where it's greenfields for whites and brownfields for browns unless the community comes in and grabs a say."[14] According to Collin, any definition of sustainability is not acceptable unless it includes "issues of reparations for environmental injustices of the past."[15]

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[9] BAY AREA ALLIANCE FOR SUSTAINABLE COMMUNITIES, COMPACT FOR A SUSTAINABLE BAY AREA: ECONOMY, ENVIRONMENT, EQUITY, 3 (2002), http://www.bayareaalliance.org.

[10] Colloquium, *Environmental Justice and Sustainable Development in the City*, 17 J. ENVTL. L. & LITIG. 97 (2002) [hereinafter Colloquium].

[11] *Id.* at 103.

[12] *Id.* at 103-04.

[13] *Id.* at 114.

[14] *Id.*

[15] *Id.* at 115.

B. Criticisms of Sustainable Development

In discussions of sustainable development, it may not seem so difficult to reduce sustainability to a mathematical formula: don't deplete faster than you (or nature) can replenish. However, current economic, social, and political structures can seriously complicate our ability to apply this formula. Some people might respond negatively to Muhammad's question of whether economic growth and across-the-board fairness can coexist. Growth and development must inevitably create burdens that corporations will shift around in the most cost-effective ways possible. Those with means will always find ways to mitigate their burdens at the expense of those without means. If this is the case, sustainable development is not only an oxymoron, but antithetical to environmental justice. Sustainable development will be a proxy for the ability of more affluent and empowered members of society to avoid their share of environmental burdens.

If development is defined as the process of more and more people consuming more and more goods, with fewer and fewer goods available, pairing the "development" with "sustainable" seems ridiculous.[16] The law of entropy states that nothing is permanently sustainable; why should mere endurance be trumped up as a virtue?[17] However, development can be understood in different ways. Some people are more comfortable with the term "community" in place of "development" because it focuses attention on the process of increasing the self-sufficiency and health of its members in ways that do not infringe on other communities' freedom to do likewise.[18] And in terms of entropy, not even the Iroquois, spiritual ancestors of sustainable development, felt compelled to plan farther ahead than seven generations.[19] It makes little sense to worry about whether sustainable means eternal, if we will be lucky to last another forty years.[20]

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[16] Hempel, *supra* note 3, at 46 (quoting William Ophuls, *Unsustainable Liberty, Sustainable Freedom, in* BUILDING SUSTAINABLE SOCIETIES: A BLUEPRINT FOR A POST-INDUSTRIAL WORLD (Dennis Pirages ed., 1996).

[17] *See* HAWKEN, *supra* note 5, at xv (stating that the "dirty secret" in environmentalism is that sustainability does not really exist because present planetary resources have already been depleted beyond their capacity to support the population of the next forty years); Hempel, *supra* note 3, at 43, 46.

[18] *See generally* Hempel, *supra* note 3, at 52.

[19] *E.g.*, 10 KEY VALUES OF THE CANADIAN GREENS, *available at* http://www.global.greens.org.au/charter/10values(canada).html (citing Iroquois' concept of considering effects of every decision on the next seven generations).

[20] HAWKEN, *supra* note 5, at xv.

III. Environmental Justice and Sustainability

As Robert Collin implied when criticizing sustainability as a movement plagued by eco-fascism, some of the problems with the movement can be resolved by incorporating principles of equity and environmental justice into the definition of sustainability. Any model for sustainable development failing to incorporate equity is simply not a sustainable model.[21] Similarly, environmental justice advocacy that disregards principles of sustainability will never be able to achieve its objectives on a large scale.

A. Lack of Sustainability Intensifies Environmental Justice Issues

The environmental justice movement developed in response to mounting evidence that communities of color (and low-income communities, to a lesser degree) bear a disproportionate level of industry's adverse environmental impacts in siting, compliance, and cleanup contexts.[22] Environmental justice advocates assert that communities impacted by polluting facilities and contaminated sites should be able to participate as equal stakeholders in environmental regulation processes.[23] Neighborhoods suffering from disparate environmental impacts are often referred to as environmental justice communities (EJ communities), perhaps in consideration of the result they would hope to achieve through community empowerment, activism and legal strategies.

A serious challenge faced by EJ communities in seeking redress for environmental inequities is establishing causation. Evidence that an individual corporate or agency decision caused an environmental problem may fall considerably short of establishing legal responsibility for redress.[24] Though the causation debate in environmental justice is multifaceted, one part of the debate is whether market forces are really the culprits behind the uneven distribution of environmental burdens.[25] Market forces are notoriously judgment-proof in a lawsuit, especially if the affected community became "disproportionately minority or poor" sometime after a polluting facility was sited, as property values dropped and housing became more affordable in the area.[26] However, typical economic theories of causation have a major weakness: they accept some level of cost-shifting as a given. Cost-shifting could also fall under the

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21 *See* Colloquium, *supra* note 10, at 113-14.

22 *See generally* Clifford Rechtschaffen & Eileen Gauna, Environmental Justice: Law, Policy & Regulation 3-5 (2002); Collin, *supra* note 2.

23 *See* Rechtschaffen & Gauna, *supra* note 22, at 5.

24 *See id.* at 27-52.

25 *See id.* at 34-44.

26 *See* Vicki Been, *Locally Undesirable Land Uses in Minority Neighborhoods: Disproportionate Siting or Market Dynamics?* 103 Yale L.J. 1383 (1994), *excerpted in* Rechtschaffen & Gauna, *supra* note 22, at 42.

category of intentional discrimination if a corporation deliberately shifts its environmental burdens to a community of color in the belief that the corporation will save money by doing so.

Sustainable development questions the assumption that cost-shifting and externalization is legitimate business practice. In so doing, it helps EJ communities in the causation debate because it demands that industry pay its own way. If a corporation is failing to account for the real costs of doing business, it is causing an adverse environmental, economic, or social impact somewhere, end of story.

B. Environmental Justice and Sustainability Movements Have Symbiotic Goals

While sustainable development and environmental justice have distinguishable goals, they relate to each other symbiotically. A comparison of the goals of the two movements reveals their need for interdependence. If environmental justice seeks to remedy the disparate impacts of industrial pollution and ecological damage on minority and low-income communities, failure to question the continuing existence of damaging practices puts environmental justice communities in a position of continual struggle and / or compromise. The community must be sufficiently organized and empowered to resist the siting of a facility, or be able to negotiate some form of compensation for the real or speculative harms a facility might cause. These are the more successful environmental justice efforts; many communities are not yet in a position to resist or negotiate at all.

Sustainable development attempts to close loops of resource consumption and waste production. It attempts to return human activity to its rational place in the ecosystem, using technology that integrates and accommodates natural processes rather than foolishly (and expensively) trying to counteract them. Sustainable development trusts that given a chance, nature can do remarkably well at recycling waste, regulating temperature, cleaning air and water, and even controlling floods. On an economic level, sustainable development is about community self-reliance and responsibility. A sustainable community is one that is able to identify and fulfill its own needs without impacting its neighbors' ability to do the same. Rather than accepting the notion that a burden can go somewhere else, a sustainable community is able to internalize its costs by closing resource and waste loops.

Considered separately, environmental justice and sustainable development each has a missing piece that prevents it from maximizing its effectiveness as a movement. If sustainable development fails to prioritize issues of distributive justice, it will be little more than an accomplice to the ongoing exploitations of the market. Similarly, environmental jus-

tice cannot achieve its goal of distributive justice as long as there are burdens to distribute. Burdens will always follow a path of least resistance that will probably terminate in yet another EJ community.

C. Poverty as an Environmental Issue

While race is a more significant indicator for environmental justice communities than income,[27] the two demographics frequently overlap. The effects of poverty and institutionalized racism may overlap in these communities to such an extent that it becomes extremely difficult to pinpoint causation. Is a polluting facility causing the community's health problems, or are they more directly related to poor nutrition, tobacco and alcohol use, and inadequate medical care?[28] Bringing sustainability into the discussion and seeing poverty as an environmental issue of its own makes the causation debate less important. A community locked into the belief that it cannot survive without the employment created by a new polluting facility is already a depressed community, in terms of economic, physical, and mental health. The environmental effects of this depression reach far beyond the community itself, as "white flight" creates suburban sprawl, gobbling up open spaces and causing more pollution from cars.[29]

Far-reaching environmental damage linked to poverty can look even more dramatic away from our familiar U.S. urban / suburban landscapes. Alan Durning notes that not only do the poor "suffer disproportionately from environmental damage caused by the better off, they have become a major cause of ecological decline themselves."[30] Population growth and inequitable development patterns push the poor in developing nations to clear rainforest plots and overgraze rangeland.[31]

As we examine the environmental impacts of both industry and poverty, it becomes increasingly difficult to tell where socioeconomic issues stop and environmental issues begin. Separation between what is urban and what is natural in the public consciousness may prevent us from commonly thinking of issues, such as the affordable housing shortage, in environmental terms. However, when even people of average income cannot afford to live in the cities where they work, an environmental

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[27] RECHTSCHAFFEN & GAUNA, *supra* note 22, at 4.

[28] *See* CHRISTOPHER H. FOREMAN, JR., THE PROMISE AND PERIL OF ENVIRONMENTAL JUSTICE (1998), *excerpted in* RECHTSCHAFFEN & GAUNA, *supra* note 22, at 17.

[29] *See* PAUL HAWKEN ET AL., NATURAL CAPITALISM 108 (1999) (citing federally sponsored industry study called *The Costs of* Sprawl). *See also* John G. Mitchell, *Urban Sprawl*, NATIONAL GEOGRAPHIC, July 2001, at 55.

[30] ALAN B. DURNING, POVERTY AND THE ENVIRONMENT: REVERSING THE DOWNWARD SPIRAL 6 (World Watch Institute Paper No. 92, 1989).

[31] *Id.*

problem is born in the form of more automobile pollution. The shortage of affordable housing also contributes to the concentration of environmental burdens in minority and low-income communities, as it serves to concentrate these populations in areas already considered less desirable by white people. City planners and property owners who fear its high density (and sometimes its potential for racial diversity) frequently view affordable housing itself as a locally unwanted land use. However, no study in California has ever shown that affordable housing developments reduce property values.[32] Additionally, well-designed affordable housing can be completely congruent with the aesthetics of more expensive housing in the area.[33]

IV. Overcoming Obstacles to Sustainable Development

Ours is not a society that generally trusts government, business, one another, or even ourselves to do the right thing when faced with opportunities for short-term benefit. Sustainability requires a commitment on a personal level to act with long-term benefits in mind, and the state cannot coerce such commitments.[34] Paul Hawken questions the impulse to legally mandate the imposition of higher rights than those constitutionally recognized for the sake of ecological protection, even when facing ecological crisis.[35] He suggests that while government has a critical role, it must coincide with society's natural impulses because humans will ultimately reject any conservation system that conflicts with their "impulse to flourish and prosper."[36] Some might argue that the impulse to flourish and prosper includes an impulse to consume at whatever rate a person's economic status will permit. If, for the sake of argument, we construe these natural impulses as rights, in a world of finite resources there is a big difference between a right to flourish and a right to consume. People can flourish freely without significant harm to the present and future interests of others. However, a right to consume is really a proxy for competition that will have more and more losers as resources decline.

A. Recognizing False Dichotomies

Our ways of thinking about human existence as an endless struggle for dominance over nature and other humans have created a dichotomy between people and nature that obstructs both ecological protection and

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[32] California Planning Roundtable, Myths & Facts About Affordable and High-Density Housing (June 1997), http://www.abag.ca.gov/services/finance/fan/housingmyths2.htm.

[33] *Id.*

[34] Robin M. Collin and Robert W. Collin, *Where Did All the Blue Skies Go? Sustainability and Equity: The New Paradigm*, 9 J. Envtl. L. & Litig. 399, 439 (1994).

[35] Hawken, *supra* note 5, at xiv-xv.

[36] *Id.* at xv.

economic wellness. Without trying to refute basic theories of evolution, it seems safe to say that many human societies and institutions have missed the point: cooperation is often a better survival strategy than competition. The people vs. nature dichotomy often puts EJ communities (along with regions whose economies have historically depended on industries such as lumber, fishing, mining, etc.) in the painful position of choosing between jobs and the environment, or even between economic growth and the community's long-term health and safety. These dichotomies also pose a serious problem to environmentalists who want to make sure that communities make the "right" choices. In reality, the dichotomy is not a "choice" but a form of extortion.

Robert Collin explains that false dichotomies operate to preserve privilege, externalizing clean up and abatement costs onto either nature or minority and low-income communities.[37] Conversely, sustainable development, or sustainable human flourishing, provides communities with an escape from environmental extortion by promoting corporate cost internalization and community self-reliance. While people may have to choose between particular types of jobs and environmental protection, a sustainably developed community will not have all its economic eggs in one basket.

The natural world contains built-in redundancy to promote the stability and success of the ecosystem when one part of the system falters.[38] Thriving sustainable communities and businesses depend on this kind of diversity as well. Because each component of a sustainable system serves multiple functions, the backup systems are not wasteful and give communities the power to say no to benefits that come at too high a cost. Diversifying for survival is not an alien concept to the business mind, yet in some important commercial contexts the need for diversity has been overlooked. In the realm of agribusiness, for example, monoculture practices threaten the security of our food supply.[39] Largely as a result of these practices, one study indicates that 97 percent of the vegetable varieties available in 1900 are now extinct.[40]

Monoculture is not limited to the realm of agribusiness, however. The current global economic system seems not only to deny that diversity

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[37] Collin, *supra* note 2.

[38] Toby Hemmingway, Presentation on permaculture and design of sustainable environments at the Bioneers Conference in San Rafael, California (Oct. 18, 2002) (using an example of implementing multiple water conservation methods in drought areas to create human habitation that provides a net gain, rather than loss, for the environment).

[39] *See* FATAL HARVEST: THE TRAGEDY OF INDUSTRIAL AGRICULTURE 71 (Douglas Tompkins & Andrew Kimbrel eds., 2002) (explaining that industrial-scale planting of single crop monocultures are an open invitation to plant pests and diseases, particularly as the pests develop increasing resistance to chemicals used to combat them).

[40] *Id.*

equals wealth but appears to have declared war against it.[41] The dominant economic paradigm views biological, cultural, and even racial diversity as costly and inefficient, a problem either to be streamlined out of existence or dumped somewhere out of the way. If this is true, especially in regard to the latter "solution", we need not spend much time wondering why there is a correlation between communities of color and environmental inequity. It is simply global capitalism's deranged sense of efficiency.

B. Reinterpreting Capitalism

Capitalism as currently practiced is a world threat, largely because it fails to adhere to its own principles of accounting. As Paul Hawken explains, the current economic system "liquidates its capital and calls it income. It neglects to assign any value to the largest stocks of capital it employs – the natural resources and living systems, as well as the social and cultural systems that are the basis of human capital."[42] If capitalism shifted its bottom line of financial capital to one of human and natural capital, recognizing that there are, in fact, other valid forms of wealth that exist in the stability of ecosystems and in human health, business itself could become an extremely powerful tool for restoring and preserving the environment. Even the World Bank has acknowledged that economic capital accounts for only 20% of the world's total wealth. Yet economic capital seems to get all the love and attention.[43]

While economic capital continues to be the nearly exclusive focus of the market, the market will continue to deplete natural resources and oppress humanity, thus ultimately sealing its own doom. As Hawken states, "the single most damaging aspect of the present economic system is that the expense of destroying the earth is largely absent from the prices set in the marketplace."[44] Changing destructive cost-externalization practices requires a paradigm shift toward fairness that legislation cannot mandate.[45] However, many other factors can encourage large-scale behavioral changes. Collin and Collin note that social change arises from a desire for a different future. When this desire becomes widely articulated, it can change existing relationships of power and inequality.[46]

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41 *See* HAWKEN, *supra* note 5 at 27 (declaring biodiversity the source of all wealth); Vandana Shiva, *Monocultures of the Mind, in* FATAL HARVEST, *supra* note 40 at 67.

42 HAWKEN ET AL., *supra* note 30, at 5 (1999).

43 Trevor Hancock, *People, Partnerships and human progress: building community capital*, 16 HEALTH PROMOTION INTERNATIONAL 275 (Sept. 2001), *available at* http://heapro.oupjournals.org.

44 HAWKEN, *supra* note 5 at 13.

45 Collin & Collin, *supra* note 35, at 439.

46 *Id.* at 412-13.

C. *Dudley Street Neighborhood Initiative: Example of Success*

The Dudley Street Neighborhood Initiative (DSNI) in the Roxbury area of Boston, Massachusetts, provides an example of how sustainable development can rebuild an urban community and address its environmental justice concerns.[47] Between 1950 and 1981, the Roxbury area became a wasteland through disinvestment, abandonment, and arson, until one-third of the land in the neighborhood lay vacant.[48] By the early 1980's, the area was home to approximately 1,300 abandoned lots, most of them brownfields, in addition to 51 hazardous waste sites and forty percent of Boston's trash business. Illegal dumping from around the city and state posed additional health and safety threats to residents.[49] In 1984, residents founded the DSNI to address serious ongoing threats to their community such as the illegal dumping, arson for profit, and urban renewal projects aimed at removing low-income people from their neighborhoods. The initiative began with a "Don't Dump on Us" campaign to organize cleanup of the vacant lots and shut down illegal trash transfer stations.[50]

DSNI responded to the problem of Roxbury's hazardous waste sites by becoming the first group in Boston to petition for and obtain the right of public involvement in remedying hazardous sites. DSNI's Environmental Committee has a collaborative relationship with the EPA, the state attorney general's office, the city Environmental Strike team and other agencies for strategizing environmental cleanup.[51]

Rather than struggling to influence city government's traditional top-down urban planning methods, Roxbury residents hired their own planning consultants and created a "bottom-up" redevelopment plan focused on true urban renewal rather than urban "removal" and displacement of the poor. DSNI became the first community-based nonprofit group to be granted eminent domain authority, which it was entitled to exercise over thirty acres of vacant land in the most burned-out part of Roxbury.[52] It established a community land trust in the eminent domain area to prevent real estate speculation and further displacement. The community land trust thus helped to ensure availability of affordable housing while building the community's wealth. Real property ownership in the community land trust splits real property ownership with the

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47 Greg Watson, *Options for Sustainable Cities: Development Without Displacement*, Address at the Bioneers Conference in San Rafael, CA (Oct. 18, 2002).

48 Holly Sklar, *Building an Urban Village: The Dudley Street Neighborhood Initiative*, 28 ENVIRONMENTAL ACTION MAGAZINE 33 (March 22, 1996).

49 Watson, *supra* note 48.

50 Sklar, *supra* note 49.

51 *Id.*

52 Sklar, *supra* note 49; Watson, *supra* note 48.

residents: the trust has title to the land, and the residents have the title to their homes. 440 new units of housing have been built or are planned.[53]

Other important elements in DSNI's vision of itself as an "urban village" include urban agriculture (a community greenhouse is planned on a former brownfield site, and numerous vacant lots have already become community gardens) to provide produce for local markets and restaurants. In 1996, the neighborhood was 37 percent Black, 29 percent Latino, 37 percent Cape Verdean and 7 percent white, and over a third of the residents were under 18 years of age. DSNI has explored and celebrated the wealth of the neighborhood's diversity with multicultural festivals and job mentoring programs for its youth.[54] It created a "Declaration of Community Rights" so bold as to state that the community has the right to shape the development of "all plans, programs and policies likely to affect the quality of our lives as neighborhood residents."[55]

DSNI's successes may not be reproducible in all EJ communities and urban areas targeted for more traditional redevelopment. It is, however, a stunning example of what a community can achieve with bold thinking and extensive organization. Though DSNI interacted with government and legal structures out of necessity to accomplish its goals, it refused to wait for the city or the law or even market forces to provide solutions for its most urgent problems. DSNI's environmental justice gains are more likely to last because of its holistic, sustainable view of redevelopment for the community.

V. Role of Legal Professionals in Promoting Environmentally Just, Sustainable Development

Environmental justice scholars have seriously questioned the effectiveness of traditional legal methods as tools for solving complex problems of environmental and social equity.[56] Conditions of near gridlock in the justice system may be one reason for this, but as Robin and Robert Collins also point out, conventional decision making and problem solving structures are based on "twin pillars of governmental coercion and expert consultancy."[57] This structure does not readily accommodate the kind of public communication and consensus building needed on the environmental justice front. The traditional approach is even less conducive to sustainability that demands not only community consensus, but self-created changes in behavior.

