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Voluntary Environmental Programs at Contaminated Properties

*Perspectives from U.S. Regulators and
Program Participants*

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Abstract

Nearly every state in the United States has developed one or more voluntary cleanup programs (VCPs) to support an alternative approach to cleanup of contaminated sites. Thousands of sites have entered into these programs. Yet, despite the ubiquity of VCPs and the number of enrolled properties, we know little about the factors that influence voluntary action at these sites. This paper reports results from interviews of state officials involved in VCPs in all states, and from a survey of VCP participants in several states. It has two objectives. First, at an application level, the interview and survey results can be used to help improve policy and practice in voluntary cleanup programs. Second, the paper furnishes a unique study to the general literature on environmental voluntary behavior, contributing an empirical, survey-based study of volunteers engaged in cleanup.

Key Words: voluntary cleanup, brownfields, contamination, redevelopment, remediation

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Kris Wernstedt, Allen Blackman, Thomas P. Lyon, and Kelly Novak*

1. Introduction

The cooperative bargaining and voluntary approaches that have appeared in environmental regulatory reforms in Europe and the United States since the early 1990s (Schnabl 2005; Brouhle et al. 2005) are well crystallized in efforts to revitalize contaminated sites. Such sites include properties that qualify as brownfields in U.S. national legislation—“abandoned, idled or underutilized industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived contamination” (42 U.S.C. §9601, amended 2002)—as well as other types of properties contaminated with hazardous substances. U.S. brownfields number in the hundreds of thousands, perhaps even a million, according to some estimates. The sites are former and current manufacturing plants, gas stations, mines, landfills, dry cleaners, foundries, wholesale distributors, and other enterprises that may have generated contamination. And they are found in urban, suburban, and rural settings, occupying parcels smaller than the average home lot or spanning thousands of acres.

The 1980 Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), known colloquially as the Superfund law, has been widely criticized for creating a perverse disincentive that discourages site owners and prospective buyers and developers from cleaning and reusing contaminated properties. As a result, many distressed properties continue to pose threats to public health and the environment and depress local economies. In addition, “mini Superfund” laws have appeared at the state level, addressing contaminated sites that pose smaller risks to human health and the environment or those that may fall outside the CERCLA realm; like the federal statute, these state laws often deter public and private parties, including lenders of capital, from investing in a site for fear of being held liable for its cleanup.

Since the early 1990s, the federal government and nearly all states have supported efforts to develop state voluntary cleanup programs (VCPs) to remediate contaminated sites in a more cooperative and less burdensome fashion. Typically, these programs encourage revitalization of

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the sites by 1) providing some form of liability release upon state approval of cleanup; 2) tailoring cleanup standards to the expected future use of the properties, rather than requiring, for example, the same cleanup of a future industrial park as for a future playground; 3) delegating state regulatory functions (including monitoring and oversight of cleanup activities) to the private sector; and/or 4) offering financial incentives to spur investment in contaminated sites. These programs and their participants, however, have not been well studied, in part because of a lack of good data.

Our objective in this paper is both to document the different features of state-level voluntary cleanup programs—an approach that while now ubiquitous in the United States is not common in many western European countries—and to describe participants' attitudes toward these programs. To that end, we interviewed state program officials and surveyed participants in several states' voluntary cleanup programs. In section 2, we briefly review the literature on voluntary behavior, cleanup programs, and contaminated sites more generally. In section 3, we highlight several characteristics of the states' programs and officials' perceptions about several of their features. We discuss participants' experiences and attitudes toward state-level voluntary cleanup programs in section 4. We offer concluding comments in section 5.

2. Background

The literature on voluntary environmental behavior is substantial. Economic treatments (Lyon and Maxwell 2004; Khanna and Anton 2002; Blackman et al. Forthcoming; Alberini and Segerson 2002) generally attribute such behavior to a desire to preempt regulatory pressures and/or gain preferential treatment from regulatory entities; market pressures that reward firms that improve environmental performance beyond required levels or produce environmentally friendly products; and social or community pressures to mitigate local environmental problems. These pressures may be mediated through public disclosure of environmental performance. Organizational theories from sociology (DiMaggio and Powell 1983) partially overlap these economic perspectives, suggesting that some firms that seek social legitimacy may be influenced as much by external traditions, values, and norms as by internal profit considerations (see, for example, King and Lenox 2000). Similarly, the legal studies literature (Gunningham et al. 2004) has focused on how firms' "social licenses" obligate them to meet societal expectations even when these are not formally embedded in law or regulations.

