GRBER Global Review of Business and Economic Research
Vol. 10 • No. 1 • Spring 2014 : 83-110

WHAT DETERMINES WHETHER THE SETTLEMENT OF A U. S. EPA CASE INCLUDES A SUPPLEMENTAL ENVIRONMENTAL PROJECT: LESSONS LEARNED FROM U.S. HISTORY

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Abstract: *This is an interdisciplinary research paper covering legal, environmental, socioeconomic, political and statistical issues. The paper tries to draw lessons from U.S. history regarding the determination of whether settlement of an Environmental Protection Agency (EPA) case includes a benefit received by the community in the form of supplemental environmental project (SEP). Maximum likelihood* probit *models of the propensity of a typical U.S. EPA administrative case to include a SEP in its settlement are estimated. Independent variables for demographics (ethnicity and income) of the area of the facility, the industrial activity at the facility, and the statute allegedly violated, had a statistically significant effect on whether the settlement included a SEP, and this effect varied depending upon whether the settlement was entered into during the administration of William Jefferson Clinton or George W Bush, with certain results consistent with political economy considerations. And, the variable for the monetary penalty sought (a proxy for the amount of the monetary penalty) had a statistically significant effect on the whether the settlement included a SEP.*

Keywords: *U.S. Environmental Protection Agency, supplementalenvironmental projects (SEPs), environmental enforcement, environmental justice, restorative justice, environmental history, corporate social responsibility, George W Bush Administration, William Jefferson Clinton Administration.*

1. INTRODUCTION

During the 1990s the United States Environmental Protection Agency (EPA) as well as state environmental regulatorsshifted emphasis from a traditional deterrence-based "command and control" approach to a "cooperative" approach preferred by business. Under the cooperative approach the regulator seeks to encourage compliance with environmental laws through offering assistance and incentives,rather than through punishment. The merits of the deterrence-based and cooperative approaches are the subject of a debate between scholars, policymakers, the business community, environmentalists, and others.

Traditional environmental policy involvesmonetary penalties (hereinafter monetary penalties are referred to as "penalties") issued by the regulator against

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violators, leading to deterrence. Penalties are paid to the regulator's general fund.[1] Penalties do not provide restoration benefits or remediation for the affected community.

One way that the cooperative approach differs from the deterrence-based approach is that under the cooperative approach, when settlinga case alleged violators may, subject to EPA approval, agree to perform voluntary environmental project(s) as a part of the settlement. Such voluntary projects are supplemental environmental projects (SEPs). In contrast with penalties, SEPs restore or remediate environmental damage in the affected community (Ganguly, 1998).

When settling a case SEPs are a *mitigating* factor considered in setting the penalty (Boergers, 1999; U.S. Environmental Protection Agency 1995; U.S. Environmental Protection Agency 1998). Mitigation of the penalty has the effect of reducing the amount of the penalty by an amount that is typically some fraction of the cost of the project. The distinction between mitigation of the penalty, which occurs when considering the amount of the penalty, and reduction of the penalty, is consequential because reduction of the penalty may be viewed as reducing or diverting funds from the U.S. Treasury in violation of the Miscellaneous Receipts Act (31 U.S.C. Section 3302).

In addition to mitigation of the monetary penalty (and reducing the associated adverse publicity associated with the penalty) SEPs provide additional benefits to businesses. Businesses can perform pollution prevention SEPs that improve environmental compliance. And, businesses can promote their images through SEPs. SEPs typically benefit the community where the alleged violation occurred and can remediate damage caused by the violation. Thus, SEPs can provide restorative and remedial justice and are therefore a form of corporate responsibility. Bonorris (2007) states that SEPs "can serve to address environmental justice issues and to improve or repair relationships among all stakeholders (*i.e.*, impacted communities, facilities, and government, at all levels) following an environmental violation." (Bonorris, 2007 at page 3).

This study involves estimation ofa maximum likelihood *probit* model regarding what determines whether a typical EPA administrative case alleging violation of environmental laws included a SEP in its settlement. The discrete dependent variable is whether the settlement including a SEP. The time period examined is during the administrations of William Jefferson Clinton (the "Clinton Administration") and George W Bush (the "Bush Administration"). The estimation sample is EPA data for typical administrative cases involving a single facility. Explanatory variables are created from several data sources: variables for the ethnicity and income of the community where the facility is located are created from Census Data; political variables for whether the settlement was entered into during the Clinton or Bush administrations are created from EPA case data; and

control variables for the type of facility, the amount of penalty sought, and the type of violation are created using EPA data.