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53 Watson, *supra* note 48.
54 Sklar, *supra* note 49.
55 *Id.*
56 Collin & Collin, *supra* note 35, at 449.
57 *Id.*

A. Facilitation of Community Organizing Efforts

Robin Collin describes an approach to using the law that might sound more non-traditional than it actually is: that the law is not just what judges say, but what communities say.[58] The DSNI example illustrates this approach as the community itself was able to assume characteristics of a lawmaking body in addressing its own needs. While community efforts may be constrained by scarce financial resources, neighborhood groups are ideally positioned to unleash the power of human capital. Lawyers must encourage this process by helping communities find their voices and make them heard. Lawyers can be resources for problem solving in community groups' negotiations with non-profit and commercial developers, government agencies, and city planners. Community organizing, administrative advocacy, and media pressure are three strategic areas where lawyers can be of service to client communities.[59]

Luke Cole identifies three questions for advocates seeking to maximize the effectiveness of their efforts in helping a community achieve its goals.[60] These questions are readily adaptable to environmental justice and sustainable development issues because they encourage any given strategy to serve multiple functions, a key element of a sustainable system. First, will a strategy educate people? Cole defines "people" in this context as the client group, policy and decision-makers, the general public, and the lawyer herself.[61] Second, will it build the movement? Strategies should be calculated to draw new membership and support to the community organization. Programs that educate and empower community members naturally attract new participants.[62] Third, does the strategy address the cause rather than the symptoms of a problem? This question relates directly to sustainable development because it looks beyond existing environmental hazards,[63] and perhaps even beyond the facilities that created the hazards. Really addressing the cause of an environmental justice problem requires questioning the viability of an economy based on a pattern of "extract, consume, and pollute."[64]

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58 Dalbey, *supra* note 8 at 130.

59 Luke Cole, *Empowerment as the Key to Environmental Protection: The Need for Environmental Poverty Law*, 19 Ecology L.Q. 619 (1992), *excerpted in* RECHTSCHAFFEN & GAUNA, supra note 22 at 247.

60 *Id.*

61 *Id.*

62 *Id.*

63 *Id.*

64 Collin, *supra* note 2.

B. (Non)Traditional Legal Methods

Though litigation as a strategy is not an effective tool for community education, movement building, or for addressing the causes of a problem, lawyers can help community groups use the law to their advantage in many different ways. Additionally, progressive policy-makers can make public institutions more friendly toward sustainable development. One example of such a policy is the "locationally-efficient mortgage."[65] This program allows urban homeowners to qualify for bigger mortgages on lower incomes by accounting for saved commuting costs. Urban housing thus becomes cheaper and suburban sprawl more expensive, reflecting the latter's higher social and environmental costs.[66] Similar lending programs already exist which qualify energy-efficient homes for bigger mortgages on less income because lower energy costs can support more debt service.[67]

Laws at the county and municipal level, such as San Francisco's Resource-Efficient Building (REB) ordinance, promote sustainable development and subsequently reduce adverse environmental impacts through better management of waste and more efficient use of energy.[68] The REB or "green building" ordinance went into effect in 1999 in an effort to address the serious environmental impacts of conventional building. On a national scale, conventional building accounts for 40% of annual energy use, 40% of ozone layer depletion, 35% of municipal solid waste, and 25% of water use.[69] Additionally, at least 30% of conventionally built buildings have poor indoor air quality and most people spent about 90% of their time indoors.[70] U.S. EPA estimates the direct health care costs associated with "sick" buildings at $30 billion annually, with another $100 billion in sick leave and lost productivity.[71] San Francisco city staff projectors have estimated that implementation of the REB ordinance will save the City and County $22 million over ten years.[72] If the projections prove at all accurate, we should expect that municipalities across the country will be scrambling to create and implement similar ordinances. Legal professionals could play a crucial role in shaping these

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65 HAWKEN ET AL., *supra* note 30 at 46.

66 *Id.*

67 *Id.*

68 *See* San Francisco Mun. Code § 82.1, (1999) *available at* http://www.ci.sf.ca.us/sfenvironment/aboutus/policy/legisation/efficient.htm#4.

69 Fact sheet on green building, San Francisco Department of the Environment, *available at* http://www.ci.sf.ca.us/sfenvironment/facts/resouce_bldg.htm.

70 *Id.*

71 Peter Asmus, *San Francisco Has a Chance to Lead Green Building Revolution* (May 12, 1999), *available at* http://www.pacificnews.org/jinn/stories/5.10/990512-green-building.html.

72 *Id.*

laws and ensuring that municipal governments address EJ community concerns.

Once a region, city, or community begins to implement sustainable development policies, it can utilize a number of indicators to monitor its progress. Some of these indicators may be percentage of the workforce concentrated in the largest five employers, greenhouse gas emissions per capita, number of community gardens, net growth in livable wage jobs, voter turnout in municipal elections, pounds of toxics produced and released per year, homeownership rates, and community volunteerism by age group.[73]

Regional and community organizations should identify the indicators best suited to their specific goals. The Bay Area Alliance for Sustainable Development in Oakland, California highlights ten "commitments to action" in its Compact for a Sustainable Bay Area (Compact).[74] These commitments address specific Bay Area environmental, economic, and social concerns. Each of the ten commitments to action has several "sustainable development indicators" to be used in monitoring its progress. For example, under commitment five, "Use Resources Efficiently, Eliminate Pollution, and Significantly Reduce Waste," the Alliance has identified (among other indicators) days in violation of air quality standards and toxic pollutants discharged into San Francisco Bay as sustainable development indicators.[75] Commitment two is "Accommodate Sufficient Housing Affordable to All Income Levels within the Bay Area to Match Population Increases and Job Generation." Some of its sustainable development indicators include average density of new housing and percent of total housing within 1/2 mile of transit nodes, and number of homeless, including data by ethnicity and gender.[76]

While the *Compact* is huge in the scope of policy and change it hopes to facilitate, it demonstrates how a regional plan for sustainability can be mapped out. Planning for sustainable development requires a more holistic, interconnected view of socioeconomic and environmental issues than many legal professionals are accustomed to taking. The legal world itself is fragmented between corporate and public interests, environmental, economic, and social issues, and local, state, and federal concerns. In accordance with principles of sustainability, legal professionals must begin to use their diversity of perspectives as a problem solving resource rather than allowing so-called competing interests (see discus-

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[73] Hempel, *supra* note 3, at 64.

[74] BAY AREA ALLIANCE FOR SUSTSAINABLE COMMUNITIES, *supra* note 9, at 8.

[75] *Id.* at app. A.

[76] *Id.*

sion of false dichotomies, *supra*) to waste resources and exacerbate socioeconomic and environmental problems.

The fact that the legal profession is much better at litigating than it is at solving problems is a serious problem for the law.[77] In many circumstances, it seems doubtful that communities need lawyers in the conventional sense at all. However, community groups undoubtedly need people who understand the law and who have problem-solving, negotiation, research and writing skills. If lawyers can provide those services, the future of the legal profession in a more sustainable world looks hopeful.

VI. CONCLUSION

Sustainability requires changes in individual, community, and corporate thinking and behavior that government mandate and coercion cannot achieve. Nevertheless, lawyers and policymakers must identify existing legal structures in areas of government, business, and social policy that either encourage or obstruct sustainable development and the equitable distribution of environmental benefits and burdens. Once identified, helpful structures can be utilized more intensively, while less helpful or even unjust structures could be dismantled and recycled. As Paul Hawken suggests, we already possess most of the ideas and technology required to redesign business and restore the world; all we need is collective will.[78]

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[77] Colloquium, *supra* note 10, at 130 (statement by Professor Robin Collin).
[78] HAWKEN, *supra* note 5, at 17.

THE "*ERIN BROCKOVICH* EFFECT": HOW MEDIA SHAPES TOXICS POLICY

*Sedina Banks**

I. INTRODUCTION

Looking back on this past century, several events stand out as pivotal turning points in environmental toxics policy. These events helped shape the evolving realm of toxics policy and guided the direction that it would take in the future. Undoubtedly included among these policy-shaping events are Rachel Carson's 1962 publication of *Silent Spring* and the 1978 events at Love Canal.[1] *Silent Spring* helped launch the environmental movement and spurred a nation to question its role in altering the environment through chemical means.[2] The toxic catastrophe of Love Canal gripped the nation, as it became the first man-made disaster to be designated as a federal emergency.[3]

Few would question the importance of these two events in the timeline of the environmental movement. However, why did these events have a profound and lasting impact on toxics policy? *Silent Spring* and Love Canal became pivotal in shaping toxics policy because each environmental event had both a real-world impact and mass media appeal. The media attention garnered by each of these events led to national awareness and concern for the toxics issue involved. Consequently, policy makers developed environmental toxics policies to respond to the public's heightened concern.

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* J.D. 2003 University of California, Davis School of Law. Thanks to Professor Holly D. Doremus. This article is dedicated to my parents.

[1] In 1978 the New York neighborhood of Love Canal became contaminated with toxic waste when chemicals from an old dumpsite began seeping into residential basements and schoolyards. *See* Andrew J. Hoffman, *An uneasy rebirth at Love Canal*, Helen Dwight Reid Educational Foundation Environment, Mar. 13, 1995, at Vol. 37, No. 2, p.4, *available at* http://www.lexis.com.

[2] Hillary Mayell, *Environmental Movement at 40: Is Earth Healthier?* NAT'L GEOGRAPHIC NEWS, Apr. 19, 2002, *at* http://www.news.nationalgeographic.com/news/2002/0419_020419_rachelcarson.html (*Silent Spring* "is widely credited with launching today's environmental movement.").

[3] President of the United States Jimmy Carter declared Love Canal a federal emergency on August 7, 1978. *See* Love Canal Collection: Background on the Love Canal, Univ. Archives, Univ. Libraries, State Univ. of N.Y. at Buffalo, *at* http://www.ublib.buffalo.edu/libraries/projects/lovecanal/background_lovecanal.html (last modified Oct. 17, 2001).

Yet years from now, a seemingly unconventional event may be included with these other policy-shaping events—namely the movie *Erin Brockovich*.[4] Based on a true story, *Erin Brockovich* dealt with how one company contaminated a small Californian desert town's water supply with chromium 6.[5] At first glance some may question whether a movie could have any legitimate effect on toxics policy. Change, however, can and does come through alternative vessels. Many parallels can be drawn between the impact of *Erin Brockovich* on toxics policy and the other policy-shaping events.

This paper will explore how and why *Erin Brockovich* may someday be included with *Silent Spring* and Love Canal as a major event that shaped toxics policy, specifically the regulation of chromium 6. This paper will also focus on the unfolding debate in Glendale, California, regarding the safety of its water supply. Finally, this paper will examine the steps that policy makers continue to take in response to the public's concern regarding the toxicity of chromium 6 in their drinking water.

II. History of Interplay Between Publicity and Toxics Policy

A. *Silent Spring*

Rachel Carson's *Silent Spring* awakened a nation to the detrimental health and environmental consequences of DDT (dichloro-dephenyl-trichloro-ethane). The title for *Silent Spring* came from the book's apocalyptic vision of the long-term ecosystem destruction caused by indiscriminate spraying.[6] "There was once a town in the heart of America where all life seemed to live in harmony with its surroundings . . . Then a strange blight crept over the area and everything began to change . . . There was a strange stillness . . . The few birds seen anywhere were moribund; they trembled violently and could not fly. It was a spring without voices. On the morning that had once throbbed with the dawn chorus of scores of bird voices there was now no sound; only silence lay over the

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[4] Directed by Steven Soderbergh and starring Julia Roberts, *Erin Brockovich* was based on the true story of how one company contaminated a small Californian desert town's water supply with chromium 6. Erin Brockovich (Universal Studios Mar. 2000); *see eg.* Andrew Gumbel, *This Woman is at a Film Premiere, but She is Not a Film Star*, Indep. (London), Apr. 1, 2000, Features at 1, *available at*, http://www.lexis.com.

[5] *Id.*

[6] Jonathan N. Leonard, *Rachel Carson Dies of Cancer: 'Silent Spring' Author was 56*, N.Y. Times, Apr. 15, 1964, *at* http://www.nytimes.com/books/97/10/05/reviews/carson-obit.html.

fields and woods and marsh."[7] *Silent Spring* warned mainstream America about the dangers of DDT, a persistent, toxic chemical that would threaten public health and the environment for years to come.[8] The book outlined how DDT disrupts the natural ecological balance by accumulating in the food chain and harming non-target organisms such as birds, fish, and perhaps even humans.[9]

DDT became the pesticide of choice for agriculture after its first mass use in World War II.[10] Following the 1945 approval of DDT for civilian use, farmers frequently applied the chemical, already known to be toxic, throughout the country.[11] Over the next thirty years, approximately 1.35 billion pounds of DDT was used domestically.[12]

As early as the mid-1940's, scientists began warning people about the possible effects of DDT.[13] Not until, *Silent Spring,* however, did the general public become aware of the risk. *Silent Spring* had an immediate and profound impact on public opinion regarding DDT. On its publication date, September 27, 1962, Rachel Carson's book sold 40,000 advance copies and the Book of the Month Club ordered up another 150,000.[14] Growing more popular over time, *Silent Spring* remained a bestseller for a year. The book was eventually translated into many languages and has enjoyed ongoing success as a foundational environmental text.[15] *Silent Spring's* message, however, has not gone unchallenged.

The chemical industry vehemently opposed *Silent Spring*, spending more than $250,000 in a publicity campaign against Carson and her book.[16] The Monsanto Company, one of the nation's largest chemical

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[7] Peter Matthiessen, *Rachel Carson*, TIME MAG., *at* http://www.time.com/time/time100/scientist/profile/carson.html (*quoting* Rachel Carson, SILENT SPRING, Houghton Mifflin, Riverside Press,1962).

[8] *See generally* Rachel Carson, SILENT SPRING, Houghton Mifflin, Riverside Press,1962.

[9] *Id.*

[10] Excerpt from *DDT, A Review of Scientific and Economic Aspects of the Decision To Ban Its Use as a Pesticide*, prepared for the Committee on Appropriations of the U.S. House of Representatives by EPA, (July 1975), (EPA-540/1-75-022), *available at* http://www.epa.gov/history/topics/ddt/02.htm (last modified May 01, 2002).

[11] Toxic Chemicals & Health: Pesticides: In brief History, *at* http://www.nrdc.org/health/pesticides/hcarson.asp (last modified Apr. 16, 1997).

[12] Excerpt from *DDT, A Review of Scientific and Economic Aspects of the Decision To Ban Its Use as a Pesticide*, prepared for the Committee on Appropriations of the U.S. House of Representatives by EPA, July 1975, EPA-540/1-75-022, *available at* http://www.epa.gov/history/topics/ddt/02.htm (last modified May 01, 2002).

[13] *Id.*

[14] Dorothy McLaughlin, *Silent Spring Revisited*, *at* http://www.pbs.org/wgbh/pages/frontline/shows/nature/disrupt/sspring.html (last visited Apr. 27, 2002).

[15] A Science Odyssey: People and Discoveries: Rachel Carson, *at* http://www.pbs.org/wgbh/aso/databank/entries/btcars.html (last visited Apr. 27, 2002).

[16] *Environmental Truths*, COLUM. JOURNALISM REV., *at* http://www.cjr.org/year/01/6/1962.asp (last visited Apr. 27, 2002).

concerns, distributed a parody of *Silent Spring* entitled "*The Desolate Year.*"[17] The chemical industry's counterattack described a desperate world plagued with famine, disease, and overrun by insects due to the banning of pesticides.[18] A spokesman for the industry claimed, "if man were to follow the teachings of Ms. Carson, we would return to the Dark Ages, and the insects and diseases and vermin would once again inherit the earth."[19]

Notwithstanding the chemical industry's criticism of *Silent Spring*, the book affected DDT use within the United States. In the early 1970's, application of DDT declined drastically from a peak of approximately 80 million pounds per year in 1959 to just 12 million pounds domestically.[20] One of the reasons for this decline was the increasing public concern about the environmental and health effects of DDT.[21] During this same period, a group of scientists seeking a complete ban on DDT founded the Environmental Defense Fund, which has remained one of the leading environmental organizations in the country to this day.[22]

Silent Spring also sparked an immediate political reaction. On August 29, 1962 President John F. Kennedy announced that Federal agencies were going to take a closer look at the pesticide problem outlined in *Silent Spring*.[23] On May 15, 1963 the President's Science Advisory Committee released a report containing recommendations for the use and regulation of pesticides in the United States.[24] The advisory report, entitled "The Use of Pesticides," recommended the decreased use of toxic chemicals and, when chemicals were used, they should be less persistent in the environment.[25] The report also cited *Silent Spring*, noting that—

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17 Jonathan N. Leonard, *Rachel Carson Dies of Cancer: 'Silent Spring' Author was 56,* N.Y. TIMES, Apr. 15, 1964, http://www.nytimes.com/books/97/10/05/reviews/carson-obit.html.

18 *Id.*

19 Statement by Dr. Robert White-Stevens, a former biochemist and assistant director of the Agricultural Research Division of American, *quoted in,* Dorothy McLaughlin, *Silent Spring Revisited*, *at* http://www.pbs.org/wgbh/pages/frontline/shows/nature/disrupt/sspring.html (last visited Apr. 27, 2002).

20 Excerpt from *DDT, A Review of Scientific and Economic Aspects of the Decision To Ban Its Use as a Pesticide*, prepared for the Committee on Appropriations of the U.S. House of Representatives by EPA, July 1975, EPA-540/1-75-022, *available at* http://www.epa.gov/history/topics/ddt/02.htm (last modified May 01, 2002).

21 *Id.*

22 ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY 280 (2ND ED. 1996).

23 Dorothy McLaughlin, *Silent Spring Revisited*, *at* http://www.pbs.org/wgbh/pages/frontline/shows/nature/disrupt/sspring.html (last visited Apr. 27, 2002).

24 President's Science Advisory Committee, *Use of Pesticides* (1963).

25 Dorothy McLaughlin, *Silent Spring Revisited*, *at* http://www.pbs.org/wgbh/pages/frontline/shows/nature/disrupt/sspring.html (last visited Apr. 27, 2002).

"until the publication of *Silent Spring*, people were generally unaware of the toxicity of pesticides."[26]

The growing public concern and scientific evidence regarding the environmental effects of DDT eventually led the United States Environmental Protection Agency (EPA), established in 1970, to take action to ban DDT. On June 14, 1972, EPA announced the final cancellation of all remaining crop uses of DDT in the U.S.[27] DDT was the first pesticide banned by EPA.[28]

To this day, some groups oppose *Silent Spring*'s message and the banning of DDT.[29] In May of 1997 the American Council on Science and Health (ACSH) published *Facts Versus Fears: A Review of the Greatest Unfounded Health Scares of Recent Times*, which criticizes the banning of DDT.[30] Founded by a group of scientists in 1978, ACSH claims to be "a consumer education consortium concerned with issues related to food, nutrition, chemicals, pharmaceuticals, lifestyle, the environment and health."[31] ACSH asserts that *Silent Spring* was "scientifically flawed" and argues that there is insufficient scientific evidence to support the banning of DDT.[32]

Admirers and critics of Carson, however, concede that the publication of *Silent Spring* marked a pivotal moment in the development of the modern environmental movement and toxics policy. *Silent Spring* ranked as one of the top news stories of the last century, selected as the 57th most important news event by journalists and scholars in the Newseum's list of the 20th Century's top 100 stories.[33] U.S. News listed Carson as one of the "25 Makers of the American Century."[34] Time Magazine included Carson as one the top 20 "Most Influential Scientists

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[26] *Id.*

[27] Consolidated DDT Hearings: Opinions and Order of the Administrator, 37 Fed. Reg. 13,369 (1972).

[28] People and Profiles: The Power of One, (June 8, 2000) *at* http://www.epa.gov/epahome/people2_0608.htm (last modified Mar. 19, 2002).

[29] Adam J. Lieberman & Simona C. Kwon M.P.H., *Facts Versus Fears: A Review of the Greatest Unfounded Health Scares of Recent Times*, American Council on Science and Health (3d. ed. 1998), *available at* http://www.acsh.org/publications/reports/facts3.pdf.

[30] *Id.*

[31] A group of scientists founded the American Council on Science and Health in 1978. American Council on Science and Health, *About ACSH*, *available at* http://www.acsh.org/about/index.html (last visited on Apr. 27, 2002).