Although less extensive than the general literature on voluntary behavior, studies of the institutional dimensions of the remediation and reuse of contaminated land have proliferated, consistent with the growth in state voluntary cleanup programs and brownfields redevelopment. Academic and practitioner planning, environmental, and economic development journals have

continued to feature special issues on contamination and brownfields in the past 15 years—*Economic Development Quarterly* (1994), *Public Works Management & Policy* (1998), *Environmental Practice* (2003), *Local Environment* (2006), and *Journal of Urban Regeneration and Renewal* (2010)—and a wide range of individual papers on contaminated sites have appeared throughout the literature. These cover a wide range of topics (see DeSousa et al. 2009 for a recent summary), with a persistent focus on liability concerns (see, for example, Chang and Sigman 2007; Segerson 1993). Less developed is work specifically at the nexus of voluntary behavior and cleanup programs, although several papers have covered voluntary program aspects, most of them showing the importance of liability relief. Evaluation of the use of public incentives to encourage private interest in redevelopment has received attention in both the United States (Wernstedt et al. 2006a; Sherman 2003) and Europe (Alberini et al. 2005; Catney et al. 2006), and an extensive case study by Wernstedt and Hersh (2006) of Wisconsin’s brownfields program discusses in detail the evolution of the state’s Voluntary Party Liability Exemption process. Dana (2005) and Fortney (2006) have recently argued for more flexibility at the state and local levels to experiment with voluntary and other efforts that encourage innovative practices and monitoring to determine what program features yield positive results. However, we are aware of only three articles in the peer-reviewed literature that focus explicitly on voluntary cleanup programs.

In the earliest of these, Simons et al. (2003) examine the frequency with which state regulators have revisited sites that had received a closure letter indicating completion of cleanup. Such closure letters are a crucial element of state voluntary programs, since parties at contaminated sites have long expressed concern over “reopeners” (wherein a regulatory entity reconsiders a previously approved cleanup). The authors report that fewer than 0.2 percent of more than 11,000 sites with closure letters have been reopened, a record that objectively implies a very manageable problem. They caution, however, that more opportunities for reopeners will arise as site histories lengthen at voluntarily remediated sites, and that increased enforcement could further increase this rate.

In a more recent paper, Daley (2007) investigates the drivers stimulating the adoption of voluntary cleanup programs in 44 states. She concludes that interest group pressures, negative experience with the pace of federally mandated Superfund cleanups, and proximity to other states with existing voluntary cleanup programs all speed a state’s adoption of a voluntary approach.

Finally, Alberini (2007) econometrically examines incentives and the characteristics of properties that correlate with participation in Colorado’s Voluntary Cleanup Program and the influence of program participation on property prices. Consistent with the redevelopment rather

than the environmental agenda of the revitalization of contaminated properties, she finds that site size and surrounding land use constitute the principal drivers of site participation and that less contaminated sites join at greater rates than more contaminated ones. In addition, properties going through the program recover the depreciation associated with contamination, likely an important selling point. However, the data fail to demonstrate that the state program attracts contaminated sites lacking development potential. It appears that even with other economic development and remediation incentives, there appears little motivation for participation at less promising properties.

Earlier work in the gray literature also stresses the economic development features of voluntary cleanups. Meyer's (2000) study of three state voluntary cleanup programs suggests that their variable cleanup standards have both lowered cleanup costs and increased cleanup activity. He argues that regulatory reform in general has promoted voluntary activity more than has financial support, particularly at larger sites, noting that voluntary cleanup programs have served principally as de facto local economic development programs. The oft-cited surveys of cities by the U.S. Conference of Mayors on brownfields redevelopment also have emphasized economic rather than environmental gains. U.S. Conference of Mayors (2008)—the seventh in a series that dates back to 1998—notes that the 190 cities responding to its survey indicated that more than 100,000 jobs were created as a result of redevelopment of thousands of acres of brownfields.¹ Neighborhood revitalization was identified by the highest proportion of respondents as being a benefit of brownfields redevelopment, followed by increased taxes and jobs. Environmental protection appeared only as the fourth most-identified benefit.

That the economic dimension predominates in cleanup programs throughout the United States may reflect the fact that many publicly led efforts at contaminated properties are housed in local development entities, rather than in public planning agencies. In fact, a survey of roughly 80 representatives of public planning and economic development agencies in Wisconsin (see Wernstedt and Hersh 2006) indicates the different objectives of the two groups. As Table 1 highlights, individuals in planning agencies appear to emphasize reducing environmental and health risks, while those in economic development agencies value more efficient use of

¹ Although the general emphases on neighborhood revitalization, tax and job augmentation, and environmental cleanup may fairly represent the objectives of the survey respondents, the U.S. Conference of Mayors' numerical results are problematic. The survey is a biased convenience sample of those U.S. cities that are both motivated enough to respond to the survey and have a staff member with time (and one hopes the expertise) to complete the questionnaire. To the best of our knowledge, there has been no independent evaluation of the job, tax, and acreage claims in the U.S. Conference of Mayors' report.