Studying the factors that determine whether a business (or other violator) included a SEP in the settlement of an EPA case provide historical lessons regarding the determinants of whether SEPs are included in settlements. More broadly, lessons may be learned regarding both what determined whether a business (or other entity) decided to provide benefits under the cooperative approach, and also what determined whether a community would benefit from the cooperative approach. This includes historical lessons regarding how demographic and political variables, as well as the types of industry involved and characteristics of the case (statute allegedly violated and penalty sought) affectedwhether these voluntary projects, SEPs, were included in settlements of cases.

The rest of the paper is composed of the following sections: section 2 reviews the relevant literature;section 3 presents the methodology and explains the data; section 4 presents and discuss the empirical results; section 5 concludes the paper.

2. REVIEW OF LITERATURE

Prior to 1991, there was confusion regarding the EPA's authority to include SEPs in settlements. The confusion led the EPA to issue the *EPA Policy on the Use of Supplemental Environmental Projects in Enforcement Settlements* (1991 SEP Policy), which clarified the use of SEPs (Nghiem, 1997; U.S. Environmental Protection Agency, 1991). The 1991 SEP Policy "spurred an increase in the use of SEPs" (Nghiem, 1997 at 570).

SEPs have been characterized as part of a broader cooperative movement toward compliance through flexible, negotiated solutions (Bonorris, 2007). Dana (2000) considers SEPs a "contractarian" rather than command-and-control approach to environmental law. Under the contractarian approach, regulators on an individualized basis agree to waive regulatory requirements in exchange for overcompliance (Dana, 2000). The contractarian approach allows decentralized, tailored solutions, rather than a centralized command-and-control solution (Dana, 2000).

There are three basic types of cases that the U.S. EPA may bring against alleged violators: civil judicial, administrative, and criminal. SEPs may be included in the settlements of EPA civil judicial and administrative penalty cases brought against alleged violators of environmental laws.

The EPA prosecutes administrative cases, which are resolved through formal administrative proceedings. The EPA refers civil judicial cases to the Department of Justice for prosecution. Civil judicial cases are filed in Federal District Court and tend to result in larger penalties and are more burdensome for the violator

than administrative cases. There is no authorization for SEPs, and thus there are no SEPs, in criminal cases filed by the EPA.

The EPA's SEP Policy provides guidelines for EPA approval of SEPs included in settlements of EPA civil judicial and administrative actions. The EPA's current SEP Policy guidelines are contained in the May 1, 1998 *EPA Final Supplemental Environmental Projects Policy* (1998 SEP Policy) (U.S. Environmental Protection Agency, 1998). The 1998 SEP Policy primarily clarifies the 1995 *Interim Revised EPA Supplemental Environmental Projects Policy* (1995 SEP Policy) (U.S. Environmental Protection Agency, 1995). The predecessor of the 1995 SEP Policy was the 1991 *EPA Policy on the Use of Supplemental Environmental Projects in Enforcement Settlements*(1991 SEP Policy) (U.S. Environmental Protection Agency, 1991).

These guidelines have all required a "nexus" between the SEP and the violation. For example, the 1998 SEP Policy states:

Nexus is the relationship between the violation and the proposed project. This relationship exists only if:

(a) the project is designed to reduce the likelihood that similar violations will occur in the future; or

(b) the project reduces the adverse impact to public health or the environment which the violation at issue contributes; or

(c) the project reduces the overall risk to public health or the environment potentially affected by the violation at issue.

Nexus is easier to establish if the primary impact of the project is at the site wherethe alleged violation occurred or at a different site in the same ecosystem or within the immediate geographic area. (U.S. EPA, 1998 part C).

The nexus requirement causes the benefits of SEPs to tend to accrue tothe communities affected by the violations. During the five-year period of Fiscal Years 2009 through 2013, inclusive, there were 660 EPA settlements that included SEPs. The combined cost of these 660 SEPs, which was provided by the alleged violators, was 162 million dollars (U.S. Environmental Protection Agency, 2013).[2]

The SEP Policy guidelines determine how much the penalty is mitigated: The EPA first determines the penalty necessary to settle the case *without* [emphasis added] the SEP. This amount is what Green (1994) and others refer to as the "proposed penalty." The proposed penalty is privileged and thus not available for empirical researchers (not observed). The EPA next determines the minimum penalty *with* a SEP, which is in effect a minimum penalty floor. (Although, under the 1995 SEP Policy in "extraordinary circumstances" the minimum SEP penalty may be lower (U.S. Environmental Protection Agency, 1995 part E).) The EPA then calculates the cost of the SEP. After calculating the cost of the SEP, the EPA

determines the "mitigation percentage," which is the percentage of the cost of the SEP that may be applied (subject to the minimum penalty floor) against the amount of the proposed penalty (U.S. Environmental Protection Agency 1995, part E; U.S. Environmental Protection Agency, 1998 part E).