[32] *Id.*

[33] *Id.*

[34] U.S. News, *25 Makers of the American Century*, at http://www.usnews.com/usnews/news/991227/makers.htm (last visited Mar. 10, 2003).

and Thinkers of the 20th Century,"[35] despite having first questioned the book's accuracy and validity in a 1962 review.[36]

One of *Silent Spring's* lasting effects is that it brought into the consciousness of the public and the government the notion that no chemical should be assumed "safe." *Silent Spring* helped shape toxics policy because the potential health effects of DDT addressed in *Silent Spring* left people questioning the safety of the environment around them. It had a real-world impact because at the time of *Silent Spring's* publication few people were immune from coming in contact with the DDT-tainted environment. The subsequent debate and media attention surrounding *Silent Spring* further fueled the public's awareness of the potential environmental and health problems DDT created. This convergence of factors helped ignite the environmental movement, shape toxics policy, and led to EPA's banning of DDT.

B. Love Canal

A second milestone in the evolution of toxics policy was the tragedy of Love Canal. Love Canal told the cautionary tale of what can happen when industries that pollute are unregulated. The original Love Canal site consisted of a 16-acre parcel of land located in the City of Niagara Falls, New York.[37] In the 1890's, entrepreneur William T. Love began constructing the canal to provide cheap hydroelectric power for his industrial "city of the future."[38] When Love's plan fell through in 1942, the Hooker Chemicals and Plastics Corporation (acquired by Occidental Chemical Corp. in 1968) purchased the site.[39] Hooker used the site as its primary dumping ground for toxic chemicals from its Niagara Falls plant until 1953,[40] dumping over 21,000 tons of at least 200 different chemicals at the site.[41]

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[35] Peter Matthiessen, *Rachel Carson*, TIME MAG., *available at* http://www.time.com/time/time100/scientist/profile/carson.html (last visited Apr. 27, 2002).

[36] Hillary Mayell, *Environmental Movement at 40: Is Earth Healthier?* NAT'L GEOGRAPHIC NEWS, Apr. 19, 2002, *at* http://www.news.nationalgeographic.com/news/2002/0419_020419_rachelcarson.html.

[37] *United States v. Hooker Chemical & Plastics Corp.*, 850 F. Supp. 993 (W.D.N.Y. 1994).

[38] Andrew J. Hoffman, *An uneasy rebirth at Love Canal*, Helen Dwight Reid Educational Foundation Environment, Mar. 13, 1995, at Vol. 37, No. 2, p.4, *available at* http://www.lexis.com.

[39] *Id.*

[40] *United States v. Hooker Chemical & Plastics Corp.*, 850 F. Supp. 993 (W.D.N.Y. 1994).

[41] Andrew J. Hoffman, *An uneasy rebirth at Love Canal*, Helen Dwight Reid Educational Foundation Environment, Mar. 13, 1995, at Vol. 37, No. 2, p.4, *available at* http://www.lexis.com.

In 1953, with the landfill at maximum capacity,[42] Hooker covered the wastes with a protective clay cap.[43] The Niagara Falls Board of Education purchased the site from Hooker for $1 despite the company's warnings that hazardous chemicals were buried at the site.[44] Shortly thereafter, construction began on 100 homes with an elementary school to be built on the center of the landfill.[45] During this time Hooker continued to dump fly ash at the site for a period of one year.[46] Prospective homeowners, however, were not warned about the potential health hazards connected with the site.[47] Homeowners began to flock to the developing residential community of Love Canal, unaware of the toxic sludge that lay beneath their homes, schools, and parks.

Health problems began almost immediately, when toxic wastes were exposed during the development of the site.[48] For two decades chemicals migrated to the surface of Love Canal.[49] Although area residents repeatedly complained of odors and mysterious "substances" surfacing in their yards, the City merely covered the substances with dirt or clay.[50] By the late 1970's, many residents of this primarily working-class neighborhood became increasingly concerned with the inexplicable health effects of living in Love Canal.[51] For example, numerous children in the area required treatment for face and eye burns caused by exposure to the toxic chemicals.[52]

In 1978, the tragedy finally received national attention when, following heavy rains, a "chemical soup" began seeping to the surface of Love Canal, invading the backyards, basements and schoolyards of Love Canal

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[42] Love Canal Collection: Background on the Love Canal, Univ. Archives, Univ. Libraries, State Univ. of N.Y. at Buffalo, *at* http://www.ublib.buffalo.edu/libraries/projects/lovecanal/background_lovecanal.html (las modified Oct. 17, 2001).

[43] Andrew J. Hoffman, *An uneasy rebirth at Love Canal*, Helen Dwight Reid Educational Foundation Environment, Mar. 13, 1995, at Vol. 37, No. 2, p.4, *available at* http://www.lexis.com.

[44] *Id.*

[45] *Id.*

[46] *United States v. Hooker Chemical & Plastics Corp.*, 850 F. Supp. 993 (W.D.N.Y. 1994).

[47] Love Canal Collection: Background on the Love Canal, Univ. Archives, Univ. Libraries, State Univ. of N.Y. at Buffalo, *at* http://www.ublib.buffalo.edu/libraries/projects/lovecanal/background_lovecanal.html (las modified Oct. 17, 2001).

[48] *United States v. Hooker Chemical & Plastics Corp.*, 850 F. Supp. 993 (W.D.N.Y. 1994).

[49] Federal Environmental Superfund Records, Love Canal, Sept. 26, 1988, *available at* http://www.westlaw.com.

[50] Love Canal Collection: Background on the Love Canal, Univ. Archives, Univ. Libraries, State Univ. of N.Y. at Buffalo, *at* http://www.ublib.buffalo.edu/libraries/projects/lovecanal/background_lovecanal.html (las modified Oct. 17, 2001).

[51] *Id.*

[52] *United States v. Hooker Chemical & Plastics Corp.*, 850 F. Supp. 993 (W.D.N.Y. 1994).

residents.[53] At the time, roughly 7,400 residents lived on top of or adjacent to the toxic disaster of Love Canal.[54] The New York State Health Department investigated and discovered high rates of birth defects, miscarriages, epilepsy, and, liver abnormalities, as well as incidences of sores, rectal bleeding, and headaches.[55] A series of newspaper articles written by the Niagara Gazette further highlighted for the nation the toxic tragedy unfolding in Love Canal.[56] Clearly Love Canal could no longer be ignored.

On August 7, 1978, President Jimmy Carter declared Love Canal a federal emergency—the nation's first federal emergency for a non-natural environmental disaster.[57] Subsequent media attention surrounding Love Canal became a major factor in Congressional passage of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).[58] Love Canal and the media attention "propelled the problems of inadequate hazardous chemical waste disposal into the national spotlight."[59]

The legislative history of CERCLA expressly mentions the incidents at Love Canal at several points.[60] Furthermore, in addressing the Committee on the Environment and Public Works, President Carter stated that the "human suffering and financial costs associated with the Love Canal site are a national tragedy." On December 11, 1980, when President Carter signed CERCLA into law, he stated that Love Canal was a "stark reminder of the neglect in our society to deal with [the] growing problem" of toxic wastes.[61]

CERCLA, commonly referred to as the "Superfund" law, creates incentives for preventing the release of hazardous substances and ensures that toxic and potentially dangerous sites are properly cleaned up.[62]

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[53] *Id.*

[54] Paul MacClennan, *The Environmental Legacy of Love Canal*, BUFF. NEWS, July 26, 1998, at 1H, *available at* http://www.lexis.com.

[55] S. Rep. No. 848, 96th Cong., 2d Sess., at 8 (1980)(quoting Michael H. Brown, *Love Canal, U.S.A.*, N.Y. TIMES MAG., Jan. 21, 1979, at 23).

[56] Love Canal Collection: Background on the Love Canal, Univ. Archives, Univ. Libraries, State Univ. of N.Y. at Buffalo, *at* http://www.ublib.buffalo.edu/libraries/projects/lovecanal/background_lovecanal.html (las modified Oct. 17, 2001).

[57] Paul MacClennan, *The Environmental Legacy of Love Canal*, BUFF. NEWS, July 26, 1998, at 1H, *available at* http://www.lexis.com.

[58] ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY 280 (2ND ED. 1996).

[59] S. REP. NO. 848, 96TH CONG., 2D SESS., at 7 (1980).

[60] *See* S. REP. NO. 848, 96TH CONG., 2D Sess., at 8-10 (1980); H.R. Rep. No. 1016, 96th Cong., 2d Sess., pt. 1, at 18-20 (1980).

[61] REMARKS OF PRESIDENT CARTER ON SIGNING PUBLIC LAW 96-510, 16 WEEKLY COMP. PRES. DOC. 50 (Dec. 11, (1980).

[62] *See eg.* Michael P. Healy, *Direct Liability for Hazardous Substance Cleanups Under CERCLA: A Comprehensive Approach*, 42 CASE W. RES. L. REV. 65, 77 (1992).

On September 8, 1983, EPA classified Love Canal as one of the first sites on the Superfund list.[63] Today Superfund monies help finance the government's clean up of hazardous waste sites throughout the United States.[64] Love Canal and the media circus that followed served as catalysts for the regulation of hazardous waste dumping and cleanup.

The events surrounding Love Canal, like *Silent Spring*, had both a real-world impact and mass media appeal. The events of Love Canal had a real-world impact because people across the nation could relate to the residents of Love Canal. Therefore, the resulting toxic tragedy that ensued at Love Canal garnered mass media attention. This heightened media attention and resulting public concern helped shape toxics policy and directly led to the passage of CERCLA.

III. *ERIN BROCKOVICH* AND THE REGULATION OF CHROMIUM 6

There is a clear pattern in the impact of *Silent Spring* and Love Canal on toxics policy. First, both events gained widespread media attention as the stories surrounding them represented an environmental event that could not be ignored. Second, the publication of *Silent Spring* and the tragedy of Love Canal opened America's eyes to the hazards of chemicals in the environment. Third, policy makers were forced to take measures to alter then existing policies to respond to growing public concern. *Erin Brockovich* follows this same pattern.

A. The Story, the Movie, and the Outcry

1. The Story

As with *Silent Spring* and Love Canal the environmental phenomenon depicted in the movie *Erin Brockovich* has inspired fear and concern in the public psyche. The story begins in Hinkley, California, a town of roughly 3,500 residents, located 120 miles northeast of Los Angeles.[65] Hinkley is also home to a natural gas compressor station belonging to Pacific Gas & Electric Company (PG&E), a Californian utility that is an affiliate of one of the world's largest energy companies.[66] In the 1980's, residents of this small San Bernardino County town began complaining

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[63] 48 Fed. Reg. 40658 (Sept. 8, 1083).

[64] Michael P. Healy, *Direct Liability for Hazardous Substance Cleanups Under CERCLA: A Comprehensive Approach*, 42 CASE W. RES. L. REV. 65, 73 (1992)("CERCLA's paramount goal is to facilitate cleanup of hazardous substances through Superfund-financed and privately-financed response actions.").

[65] Kathleen Sharp, *Erin Brockovich: The Real Story*, SALON ARTS & ENT., *at* http://www.salon.com/ent/feature/2000/04/14/sharp/index/html (Apr. 14, 2000).

[66] Robert W. Welkos, *Digging For the Truth*, L.A. TIMES, Mar. 12, 2000, Calendar at 8, *available at* http://www.lexis.com.

that PG&E's compressor station had polluted their drinking water supply with chromium 6.[67]

PG&E built the Hinkley compressor station in 1952 as part of a pipeline system that brings natural gas into PG&E's service territory.[68] The natural gas flows through a pipeline from the Texas Panhandle to California and then throughout much of the state, fueling heating systems and power plants.[69] As the natural gas moves through the pipeline friction causes the gas to lose pressure.[70] Compressor stations like the one in Hinkley force the gas back up to a higher pressure to facilitate transmission.[71] During this process oil and water cool the gas compressor.[72] To prevent rust from corroding the cooling PG&E uses a corrosion inhibitor.[73]

Chromium 6 is one of the cheapest and most efficient commercially available corrosion inhibitors and was used by PG&E in their compressor stations.[74] Unfortunately, chromium 6 is also highly toxic suspected carcinogen.[75] PG&E used chromium 6 as its corrosion inhibitor.[76] Reminiscent of Hooker Chemical's activities at Love Canal, PG&E disposed huge amounts of chromium-tainted water into open, unlined ponds from 1952 to 1966.[77] During this period, PG&E workers allegedly discharged roughly 370 million gallons of chromium-tainted wastewater into spreading ponds around Hinkley.[78]

In 1987, during an environmental assessment, PG&E discovered that the chromium had migrated into Hinkley's groundwater supply, contaminating ten private drinking wells with chromium 6 concentrations exceeding the state standard.[79] Some Hinkley residents claim that PG&E

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67 *Id.*

68 Joe Koutsky, *Executive Officer's Report: PG&E Hinkley and the Film Erin Brockovich*, Lahontan Regional Water Quality Control Board, Mar. 2000, *available at* http://www.swrcb.ca.gov/rwqcb6/eor/eor300.htm (on file with author).

69 Robert W. Welkos, *Digging For the Truth*, L.A. TIMES, Mar. 12, 2000, Calendar at 8, *available at* http://www.lexis.com.

70 An Overview of a Natural Gas Compressor Station, BSI Group, *at* http://www.bsicos.com/global/Gas_Compression.htm (last modified 1998).

71 *Id.*

72 *Id.*

73 Factsheet: Eliminating Hexavalent Chrome From Cooling Towers, L.A. Board of Public Works: Hazardous and Toxic Materials Office, *available at* http://es.epa.gov/techinfo/facts/ca-htm/htmfact3.html (last modified Nov. 13, 1995).

74 *Id.*

75 *Id.*

76 Kathleen Sharp, *Erin Brockovich: The Real Story*, SALON ARTS & ENT., *at* http://www.salon.com/ent/feature/2000/04/14/sharp/index/html (Apr. 14, 2000).

77 *California Utility Agrees to Settle Suit by Residents for $50 Million to $400 Million*, BNA TOXICS L. DAILY, May 11, 1995, *available at,* http://www.lexis.com.

78 *Id.*

79 Joe Koutsky, *Executive Officer's Report: Public Health Assessment for Pacific Gas and Electric site in Hinkley, San Bernardino County,* Lahontan Regional Water

knew of the chromium 6 contamination as early as 1965 but told no one.[80] On December 7, 1987, PG&E notified the Lahontan Regional Water Quality Board (LRWQB), which is responsible for Hinkley's water supply, and San Bernardino County about the contamination.[81] On December 27, 1987, LRWQB issued Cleanup and Abatement Order 6-87-160, requiring PG&E to clean up the contaminated groundwater.[82] PG&E then began cleaning up a 290-acre underground plume of toxic, chromium 6-laced material.[83] Throughout the early 1990's, PG&E spent $12.5 million on this effort and approached the owners of three farms and ten houses in the area to inquire about buying their property.[84] When the company agreed to pay ten times the fair market value of one property, Hinkley townspeople became suspicious and took measures to file suit.[85]

Hinkley residents, among other people, began to believe that PG&E's use of chromium 6 in its natural gas compressor stations was causing severe health problems in populations exposed to the chemical.[86] Many claimed that exposure to the contaminated water, soil, and dust particles were responsible for health problems including cancer, tumors, and birth defects.[87] In response, PG&E argued that the frequency of these types of health problems was not statistically significant in a population the size of Hinkley.[88] Yet, Hinkley's residents were exposed to the chromium everyday—drinking it in their water, and bathing in it and inhaling its vapors in the pool or showers.[89]

Quality Control Board, Feb. 2001, *available at* http://www.swrcb.ca.gov/rwqcb6/eor/eor201.htm (last visited Apr. 27, 2002) (on file with author).

[80] Joseph Ascenzi, *Toxics suit cites PG&E in 4 deaths: Action by 56 plaintiffs says toxic water used to fill swimming pools*, BUS. PRESS/CAL., Aug. 14, 2000, *available at*, http://www.lexis.com.

[81] Joe Koutsky, *Executive Officer's Report: PG&E Hinkley and the Film Erin Brockovich*, Lahontan Regional Water Quality Control Board, Mar. 2000, *available at* http://www.swrcb.ca.gov/rwqcb6/eor/eor300.htm (on file with author).

[82] *Id.*

[83] *California Utility Agrees to Settle Suit by Residents for $50 Million to $400 Million*, BNA TOXICS L. DAILY, May 11, 1995, *available at,* http://www.lexis.com.

[84] Kathleen Sharp, *Erin Brockovich: The Real Story*, SALON ARTS & ENT., *at* http://www.salon.com/ent/feature/2000/04/14/sharp/index/html (Apr. 14, 2000).

[85] *Id.*

[86] *California Utility Agrees to Settle Suit by Residents for $50 Million to $400 Million*, BNA TOXICS L. DAILY, May 11, 1995, *available at,* http://www.lexis.com.

[87] *See California Utility Agrees to Settle Suit by Residents for $50 Million to $400 Million*, BNA TOXICS L. DAILY, May 11, 1995, *available at,* Lexis, News; Kathleen Sharp, *Erin Brockovich: The Real Story*, SALON ARTS & ENT., *at* http://www.salon.com/ent/feature/2000/04/14/sharp/index/html (Apr. 14, 2000).

[88] Robert W. Welkos, *Digging For the Truth*, L.A. TIMES, Mar. 12, 2000, Calendar at 8, *available at* http://www.lexis.com.

[89] *Id.*

Approximately 650 plaintiffs claimed that PG&E failed to warn them of the potential health risks associated with chromium 6.[90] Attorneys for the plaintiffs also alleged that two PG&E employees-turned whistleblowers were instructed by PG&E to dump all of the Hinkley compressor station records.[91] We may never know the full story, because the subsequent lawsuit (Anderson v. Pacific Gas & Electric Co., Superior Ct. for County of San Bernardino, Barstow Division, file BCV 00300), filed in 1993, was eventually settled for a $333 million payment in an undisclosed arbitration agreement.[92] At the time, this represented the largest settlement amount ever paid in a lawsuit in United States history.[93]

Settlement offers cannot be used in court against a party as evidence of wrongdoing.[94] Because the arbitration was closed to the public, it is unclear exactly what scientific proof the plaintiffs presented or whether PG&E's actions actually harmed the health of Hinkley's residents.[95] In the realm of public opinion, however, a $333 million settlement is as good as a conviction. PG&E's alleged cover-up of its activities and the enormity of the settlement sum dramatically increased the intrigue of the story and began to focus some attention on the potential dangers of chromium 6. Most people, however, may never have known about the residents of Hinkley or about chromium 6 if Hollywood had not taken an interest in telling the story.[96]

2. The Movie

Erin Brockovich was an indisputable Hollywood success. Moviegoers and critics alike praised and embraced the story about a single working mother's fight against a company that contaminated a small town's water with chromium 6 and then tried to cover up the danger.[97]

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[90] *California Utility Agrees to Settle Suit by Residents for $50 Million to $400 Million*, BNA TOXICS L. DAILY, May 11, 1995, *available at,* http://www.lexis.com.

[91] Robert W. Welkos, *Digging For the Truth*, L.A. TIMES, Mar. 12, 2000, Calendar at 8, *available at* http://www.lexis.com.

[92] Federal News Service, *National Press Club Luncheon with Erin Brockovich, Activist*, Aug.16, 2001, *available at* http://www.lexis.com.

[93] Martha Hamilton, *Big Business Plays the Heavy on Film; Companies Deal with Unwanted Fame*, WASH. POST, Apr. 7, 2000, Financial at E3, *available at* http://www.lexis.com.

[94] FED. R. EVID. 408.

[95] Kathleen Sharp, *Erin Brockovich: The Real Story*, SALON ARTS & ENT., *at* http://www.salon.com/ent/feature/2000/04/14/sharp/index/html (Apr. 14, 2000).

[96] *See eg.* Andrew Gumbel, *This Woman is at a Film Premiere, but She is Not a Film Star*, INDEP. (London), Apr. 1, 2000, Features at 1, *available at*, http://www.lexis.com.

[97] Kathleen Sharp, *Erin Brockovich: The Real Story*, SALON ARTS & ENT., *at* http://www.salon.com/ent/feature/2000/04/14/sharp/index/html (Apr. 14, 2000).

Ads for the movie proclaimed "[s]he brought a small town to its feet and a huge company to its knees."[98]

The movie, directed by Steven Soderbergh and starring Julia Roberts, was an instant box office hit.[99] Released in March of 2000, in roughly two years *Erin Brockovich* grossed almost $260 million dollars worldwide.[100] The movie received five Academy Award nominations and the film's heroine Julia Roberts won best actress for her portrayal of Ms. Brockovich.[101] More than just box office success, *Erin Brockovich* "added new momentum to the real-life story."[102] *Erin Brockovich* was the initial media mechanism to garner public awareness and concern about chromium 6.