infrastructure and removal of eyesores. The economic development respondents also indicate an interest in increasing tax revenues, whereas the planning respondents place more importance on increasing jobs. Elected officials rank reducing health risks and removing eyesores higher than making more efficient use of infrastructure. However, the only differences between the planning and economic development subsamples that are statistically significant at the 0.05 level (difference of proportions test) are the “reduce public health risks” and “creating jobs” reasons. When elected officials are included, the “more efficient use of infrastructure” difference across the three types of respondents also is statistically significant at the 0.05 level (because of elected officials’ significantly lower prioritization of the infrastructure concern).

Whatever the motivation, the economic orientation likely both drives and reflects the interest of parties who participate. However, no study has systematically collected data to investigate regulators’ reasons for creating a voluntary cleanup program or participants’ motivations for enrolling. This paper examines both the supply and the demand questions about such programs.

Table 1: Comparisons Among Economic Development, Planning, and Elected Stakeholders On Redeveloping Contaminated Properties

Reasons for Redeveloping Contaminated Properties, Wisconsin, USA			
Please indicate your view of the importance of each of the following reasons why contaminated properties should be redeveloped in your local area, using a scale of 1 (not important) to 5 (very important).			
<i>(percentage selecting “important” or “very important”)</i>			
Reason	<i>Economic development officials (n=35)</i>	<i>Planning officials (n=49)</i>	<i>Elected officials (n=21)</i>
More efficient use of infrastructure	86	82	57
Remove eyesores	83	78	95
Increase tax revenue	77	72	71
Reduce environmental risk	77	84	90
Reduce public health risk	66	84	95
Create jobs	63	71	67
Reduce sprawl	57	51	29
Part of area-wide redevelopment agenda	46	39	52
Diversify business mix	46	39	24
Promote greenspace	34	31	52

Source: adapted from Wernstedt and Hersh (2006).

3. Structured Interviews of State Voluntary Cleanup Program Officials

Both the U.S. government and several nongovernmental organizations have published reports that describe the basic elements of mandatory and voluntary state cleanup programs and their evolution since the mid-1990s (Bartsch and Dorfman 2000; Environmental Law Institute 2002; Office of Technology Assessment 1995; U.S. Environmental Protection Agency 2005, 2008). The most recent examination (U.S. Environmental Protection Agency 2008) highlights the nearly universal adoption of voluntary cleanup elements across land cleanup programs in the 50 states, increased emphasis on reuse along with cleanup objectives, consistent reliance on institutional controls, and renewed attempts to document program benefits. Along with the earlier reports, it also discusses available liability protections, which generally have expanded over the years.

To augment this body of work and collect information that allows us to distinguish specific program features more systematically—and the motivations for developing these programs—we employed a structured interview guide to conduct 51 hour-long interviews of

voluntary cleanup program officials, one in each of the 50 states and the District of Columbia. Much of the information collected reflects the perspective of the individual interviewed, typically the official in charge of the state voluntary program (or the major voluntary elements of a traditional state cleanup program if no formal voluntary program existed). Forty-nine of our interviews took place by phone; the other two were conducted face-to-face at the national brownfields conference. Our interviews concluded in 2007.

3.1 State Program Characteristics

According to our interviewees, most states have moved to variable cleanup standards and away from uniform cleanup standards for all sites and uses, with nearly three-quarters of the states at the time of our survey tying cleanup to expected future use at the site. Depending on the particular contaminant, roughly half the states have some discretion to decide cleanup levels on a case-by-case basis. In addition, the state programs offer a variety of liability protections, with protection against further cleanup requirements being the most common; that is, once a state environmental agency approves remediation, it will not require further cleanup even if certain conditions change (see below). Such protection aims to decrease the open-ended nature of many previous cleanups, where environmental agencies may have reserved the right to require additional cleanup in future years even after having approved “completed” cleanups. Forty-five of the 51 states offered this type of protection at the time of our interviews. However, only 11 of the states provide protection against third-party suits—claims from site workers, occupants, or neighbors for environmental and/or health damages—and most of these protections are relatively limited.

What reopeners do the above state liability protections cover? Twenty of the states responding to questions on reopeners indicate that liability protection continues even if contamination that was unknown but existed at the time of the cleanup approval is later discovered. In addition, most states (all but 6 of the 45 states responding to this question) continue to provide liability protection—and refrain from reopeners—if environmental standards change in the future at sites where cleanups have already been approved under older standards. A majority of these provide it even to responsible parties. However, 32 of the 45 states responding to our question on liability protection indicate that they do not offer such safeguards for remedy failures.