How well the SEP performs with respect to environmental justice is considered in determining the mitigation percentage: SEPs "which perform well on this factor [environmental justice] will mitigate damage or reduce risk to minority or low income populations which may have been disproportionately exposed to pollution or are at environmental risk" (U.S. Environmental Protection Agency 1995; U.S. Environmental Protection Agency 1998). The United States Supreme Court holds that federal agencies (such as the EPA) have great discretion in prosecuting enforcement actions (*Heckler v. Chaney*, 420 U.S. 821, 831 (1985)). The executive branch administers the EPA. The great prosecutorial discretion of the EPA suggests that changes in the executive branch (from the Clinton Administration to the Bush Administration) may result in measurable differences in the prosecution of EPA enforcement actions, including whether a SEP is included in the settlement of a case.

SEPs are contended to be an effective way to provide benefits for the environment (Droughton, 1995; Ganguly, 1998). Kuoh (2013) encourages an expansion of the use of SEPs for environmental justice issues. Pollution prevention SEPSs have been associated with a reduction in toxic releases (Pearson, Sekor, and Wong, 1995). Some commentators qualify their support for SEPs. Dana (1998) raised the issue of SEPs compromising deterrence as violators may pay less than the optimal penalty. Glicksman and Earnhart (2007) empirically studied the deterrent effects of SEPs on whether industrial chemical and allied products facilities committed violations of the federal Clean Water Act. The *specific* deterrent effect of performing a SEP is the effect of performing a SEP on deterring violations at the specific (same) facility where the violation occurred. The *general* deterrent effect of performing a SEP is the threat effect of performing a SEP on whether violations occur at other (general) facilities. They find that performing a SEP and monetary sanctions have about the same specific deterrent effect, but the general deterrent effect of performing a SEP is less effective than monetary sanctions (Glicksman and Earnhart, 2007).

SEPs are widely used in state environmental enforcement. The EPA's SEP Policy has "in some way been relied upon by all of the states that have developed their own policies [footnote omitted] and is used as the default guidance for many states that do not have their own policies" (Carey, 1998 at page 6). Similarities between state and federal EPA SEP policies create similar incentives. It follows that the historical lessons of this study regarding the EPA's SEP Policy may suggest the likelihood of similar lessons from a study of state SEP policies. Restorative environmental projects are potential compulsory remedies under certain federal

statutes: the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); the National Marine Sanctuaries Act (NMSA); and the National Oceanic and Atmospheric Administration (NOAA) regulations under the Oil Pollution Act (OPA) (Penn, undated). Although SEPs are voluntary, rather than compulsory, environmental projects, SEPs nevertheless are part of a group of mechanisms through which environmental projects may remediate environmental harms. Thus, historical lessons regarding the determinants of whether a settlement includes SEP(s) may (indirectly) give an idea of what might influence the inclusion of environmental projects as remedies under such statutes.

Policymakers do have some levers available that can increase the likelihood that a settlement includes SEPs. Using the case study method involving ten settlements, Becker and Ashford (1995) investigate how to encourage the use of pollution prevention in settlement agreements involving both SEPs and injunctive relief. Their recommendations to increase the number of SEPs in settlements include increasing education and information regarding pollution prevention among the attorneys and the firms involved. Larger proposed penalties provide greater incentives for SEPs (Becker and Ashford, 1995; Green, 1994). Clean Air Act cases result in the largest monetary penalties and focusing on increasing the number of SEPs in such cases is recommended by Kuoh (Kuoh, 2013). Multi-media enforcement, where there is a claim that more than one medium or statute is violated, can be used to aggregate penalties under one statute to increase the size of the proposed penalty, thus increasing the likelihood of a SEP (Becker and Ashford, 1995; Green, 1994). Additional ways to increase the use of SEPs include: "SEP Idea Banks" (preapproved lists of proposed SEPs); "SEP Libraries" (a database of SEPs to give a reference for developing SEPs); and "SEP Fund Banks" (allowing smaller amounts of SEP funds from different cases to be aggregated) (National Policy Consensus Center). Kristl (2007) and Robertson (2009) encourage loosening the nexus requirement and increasing the amount of penalty mitigation due to the SEP.