Hollywood's influence, on the public perception of environmental issues does not come by accident.[103] Groups such as the Environmental Media Association (EMA), established in 1989, strive "to mobilize the entertainment community in a global effort to educate people about environmental problems and inspire them to act on those problems now."[104] EMA believes "in the power of the media [to influence public perception] and . . . [uses] that power to the environments' advantage."[105] Everything from what props are used on set, to television and movie storylines have been touched by an environmentally motivated Hollywood.[106] Although not involved with the production of *Erin Brockovich*,[107] on December 6, 2000, EMA presented *Erin Brockovich* with an

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98 *Erin Brockovich* Promotion, Universal Studios, *available at* http// www.erinbrockovich.com/home.html (last modified 2000).

99 *Id.*

100 The Numbers: Box Office Date, Movie Stars, Idle Speculation: Erin Brockovich, *at* http://www.the-numbers.com/movies/2000/ERINB.html (last modified Mar. 15, 2002).

101 Oscars 2001 Scorecard, E-Online, *at* http://www.eonline.com/Features/Awards/Oscars2001/Scorecard/ (last visited Apr. 27, 2002).

102 Andrew Gumbel, *This Woman is at a Film Premiere, but She is Not a Film Star*, INDEP. (London), Apr. 1, 2000, Features at 1, *available at*, http://www.lexis.com.

103 *See eg.* Gary Polakovic, *Seeing a Greener Big Screen; 'Erin Brockovich' has Plenty of Company as Films Increasingly Cast Polluters as the Villain*, L.A. TIMES, Mar. 27, 2001, at A1, *available at* http://www.lexis.com; Gretel Shueller, *Can Hollywood Save the World? Environmental Issues in the Movies*, SIERRA MAG., July 1, 2001, at Vol. 86, p.68, *available at* http://www.lexis.com.

104 Environmental Media Association, at http://www.ema-online.org/mission.htm (last visited May 5, 2002).

105 Environment Media Association, *About EMA*, at http://www.ema-online.org/what_we_do_about.htm (last visited Mar. 10, 2003).

106 Gretel Shueller, *Can Hollywood Save the World? Environmental Issues in the Movies*, SIERRA MAG., July 1, 2001, at Vol. 86, p.68, *available at* http://www.lexis.com.

107 Telephone Interview with Environmental Media Association Representative, (Mar. 10, 2003).

award to "recognize the meaningful use of an environmental theme" in a feature film.[108]

Some suggest, however, that Hollywood should not be used as a means to influence toxics policy.[109] Primarily industry advocates argue that Hollywood misrepresents industry's actions toward the environment and does not depict the steps industry takes to help protect our natural resources.[110] Also, given the unending complexity of environmental issues, movies cannot fully capture every side of an environmental issue.[111] *Erin Brockovich*, for instance, did not delve into all of the scientific uncertainty surrounding the toxicity of chromium 6 when ingested.[112] As one commentator contended the "current hysteria surrounding chromium is not based upon reliable science, but is a product of newspaper blitz," . . .and the media has "scared the consumers of water without a reasonable scientific basis."[113]

Nonetheless, *Erin Brockovich* served the important function of bringing awareness to the subject of our water quality. At the same time, the movie opened up channels of discussion for opponents of more stringent water regulation by creating a media forum to discuss water quality issues in general. In this respect, *Erin Brockovich* represents another source of information in a world where information can be accessed through books, the media, or even the touch of a keyboard. As with any source of information, the public has the ability to question its validity.

3. The Outcry

What press coverage chromium 6 and the Hinkley story first received paled in comparison to the media frenzy after the release of *Erin Brockovich*.[114] With the release of *Erin Brockovich* "all of a sudden, a

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[108] Environmental Media Association, *10th Annual EMA Awards, Dec. 6, 2000*, at http://www.ema-online.org/awards_10th_annual.htm (last visited Mar. 10, 2003).

[109] Gary Polakovic, *Seeing a Greener Big Screen; 'Erin Brockovich' has Plenty of Company as Films Increasingly Cast Polluters as the Villain,* L.A. TIMES, Mar. 27, 2001, at A1, *available at* http://www.lexis.com.

[110] *Id.*

[111] *Id.*

[112] *Id.*

[113] Thomas L. Van Wyngarden and Nana Nakano, *Chromium 6: Public Perception Versus Public Health*, TOXIC CHEMICALS LITIG. REP., May 4, 2001, at Vol. 19, 1, *available at* http://www.lexis.com.

[114] Andrew Gumbel, *This Woman is at a Film Premiere, but She is Not a Film Star*, INDEP. (London), Apr. 1, 2000, Features at 1, *available at*, http://www.lexis.com ("Ms. Brockovich's story . . .never received much attention in the news at the time," but now "the newspapers and television stations" . . .are "falling over themselves to cover the movie, and the scandal, in painstaking detail."); David Lazarus, *PG&E Cast as Villain in New True-Story' Movie*, S. F. CHRON., Mar. 16, 2000, News at A1, *available at* http://www.lexis.com (Before the *Erin Brockovich's* release PG&E "was pleasantly surprised to find the matter all but ignored by the media.").

well-kept dirty secret [had] become widespread public knowledge."[115] As a result of the nation-wide release of *Erin Brockovich*, print media and television shows spotlighted the potential health risks of chromium 6.

Major newspapers across the nation covered the movie and its message, including: Los Angeles Times, Chicago Tribune, San Francisco Chronicle, Houston Chronicle, Washington Post, and New York Times. Concurrently, multiple national television shows ranging from NBC's Dateline to the syndicated Oprah Winfrey show covered *Erin Brockovich* and the events in Hinkley, California. The Oscar buzz surrounding the movie further focused media attention on chromium 6.

In addition to informing the general public about chromium 6, *Erin Brockovich* informed Hinkley residents about the potential contamination in their water. Following the movie's release, additional plaintiffs brought claims against PG&E for ground water contamination.[116] These plaintiffs claimed they "learned of PG&E's alleged chromium contamination of ground water around Hinkley when the movie was released."[117]

However, *Erin Brockovich's* message did not escape criticism. A spokesman for PG&E tried to downplay the movie's implications stating, "our general response with respect to the movie is just that we recognize it's a dramatization. It's an entertainment vehicle."[118] Unfortunately for PG&E the film depicts the company as "the epitome of corporate evil" with its attempt to deceive Hinkley residents.[119] In response to the potential PR nightmare, PG&E sent out an internal memo to its employees noting, "'based on a true story' doesn't mean that everything in the story is true."[120]

Some in the media take PG&E's point of view.[121] One commentator argued that PG&E's $333 million settlement merely reflected PG&E's

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115 Andrew Gumbel, *This Woman is at a Film Premiere, but She is Not a Film Star*, INDEP. (London), Apr. 1, 2000, Features at 1, *available at*, http://www.lexis.com.

116 Bloomberg News, *California; 'Brockovich' Film Prompts More Residents to Sue PG&E*, L.A. TIMES, Oct. 27, 2000, Business at C2, *available at*, http://www.lexis.com.

117 *Id.*

118 Christine Hanley, *Hit Movie Puts Spotlight on Utility Company*, DEN. ROCKY MOUNTAIN NEWS, Mar. 28, 2000, Business at 11b, *available at*, http://www.lexis.com, *quoting* Greg Pruett, spokesman at the time for Pacific Gas & Electric.

119 *See eg.* David Lazarus, *PG&E Cast as Villain in New True-Story' Movie*, S. F. CHRON. Chronicle, Mar. 16, 2000, News at A1, *available at* http://www.lexis.com; Martha Hamilton, *Big Business Plays the Heavy on Film; Companies Deal with Unwanted Fame*, WASH. POST, Apr. 7, 2000, Financial at E3, *available at* http://www.lexis.com.

120 Martha Hamilton, *Big Business Plays the Heavy on Film; Companies Deal with Unwanted Fame*, WASH. POST, Apr. 7, 2000, Financial at E3, *available at* http://www.lexis.com.*quoting* March 10 PG&E internal memo authored by then PG&E Chairman Bob Glynn Jr.

121 *See eg.* Michael Fumento, *The Dark Side of Erin Brockovich*, WASH. TIMES, Apr. 04, 2000, Commentary at A17, *available at* http://www.lexis.com.

apprehension about going against one of the "most successful trial attorneys" and a jury likely to be biased.[122] Furthermore, he argued "no one agent could possibly have caused more than a handful of the symptoms described and chromium 6 in the water almost certainly couldn't have caused any of them."[123] Even the ABC news show "20/20" questioned the truthfulness of *Erin Brockovich*.[124]

In 20/20's segment "Give Me a Break," anchor John Stossel questioned the movie's claim that chromium 6 caused a multitude of diseases including "cancer, Hodgkin's disease, and spinal deterioration."[125] Stossel pointed to the "murky" science on the issue and how "it's natural when people are sick and industry's been caught polluting and covering up to assume the big bad company made people sick, but that doesn't mean it's true."[126] Nevertheless, for all of Mr. Stossel's protestations against the movie's truthfulness, when asked he admitted that he would not let his family drink the water in Hinkley.[127]

Mr. Stossel's reaction exemplifies *Erin Brockovich's* impact on the public's perception of chromium 6, even among the movie's skeptics. *Erin Brockovich* has been heralded as focusing attention on the harm water contamination can cause to drinking water quality and public health.[128] More specifically, as the California Senate Committee on Health and Human Services noted "the release of the film *Erin Brockovich* . . . made chromium a common household word . . .[and] has vastly increased public awareness about chromium and its health effects."[129]

The outcry following *Erin Brockovich* mimics that of *Silent Spring* and Love Canal. Any skepticism regarding the toxicity of chromium 6 mirrors the skepticism regarding the toxicity of DDT following the publication of *Silent Spring*. *Erin Brockovich,* like *Silent Spring* and Love Ca-

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122 Michael Fumento, *Errin' Brockovich*, American Outlook, Hudson Institute, Summer 2000 *available at* http://www.fumento.com/hudsonbrock.html (last vistited Apr. 27, 2002) (on file with author).

123 *See eg.* Michael Fumento, *The Dark Side of Erin Brockovich*, WASH. TIMES, Apr. 04, 2000, Commentary at A17, *available at* http://www.lexis.com.

124 *See 20/20: Give Me a Break; Realities behind Erin Brockovich* (ABC television broadcast, July 14, 2000), *available at* http://www.lexis.com.

125 *Id.*

126 *Id.*

127 *Id.*

128 *"Erin Brockovich" Earns Rave Review From Water Industry*, ENVTL. NEWS SERV., Mar. 20, 2000, *available at* http://www.lexis.com ("American Water Works Association (AWWA) applauds . . . 'Erin Brockovich' for bringing much needed attention to the damage water polluters do to drinking water quality and public health . . . AWWA is the largest organization of water supply professionals in the world").

129 *Health Effects of Chromium IV contamination of Drinking Water, Before the CA Leg. J. Informational Hearing of the S. Comm. on Health and Human Services and S. Comm. on Natural Resources and Wildlife and Assemb. Comm. on Environmental Safety and Toxic Materials*, at 7 (Oct. 24, 2000).

nal, increased the public's awareness and concern about a toxics issue. The direct effect of this increased public awareness and concern regarding the potential health risks of chromium 6 is unfolding in Glendale, California. A debate continues regarding whether Glendale's water supply may pose a health risk from chromium 6 contamination. However, before examining Glendale, it is important to understand the science of chromium 6 and the uncertainty regarding its toxicity.

B. The Science of Chromium 6

1. Scientific Uncertainty in the Regulatory Process

Scientific uncertainty is perhaps the foremost problem with toxics policy decisions.[130] Uncertainty plagues toxics policy decisions from the initial stages of risk assessment to the final codification of regulations.[131] Most of this uncertainty stems from the infinite number of variables that regulators confront during the decision making process.[132] Unfortunately science cannot determine the exact level at which a chemical becomes a real risk to humans.[133] Therefore, regulators must develop quantitative health standards for toxins based on risk assessments.[134]

Risk assessments consist of four main components: (1) hazard identification; (2) dose-response assessment; (3) exposure assessment; and (4) risk characterization.[135] This risk assessment process often yields only a general sense of the toxicity of a substance.[136] For instance, estimates for cancer risk assessment models can vary over ten orders of magnitude.[137] The disparity between some low and high estimates of cancer risks has

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130 For a discussion of uncertainty in the toxic regulatory process *see eg.* Wendy E. Wagner, *The Science Charade in Toxic Risk Regulation*, 95 COLUM. L. REV. 1613 (1995); Alyson C. Flournoy, *Legislating Inaction: Asking the Wrong Question in Protective Environmental Decisionmaking*, 15 HARV. ENVTL. L. REV. 327 (1991).

131 *See eg.* Alyson C. Flournoy, *Legislating Inaction: Asking the Wrong Questions in Protective Environmental Decisionmaking*, 15 HARV. L. ENVTL. REV. 327 (1991).

132 *See generally* Wendy E. Wagner, *Science Charade in Toxic Risk Regulation*, 95 COLUM. L. REV. 1613 (1995).

133 *Id* at1619 (1995).

134 *See eg.* Mark E. Shere, *The Myth of Meaningful Environmental Risk Assessment*, 19 HARV. ENVTL. L. REV. 409, 412 (1995) ("Risk assessment is a quantitative estimate of the chance that a person will be stricken with cancer or other serious illness over the course of that person's lifetime due to exposure to a chemical substance.").

135 For a detailed discussion on the four stages of risk assessment *see* Mark E. Shere, *The Myth of Meaningful Environmental Risk Assessment*, 19 HARV. ENVTL. L. REV. 409, 430 (1995).

136 *Id* at 412.

137 Sidney A. Shapiro & Thomas O. McGarity, *Not So Parodoxical: the Rationale for Technology-Based Regulation*, 1991 DUKE L.J. 729, 732 (1991).

been compared to having "no idea if you had enough money to pay for a cup of coffee or the national debt, and no way of finding out."[138]

This uncertainty or gaps in knowledge are known as "trans-science" and raise "questions which can be asked of science and yet cannot be answered by science."[139] In part these trans-science problems stem from a lack of complete experimentation.[140] For instance, scientists are forced to extrapolate chemical toxicity levels for humans from animal studies.[141] This is problematic because the studies use much higher doses than expected human exposure.[142] Scientists must then construct a "dose-response curve" to extrapolate the human response at lower levels of exposure.[143] Therefore, animal studies give a limited indication of possible human health effects from exposure to a specific substance.[144]

Scientists also confront informational and ethical problems with epidemiological studies (studies conducted on humans).[145] First, epidemiological studies are not "true experiments," because researchers cannot control the variables that affect the data.[146] Second, scientists do not generally test suspect chemicals on humans because of ethical considera-

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138 Mark E. Shere, *The Myth of Meaningful Environmental Risk Assessment*, 19 HARV. ENVTL. L. REV. 409, 414 (1995) (Citing Sidney A. Shapiro & Thomas O. McGarity, *Not So Parodoxical: the Rationale for Technology-Based Regulation*, 1991 DUKE L.J. 729, 732 (1991)).

139 Wendy E. Wagner, *The Science Charade in Toxic Risk Regulation*, 95 COLUM. L. REV. 1613, 1619 (1995) *quoting* Alvin M. Weinberg, *Science and Trans-Science*, 10 MINERVA 209, 209 (1972).

140 Wendy E. Wagner, *The Science Charade in Toxic Risk Regulation*, 95 COLUM. L. REV. 1613, 1620 (1995).

141 Troyen A. Brennan, *Causal Chains and Statistical Links: The Role of Scientific Uncertainty in Hazardous-Substance Litigation*, 73 CORNELL L. REV. 469, 509 (1988) ("Scientists assume that animal models of carcinogenesis always apply to humans, but limited resources preclude undertaking a set of low-level-exposure animal studies on all suspected carcinogens.").

142 Alyson C. Flournoy, *Legislating Inaction: Asking the Wrong Questions in Protective Environmental Decisionmaking*, 15 HARV. ENVTL. L. REV. 327, 334 (1991) (High doses must be administered to animals because "enormous costs and practical difficulties are associated with a test that attempts to detect harmful effects that may occur in one out of a hundred (or a million) people as a result of low-level exposure.").

143 *Id* at 334.

144 Troyen A. Brennan, *Causal Chains and Statistical Links: The Role of Scientific Uncertainty in Hazardous-Substance Litigation*, 73 CORNELL L. REV. 469, 509 (1988).

145 Wendy E. Wagner, *The Science Charade in Toxic Risk Regulation*, 95 COLUM. L. REV. 1613, 1621 (1995); Troyen A. Brennan, *Causal Chains and Statistical Links: The Role of Scientific Uncertainty in Hazardous-Substance Litigation*, 73 CORNELL L. REV. 469, 507 (1988) ("Epidemiology applies statistical techniques and probabilistic reasoning to disease incidence").

146 Troyen A. Brennan, *Causal Chains and Statistical Links: The Role of Scientific Uncertainty in Hazardous-Substance Litigation*, 73 CORNELL L. REV. 469, 507 (1988).

tions.[147] Oftentimes regulators utilize policy considerations to fill in these trans-scientific gaps in knowledge.[148] The result is that the "outstanding characteristic" of regulating toxic substances is "chronic and pervasive uncertainty."[149]

2. Uncertainty Regarding the Health Effects of Chromium 6

As with other toxic substances, there exists a lot of scientific uncertainty regarding the specific health effects of chromium 6. Chromium is a naturally occurring element found in rocks, animals, plants, soil, and in volcanic gases.[150] The most common chromium forms are, chromium (0), chromium 3, and chromium 6.[151] These different forms of chromium have varying attributes. Chromium 3 occurs naturally in the environment and is an essential nutrient for humans with a recommended dosage of 50 to 200 μg per day for adults.[152] It promotes the action of insulin in body tissues so the body can use sugar, protein, and fat.[153] This naturally occurring chromium 3 is also used as brick lining for high-temperature industrial furnaces that are used to make metals, alloys, and chemical compounds.[154]

On the other hand, chromium 6 and chromium (0) are generally produced by and used in industrial processes.[155] U.S. industry has used chromium commercially for over 100 years.[156] The chemical industry

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147 Alyson C. Flournoy, *Legislating Inaction: Asking the Wrong Questions in Protective Environmental Decisionmaking*, 15 HARV. ENVTL. L. REV. 327, 333 (1991).

148 Wendy E. Wagner, *The Science Charade in Toxic Risk Regulation*, 95 COLUM. L. REV. 1613, 1622 (1995).

149 John S. Applegate, *Worst Things First: Risk, Information, and Regulatory Structure in Toxic Substances Control*, 9 YALE J. ON REG. 277, 280 (1992).

150 For a detailed discussion of chromium 6 *see* Agency for Toxic Substances and Disease Registry (ATSDR) 2000. Public Health Statement for chromium (Update). Atlanta, GA: U.S. Dept of Health and Human Services, Public Health Service *available at* http://www.atsdr.cdc.gov/ToxProfiles/phs8810.html (last visited Apr. 27, 2002); U.S. Environmental Protection Agency, *Toxicological Review of Hexavalent Chromium* CAS No. 18540-29-9, U.S. Environmental Protection Agency, DC: August 1998, *available at* http://www.epa.gov/IRIS/toxreviews/0144-tr.pdf (last visited Apr. 27, 2002).

151 Chromium and Compounds: Hazard Summary, *at* http://www.epa.gov/ttn/atw/hlthef/chromium.html (last visited Apr. 28, 2002).

152 CA Dept. of Health Services, Chromium –6 in Drinking Water: Background Information, *at* http://www.dhs.ca.gov/ps/ddwem/chemicals/Chromium6/Cr+6backgroundinfo.htm (last modified Apr. 05, 2002).

153 Agency for Toxic Substances and Disease Registry (ATSDR) 2000. Toxicological profile for chromium (Update). Atlanta, GA: U.S. Dept of Health and Human Services, Public Health Service *available at* http://www.atsdr.cdc.gov/ToxProfiles/phs8810.html.

154 *Id.*

155 *Id.*

156 *Reflections on Hexavalent Chromium: Health Hazards of an Industrial Heavyweight*, Environmental Health Perspectives V.108, N.9, Sept. 2000, *available at* http://

produces chromium compounds (mostly chromium 3 and chromium 6) for chrome plating, the manufacture of dyes and pigments, leather tanning, and wood preserving.[157] Chromium (0) makes up the metal chromium, which is a steel-gray solid with a high melting point used primarily for making steel and other alloys.[158] Smaller amounts of chromium 6 are used as rust and corrosion inhibitors, as in PG&E's Hinkley gas compressor station.[159]

The general population is exposed to some form of chromium by eating food, drinking water, and inhaling air that contains the chemical.[160] Many factors determine whether a person will be harmed by exposure to chromium 6, including the duration of exposure, the dose, and the route of exposure.[161] For instance, people living in close proximity to chromium waste disposal sites or chromium manufacturing and processing plants have a greater probability of higher exposure rates through the air and water than the general population.[162]

There are a few notable differences between chromium 6 and chromium 3. Experts consider chromium 6 to be more toxic than chromium 3.[163] Of the two, researchers have classified only chromium 6 as a human carcinogen because only chromium 6 has been found to be carcinogenic in animal studies.[164] Also, human beings absorb chromium 6 more easily than chromium 3. The body, however, may convert some amount of chromium 6 to chromium 3.[165] Researchers believe that ingested chro-

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www.mindfully.org/Pesticide/Hexavalent-Chromium-Health-Hazards.htm (last visited Apr. 27, 2002) (on file with author).