Even with these various protections, participants may remain concerned about claims brought by other parties. When asked to assess the level of concern the officials believe participants have about actions by other (non-VCP) state agencies, third-party lawsuits, and actions by EPA, nearly two-thirds of those responding to the question indicated that program

participants are most concerned about actions by other state agencies. One-half as many indicated that program participants were most concerned about third-party lawsuits, and only two officials indicated that EPA action constituted the primary concern of participants.

3.2 Motivations for Development of Voluntary Programs

In addition to exploring perspectives on liability regimes and protections, our interviews questioned state officials about motivations for the creation of voluntary cleanup programs and perceived motivations for participation. When presented a set of 12 possible motivations for VCP creation (Table 2) and asked to indicate their significance on a scale of 1 to 9 (with 9 indicating a very significant motivation), the median response for “to redevelop more properties” was 8, the highest score of any of the posited motivations. Similarly, when given a set of 15 possible reasons (Table 3) for parties to choose to enter a voluntary program (with 9 indicating a very significant reason), the median response for “to obtain a bank loan or make a property transaction” was 9, the highest score of the 15 listed. Thus, the thread linking the program creation and participation motivations is economic development.

Other motivations related to the economic development aspect of voluntary cleanup programs also appear to be significant reasons to develop such programs. Speeding cleanups and attracting developers both have median significance scores of 7, along with improving environmental quality and reducing stigma. At the other extreme, decreasing government presence, addressing calls to relax environmental standards, reducing litigation, responding to political pressure for less enforcement, and saving enforcement dollars do not appear to be major drivers. From the participants’ side as seen through the eyes of the state officials, “liability protection” appears as the only other reason that has a median score above 6, with nearly two-thirds indicating that protection from state agency action was more important than protection from third-party lawsuits. State technical and financial assistance, lower cleanup standards, social and political pressures, and getting off a public list of contaminated sites all appear to have relatively low salience.

Table 2: Motivations (Median Response) for Developing State Voluntary Cleanup Program, as Reported by State Program Officials

(scale ranges from 1 to 9, with 9 indicating highly significant motivation)

Motivation	Median response
Redevelop more properties	8
Speed cleanup	7
Reduce contamination stigma	7
Improve environmental quality	7
Attract new developers and investors	7
Create structured cleanup process	6
Create collaborative cleanup procedure	6
Save state enforcement dollars	4
Political pressure for less enforcement	4
Decrease litigation	4
Mitigate pressures to relax env. standards	2
Decrease presence of government	2

n = 51

Table 3: Reasons (Median Response) for Site Participants to Enter State Voluntary Cleanup Program, as Reported by State Program Officials

(scale ranges from 1 to 9, with 9 indicating high significance)

Reason	Median response
Obtain a bank loan or make a property transaction	9
Receive liability protection	8
Experience a more certain cleanup process	6
Obtain expedited state or local permitting	5
Receive good publicity or avoid a bad image	5
Obtain financial support, such as grants or loans	4
Reduce political or community pressure	4
Remove site from public list of contaminated properties	4
Receive tax incentives	3
Discharge social duty	3
Receive consulting services from state	3
Reduce peer pressure from fellow professionals	2
Obtain less stringent cleanup standards	1
Receive assessment services from state	1
Receive site remediation services from state	1

n = 51

3.3 Voluntary Program and Enforcement

The third element of our state interviews examines the interplay between voluntary and enforcement cleanup programs. Despite the relatively recent emergence of the former, more sites appear to move through these programs than under traditional enforcement. When asked to indicate what percentages of all of the contaminated sites that enter either type of program go to each, the mean split was 66 percent voluntary and 34 percent enforcement. Median values for reporting states are 75 percent voluntary and 25 percent enforcement. Many sites, however, remain outside both programs. One-half of respondents to our question on the programmatic disposition of contaminated sites indicated that 50 percent or more of contaminated sites in their states had entered neither a voluntary nor enforcement program, and five officials indicated 80 percent or more had not entered either.

Cleanup costs may differ notably between the two types of programs. Table 4 presents a cost comparison between sites cleaned through an enforcement program and those cleaned through a voluntary program. Of the 41 respondents to our question on cost differentials, 2

officials indicated that the average costs of cleanup were higher at voluntary sites, but 18 reported equal average costs between the two approaches and 21 indicated lower average cleanup costs for VCP sites. Roughly 20 percent of the respondents indicated average cleanup costs at voluntary sites were less than one-half as much as average cleanup costs at enforcement sites.