3. METHODOLOGY

I. Data

Data wasobtained and merged from four sources: (1) the EPA's Integrated Compliance Information System (ICIS), which the EPA uses to track its enforcement actions; (2) the EPA's Integrated Data for Enforcement Analysis System (IDEA), an umbrella system of environmental enforcement related databases, which was used to obtain additional ICIS data; (3) United States Census Data at the tract level obtained from ESRI; and (4) United States Census Data at the tract level obtained from Census files. Table 1 describes the variables constructed for use in this paper.[3]

Table 1
Variable Description

Dependent Variable: SEP, is a dummy variable, 1 if the settlement included a SEP, and, 0 otherwise.

Explanatory variables (Administration):BUSH, a dummy variable, 1 if the settlement entered during the George W Bush, and, 0 otherwise.

Census Tract population Characteristics:

BLACK, is proportion black.

POOR, is proportion poverty level.

RICH: proportion with annual income of e" $100,000.

BLACK^2, is proportion black squared.

RICH^2, is proportion with annual income of $100,000 or more squared.

*BLACK*POOR* , is proportion black multiplied by proportion below poverty level.

*BLACK*RICH,* proportion black multiplied by proportion with annual income of $100,000 or more.

*POOR*RICH,*is proportion below poverty level multiplied by proportion with annual income of e" $100,000.

MINERAL; A dummy variable equal to 1 if the facility was involved in Mineral Industries, and 0 otherwise.

CONSTRUCTION, a dummy variable equal to 1 if the facility was involved in Construction Industries, and, 0 otherwise.

MANUFACTURING, a dummy variable equal to 1 if the facility was involved in Manufacturing Industries, and, 0 otherwise.

TRANSPORT, a dummy variable equal to 1 if the facility was involved in Transportation, Communication, and Utilities, and, 0 otherwise.

WHOLESALE, a dummy variable equal to 1 if the facility was involved in Wholesale Trade, and, 0 otherwise.

RETAIL, a dummy variable equal to 1 if the facility was involved in Retail Trade, and, 0 otherwise.

FIN/INS/RE, a dummy variable equal to 1 if the facility was involved in Finance, Insurance, and Real Estate, and, 0 otherwise.

SERVICES, a dummy variable equal to 1 if the facility was involved in Service Industries, and 0 otherwise.

PUBLIC ADMIN, a dummy variable equal to 1 if the facility was involved in Public Administration, and, 0 otherwise.

CAA, a dummy variable equal to 1 if Clean Air Act violation alleged, and, 0 otherwise

CERCLA, a dummy variable equal to 1 if Comprehensive Environmental Response, Compensation, and Liability Act violation alleged, and, 0 otherwise.

CWA, a dummy variable equal to 1 if Clean Water Act violation alleged , and, 0 otherwise.

EPCRA, a dummy variable equal to 1 if Emergency Planning and Community Right-to-Know Act violation alleged, and, 0 otherwise.

FIFRA, a dummy variable equal to 1 if Federal Insecticide, Fungicide, and Rodenticide Act violation alleged, and, 0 otherwise.

contd. table 1

RCRA, a dummy variable equal to 1 if Resource Conservation and Recovery Act violation alleged, and, 0 otherwise.
SDWA, a dummy variable equal to 1 if Safe Drinking Water Act violation alleged, and , 0 otherwise.
TSCA, a dummy variable equal to 1 if Toxic Substances Control Act violation alleged, and, 0 otherwise.
Additional Allegation of Complaint: PENALTY (million in $) is the amount in millions of dollars of the penalty sought in the complaint/ proposed order.
Time-Trend Variables:
TIME, is the number of days from January 1, 1960 to the date that the settlement is entered, divided by 100
TIME^2, is the variable TIME squared.

Source: IntegratedDate for EnforcementAnalysis(IDEA),
U.S.EPA, unless otherwise indicated. U. S. Bureau of the Censusvia ESRI 3.2,2000 Census, except for the variables *RICH* and *POOR*. The variables *RICH* and *POOR* were obtained from the *source:* U. S. Dept. of Commerce, Bureau ofthe Census, and Inter-university Consortium for Political and Social Research. CENSUS OF POPULATION AND HOUSING, 2000 [UNITED STATES]: SELECTED SUBSETS FROM SUMMARY FILE 3 [Computerfile]. 2nd ICPSR ed. Washington, DC: U. S. Dept. of Commerce, Bureau of the Census, and Ann Arbor, MI: Inter-University Consortium for Political and Social Research [producers], 2004. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2004.