157 Agency for Toxic Substances and Disease Registry (ATSDR) 2000. Toxicological profile for chromium (Update). Atlanta, GA: U.S. Dept of Health and Human Services, Public Health Service *available at* http://www.atsdr.cdc.gov/ToxProfiles/phs8810.html.

158 *Id.*

159 National Primary Drinking Water Regulations: Consumer Factsheet on Chromium, *at* http://www.epa.gov/safewater/dwh/c-ioc/chromium.html (last modified Mar. 09, 2001).

160 Chromium and Compounds: Hazard Summary, *at* http://www.epa.gov/ttn/atw/hlthef/chromium.html (last visited Apr. 28, 2002).

161 Agency for Toxic Substances and Disease Registry (ATSDR) 2000. Toxicological profile for chromium (Update). Atlanta, GA: U.S. Dept of Health and Human Services, Public Health Service *available at* http://www.atsdr.cdc.gov/ToxProfiles/phs8810.html.

162 *Id.* ("An estimated 305,500 workers in the United States are potentially exposed to chromium and chromium-containing compounds in the workplace.").

163 Chromium and Compounds: Hazard Summary, *at* http://www.epa.gov/ttn/atw/hlhef/chromium.html (last visited Apr. 28, 2002).

164 *Id.*

165 Agency for Toxic Substances and Disease Registry (ATSDR) 2000. Toxicological profile for chromium (Update). Atlanta, GA: U.S. Dept of Health and Human Services, Public Health Service *available at* http://www.atsdr.cdc.gov/ToxProfiles/phs8810.html *but see Reflections on Hexavalent Chromium: Health Hazards of an Industrial Heavyweight*, ENVTL. HEALTH PERSP. V.108, N.9, Sept. 2000, (citing that

mium 6 is reduced to the chromium 3 form in the gastrointestinal tract,[166] when it comes into contact with the body's gastric acids and other organic reducing agents.[167]

Few studies, however, have been done on the health effects of ingested chromium 6.[168] The bulk of the information regarding the toxicity of chromium 6 comes from studies of the carcinogenic effects of chromium 6 when inhaled.[169] EPA identifies the respiratory tract as the major target organ for chromium 6 toxicity from acute and chronic inhalation exposures.[170] Cases of inhalation exposure show that gastrointestinal and neurological effects are associated with acute inhalation to chromium 6.[171] Specifically, inhalation exposure to chromium 6 above the national standard can cause irritation to the nose, such as runny nose, sneezing, itching, nosebleeds, ulcers, and holes in the nasal septum,[172] perforations and ulcerations of the septum, bronchitis, decreased pulmonary function, pneumonia, and other respiratory effects.[173]

Epidemiological studies from the workplace show a higher occurrence of cancer among workers exposed to certain airborne chromium 6 compounds in occupations such as chromate production, chromate pigment production and chromium plating industries.[174] Also, acute dermal exposure to chromium 6 has been shown to cause skin burns.[175] Finally, animal studies have shown that certain chemical forms of chromium 6 cause cancer in laboratory animals when the animals are injected with

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some experts believe as much as 10% of the chromium 6 may be absorbed into the human body and not converted into chromium 3.) *available at* http://www.mindfully.org/Pesticide/Hexavalent-Chromium-Health-Hazards.htm (last visited Apr. 27, 2002) (on file with author).

166 *Id.*

167 U.S. Environmental Protection Agency, *Toxicological Review of Hexavalent Chromium* CAS No. 18540-29-9, 48, U.S. Environmental Protection Agency, DC: August 1998, *available at* http://www.epa.gov/IRIS/toxreviews/0144-tr.pdf (last visited Apr. 27, 2002).

168 *Id.*

169 *Id.*

170 Chromium and Compounds: Hazard Summary, *at* http://www.epa.gov/ttn/atw/hlhef/chromium.html (last visited Apr. 28, 2002).

171 *Id.*

172 Agency for Toxic Substances and Disease Registry (ATSDR) 2000. Toxicological profile for chromium (Update). Atlanta, GA: U.S. Dept of Health and Human Services, Public Health Service *available at* http://www.atsdr.cdc.gov/ToxProfiles/phs8810.html.

173 Chromium and Compounds: Hazard Summary, *at* http://www.epa.gov/ttn/atw/hlhef/chromium.html (last visited Apr. 28, 2002).

174 Agency for Toxic Substances and Disease Registry (ATSDR) 2000. Toxicological profile for chromium (Update). Atlanta, GA: U.S. Dept of Health and Human Services, Public Health Service *available at* http://www.atsdr.cdc.gov/ToxProfiles/phs8810.html (last visited Apr. 27, 2002).

175 Chromium and Compounds: Hazard Summary, *at* http://www.epa.gov/ttn/atw/hlthef/chromium.html (last visited Apr. 28, 2002).

chromium 6 or made to inhale the chemical.[176] Based on these studies both the U.S. Department of Health and Human Services and the International Agency for Research on Cancer have determined that certain chromium 6 compounds are human carcinogens.[177] EPA has also determined that inhaled chromium 6 is carcinogenic to humans.[178]

However, researchers do not know everything about the health effects of chromium. For instance, "very few studies have looked at how chromium can affect the health of children."[179] Also, researchers do not know if exposure to chromium will result in birth defects or other developmental effects in people.[180] EPA asserts there is insufficient information to determine whether chromium 6 ingested through water or food is a human carcinogen,[181] although ingestion of very high doses of chromium 6 has been documented to cause "stomach upsets and ulcers, convulsions, kidney and liver damage, and even death."[182] In its chromium 6 regulations, the California Department of Health Services (CDHS) asserts, "despite the carcinogenicity of chromium 6 in occupational settings and in laboratory animals and concerns about inhalation exposures, the evidence for its carcinogenicity when ingested is not compelling."[183]

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176 Agency for Toxic Substances and Disease Registry (ATSDR) 2000. Toxicological profile for chromium (Update). Atlanta, GA: U.S. Dept of Health and Human Services, Public Health Service *available at* http://www.atsdr.cdc.gov/ToxProfiles/phs8810.html.

177 *Id.*

178 U.S. Environmental Protection Agency, *Toxicological Review of Hexavalent Chromium* CAS No. 18540-29-9, 48, U.S. Environmental Protection Agency, D.C.: August 1998, *available at* http://www.epa.gov/IRIS/toxreviews/0144-tr.pdf (last visited Apr. 27, 2002).

179 Agency for Toxic Substances and Disease Registry (ATSDR) 2000. Toxicological profile for chromium (Update). Atlanta, GA: U.S. Dept of Health and Human Services, Public Health Service *available at* http://www.atsdr.cdc.gov/ToxProfiles/phs8810.html.

180 *Id.* ("Birth defects have been observed in animals exposed to chromium(IV).").

181 U.S. Environmental Protection Agency, *Toxicological Review of Hexavalent Chromium* CAS No. 18540-29-9, 48, U.S. Environmental Protection Agency, D.C.: August 1998, *available at* http://www.epa.gov/IRIS/toxreviews/0144-tr.pdf (last visited Apr. 27, 2002).

182 Agency for Toxic Substances and Disease Registry (ATSDR) 2000. Toxicological profile for chromium (Update). Atlanta, GA: U.S. Dept of Health and Human Services, Public Health Service *available at* http://www.atsdr.cdc.gov/ToxProfiles/phs8810.html; *see Reflections on Hexavalent Chromium: Health Hazards of an Industrial Heavyweight*, ENVTL HEALTH PERSP. V.108, N.9, Sept. 2000, *available at* http://www.mindfully.org/Pesticide/Hexavalent-Chromium-Health-Hazards.htm (on file with author).

183 CA Dept. of Health Services, Chromium -6 in Drinking Water: Background Information, *at* http://www.dhs.ca.gov/ps/ddwem/chemicals/Chromium6/Cr+6backgroundinfo.htm (last modified Apr. 05, 2002).

However, researchers know little about all of the health consequences from the long-term ingestion of water contaminated with chromium 6.[184]

C. Current Regulation of Chromium 6

Both state and federal agencies regulate chromium levels in drinking water. CDHS, the agency responsible for setting California's primary drinking water standards, currently regulates chromium in drinking water as total chromium present in the water supply.[185] However, due to recent changes in California state law chromium 6 will be regulated separately in the future.[186]

In 1977, CDHS established a 50 parts per billion (50 parts total chromium per billion parts of drinking water—ppb) maximum contaminant level (MCL) standard for total chromium present in drinking water.[187] MCLs consider both public health goals and the economic and technical feasibility of achieving these goals.[188] CDHS claims that it based its total chromium standard on what it considered to be "protective of the public health for chromium 6."[189] The California standard is twice as stringent as the national standard of 100 ppb set by EPA in 1991.[190]

In 1999, the Office of Environmental Health Hazard Assessment (OEHHA), the agency that establishes public health goals in California, suggested a public health goal (PHG) for total chromium in California's drinking water of 2.5 parts per billion.[191] In setting the PHG for chromium, OEHHA assumed that chromium 6 was a carcinogen when ingested.[192] Unlike the process for determining the MCL for chromium, the California Safe Drinking Water Act of 1996 requires OEHHA to base its public health goals exclusively on scientific and public health considerations.[193] CDHS then uses the PHG to establish its primary drinking water

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184 U.S. Environmental Protection Agency, *Toxicological Review of Hexavalent Chromium* CAS No. 18540-29-9, 49, U.S. Environmental Protection Agency, DC: August 1998, *available at* http://www.epa.gov/IRIS/toxreviews/0144-tr.pdf (last visited Apr. 27, 2002) ("Relatively few studies in the literature address the oral toxicity of Cr(VI).").

185 CAL. CODE REGS. tit. 22, § 64431 (2003).

186 *See* S.B. 351, 2001 Leg., Reg. Sess. (Ca. 2001)(requiring CDHS to adopt a chromium-6 MCL by January 1, 2004).

187 CAL. CODE REGS. tit. 22, § 64431 (2003).

188 CAL. HEALTH & SAFETY CODE §116365 (West 2003).

189 CA Dept. of Health Services, Chromium –6 in Drinking Water: Background Information, *at* http://www. .ca.gov/ps/ddwem/chemicals/Chromium6/Cr+6backgroundinfo.htm (last modified Apr. 05, 2002).

190 40 C.F.R. § 141.51 (2003).

191 OEHHA, 1999, *Public Health Goal for Chromium in Drinking Water*, Office of Environmental Health Hazard Assessment, Feb. 1999.

192 *Id.*

193 CAL. HEALTH & SAFETY CODE §116365 (West 2003).

standards.[194] Sometimes the PHG and MCL differ because CDHS "acknowledges that in setting a drinking water standard there is a balance that must be reached between the cost to the public and the benefit the public receives in risk reduction."[195]

In August 1999, responding to OEHHA's 2.5 ppb chromium PHG, CDHS began conducting tests on a small number of water systems throughout California to determine the water's chromium 6 levels.[196] Prior to these tests, agencies knew little about the levels of chromium 6 in California's water systems.[197] In fact, California only required water agencies to test for total chromium present in drinking water and not chromium 6 separately.[198] Both CDHS and OEHHA had determined their chromium standards based on an assumption about the amount of chromium 6 present in total chromium.[199] The agencies had assumed that chromium 6 makes up only 7.2% of any chromium sample. Yet many experts felt that this percentage was far too low.[200]

The 7.2% figure comes from a study of two lakes in North Carolina.[201] At the time CDHS established the MCL for chromium there was very little data regarding the actual percentage of chromium 6 in total chromium in drinking water—in fact only the one study had been conducted.[202] No data existed regarding the percentage of chromium 6 found in total chromium in water systems in California.[203]

CDHS's 1999 study of California's drinking water demonstrated that, on average, chromium 6 makes up more than 50% of total chromium in California's drinking water—almost seven times more than the

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194 *Id, See* OEHHA, 1999, *Public Health Goal for Chromium in Drinking Water*, Office of Environmental Health Hazard Assessment, Feb. 1999.

195 *Health Effects of Chromium IV Contamination of Drinking Water*, Joint Informational Hearing, (Oct. 24, 2000)(statement of David P. Spath, California Dept. of Health Services).

196 *Id.*

197 OEHHA, 1999, *Public Health Goal for Chromium in Drinking Water*, Office of Environmental Health Hazard Assessment, Feb. 1999.

198 Andrew Blankenstein, *Calls for Reducing Chromium Levels in Water Go Unheaded*, L.A. TIMES, Aug. 20, 2000, at B1.

199 *Health Effects of Chromium IV contamination of Drinking Water, Before the CA Leg. J. Informational Hearing of the S. Comm. on Health and Human Services and S. Comm. on Natural Resources and Wildlife and Assemb. Comm. on Environmental Safety and Toxic Materials*, at 8 (Oct. 24, 2000).

200 Andrew Blankstein, *Dispute Hampers Cleanup of Wells; Environment: In 1998, Officials urged a crackdown on levels of chromium 6, but regulations have been delayed because experts disagree over health risks*, L.A. TIMES, Aug. 20, 2000, Metro at B1, *available at* http://www.lexis.com.

201 Andrew Blankenstein, *Calls for Reducing Chromium Levels in Water Go Unheaded*, L.A. TIMES, Aug. 20, 2000, at B1.

202 OEHHA, 1999, *Public Health Goal for Chromium in Drinking Water*, Office of Environmental Health Hazard Assessment, Feb. 1999.

203 *Id.*

7.2% figure on which CDHS based the chromium MCL.[204] CDHS determined that before setting a new chromium MCL, it needed to conduct more tests to determine the actual levels of chromium 6 in California's water systems.[205] Accordingly, CDHS adopted regulations to require statewide monitoring by water systems for chromium 6 effective January 2001.[206]

D. The Public Reaction

1. Glendale's Chromium 6 Fears

As discussed earlier, the movie *Erin Brockovich*, like *Silent Spring* and Love Canal before it, brought mainstream attention on the potential health effects of chromium 6.[207] Prior to the movie's release, few people gave chromium 6 much thought.[208] Now even CDHS acknowledges the widespread impact of *Erin Brockovich* in publicizing chromium and bringing "press and political attention" that has raised "public awareness and concern."[209] Despite assurances from both EPA and CDHS that chromium 6 poses no significant health effects when ingested through drinking water, many in the public now believe otherwise. One Southern California community in particular has been concerned with the health effects of chromium 6 in its drinking water.[210]

Glendale, located in the San Fernando Valley near Los Angeles, is home to approximately 200,000 people.[211] Since early 2000, many of Glendale's residents and officials have been concerned with the amounts of chromium 6 in their drinking water.[212] People in the community began to be concerned when tests detected varying amounts of chromium 6 in

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204 *Health Effects of Chromium IV Contamination of Drinking Water*, Joint Informational Hearing, (Oct. 24, 2000)(statement of David P. Spath, California Dept. of Health Services).

205 *Id.*

206 Office of Environmental Health Hazard Assessment, Public Information—Fact Sheets, *at* http://www.oehha.ca.gov/public_info/facts/chrom6facts.html, *see* CAL. CODE REGS. tit. 22 § 64450 (2003).

207 *See* discussion supra.

208 Charles F. Bostwick, *Chromium 6 Dangers Now Well-Known*, S. F. CHRON., Jan. 14, 2001, *available at* http://www.lexis.com.

209 CA Dept. of Health Services, Chromium -6 in Drinking Water: Background Information, *at* http://www.dhs.ca.gov/ps/ddwem/chemicals/Chromium6/Cr+6backgroundinfo.htm (last modified Apr. 05, 2002).

210 Rene Sanchez, *Fear of Toxin in Tap Water Rocks California Valley*, WASH. POST, Dec. 8, 2000, at A3, *available at* http://www.lexis.com.

211 City of Glendale Website, *at* http://www.ci.glendale.ca.us/about/index.html (last modified 2002) (on file with author).

212 Jennifer Hamm, *Glendale Water Safe, City Says; Chromium 6 levels not alarming, tests indicate,* DAILY NEWS OF L.A., Sept. 19, 2000, *available at* http://www.lexis.com.

30 out of 80 ground water wells throughout the San Fernando Valley.[213] Although other California wells showed detectable levels of total chromium,[214] the San Fernando Valley has been a "hot zone for chemical contamination."[215] Decades of industrial activity in the area have resulted in the contamination of shallow and deep aquifers with pollutants including chemical solvents.[216] In 1986, parts of Burbank, Glendale, and North Hollywood were all declared federal Superfund cleanup sites.[217]

The San Fernando Valley Basin is home to the major aquifer for residents of Los Angeles, Glendale, and Burbank.[218] In 2000, total chromium levels in San Fernando Valley wells used by the Department of Water and Power (DWP) ranged from trace amounts to 30 parts per billion.[219] Although these levels were lower than the state standard, past experience demonstrated that they could increase rapidly. For instance, a well in Burbank went from 15 parts per billion in 1995 to 110 parts per billion in 1999.[220] Sampling of wells in the San Fernando Valley also indicated a ratio of chromium 6 to total chromium of between 61% and 99%.[221] In response to the chromium contamination in area wells, Glen-

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213 *Health Effects of Chromium IV contamination of Drinking Water, Before the CA Leg. J. Informational Hearing of the S. Comm. on Health and Human Services and S. Comm. on Natural Resources and Wildlife and Assemb. Comm. on Environmental Safety and Toxic Materials*, at 7 (Oct. 24, 2000).

214 *Health Effects of Chromium IV contamination of Drinking Water, Before the CA Leg. J. Informational Hearing of the S. Comm. on Health and Human Services and S. Comm. on Natural Resources and Wildlife and Assemb. Comm. on Environmental Safety and Toxic Materials*, at 8 (Oct. 24, 2000) (CDHS found that "water sources in 48 out of California's 58 counties have detectable levels of total chromium").

215 Andrew Blankstein, *Governor Signs Bill Speeding Water Testing; Health: Law requires state agency to report on chromium 6 levels in valley wells and assess statewide safety risk within two years,* L.A. TIMES, Sept. 30, 2000, Metro at B1, *available at* http://www.lexis.com.

216 California Regional Water Quality Control Board: Los Angeles Region, Special Board Meeting on Chromium Contamination: Staff Report, Glendale CA. Nov. 13, 2000.

217 *Id.*

218 *Health Effects of Chromium IV contamination of Drinking Water, Before the CA Leg. J. Informational Hearing of the S. Comm. on Health and Human Services and S. Comm. on Natural Resources and Wildlife and Assemb. Comm. on Environmental Safety and Toxic Materials*, at 7 (Oct. 24, 2000).

219 Andrew Blankstein, *Dispute Hampers Cleanup of Wells; Environment: In 1998, Officials urged a crackdown on levels of chromium 6, but regulations have been delayed because experts disagree over health risks,* L.A. TIMES, Aug. 20, 2000, Metro at B1, *available at* http://www.lexis.com.

220 *Id.*

221 California Regional Water Quality Control Board: Los Angeles Region, Special Board Meeting on Chromium Contamination: Staff Report, Glendale CA. Nov. 13, 2000.

dale City Manager Jim Starbird called for testing in Glendale's wells.[222] One test in February of 2000 indicated that one well in Glendale contained 61 parts per billion of chromium.[223]

The chromium 6 contamination in Glendale likely resulted from the San Fernando Valley's long history of being an aerospace and industrial center, because of industry's use of chromium to harden steel and make paint pigments.[224] In industrial areas, chromium 6 can get into the ground water by accidental or intentional discharges.[225] Glendale's water was likely contaminated by intentional discharges.[226] City records show that high levels of water tainted with chromium 6 were discharged between 1945 and the mid-1960's into storm drains that flow to the Los Angeles River.[227] Furthermore, evidence suggests that some industries may have dumped water tainted with chromium 6 directly into the San Fernando Valley aquifer beginning in the 1940's.[228] Therefore, Glendale may have a valid reason for being concerned with the levels of chromium 6 in its drinking water.