Table 4: Perceived Difference in Average Cleanup Cost between Site in VCP and Site in Enforcement Program, as Reported by State Program Officials

Average cost comparison	Number of states
VCP sites cost less than 50% of enforcement sites	8
VCP sites cost 50% to 90% of enforcement sites	13
VCP sites cost roughly the same as enforcement sites	18
VCP sites cost 10% to 50% greater than enforcement sites	1
VCP sites cost more than 50% greater than enforcement sites	1

4. Survey of VCP Participants

The officials from 51 different voluntary cleanup programs provide a nationwide overview of the motivations for creating these programs but cannot speak for those who actually choose to participate. A systematic survey of program participants across the country to better understand these motivations is difficult to undertake, however. No national-level registry of all contaminated sites exists—a situation that has challenged every research effort investigating site cleanup dynamics—and existing individual state-level databases are poorly designed for tracking participants. Site information typically is not actively updated after regulators approve cleanups, and most databases contain the location of sites rather than the addresses of the program participants themselves. Leasing arrangements that separate owners from tenants, absentee landlords, and property transactions make any contact information that is provided problematic. In addition, while VCPs may target property owners, prospective purchasers, developers, and other parties with an equity stake in contaminated properties, environmental engineering consultants and/or legal counsel often initiate and complete the enrollment of properties in voluntary programs. The named owner-participants may lack real familiarity with the program and not fully comprehend the reasons why their engineers or attorneys recommended enrollment in it.

4.1 Survey Administration

Notwithstanding the difficulties just noted, some state databases with suitable contact information exist, and these have enabled us to survey program participants in several states. We report here results for site participants and related parties (legal counsel and environmental consultants) that entered VCPs in Illinois, Texas, and Virginia from 2003 to 2007. Participants and related parties identified in these databases include those who have completed voluntary cleanups (and received a certificate of completion or other closure from the state), those who have entered a program and remain active in it, those who are inactive, and those who entered but subsequently withdrew prior to receiving closure. Our recruitment method for these participants included a mix of mail solicitation in Illinois and Texas—a postcard that briefly explains the survey and invites the participant to complete it on-line, along with the survey URL and access code to control survey participation—and telephone contact in Virginia, with a subsequent email invitation containing the same information as the postcard solicitation.²

4.2 Respondent and Site Characteristics

The first section of the survey collects information on respondents and sites enrolled in the program. Table 5 shows that consultants constitute the plurality of our respondents—nearly three-quarters of these indicated that they were directly involved in making the decision to enter the site in the state voluntary program. Current owners represent the only other category with more than one-quarter of respondents (respondents could indicate more than one category). A follow-up question indicates that 45 percent of the respondents have been involved in six or more sites that have participated in their state’s voluntary cleanup program.

To tie our questions to individual sites, we asked respondents in the preface of the questionnaire to choose a specific volunteer property that they have been involved in and to answer the questions with respect to that property. Site characteristics range widely across our

² Our response rates for Illinois and Texas ostensibly are both in the single digits, but this includes an unknown number of outdated contacts (i.e., our recruitment method in these two states does not distinguish between program participants who received postcards and declined to respond and those who never received a postcard because of outdated contact information). In our two-stage telephone and email recruitment method in Virginia, nearly 40 percent of participants listed in the voluntary program database were not reachable, most because of outdated contact information. The 126 program participants actually contacted in Virginia yielded 27 responses, for a 21 percent response rate. This compares favorably with response rates (11–12 percent) from two previously published studies that report results from surveys of private parties on the redevelopment of contaminated properties (Wernstedt and Hersh 2006; Wernstedt et al. 2003) and the response rate (10 percent) reported in a recent survey of public officials about the conversion of contaminated properties to parks (Siikamäki and Wernstedt 2008).

respondents. The left-hand bar in each pair of uses in Figure 1 shows that 60 percent of the sites had industrial use prior to entering the cleanup program, and half as many hosted commercial use (sites could have more than one use). Nearly all the sites had soil contamination, and roughly two-thirds of these also had groundwater contamination. Fewer than 20 percent of the sites were included on a formal list of contaminated sites prior to entering into the voluntary cleanup program, but almost one-half of respondents indicated that the state environmental agency was aware of possible contamination at the site prior to voluntary program enrollment. Costs for assessment and cleanup ranged from \$7,500 to \$20 million per site, with a median cost of \$275,000.³

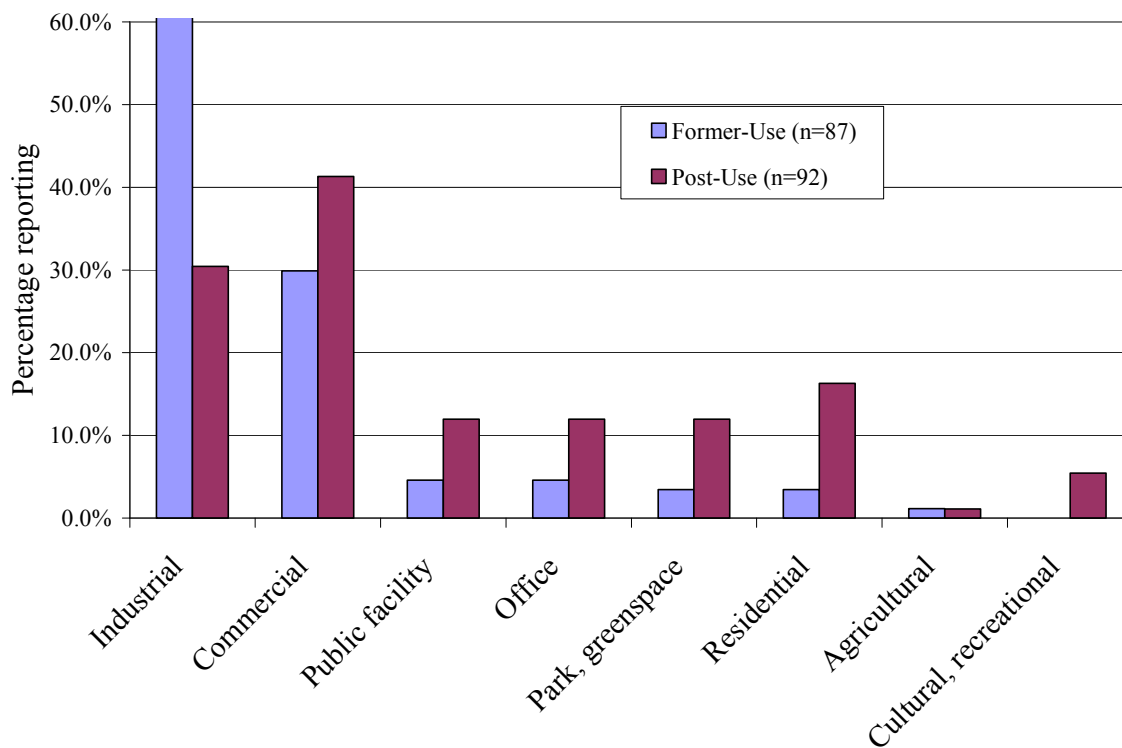
Table 5: Role of Respondent

Role at site	Percentage of respondents
Consultant	41.6
Present owner	25.7
Responsible party	17.8
Local government	17.8
Developer	13.9
Past owner	6.9
Legal counsel	6.9
Site occupant or lessee	2.0

n = 101

³ The average cost of assessment and remediation for volunteer parties is not known. Heberle and Wernstedt (2006) cite several studies suggesting remediation and assessment costs at brownfield sites typically constitute less than 10 percent of redevelopment costs. Many volunteer sites cost much less, and our median cost of \$275,000 likely indicates a bias toward larger, more complicated sites.

Figure 1: Site Use before and after Enrollment in Volunteer Program
(percentage of respondents reporting)



4.3 Participant and Site Experiences in Program

The second major section of the survey explored experiences in the voluntary cleanup program. Although most respondents chose to enroll their properties, about 10 percent noted their sites were legally required to enter the voluntary cleanup program to be cleaned up. As Table 6 shows, about one-half of the sites were vacant and not used when entered into the program, and nearly 20 percent were underutilized or abandoned (sites could fall into more than one category). At the time of the survey, slightly more than one-half of our respondents’ sites had completed and exited their state’s voluntary program, with one-half of these having been in the program for two years or less. Of those that had completed the program, three-quarters had received a no further action letter, and the remainder a certificate of completion.

Table 6: Status of Site When Entered into Voluntary Program

Status	Percentage of sites
Vacant	52.1
Actively in use	38.5
Used but underutilized	12.5
Abandoned	6.3
Tax delinquent	2.1

n = 96

The right-hand bar for each use in Figure 1 highlights the change in activities at many of the volunteer sites that have entered into a voluntary program. The proportion of sites with industrial use decreased significantly after completing the program—one half as many sites have an actual or planned industrial use after emerging from a voluntary program as they did prior to enrollment—and the proportion of sites with postcleanup use for office, park, or public facility activities nearly tripled. The proportion of those with residential use also greatly increased, from 3 percent to 17 percent. Overall, one-half of the sites completing a program have been or are being redeveloped for a new activity. Most of these have encountered local permitting or zoning processes as part of redevelopment, with roughly 20 percent facing community opposition to the redevelopment. In contrast, only 5 percent of respondents noted that community members had objected to the proposed cleanup strategy.