At the heart of Glendale's chromium 6 concerns lies a water treatment plant known as the "Glendale Operable Unit."[229] This treatment plant was part of a remedial measure for a Superfund site in the San Fernando Valley.[230] The Superfund listing resulted from a water quality inquiry from the CDHS in 1980.[231] CDHS requested all major groundwater users to conduct tests for the presence of certain industrial chemicals in the drinking water.[232] The groundwater in the San Fernando Valley tested positive for contamination by volatile organic compounds (chemical solvents).[233] Specifically, the chemicals perchloroethylene (PCE) and trichloroethylene (TCE) were detected in concentrations

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222 Jennifer Hamm, *Glendale Water Safe, City Says; Chromium 6 levels not alarming, tests indicate,* DAILY NEWS OF L.A., Sept. 19, 2000, *available at* http://www.lexis.com.

223 *Id.*

224 Andrew Blankstein, *Dispute Hampers Cleanup of Wells; Environment: In 1998, Officials urged a crackdown on levels of chromium 6, but regulations have been delayed because experts disagree over health risks,* L.A. TIMES, Aug. 20, 2000, Metro at B1, *available at* http://www.lexis.com.

225 *Id.*

226 Andrew Blankstein, *Chromium 6 Released into L.A. Rivers for Year,* L.A. TIMES, Oct. 30, 2000, at A1, *available at* http://www.lexis.com.

227 *Id.*

228 Andrew Blankstein, *Lockheed Linked to Chromium 6 Pollution,* L.A. TIMES, Jan. 21, 2001, Metro at B1, *available at* http://www.lexis.com.

229 California Regional Water Quality Control Board: Los Angeles Region, Special Board Meeting on Chromium Contamination: Staff Report, Glendale CA. Nov. 13, 2000.

230 *Id.*

231 *Id.*

232 *Id.*

233 *Id.*

higher than the state and federal maximum contaminant levels.[234] Consequently, on June 6, 1986, EPA listed the San Fernando Valley Area as a Superfund site.[235]

Pursuant to the Superfund program, EPA required polluters to build the treatment plant (Glendale Operable Unit) at a cost of roughly $25 million,[236] to clean up a thirteen square mile plume of the chemicals PCE and TCE.[237] Upon the completion of the water treatment plant, EPA wanted Glendale to begin taking drinking water from the plant.[238] However, water from the treatment plant had chromium 6 levels as high as 15 parts per billion.[239] On the other hand, Glendale's imported water supply from the Metropolitan Water District (MWD), which constitutes approximately 85% of the city's water supply,[240] contained less than 1 part per billion of chromium 6.[241]

Glendale expressed concern to EPA regarding the chromium 6 levels in its water because the treatment plant was designed to treat the groundwater for PCE and TCE contamination and not for chromium 6.[242] Glendale also requested more time to assess the risks from chromium 6 before supplying it to area homes.[243] EPA refused Glendale's request, stating, "testing of the treatment system shows that the treated water will meet or be below all drinking water standards."[244] In response, Glendale officials indicated that instead of delivering the water to its residents, it would dump the water into the Los Angeles River until it knew more about the health effects of ingesting chromium 6.[245]

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234 Andrew Blankstein, *EPA Rejects Glendale Delay in Pumping Treated Water,* L.A. TIMES, Oct. 14, 2000, Metro at B18, *available at* http://www.lexis.com.

235 51 Fed. Reg. 21054.

236 Michael Gougis, *How state scientists botched a key calculation on how much toxic chrome 6 should be in our drinking water,* NEW TIMES L. A., Oct. 26, 2000, *available at* http://www.lexis.com.

237 Andrew Blankstein, *EPA Rejects Glendale Delay in Pumping Treated Water,* L.A. TIMES, Oct. 14, 2000, Metro at B18, *available at* http://www.lexis.com.

238 Andrew Blankstein, *EPA Rejects Glendale Delay in Pumping Treated Water,* L.A. TIMES, Oct. 14, 2000, Metro at B18, *available at* http://www.lexis.com.

239 Andrew Blankstein, *End to Water-Dumping Sought,* L.A. TIMES, Nov. 17, 2001, California at 6, *available at* http://www.lexis.com.

240 Jones & Stokes, Final Environmental Impact Report for Oakmont View Phase V, Volume 1: Final EIR Text, Prepared for the City of Glendale Planning Commission, 3J-3 (Feb. 2002), *available at* http://www.ci.glendale.ca.us (last modified 2002) (on file with author).

241 Andrew Blankstein, *End to Water-Dumping Sought,* L.A. TIMES, Nov. 17, 2001, California at 6, *available at* http://www.lexis.com.

242 Michael Gougis, *How state scientists botched a key calculation on how much toxic chrome 6 should be in our drinking water,* NEW TIMES L. A., Oct. 26, 2000, *available at* http://www.lexis.com.

243 Andrew Blankstein, *EPA Rejects Glendale Delay in Pumping Treated Water,* L.A. TIMES, Oct. 14, 2000, Metro at B18, *available at* http://www.lexis.com.

244 *Id.*

245 *Id.*

Glendale subsequently followed through with its threat and began dumping the treated water into the Los Angeles River.[246] Mel Blevins, the court-appointed watermaster for the upper Los Angeles River area, argued that Glendale was wasting water because the treatment plant had been treating the discharged water at a high cost.[247] He estimated that more than one million dollars worth of water had been wasted in the first three months of the plant's operation because of the dumping.[248]

Glendale now confronts policy makers who question whether water containing chromium 6 poses high enough health risks to justify its waste. Even the county's own water-master stated that "[f]or many, many years, people have been drinking the water. . . I don't see a lot of people sick."[249] The real question, however, is whether residents of Glendale should be forced to serve as involuntary subjects in an epidemiological study on the health risks of drinking water laced with chromium 6.

On November 9, 2001, Mel Blevins filed suit in Los Angeles County Superior Court challenging Glendale's dumping of tens of thousands of gallons of treated well water into the Los Angeles River.[250] Threatened with legal action and multi-million dollar fines, Glendale agreed to allow higher levels of chromium 6 into its water supply for the time being.[251] Under Glendale's agreement with EPA, the city will deliver the treated water to its residents at a capped level of five ppb of chromium 6.[252] In a recent report, however, Blevins indicated that migrating plumes of chromium 6 could result in the closure of area wells if the groundwater is not cleaned up.[253] Meanwhile, Glendale must wait while regulators attempt to determine what constitutes safe levels of chromium 6 in drinking water.

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246 Jean Guccione, *EPA Extends deal allowing Glendale to dump its water,* L.A. TIMES, Jan. 5, 2001, Metro at B3, *available at* http://www.lexis.com.

247 California Regional Water Quality Control Board: Los Angeles Region, Special Board Meeting on Chromium Contamination: Staff Report, Glendale CA. Nov. 13, 2000.

248 Jean Guccione, *EPA Extends deal allowing Glendale to dump its water,* L.A. TIMES, Jan. 5, 2001, Metro at B3, *available at* http://www.lexis.com.

249 Andrew Blankstein, *Dispute Hampers Cleanup of Wells; Environment: In 1998, Officials urged a crackdown on levels of chromium 6, but regulations have been delayed because experts disagree over health risks,* L.A. TIMES, Aug. 20, 2000, Metro at B1, *available at* http://www.lexis.com.

250 Andrew Blankstein, *End to Water-Dumping Sought,* L.A. TIMES, Nov. 17, 2001, California at 6, *available at* http://www.lexis.com.

251 Helen Gao, *Glendale Backs Dones on Water; Plant change to allow level of chromium 6 to rise in city,* DAILY NEWS OF L.A., Jan. 31, 2002, at N3, *available at* http://www.lexis.com.

252 *Id.*

253 Kerry Cavanaugh, *Chromium 6 Cleanup Urged*, DAILY NEWS OF L.A., Feb. 27, 2003, News at N3, *available at* http://www.lexis.com.

2. The "Political Landmine" of Chromium 6 Regulation

From the perspective of a California policy maker, the chromium 6 debate coupled with the "*Erin Brockovich* effect" on the public's psyche can be a political landmine. On the one hand, policy makers face a great deal of uncertainty regarding the toxicity of ingested chromium 6; on the other, policy makers know one thing for certain—more stringent standards are costly.

Implementing more stringent chromium standards is costly for primarily two reasons—water treatment costs and water replacement costs.[254] First, most existing treatment plants are incapable of treating groundwater to meet more stringent chromium 6 standards without major operational modifications. Water treatment alternatives for lessening the chromium 6 contamination in the water include: reverse osmosis, ionization, and water blending.[255] More stringent standards would force numerous groundwater wells not meeting the standards to close down until improvements were made.[256] These improvements would be time consuming and costly.[257] Mel Blevins estimates that each city could be forced to spend as much as $10 million on chromium 6 treatment plants and an additional $5 million per year to run them.[258]

Meanwhile, since renovation takes time, current local well water users would be required to pay higher costs for imported water from MWD.[259] For example, some water officials speculate it would cost $47 million a year for replacement water to serve just the city of Los Angeles if regulators lower the current chromium standard to the OEHHA current recommended public health goal of 2.5 parts per billion.[260] This represents about a $5 per month increases for the typical water customer.[261]

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254 *See Health Effects of Chromium IV contamination of Drinking Water, Before the CA Leg. J. Informational Hearing of the S. Comm. on Health and Human Services and S. Comm. on Natural Resources and Wildlife and Assemb. Comm. on Environmental Safety and Toxic Materials*, at 8 (Oct. 24, 2000).

255 *Id.*

256 Andrew Blankstein, *Dispute Hampers Cleanup of Wells; Environment: In 1998, Officials urged a crackdown on levels of chromium 6, but regulations have been delayed because experts disagree over health risks,* L.A. TIMES, Aug. 20, 2000, Metro at B1, *available at* http://www.lexis.com.

257 *Id.*

258 Andrew Blankstein, *Lockheed Linked to Chromium 6 Pollution,* L.A. TIMES, Jan. 21, 2001, Metro at B1, *available at* http://www.lexis.com.

259 *See Health Effects of Chromium IV contamination of Drinking Water, Before the CA Leg. J. Informational Hearing of the S. Comm. on Health and Human Services and S. Comm. on Natural Resources and Wildlife and Assemb. Comm. on Environmental Safety and Toxic Materials*, at 8 (Oct. 24, 2000).

260 *Id.*

261 Andrew Blankstein, *Dispute Hampers Cleanup of Wells; Environment: In 1998, Officials urged a crackdown on levels of chromium 6, but regulations have been*

Therefore, a more stringent standard would have an economic impact on local utilities and consumer's rates.

Proponents of a more stringent standard argue that the health benefits of lowering allowable chromium 6 levels would greatly outweigh the costs. However, no one knows for certain exactly what those health benefits would be.[262] Furthermore, the California standard for total chromium of 50 parts per billion is already significantly lower than the national standard of 100 parts per billion. Therefore, policy makers confront a difficult task when public outcry and fear following *Erin Brockovich* demands more stringent chromium 6 standards. The controversy in Glendale exemplifies all of these problems and shows how difficult it can be for regulators to regulate a substance shrouded in scientific uncertainty.

E. Regulatory Response

The regulatory response following *Erin Brockovich* parallels the response following *Silent Spring* and Love Canal. The recent outcry in Glendale regarding chromium 6 has caught the attention of politicians at the state and federal levels. The California state legislature and the U.S. Congress have enacted laws that directly address chromium 6 contamination in our drinking water. One set of laws specifically addresses the chromium 6 contamination in the San Fernando Valley.[263] The second attempts to establish new primary state and federal drinking water standards for chromium 6.[264] *Erin Brockovich* has served as the catalyst toward the enactment of these laws.[265] In California, for example, *Erin Brockovich* "helped fuel public outrage that contributed to the so-called Brockovich Bill."[266]

1. California Legislation

In response to the existing uncertainty about the health effects of chromium 6 and the public's outcry, California has enacted several laws dealing with the problem of chromium 6 in its drinking water. In 2000,

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delayed because experts disagree over health risks, L.A. TIMES, Aug. 20, 2000, Metro at B1, *available at* http://www.lexis.com.

262 *See generally* discussion above in section on the *Uncertainty Regarding the Health Effects of Chromium 6.*

263 *See* H.R. Rep. No. 107-272 (2001); S.B. 2127, 2000 Leg., Reg. Sess. (Ca. 2000).

264 *See* S. 698, 107th Cong. (2001); S.B. 351, 2001 Leg., Reg. Sess. (Ca. 2001).

265 Charles F. Bostwick, *Chromium 6 Dangers Now Well Known,* S. F. CHRON., Jan. 14, 2001, at A20, *available at* http://www.lexis.com.

266 Gary Polakovic, *Seeing a Greener Big Screen; 'Erin Brockovich' has Plenty of Company as Films Increasingly Cast Polluters as the Villain,* L.A. TIMES, Mar. 27, 2001, at A1, *available at* http://www.lexis.com.

California enacted Senate Bill 2127[267] and in 2001, California enacted Senate Bill 351.[268] Sponsored by then State Senator Adam Schiff, Senate Bill 2127 deals directly with the chromium 6 contamination in the San Fernando Valley Basin.[269]

Signed into law by Governor Gray Davis on September 29, 2001, Senate Bill 2127 contains several chromium-6 related requirements. First, it requires CDHS to "determine the levels of [chromium 6] in the drinking water supplied by the public water systems in the San Fernando Basin aquifer."[270] Second, it requires CDHS in consultation with the Office of Environmental Health Hazard Assessment, to "assess the exposures and risks to the public" due to the levels of chromium 6 found in the drinking water.[271] Finally, the bill required CDHS to report its findings to the Governor and the legislature no later than January 1, 2002.[272]

The second piece of legislation dealing with chromium in California, Senate Bill 351, became law on October 9, 2001.[273] Sponsored by State Senator Deborah Ortiz, Senate Bill 351 requires CDHS to adopt a primary drinking water standard for chromium 6 on or before January 1, 2004 and to provide the legislature with a report on its progress in developing a standard by January 1, 2003.[274] The legislative history of Senate Bill 351 cites *Erin Brockovich* specifically as one of the motivations for the law,[275] noting that the "public concern . . . (has) been heightened because of the unusual circumstances surrounding a federal Superfund project in the San Fernando Valley and because of last year's popular film, 'Erin Brockovich.'"[276] Therefore, *Erin Brockovich* has already had an impact on California's regulation of chromium 6.

2. Federal Legislation

The federal legislature has also taken steps to address the public's concern about chromium 6 contamination in the drinking water supply. In 2001, the federal government allocated $750,000 toward a new treatment plant and further study of technologies to remove chromium 6 from the drinking water in Glendale.[277] Also, in April of 2002, xRepresenta-

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267 S.B. 2127, 2000 Leg., Reg. Sess. (Ca. 2000).
268 S.B. 351, 2001 Leg., Reg. Sess. (Ca. 2001).
269 S.B. 2127, 2000 Leg., Reg. Sess. (Ca. 2000).
270 *Id.*
271 *Id.*
272 *Id.*
273 S.B. 351, 2001 Leg., Reg. Sess. (Ca. 2001).
274 *Id.*
275 *See eg. Hexavalent Chromium: Drinking Water Standards: hearing on S.B. 351 Before the Senate Floor*, 2001 Leg., Reg. Sess. (Ca. 2001).
276 *Id.*
277 *See* H.R. Rep. No. 107-272 (2001)("$750,000 to the City of Glendale, California . . .for a research study and pilot treatment plant focused on the removal of chromium

tive Adam Schiff requested that Congress allocate an additional $2.25 million to help finish the study and build the plant.[278] Congress has also attempted to take measures to regulate chromium 6 directly.[279]

On April 4, 2001, Senators Barbara Boxer, D-CA, and Harry Reid, D-NV, introduced Senate Bill 698 to amend the Safe Drinking Water Act to designate chromium 6 as a contaminant, and to establish a maximum contaminant level for chromium 6.[280] In her remarks introducing the Bill, Senator Boxer cited *Erin Brockovich* as "making front page news of the substance hexavalent chromium . . . that until last year had only received attention from the scientific community."[281] She further urged Congress to enact the "vitally important health safety measure" so that more can be known about the health effects of chromium 6.[282] Therefore, Congress has also recognized the impact of *Erin Brockovich* in stimulating new national water quality regulations for chromium 6.

IV. Conclusion

The true lasting impact of *Erin Brockovich* on the regulation of chromium 6 remains to be seen. Only time will tell if *Erin Brockovich* and its portrayal of chromium 6 contamination in a small town's groundwater will be considered a pivotal moment in influencing water quality regulation. *Erin Brockovich*, thus far, has followed the recipe for shaping toxics policy displayed in *Silent Spring* and Love Canal. For now, at the very least, the message in *Erin Brockovich* has caught the attention of the public and policy makers.

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6 from water."); H.R. 2620, 107th Cong. (2001) (enacted)(final enacted appropriation version allocates the money under the United States Environmental Protection Agency: Science and Technology).

278 *Schiff Seeks $2.25 Million for Chromium 6 Cleanup*, Daily News of L. A., Apr. 11, 2002, at N3, *available at* http://www.lexis.com.

279 S. 698, 107th Cong. (2001).

280 *Id.*

281 147 Cong. Rec. S3450 (2001)(statement of Sen. Boxer).

282 *Id.*

TOXICITY TESTING REQUIREMENTS, METHODS AND PROPOSED ALTERNATIVES

*Megan Erin Gallagher**

I. INTRODUCTION

Toxicology is the study of chemical substances that harm biological organisms.[1] Toxic exposure can occur transdermally through contact with the skin, orally and via inhalation.[2] Toxicity testing is necessary to provide some basis for the regulation of substances that humans and other living things may come into contact with, intentionally or not. It is used to determine the safety of cosmetics, pharmaceuticals, food additives, pesticides, chemicals, additives and consumer products. A toxic effect can result from a natural or a manufactured substance and manifest a variety of symptoms, both immediate and long-term.[3] As a result, toxicity testing introduces a variety of methods and rates of exposure to the test organism, in order to formulate a more accurate assessment of the risk of harm that the test substance may pose to human health and the environment.

Most human knowledge of the toxicity of various chemicals is the result of animal research, though it is intended for the most part to extrapolate predicted human physiological response.[4] Although there is no accurate numerical statistic available, animals are used by the millions annually for product testing in the United States. Under the Federal Animal Welfare Act, only dogs, cats, primates, rabbits, hamsters and guinea pigs are protected, and thus statistically counted for agency reporting to the U.S. Department of Agriculture.[5] Undoubtedly countless more rodents [often mice and rats which constitute 85-90% of laboratory animals used] and other animals are experimented on annually and their

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* J.D. 2003 University of California, Davis School of Law. B.A., B.Phil & M.A. in Philosophy, National University of Ireland, Maynooth. A heartfelt thanks to the many pets that have touched and so greatly enhanced my life. This article is dedicated to those nonhumans who have perished in the name of science, those who continue to suffer, and those yet to be born, for the use of their bodies.

1 Joanne Zurlo, Deborah Rudacille, and Alan M. Goldberg, *Animal and Alternatives in Testing: History, Science, and Ethics*, Johns Hopkins University Center for Alternatives to Animal Testing (2002), *at* http://caat.jhsph.edu/pubs/animal_alts/animal_alts.htm.

2 *Id.*

3 *Id.*

4 *Id.*

5 Animal Welfare Act, 7 U.S.C.A. § 2131 (West 1999).

numbers unreported.[6] In 1985 the Office of Technology Assessment estimated that in the mid-1980s 17 to 22 million vertebrates were used annually for all research purposes combined.[7] The Humane Society of the United States estimates that of these, at least 55% are used for pharmaceutical and other product toxicity testing.[8] These millions suffer and die for the benefit of humans, yet anaesthesia has become common practice in the laboratory only in the last decade.[9] Plus, such suffering does not always benefit humans. Many animal tests have led to results that are inaccurate in humans, and some have led to death and deformity caused by products that initially appeared to be nontoxic to nonhumans. For these reasons the incorporation of new technologies in toxicity testing that better represent human tissue are currently under investigation and subject to the federal legislation that will be discussed below.