4.4 Participant Motivations and Benefits

The third part of the participant survey posed questions to explore motivations and perceived benefits of enrolling in voluntary cleanup programs from the participants' vantage point. Table 7 shows for each of nine possible benefits the percentage of respondents who ranked the benefit as the most important reason for entering their sites into a voluntary cleanup program. A clear plurality indicated that facilitating property resale was the most important expected benefit, with liability protection ranked the highest by nearly one-quarter of respondents. Combined, the related rationales of facilitating transactions and accessing capital with bank loans accounted for more than one-half of the principal expected benefits. At the other extreme, few respondents indicated that the primary expected benefit for enrolling their properties was to remove them from a public list of contaminated sites, a motivation that the environmental disclosure has emphasized (although in a separate question, one-quarter of respondents indicated

that an expected benefit of site enrollment was that it would address the potentially negative effects of the sites' listing in a public database of contaminated sites).

Table 7: Ranking of Benefits Motivating Entry into Voluntary Cleanup Program
(percentage of respondents indicating top rank for each benefit)

<i>Motivation</i>	<i>Percentage</i>
To facilitate property sale	40.0
To provide liability protection	24.2
To obtain bank loan	10.5
To decrease time of cleanup and redevelopment	9.5
To ease concerns of tenants or visitors w/ state-approved cleanup	6.3
To decrease cleanup cost	5.3
To increase public funding for cleanup and redevelopment	2.1
To expedite permitting	1.1
To remove site from list of contaminated properties	1.1

n=95

The actual benefits that respondents report receiving from enrolling their properties in a voluntary program appear in Table 8. Liability protection, property sale facilitation, and bank loan approval appear as commonly received benefits, but 44 percent of respondents also indicated that enrollment eased the concerns of site visitors and tenants at the site. Nearly one-third noted that enrollment had helped decrease time and/or costs of cleanup costs. Fewer than 10 percent said that enrollment had yielded no benefits.

Table 8: Actual Benefits from Enrolling in Voluntary Cleanup Program
(percentage of respondents indicating benefit actually received from program)

<i>Benefit realized</i>	<i>Percentage</i>
Providing liability protection	54.8
Facilitating property sale	53.8
Easing concerns of tenants or visitors w/ state-approved cleanup	44.1
Obtaining bank loan	33.3
Decreasing time of cleanup and redevelopment	31.2
Decreasing cleanup cost	31.2
Expediting permitting	17.2
Removing site from list of contaminated properties	17.2
Increasing public funding for cleanup and redevelopment	16.1
No benefit	6.5

n = 93 respondents

The last part of the participant survey examined the attractiveness of possible additional liability protections that voluntary cleanup programs could offer. Table 9 shows that 61 percent of respondents indicated that liability protection from third-party claims was the most important additional liability protection. Nearly all of the remaining respondents split equally between protections from liability for changes in standards and from liability for additional existing contamination that might be discovered in the future. Only 2 percent placed protection from additional cleanup requirements if a remedy failed as the most important liability protection that a state voluntary program could offer.

Table 9: Ranking of Liability Protections That Program Could Offer
(percentage of respondents indicating top rank for each protection)

Liability protection for ...	Percentage
Third-party claims	61.3
Change in standards	18.3
Discovery of more contamination	18.3
Failure of remedy	2.2

n = 93 respondents

5. Conclusions

Our interviews of state officials and survey of participants in U.S. voluntary cleanup programs can help improve understanding of how these programs have developed and operated and why individuals enroll their properties in them. The results inform both whether the benefits of enrolling properties as perceived by state officials match the motivations expressed by the participants themselves, and whether actual program elements match what participants want the programs to offer. To date, the limited literature addressing motivations for remediating and redeveloping contaminated properties has emphasized economic rationales, and the sparser literature concentrating on voluntary behavior at contaminated properties has focused almost exclusively on this. From the vantage point of practice, if gaps exist between the perceptions of officials and those of participants, or if motivations appear misunderstood, states may be able to identify policy, legislative, regulatory, or programmatic enhancements to improve program operation.

Both groups of stakeholders from whom we solicited perspectives reported preferences consistent with economic drivers of voluntary cleanup. State officials indicated that redeveloping more properties was the strongest motivation for implementing the voluntary programs, followed

by faster cleanup and attracting developers and investors. Program participants said that facilitating property sales and obtaining bank loans were important potential benefits of enrolling their properties. Speeding cleanup appeared as a somewhat less compelling advantage: only 1 in 10 ranked it as the most important potential benefit of program enrollment (and 1 in 3 reported that they had actually realized this benefit).