Regulatory agencies oversee an estimated minimum of 80,000 chemicals currently in use in the United States, as well as the introduction of over 2,000 new substances annually.[10] These numbers present regulatory challenges to the agencies charged with the promulgation of health and safety regulations for substances. This is because the testing guidelines must be thorough enough to assure a minimal risk to human and environmental health without over-burdening industry. This is especially difficult as toxic effects are often chronic in nature, and result from long-term exposure, the testing for which if completed over a period of several years, might render the product obsolete before it even enters the market place. Technology and market competition necessitate expediency of product approval. If extensive tests for every new chemical or product were conducted over a period of decades, the costs to the industry would be so prohibitive that the benefits of such technological developments would rarely if ever be reaped by the public. Chilling of industry and technology would become widespread and those whom toxicity testing guidelines seek to protect would undoubtedly be worse-off in the long-term through the deprivation of such advancements. These considerations beg the question as to the types of tests that should be required in order to assure accurate risk assessment of a substance. My analysis of this problem includes: the effectiveness of testing methods, reliability of test data, reasonableness of the burden on industry, regulatory approval and the ethical considerations pertaining to the above. It is no longer necessary to rely strictly on laboratory animal tests for biological re-

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6 Humane Society of the United States (2002), *at* http://www.hsus.org/ace/11396.

7 *Id.*

8 *Id.*

9 *Id.*

10 *Congressional Office of Technology Assessment: Congress Screening and Testing Chemicals in Commerce,* OTA-BP-ENV-166, U.S. Washington: Office of Technology Assessment 126 (1995).

sponse data, and the adoption of alternative methods will bring benefits of accuracy, cost and time efficiency in addition to the reduction of animal suffering.

II. Federal Toxicity Testing Requirements

Toxicity testing is required by federal law in a variety of contexts. There are four federal agencies which require animal tests: the Environmental Protection Agency (EPA), the Food and Drug Administration (FDA), the Consumer Product Safety Commission (CPSC) and the Occupational Safety and Health Administration (OSHA).

A. EPA

The Environmental Protection Agency is required to conduct toxicity tests on laboratory animals in accordance with the Toxic Substances Control Act, air and pesticide programs.[11] For example, the EPA has implemented its High Production Volume Challenge Program (HPV program), wherein it plans to test 2,800 chemicals and will perform toxicity tests on over 100,000 animals.[12] One of the substances at issue is cyclohexanol, a chemical used in nylon, plastic, and paint manufacturing.[13] The proposed experiments will entail the confinement and exposure of 1,000 rats to high amounts of cyclohexanol fumes through forced inhalation.[14] These tests will be duplicative as the chemical has already undergone extensive tests and is known to cause reproductive disorders.[15] A coalition of organizations including Physicians Committee for the Responsible Practice of Medicine and People for the Ethical Treatment of Animals has filed notice of intent to sue with the EPA, charging that the planned tests violate a provision of the Toxic Substances Control Act which requires that public commenting sessions be held in accordance with rulemaking procedures.[16] As many of the tests are redundant and involve substantial animal cruelty at a great expense to taxpayers, these groups urge that the HPV program be reconsidered and the public afforded the opportunity to comment.

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[11] *See* Toxic Substances Control Act, 40 C.F.R. § 798.6560 (Lexis, 2002). *See also*

[12] *DuPont, Honeywell Accused of Unnecessary Animal Cruelty; Doctors, Animal Protectionists Charge Companies with Violating EPA Agreement*, U.S. Newswire, Washington, March 25, 2002, *at* http://www.usnewswire.com/topnews/search4/0325-124.html.

[13] *Id.*

[14] *Id.*

[15] *Id.*

[16] Press Release, Physicians Committee for Responsible Medicine,: Doctors Initiate Legal Challenge to Testing Program, (Feb. 12, 2002) (where is it on file?) (press release).

B. FDA

The Food and Drug Administration likewise requires animal tests of drugs currently used for human consumption and applications for FDA approval to market a new drug.[17] It also promulgated extensive toxicity guidelines for food ingredients in the agency authored "Redbook 2000".[18] FDA regulations prevent color additives that are carcinogenic and other food additives that are injurious to health from entry into interstate commerce.[19]

C. CPSC

The Consumer Product Safety Commission requires experiments pursuant to the Poison Prevention Packaging Act of 1970[20] and the Federal Hazardous Substances Act.[21] It has authority to set safety standards for products that pose an unreasonable risk of injury or illness, and to recall those that pose a "substantial risk of injury to the consumer."[22]

D. OSHA

The Occupational Safety and Health Administration also requires animal toxicity data for the promulgation of regulations pertaining to hazardous substances in the work place.[23] OSHA identifies carcinogens in the workplace and sets the standard for their regulation so that no worker suffers a "material impairment of health."[24]

The preceding agency legislation illustrates the prevalence of mandatory toxicity testing as a means of assessing the risk posed by the substance at issue to biological organisms. Where the risk is sufficiently low, the chemical will receive regulatory approval. This determination is commonly made through the analysis of animal experimentation data. Federal agencies use the following principles to identify potential hazards through risk assessment:

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[17] Food, Drug and Cosmetic Act, 40 C.F.R. § 79.61-3, (Lexis, 2002). (I am not clear about what CFR you are referring to here. §79.61 is about fuel additives. Are you referring to a certain section of the FDCA or a certain CFR?)

[18] *Redbook 2000*, Center for Food Safety and Applied Nutrition, (Oct. 2001), 21 C.F.R. §§ 312.23, 314.50 (2002). *at at* http://www.cfsan.fda.gov/~redbook/red-toca.html. http://vm.cfsan.fda.gov/~red-toca.html.

[19] American Council on Science and Health,: *Of Mice and Mandates: Animal Experiments, Human Cancer Risk and Regulatory Policy*, (July 1997) *at*: http://www.acsh.org/publications/booklets/mice.pdf.

[20] Poison Prevention Packaging Act of 1970, 16 C.F.R. §1702.9 (2002).

[21] Federal Hazardous Substances Act, 16 C.F.R. §§ 1702.9,§ 1500.135 (Lexis 2002).

[22] Federal Hazardous Substances Act, 16 C.F.R. § 1702.9*Supra* note 20.

[23] Occupational Safety and Health Administration, 29 C.F.R. § 1910.1200 (Lexis 2002).

[24] *Id.*29 CFR 1910.1200 (Lexis 2002)

(1) hazard identification and the evaluation of the potential to produce adverse biological effects,
(2) dose-response assessment and the determination of the influence of exposure levels on adverse effects,
(3) exposure assessment and the estimation of anticipated exposure to an agent, and
(4) risk characterization and the description of the nature and often the magnitude of the risk, including attendant uncertainty.[25]

These criteria aid in the determination of the toxicity of a chemical and thus affect its manner of regulation by a federal agency or program. The relevant data inherently include actual biological response to exposure as a factor for consideration, without which the process of risk assessment itself would be far less accurate. In this regard, nonhuman animals provide a biological proxy for the determination of human response to potentially toxic substances.

III. Toxicity Testing on Animals

The Toxic Substances Control Act defines a "toxic effect" as "an adverse change in the structure or function of an experimental animal as a result of exposure to a chemical substance."[26] Such changes may be effected via acute, subchronic or chronic exposure studies.[27] Acute toxicity tests measure the immediate effects of exposure with an estimated time for peak effect of approximately eight hours after the initial exposure.[28] Subchronic toxicity tests occur over a period of weeks, while chronic effects tests measuring long-term exposure last several months.[29] Toxicity tests commonly focus on cytotoxicity (damages cells), mutagenicity (alters genetic materials), carcinogenicity (causes cancer) and teratogenicity (causes birth defects).[30] The route of animal exposure may be determined by the most likely route of human exposure, bioavailability, practical difficulties and other considerations, so that more than one route of exposure to the test subject may be crucial.[31]

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[25] Ad hoc Interagency Coordinating Committee on the Validation of Alternative Methods Rep. On Validation and Regulatory Acceptance of Toxicological Test Methods, NIH Publication No. 97-3981 (March, 1997), *at* http://iccvam.niehs.nih.gov/docs/guidelines/validate.pdf.

[26] 40 C.F.R. § 799.9620(c) (2003).

[27] 40 C.F.R. § 799.9620(e) (*Id.* at (e).

[28] 40 C.F.R. § 799.9620 (e)(7)(A) (2003).*Id.* at (7)(A).

[29] 40 C.F.R. § 799.9620 (e)(7)(B) (2003). *Id.* at (B).

[30] Joanne Zurlo, Deborah Rudacille, and Alan M. Goldberg, *supra* note 1.

[31] *Id.*

A. Animal Testing Practices

Millions of animals are forced annually to ingest toxic substances and to have such rubbed into their eyes and lacerated skin. This is effected through two outmoded tests that have been repeated for decades and often used in duplicative studies.[32]

The LD/50 test is used to determine the acute toxicity of a substance.[33] This is the dose at which the test substance is lethal to 50% of the test animals.[34] During the test period the animal forcibly inhales, ingests or is otherwise exposed to the substrance.[35] Often the animals involved experience acute distress including "pain, convulsions, discharge, diahrrea and bleeding from the eyes and mouth."[36]

The Draize test measures toxicity and corrosivity of chemicals applied to the eyes and abraded skin of rabbits.[37] The test is performed on the eyes of rabbits to test for corneal and conjunctival changes—i.e., irritation.[38] A substance is placed in the eye and the effects recorded at regular intervals.[39] This often causes irreparable damage to the eyes, including ulcers and bleeding, after which the animal is killed to investigate internal effects.[40] In the test for skin irritancy, the rabbit is first shaved and then its skin abraded by firmly pressing adhesive tape to its skin and ripping it off over a period of several days until several layers of skin have been exposed.[41] Thereafter the substance is applied to the raw flesh and effects recorded over a period of days or weeks of repeated applications.

B. Federal Animal Welfare Legislation

In 1963, the National Institute of Health published the first set of guidelines on how to care for laboratory animals.[42] Three years later the Animal Welfare Act was passed by Congress and amended in 1985. It required that experiments be conducted so as to minimize animal pain and distress, through the use of anesthesia, medications and euthanasia.[43]

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32 National Anti-Vivisection Society Homepage, *at* http://www.navs.org/testing/animal_tests.cfm?SectionID=testing%20(2001).

33 Joanne Zurlo, Deborah Rudacille, and Alan M. Goldberg, *supra* note 1.

34 *Id.*

35 National Anti-Vivisection Society Homepage, *supra*, note 31.

36 *Id.*

37 *Id.*

38 Joanne Zurlo, Deborah Rudacille, and Alan M. Goldberg, *supra* note 1.

39 *Id.*

40 National Anti-Vivisection Society Homepage, *supra* note 31.

41 *Id.*

42 Joanne Zurlo, Deborah Rudacille, and Alan M. Goldberg, *supra* note 1 at Appendix D.

43 *Id.* aAt Appendix C.

However there is an exception when the researcher decides that the exclusion of any of the above is 'scientifically necessary'.[44]

C. Shortcomings of Animal Tests

According to the Charter for the Scientific Advisory Committee on Alternative Toxicological Methods, alternative test methods "may provide improved prediction of adverse health effects compared to currently used methods or advantages in terms of reduced expense and time, reduced animal use, and reduced animal pain and distress. . ."[45]

1. Costs

The expense of keeping and monitoring dozens of animals for weeks and months is much higher than that involved with several alternatives. Specialized tests, including immunotoxicity assays can cost over $1,000,000 to assess one chemical via one route of exposure, in one species.[46] The cost-effectiveness of such bioassays is in dispute, as in order to complete a thorough test over a period of years, the expenditure of millions of dollars is required in order to test on only one species.[47] Acute toxicity tests cost about $6,500 each for rats and repeated dose tests cost from $40,000 for a 14-day exposure, to $800,000 for a 2-year period of exposure.[48] In order to test thoroughly for toxic effects both acute and chronic in nature, tens of thousands of dollars per species tested must be spent.

2. Suffering

Although many laboratory animals were bred and provided to experimenters for that purpose, this is not always the case. About 20% of all primates that are used are taken from their natural habitats in the wild, to be physically and psychologically harmed and then to die in captivity.[49] Half of the dogs and cats used in laboratories were former pets who were surrendered at animal control facilities and shelters, or given away and sold through newspaper advertisements.[50] These circumstances in addition to the captive breeding conditions of purpose-bred subjects amount to substantial deprivations and suffering before the physical harm of the toxicity testing is even inflicted upon the animals.

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44 7 U.S.C.A. § 2131(West 2003).

45 Department of Health and Human Services, Charter for the Scientific Advisory Committee on Alternative Toxicological Methods (Dec. 18, 2001) *at* http://iccvam.niehs.nih.gov/about/charter.pdf. http://iccvam.niehs.nih.gov/about/sacatm.htm.

46 American Council on Science and Health, *supra* note 19.

47 *Id.*

48 *Id.*

49 Humane Society of the United States, *supra* note 6.

50 *Id.*

3. Cross-species Differences

Practical problems associated with in vivo animal tests are cross-species biological differences that can lead to questionable test results. Differences among animals of the same species in addition to those differences with humans, have led to the premature approval of chemicals and products which later prove to be harmful and fatal to humans.

> The U.S. General Accounting Office found that, of all new drugs marketed during a 10-year period, a majority — 52 percent, to be exact — had seriously toxic or even fatal effects that were not predicted by animal tests. And animal tests allow more minor side effects — rashes, nausea, diarrhea, etc. — to slip through routinely.[51]

A recent example is that of the prescription drug Baycol, which was recently withdrawn from the prescription drug market [Where or what was it withdrawn from?].[52] It was suspected to have caused at least 40 deaths due to a muscular side effect called rhabdomyolysis, wherein muscle cells are destroyed and enter into the blood stream causing pain, kidney failure and death.[53] Most of the animal experiments with similar drugs designed to reduce cholesterol (statins), yielded results opposite to those later experienced by humans and were subsequently recalled.[54]

Animal tests have also yielded inaccurate information as a result of flawed design protocol. For example, in 1977 saccharin was declared to be a human carcinogen by the FDA when test rats developed tumors as a result of their ingestion of the human equivalent of 1,000 cans of soda per day.[55] This result speaks nothing to the effects likely to be experienced by a human who consumes 1-6 cans per day. Likewise, the Multicenter Evaluation of In-Vitro Cytotoxicity (MEIC) program found that "while rat and mouse tests were only roughly 65 percent accurate in predicting human lethal blood concentrations of chemicals, a combination of human-cell tests predicted chemical toxicity with 80 percent precision."[56]

IV. The Move to Alternatives to Animal Testing

For the foregoing reasons, headway has been made in the federal regulatory arena, and a new committee formed for the purpose of studying, developing and evaluating methods that will substantially replace, reduce or refine current tests that involve animals.

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51 Neal Barnard, *Experiments on Animals Ineffective, Unnecessary,* Orlando Sentinel, April 7, 2002, at B1 (Op/Ed).

52 National Anti-Vivisection Society Homepage, *supra* note 31.

53 *Id.*

54 *Id.*

55 American Council on Science and Health, *supra* note 19.

56 Neal Barnard, *supra* note 51.

A. Interagency Coordinating Committee for the Validation of Alternative Methods

The Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM or committee) was established in 1997 by the Director of the National Institute of Health (NIH), and made permanent pursuant to the ICCVAM Authorization Act of 2000.[57] The ICCVAM is an interagency coordinating committee of NIH under the National Toxicology Program Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM).[58] The purposes of the committee are to:

(1) increase the efficiency and effectiveness of Federal agency test method review;
(2) eliminate unnecessary duplicative efforts and share experiences between fed regulatory agencies;
(3) optimize utilization of scientific expertise outside the federal government;
(4) ensure that new and revised test methods are validated to meet the needs of federal agencies; and
(5) reduce, refine, or replace the use of animals in testing, where feasible.[59]

The Act also established a permanent Scientific Advisory Committee for Alternative Toxicological Methods (SACATM) to provide guidance to the NICEATM and ICCVAM.[60] The ICCVAM is composed of the heads of fifteen federal regulatory and research agencies, including those of the Consumer Product Safety Commission, Food and Drug Administration, National Institutes of Health, Occupational Safety and Health Administration, and the Departments of Defense, Energy and the Interior.[61] The SACATM is itself composed of experts from the pharmaceutical, chemical and agricultural industries, as well as that of a national nonprofit animal protection organization.[62]

The mission that guides the NICEATM program and the ICCVAM is to develop, validate and gain regulatory acceptance of alternative test methods in accordance with the requirements of federal agencies.[63] In

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57 ICCVAM Authorization Act of 2000, PL 106-545, §3(a), 114 Stat 2721. 2000. Interagency Coordinating Committee for the Validation of Alternative Methods, 42 U.S.C. § 2851-3(a) (West 2002). See also http://iccvam.niehs.nih.gov/about/sacatm.htm. (discussing the adoption of this law and the roles of the ICCVAM, NICEATM and SACATM).

58 42 U.S.C.A. § 201.

59 *Id.* at (b).

60 *Id.* at (d).

61 *Id.* at (c). List is illustrative and non-exhaustive.

62 *Id.* at (d)(2)(A)

63 *Id.*

the ICCVAM Authorization Act of 2000, the term "alternative test method" is defined as a test method that

> includes any new or revised test method; and (i) reduces the number of animals required; (ii) refines procedures to lessen or eliminate pain or distress to animals, or enhances animal well-being; or (iii) replaces animals with non-animal systems or one animal species with a phylogenetically lower animal species, such as replacing a mammal with an invertebrate.[64]

The committee carries out its functions by reviewing and evaluating proposed alternative test methods, facilitating interagency coordination of toxicological test protocols, providing guidance on the development of validation criteria, considering petitions from the public, and through its submission of test recommendations for alternative methods to appropriate federal agencies.[65] When the committee has been presented with sufficient information about a proposed test method, it will convene an expert peer review panel for the purposes of evaluating and validating the proposal.[66] Once the committee has approved a method it forwards the data and its recommendations to federal regulatory agencies for their review and possible adoption of the alternative method. The reviewing federal agency maintains discretion whether or not to adopt and incorporate the Committee's recommended alternative test methods.[67]

Any federal agency that requires or recommends toxicological testing as part of a program must identify and forward to the committee any relevant test method that calls for an animal test for which the committee has validated an alternative. The agency must then adopt the committee's recommendation unless the agency determines that the recommended test is inadequate in terms of biological relevance, hazard identification, dose-response assessment, or risk assessment; or that the recommendation will not adequately fulfill the needs of the agency in accord with its specific congressional mandate.[68]

1. Regulatory acceptance

Prior to implementation of an alternative method by a government agency, it must be validated as a reliable and applicable replacement for the purpose specified. It must also be accepted, in that a regulatory or research agency has determined that it meets a specific regulatory need.[69]

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64 ICCVAM Authorization Act of 2000, PL 106-545, §2, 114 Stat 2721. 2000.

65 42 U.S.C.A. § 201 (e).

66 ICCVAM-NICEATM Overview, *at*: http://iccvam.niehs.nih.gov/about/overview.htm.

67 ICCVAM Authorization Act of 2000, PL 106-545, §4, 114 Stat 2721. 2000.

68 *Id.* at (e).

69 Ad hoc Interagency Coordinating Committee on the Validation of Alternative Methods, *supra* note 25.

As agencies require testing for a variety of purposes and for different categories of substances, each agency will determine the suitability of the alternative method with regards to its purposes on a case-by-case basis.[70] ICCVAM procedural guidelines for approval of alternative methods state that the proposed method should include adequate data for chemicals used by the regulatory agency, hazard identification and dose-response assessment information, and the method should be able to be altered in accordance with similar testing needs of other agencies and international groups.[71] The method should also be time and cost effective and the subject of independent scientific peer review by parties who have no financial interest in the outcome of the evaluation.[72] The validation process should be flexible to comport with the increasing number and variety of scientific alternatives, but federal regulatory agencies should also force innovation.[73]

Agencies offer varying criteria for the acceptance or rejection of a test method for a specific purpose and there is no formal procedure for the interagency exchange of information in this regard.[74] Often an agency will even reject the testing guidelines of another agency pertaining to the same chemical substance.[75] ICCVAM summarizes the problem as follows:

> Toxicology is a continually evolving science. New or revised tests. . . are constantly being developed. Established tests are reworked or improved, and new paradigms evolve. . .The evaluation of these procedures by individual agencies in isolation results in duplication of effort and may lead unnecessarily to inconsistent positions.[76]

For these reasons, ICCVAM is to serve as a forum for the exchange of information, the sharing of test data and the harmonization of test guidelines between government agencies and internationally, to "broaden the scientific and policy base, share limited resources, reduce review time and effort for any single authority, decrease testing demands on industry, reduce reliance on animal testing, and improve the risk assessment process."[77] Agencies are encouraged to review data and to participate in and contribute to the validation process from the initial proposal to its subsequent rejection, adoption or remand for further study.[78]

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70 *Id.*
71 *Id.*
72 *Id.*
73 *Id.*
74 *Id.* at 3.2.1.
75 *Id.* at 3.2.2.
76 *Id.* at 3.7.
77 *Id.* at 3.5.
78 *Id.* at 3.7.