The centrality of liability protection also was evident in both groups of stakeholders. Based on our interviews, liability protection appears to give state officials a means to promote the broad objectives of voluntary programs, including more redevelopment, faster cleanups, and reduction in stigma. Responses from participants confirmed the importance of such protection. This general agreement between officials' and participants' attitudes suggests that program design has effectively addressed some of the concerns and motivations of program participants, although several observations warrant attention.

First, the uncertain representativeness of our sample may challenge the generalizability of our findings. The sites captured in our survey of program participants appear more costly to remediate than the average voluntary program site, although the lack of systematically collected and reported data, noted earlier, make this impossible to prove (or refute). In addition, according to our interviews of state officials, the bulk of contaminated sites in many states enter neither the enforcement nor the voluntary program, making our understanding of behavior at contaminated properties an incomplete picture at best.

More narrowly, our difficulty with respondent recruitment partly reflects states' limited interest or capacity to monitor program participants after sites receive closure documents, which itself could pose problems if in the future they need to work with the participants. The response rate also may reflect the limited interest and engagement that some participants have with their state's voluntary program. For example, telephone conversations with potential respondents revealed that some participants of record can not even recall their participation in the program. By definition, the participants who responded to our survey are not representative of a wider class of less engaged participants. Future work that captures the perspectives of this latter group would add greatly to our understanding of voluntary cleanup of contaminated properties. At the same time, the high proportion of consultants in our survey and in site decisionmaking suggests both the need for more research on the motivations of these stakeholders and the opportunity that states have to target this group for program expansion and education.

Second, findings from the interviews of state officials and the survey of participants diverged in one important respect, third-party protection. State officials believe program participants seek protection from action by other, non-VCP state agencies, whereas program

participants indicated a much bigger concern with third-party protection. Relatively few states offer such protection with closure letters or certificates of completion,⁴ yet nearly 60 percent of participants ranked this as the most important liability protection of the four choices that we offered. This result is consistent with evidence from a survey of private developers reported in Wernstedt et al. (2006b), which found that protection from third-party claims provides a value equivalent to more than 20 percent of a project's profits.

Third, most program participants, while noting the benefits of liability protection and facilitated property sales, did not believe that program enrollment had given them increased access to public funding or expedited permitting. State officials placed more credence on these benefits; they believe voluntary program sites enjoy a significant cost advantage over enforcement sites in many states. A clear majority of participants, in contrast, said they had not realized the benefits of decreased cleanup costs or shorter cleanup and redevelopment timelines.

Finally, evidence from our survey of other possible enrollment rationales—reasons that capture broader motivations for voluntary environmental behavior with potential application outside U.S.-specific programs—is mixed. Environmental disclosure of information to the public, which some researchers suggest can be important drivers of voluntary behavior in both western Europe and developing countries (Morgenstern and Pizer 2007; Blackman 2008), does not appear in our sample to have exerted much influence. For example, few respondents indicated that they valued program enrollment as a tactic to ease community pressure for cleanup or to remove a site from a list of contaminated properties.⁵ Rather, as already noted, more direct economic drivers appear paramount in motivating participation in state voluntary cleanup programs. These appear to reflect less the traditional economic motivations discussed in the literature—to preempt regulatory pressures or to respond to market pressures for higher environmental performance in both domestic and international markets (Delmas and Montiel

⁴ Fewer than a dozen states currently offer any form of general third-party liability protection (e.g., for innocent purchasers performing cleanups under state approvals or public agencies or lenders) or more limited coverage that provides protection for certain types of activities or limited time periods, and claims experiences with these are limited. Several states have explored these and other types of environmental insurance, but many have not yet offered products, particularly because the private environmental insurance market for brownfields remains unsettled (Yount and Meyer 2006; Paull 2010).

⁵ This may reflect the particular experiences of respondents in our sample, since most reported almost no public opposition to cleanup and relatively little opposition to site redevelopment. In addition, fewer than one-quarter had their sites listed on a contaminated property registry. However, only 20 percent of those with sites listed on such a registry expressed a high level of agreement with the statement that removing their sites from the registry was an expected benefit of completing a voluntary cleanup. This is only a few percentage points more than the results from respondents with sites not listed on a registry.

2008)—than the direct financial pressures that make cleanup a prerequisite for selling a property or obtaining a loan. Ironically, it may be that the stigma created at contaminated sites by environmental regulatory efforts in past decades—a stigma widely considered a perverse regulatory outcome that has discouraged revitalization of distressed communities—has been efficiently incorporated by the market and now serves as the primary driver for owners, developers, and others to enroll contaminated sites in voluntary state cleanup programs.

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