2. ICCVAM Test Method Validation

The process of validation entails that the test method be evaluated and found to be both reliable and relevant to a specific purpose.[79] Where a test has been designed to replace a currently employed method entirely, the standard for validation is that "use of the method will provide a comparable or better level of protection of human health or the environment than current methods or approaches."[80] The results rendered by the new method will be compared with those yielded by the currently employed methods.[81] But where a new method is developed to identify new effects not previously tested or well defined, there is no paradigm with which to compare the effectiveness of the alternative.[82] In this regard, a substance may be validated for only a limited purpose, and validation status is revocable.[83] Generally, the process of validation will be simpler where the correlation between the measured effect and the predicted toxicological harm is the clearest.[84]

Note that a prerequisite to commencing the validation study is that all controls, methods, record-keeping procedures, protocols and preliminary subject data must be prepared and standardized in advance, so that the results are held to a rigid standard of accuracy.[85] The test results must also be reproducible within other qualified laboratories according to detailed procedural protocol.[86] This is accomplished in preliminary blind tests where the chemical codes are only revealed after the results have been obtained.[87]

B. Effect of ICCVAM Rules on California Law

When a fed agency publishes acceptance of the method in the Fed register, it is officially adopted as an alternative to the traditional test for the purposes of the CA law.[88] Manufacturers and contract testing facilities are then banned from using the previously used animal testing method.[89] There is, however, an exception for medical research, in that this section does not apply, and such researchers are not restricted to the use of approved alternatives.[90]

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79 *Id.* at 2.2.
80 *Id.* at 2.3.
81 *Id.* at 2.4.
82 *Id.* at 2.3.
83 *Id.* at 2.4.
84 *Id.* at 2.4.
85 *Id.* at 2.2.
86 *Id.* at 2.4.2.1.
87 *Id.* at 2.4.2.2.
88 Cal. Civ. Code §1834.8 (a).
89 *Id.*
90 *Id.* at (e)(5). "Medical research" is defined as that "related to the causes, diagnoses, treatment, control, or prevention of physical or mental diseases and impair-

C. International Perspectives on Animal Experimentation

One of the duties of the ICCVAM is to "facilitate appropriate interagency and international harmonization of acute or chronic toxicological test protocols that encourage the reduction, refinement, or replacement of animal test methods."[91] ICCVAM recently coordinated its efforts with the Organization for Economic Cooperation and Development (OECD), an international regulatory commission comprised of 30 member-countries including Japan, Mexico, Canada and the U.S.[92] The OECD is instrumental in the acceptance of in vitro testing methods in the international regulatory community at large.[93] The OECD has accepted at least two alternatives to the acute oral toxicity LD/50 test, and after validation of the LLNA test by the ICCVAM, OECD also approved the method.[94] As a result of the peer review report on the LLNA method that was coordinated by ICCVAM and NICEATM prior to its validation, the OECD also accepted a new international test guideline (TG 429) for skin sensitization using LLNA.[95]

Likewise, the European Commission for the Validation of Alternative Methods (ECVAM) recently approved three new in vitro skin corrosivity tests and an in vitro phototoxicity assay.[96] In response NICEATM and ICCVAM developed an expedited review process for the evaluation of the methods, and the development of implementation guidelines for federal regulatory agencies.[97] Agency cooperation and reciprocity have facilitated the approval of alternative methods and serve to expedite the adoption of uniform guidelines.

V. Available Alternative Methods

A. Short Term Tests

Federal agencies have yet to coordinate their efforts and construct a comprehensive interagency database of tested substances and results.[98]

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ments of humans and animals or related to the development of biomedical products, devices, or drugs. . .does not include the testing of an ingredient that was formerly used in a drug, tested for the drug use with traditional animal methods to characterize the ingredient and to substantiate its safety for human use, and is now proposed for use in a product other than a biomedical product, medical device, or drug." *Id.* aAt (e)(5).

[91] 42 U.S.C. § 2851-3.

[92] Ad hoc Interagency Coordinating Committee on the Validation of Alternative Methods, *supra* note 25 at Appendix C.

[93] *Id.* at Appendix C.

[94] Interagency Coordinating Committee on the Validation of Alternative Methods, Annual Progress Report (Dec. 19, 2001).

[95] *Id.* at 7.

[96] ICCVAM-NICEATMThe ICCVAM Homepage, *supra* note 66.

[97] *Id.*

[98] Different agencies keep their own inventories of substances.

As a practical matter, one obstacle is that each agency acts under a different directive, and generates different sets of guidelines for many of the same compounds.[99] As a result, many of the preliminary experiments involved in each project are duplicative of those having been performed previously by other agencies. To alleviate such inefficiencies testing program administrators have sought to reduce expensive duplication of initial tests on live animals via innovative methods.[100] Procedures known as short-term tests (STT) have risen in popularity as they can inexpensively identify lower-tier hazards within a matter of weeks.[101] STTs generally focus on chromosomal damage and genetic mutations to biological materials through in vitro assays.[102] These methods are less accurate than other long-term tests, but provide a strong preliminary screen indicative of mutagenic and carcinogenic effects.[103]

B. In vitro tests

In vitro tests incorporate methods for preserving organic materials, tissues and cells outside of the body.[104] Fragments of living tissue are extracted from the organism and propagated in vitro. The biological materials are exposed to substances and notations made of any latent effects.[105] Cell, tissue and organ cultures are used in highly controlled toxicity tests which are often less expensive than traditional tests.[106] These tests can predict the cellular and molecular effects of a substance on the specific tissue or organ, but do not provide the comprehensive response that the animal or human body would provide in vivo.[107] To bridge this gap, researchers have begun to co-culture cells from multiple organs, for the purposes of establishing how the substance might affect interrelated biological processes.[108] Tissue cultures provide a good screening mechanism and can reduce the number of animals used for preliminary tests.[109] They are also valuable for the approximation of human physiological response from animal data, for the purposes of assessing risk:

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99 Timothy Riley, *Redressing the Silent Interim: Precautionary Action & Short Term Tests in Toxicological Risk Assessment,* 12 Risk: HEALTH SAFETY & ENV'T 281, 293 (2001).

100 *Id.*

101 *Id.*

102 *Id.*

103 *Id.* One study gave a predictive value for carcinogenic potential of 90% for bacterial bioassay STTs.

104 Joanne Zurlo, Deborah Rudacille, and Alan M. Goldberg, *supra* note 1.

105 *Id.*

106 *Id.*

107 *Id.*

108 *Id.*

109 *Id.*

> For extrapolation to effects on intact humans, the most effective approach may be to compare effects on a small number of living animals with effects on cultured cells from the same species, and then to compare species differences in cell culture responses. Such comparisons should be both the basis for making cell culture to whole animal correlations and an insight into species-specific differences in response to the test substances, both of which facilitate extrapolation to potential effects on in tact humans.[110]

In vitro tissue tests are also bolstered by computer models that can predict physiological and metabolic effects on the whole body through the use of equations gleaned largely from prior live animal experiments.[111]

Tissue slices are also used for a number of explants including kidney and liver. These segments retain the differentiated functions that the organ would have if it were in tact in the live animal.[112] The slice maintains its cellular heterogeneity and three-dimensional integrity in vitro, so that it is paradigmatic for comparisons with in vivo tests.[113] The use of tissue slices can also reduce the number of test animals needed, as over one hundred slices can be prepared from the liver of one rodent.[114] Slices can also be used to study the normal functions of diseased tissues and tumors.[115]

Another benefit of in vitro cell cultures is the ability to test human tissue. At present, most research is conducted on nonhuman animals, although the majority of this data is collected for the purpose of predicting human response.[116] Differences among species pertaining to cellular regulatory and metabolic processes mean that the effect on a nonhuman culture will not necessarily correspond to that on human cells.[117] For example, in a comparison of human, rat and rabbit nasal turbinate cells in response to tetradecanoylphorbol-13-acetate, the compound was found to be severely toxic to human cells, had a minor stimulant effect on cell replication in the rat cells, but caused no detectible effect on the rabbit cells.[118]

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110 Johns Hopkins University, Center for Alternatives to Animal Testing, Cell Culture Systems and In Vitro Toxicity Testing, a report of the technical workshop of June 13-15 1990, *at* http://caat.jhsph.edu/pubs/tech_reports/techreport04.htm.

111 Joanne Zurlo, Deborah Rudacille, and Alan M. Goldberg, *supra* note 1.

112 Center for Alternatives to Animal Testing, *supra* note 110.

113 *Id.*

114 *Id.*

115 *Id.*

116 *Id.* at 21.

117 *Id.*

118 *Id.*.

1. Murine Local Lymph Node Assay (LLNA)

The Murine Local Lymph Node Assay (LLNA) is a test used to determine allergic dermatitis as a result of exposure of chemicals to the skin.[119] It replaces currently accepted guinea pig tests, uses fewer animals (1/3-1/2 the amount subjected previously), and virtually eliminates pain and distress.[120] Mice are used instead of guinea pigs, and a chemical that affects lymph nodes applied to their ears.[121] As a result toxicity is perceived in an earlier and less painful stage.[122] LLNA yields results after a shorter test duration and unlike the traditional test, also yields dose-response information.[123] This method was approved by ICCVAM in 1999, and its validation published in the final peer review report of the panel in February of that year.[124] Following shortly thereafter, the EPA, FDA, and OSHA each announced its acceptance of the method.[125] An implementation workshop was convened in 2001, co-sponsored by ICCVAM and the International Life Sciences Institute, to discuss methods of conducting the test and interpreting results in accord with regulatory agency requirements.[126]

2. Corrositex®

Corrositex is another alternative method that has been reviewed and accepted for implementation by the ICCVAM.[127] It is an vitro method used to determine the corrosivity of largely acidic chemicals on the skin. Corrositex refines and reduces animal use, and partially replaces the traditional rabbit skin test.[128] It will completely replace the use of live animals in some cases, while in others reducing the number of animals used from three per chemical tested to only one.[129] This reduction becomes numerically significant in the context of tests performed annually, as there are more than two thousand chemicals introduced and submitted for approval each year.[130]

The test works by introducing the potential toxin in vitro to a collagen matrix barrier that functions as an artificial skin.[131] The test is timed

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119 ICCVM-NICEATMThe ICCVAM homepage, *supra* note 66.
120 *Id.*
121 *Id.*
122 *Id.*
123 *Id.*
124 *Id.*
125 *Id.*
126 *Id.*
127 *Id.*
128 *Id.*
129 NIEHS Press Release #10-99 (June 22, 1999), *at* http://www.niehs.nih.gov/oc/news/corros.htm.
130 *Id.*
131 *Id.*

from the moment of introduction of the chemical, until it has penetrated the barrier and caused a color change in pH indicator dyes.[132] The reaction time is then compared to a classification chart to determine corrosivity.[133] The ICCVAM has approved Corrositex for the replacement of the in vivo test under certain circumstances, and as part of a tiered testing strategy, for preliminary toxicity screening.[134]

3. EpiDerm™ and EPISKIN™

EpiDerm™ and EPISKIN™ are species-specific methods for assessing the corrosivity of a chemical to the human skin.[135] These are three-dimensional in vitro tissue cultures of human skin to which the test chemical is applied and cell death recorded throughout a defined exposure period.[136] These methods are currently under an expedited review process by the ICCVAM, as the European Center for the Validation of Alternative Methods (ECVAM) recently completed its process of validation and forwarded data to the committee for its review.[137] This interagency accelerated approval process aids in the avoidance of test duplication and unnecessary expenditure of governmental resources and time.[138] The ability to conduct tests on human tissues without any risk to individuals will usher forth toxicity testing into a new era.

C. Human Tissue

In recent years the availability of human tissues has greatly increased so that several organizations now provide cultures and cell lines, as well as toxicity testing services.[139] A report of the Center for Alternatives to Animal Testing at Johns Hopkins University, predicts that the majority of preliminary cell line toxicity tests will be performed by contract laboratories, which will then be able to specialize and refine their methods.[140] The main obstacle to more wide spread human tissue culturing is the ensuing ethical and legal considerations.

Policy issues regarding ownership and profit distribution are some of the ethical dilemmas that have surfaced in the context of human tissue extraction.[141] Donors may or may not receive compensation, depending upon the organization with which they donate, and their samples will

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132 *Id.*
133 *Id.*
134 *Id.*
135 Interagency Coordinating Committee on the Validation of Alternative Methods, Annual Progress Report (Dec. 19, 2001) at 9, *supra* note 95.
136 *Id.*
137 *Id.*
138 *Id.*
139 *Id.* at 22.
140 Center for Alternatives to Animal Testing, *supra* note 110.
141 *Id* at 25.

each have different scientific and monetary values depending upon the health of the donor and the substance to be tested.[142] Although samples may be stored anonymously, prior to collection extensive pathological information will have to be solicited from the subject in order to maintain accurate data and controls on the experiments.[143] As a result, the scientific value of a sample can often be determined before it is collected and stored as anonymous material.

The problems inherent to this process have surfaced through legal disputes over ownership of extracted and stored cells. For example, in *Moore v. Regents of the University of California*, the court held that the plaintiff had no expectation of retaining ownership of cells excised from his body, and therefore no interest in the cell line that was propagated and patented.[144] However, in *Hecht v. Superior Court,* a case over the disposition of the stored sperm of a decedent, the court determined that because the decedent had an expectation that he would retain control over the materials, and so the sperm was viewed as property and subject to ownership and transfer in accordance with the probate codes.[145] In this sense, expectation can play an important part in determining such claims to ownership or control. It should be noted that human sperm is unique in that it represents potential human life to the owners, whereas other human tissues have value that is measured by utility to the recipient or value of information to be gleaned from the experiment. The issue of control should play a smaller part in disputes over other (non-reproductive) extracted tissues once the donor has been compensated.

Another option is to reject the idea of compensating donors for their tissues. Women and men are compensated for donating genetic materials to banking services that sell them to buyer-patients who wish to create a human life. In the case of organ donation though, facilities are required to be non-profit and to operate in an equitable manner, which precludes the prioritization of financial gain.[146] As an alternative to private ownership, it has been suggested that blood banking practices serve as the paradigm, wherein people are encouraged to donate as a matter of good will.[147] In the context of blood, this idea has been largely successful and many repeat donors do so on a regular basis. It seems that people are anxious to give of themselves when they perceive a direct benefit to an individual in need. Marrow, blood and organ donors receive gratification from the expectation that they may save individual lives. Attitudes may

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142 *Id* at 26.

143 *Id* at 25.

144 *Moore v. Regents of the Univ. of Cal.*, 793 P.2d 479 (Cal. 1990).

145 *Hecht v. Superior Court*, 20 Cal. Rptr. 2d 275 (Ct. App. 1993).

146 42 U.S.C.A. § 273. (West 2002).

147 Sheila R. Kirschenbaum, *Banking on Discord: Property Conflicts in the Transplantation of Umbilical Cord Stem Cells,* 39 ARIZ. L. REV. 1391 (1997).

be different though in the context of collection of purely experimental materials, where the good to be produced is far more remote. If this is the case, financial inducement may prove to be necessary, wherein a standard fee system would probably best serve public policy. Human tissue extrapolation is comparable to blood or marrow donation and should entail minimal "costs" or health detriments to the donor, to be distinguished from the unconscionable sale of human body parts generally.

D. Cell Lines

Once a successful primary culture has been made of cells, tissues or organs taken from the organism, the materials can be subcultured and developed into a cell line.[148] The lifespan of the line may be finite or infinite, and various functions can be altered.[149] As early as 1911, toxicity tests were conducted on a cell line that had been propagated for 34 years and originated in the heart of a chick embryo.[150]

Stem cells in particular are often more sensitive to toxins than are other cells.[151] Stem cells are capable through successive duplications of differentiating into mature cells of a specific tissue type.[152] In 1998 it was discovered that stem cells taken from a human embryo can be cultured under conditions that cause them to differentiate into any other type of cell.[153] Stem cell lines replicate indefinitely and in the process create new lines in addition to differentiated cells.[154] In the future, this capability could be utilized to transplant healthy cells into the affected cite and replace damaged or diseased human tissue, creating a variety of alternative therapies.[155]

> In recent research on mice, for example, it was found that embryonic stem cells injected into the heart of the adult mouse were incorporated perfectly into the heart muscle of the adult animal, that is, they differentiated into heart muscle cells and became perfectly synchronized with the beat of the host heart.[156]

The problem with human stem cell collection, is that at present the most versatile type of these cells originates in a human fetus, the development of which is arrested at the blastocyte stage (day 5 or 6 after con-

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148 Center for Alternatives to Animal Testing, *supra* note 110.
149 *Id.*
150 Joanne Zurlo, Deborah Rudacille, and Alan M. Goldberg, *supra* note 1.
151 Center for Alternatives to Animal Testing, *supra* note 110.
152 Governo Italiano, Opinion of the National Bioethics Committee on the Therapeutic Use of Stem Cells (Oct. 27, 2000) *at* http://www.palazzochigi.it/bioetica/english/cells.html.
153 *Id.*
154 *Id.*
155 *Id.*
156 *Id.*

ception), and the stem cells isolated and extracted.[157] This process entails that a human fetus be sacrificed at the right time in its development so that the cells may be procured. The ethical implications involved are complex, as currently the common method for the collection of such tissue is in the process of voluntary or spontaneous fetal abortion procedures.[158] Stem cells have been extracted from other sources including adult tissues (blood, bone marrow, endothelium, nervous system, and muscle), blood from the umbilical cord and embryos.[159] Of the types extractable from adult tissues, bone marrow cells are the most sustainable in the undifferentiated state—that analogous to tissues derived from human fetal tissues.[160] Cells extracted from the other adult human tissues are more difficult to isolate and to maintain in an undifferentiated state.[161]

In the future, nuclear transplant techniques (i.e., "cloning") may solve this problem.[162] As tested on certain animals (recall the sheep "Dolly"), the technique has so far been able to render embryos without the use of sperm.[163] In the case of humans, where stem cells are extracted from a blastocyte (5-6 day embryo),

> the stem cells derived from the blastocytes not only behave like stem cells derived from an embryo generated by the union of sperm and egg, but could also afford the substantial advantage of being genetically identical to the cells of the person from which the nucleus was extracted, thus avoiding all problems of rejection of the cell transplant in the case in which the nucleus donor is a patient and the cell transplant is aimed at repairing damage to diseased tissue in him (auto-transplant).[164]

Cloning would entail the propagation of infinite cell lines at the expense of one human fetal blastocyte, and in terms of utility would offer multitude distributive benefits to successive generations. This sacrifice should pose less of an ethical dilemma in jurisdictions where abortion is legal. Once it is known that a fetus will be disposed of, one can argue that it would be sounder policy to utilize rather than waste such a resource. Here an analogy to *Moore* (infra) can be made: the patient has no expectation to retain control over the materials and so no property interest inheres.

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157 *Id.*
158 *Id.*
159 *Id.*
160 *Id.*
161 *Id.*
162 *Id.*
163 *Id.*
164 *Id.*

VI. CONCLUSION

According to the Humane Society of the United States, animal experimentation has greatly declined in the last twenty years, and in vitro testing rapidly increased.[165] Several consumer product companies have been supportive of alternative testing methods: over twenty years ago Revlon funded research at Rockefeller University toward the development of alternative test methods, and the Noxell and Avon Cosmetics Corporations both implemented alternatives to the draize eye test in 1989.[166] It would seem that legislators, the public and some governmental and private industries are anxious to alleviate animal suffering and to find innovative methods for toxicity testing.

Interagency coordination is pivotal in the area of domestic and international regulatory acceptance of alternative test methods. Information sharing reduces costs of testing and can refine methods so as to reduce the number of test animals subjected. Steps have been taken to substantially advance this goal, and it appears through the formation of various committees that many of the economic world-leaders would prefer to revise animal testing methods both for the advancement of human health and the reduction of animal suffering. Economic considerations also weigh in favor of interagency coordination, as duplicative studies are wasteful of time and resources as well as animal bodies.

Finally, innovative new methods are able to provide human materials with no physical harm to human individuals. The results of toxicity tests relying upon these materials provide uniquely accurate results specifically geared towards human effects. Generally this process entails financial benefits as well, but such may not always be the case. The value of human-specific results is so great that it should be the primary factor for consideration in regulatory acceptance. Guidelines pertaining to the extraction of human materials would be helpful in the determination of ownership and control issues which arise in this context. Altruistic individuals may choose to donate short of such regulations for the benefit of human kind, and these individuals should be allowed to do so if that is their wish.

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165 Humane Society of the United States, *supra* note 6.
166 *Id.*