(1) ICIS Data: ICIS contains basic information regarding EPA administrative and civil judicial cases, such as the date when the case settled; the amount of any penalties and SEPs; statutes under which the claims were made (e.g., Clean Air Act); and, the addresses and SIC Codes of the facilities involved in the alleged violations (U.S. EPA, 2007b). ICIS information is used by the EPA to track cases and is also reported to Congress.ICISdata was received by email from the EPA. ICIS is the successor to DOCKET, the system formerly used by the EPA to track its enforcement cases (2006b, U.S. EPA).[4]

The Office of Enforcement and Compliance Assurance (OECA) periodically reports quantitative information regarding EPA enforcement actions to Congress. It has an opportunity to correct errors in ICIS Data prior to entry of the data into IDEA (the umbrella system of databases) and its reports to Congress. In addition, ICIS data obtained through IDEA has better documentation. Thus, ICIS data obtained through IDEA, which we refer to as "ICIS/IDEA" data,was preferred. However, the ICIS/IDEA data filecontaining facilities information had 99 facilities with obvious errors. Thus, ICIS data containing no apparent errors was used for the EPA Facilities Information, and, ICIS/IDEA data was used for the remaining EPA information.

(2) ICIS/IDEA Download: The ICIS/IDEA Download data and the ICIS/IDEA Download document, which described the data, were upon request kindly emailed

to William Galose by the EPA. Variables containing Case Information were extracted/downloaded from the ICIS/IDEA Download.

(3) Census Data from ESRI: Census data from the 2000 Census was available through ESRI. The relevant Census data was tract-level socio-demographic data, which includes information about the ethnicity, income, age distribution, family structure, employment, occupation, and rental rates.

(4) Census Data from ICPSR: Census data from the 2000 Census at the tract level was also available through the Inter-University Consortium for Political and Social Research (ICPSR). The tract-level data includes information regarding household income, education, poverty, and housing.

Merging the Data

As stated previously data from these four sources were merged. The ICIS facility data contain EPA Case Numbers and facility addresses. The ICIS facility data was geocoded using ArcView 3.2 StreetMap 2000 to obtain physical locations of facilities (where identified) or of the tract associated with the location of their zip code centroids (if precise facility locations were not identifiable).[5] These physical locations of the facilities were used to obtain the Federal Information Processing Standards (FIPS) Code for the tract, and to merge the facilities with the tract-level Census Data.

Next, the ICIS facility data, which was already merged with the ESRI Census data, was merged with the tract-level ICSPR Census data, using the FIPS Code as a mutual identifier.

The file now containing ICIS facility data, ESRI Census data, and, ICPSR Census data, was merged by Case Number with the ICIS/IDEA Download data. From this merged dataset,all single-facility administrative cases as well as all variables used in this paper were extracted.

Available Candidate Explanatory Variables: The datawas grouped into six classes of candidate explanatory variables (for some of which the quadratic form and interactions with other variables were created): (1) Demographic variables, which provide demographic information regarding the area where the facility is located, were extracted from the ESRI and ICPSR Census data; (2) SIC Code dummy variables, indicating whether the subject facility was involved in an industry, was extracted from the ICIS facility data; (3) The statute allegedly violated was extracted from the ICIS/IDEA Download data; (4) The monetary amount of the penalty sought was extracted from the ICIS/IDEA Download data;(5) A dummy variable indicating whether the settlement occurred during the Bush or Clinton administrations was derived from the ICIS/IDEA Download data; (6) A time-trend variable for the date the settlement was entered was created from the ICIS/IDEA Download Data.

Exclusion Criteria for Observations: The focus of this paper is typical administrative settlements. The EPA refers to settlements and conclusions of enforcement actions as "Case Conclusions" (ICIS/IDEA Download, 2006). We chose the sample because we wanted to estimate models involving the types of enforcement conclusions most likely to include a SEP in the settlement.

A Case Conclusion for an administrative case is a Consent/Final Order, which resolves the case. An "EPA Case Number" may be associated with more than one Case Conclusion. Before dropping observations below, there were 29,816 Case Conclusions in the sample, including 1,539 Case Conclusions with SEPs.[6] After estimating models subject to the exclusions,the models were tested for robustness to the changes resulting from the observations dropped due to the exclusion criteria.

The "Enforcement Conclusion Action Code" of the ICIS/IDEA Data "identifies the types of enforcement conclusions" (ICIS/IDEA Download, 2006). Only cases with proposed penaltieswere likely to include SEPs—penalties provide the baseline amounts that can be mitigated by the cost of the SEP. We limited the sample to cases with an Enforcement Conclusion Action Code of "Administrative Penalty Order With or Without Injunctive Relief" or "Consent Decree or Court Order Resolving a Civil Judicial Action." The Enforcement Conclusion Action Code limitation preserved typical administrative cases that may include SEPs in the settlement and provided a more homogeneous sample. This criterion resulted in dropping 16,041 settlements from the sample, only 18 of which were settlements that include SEPs. The sample was now composed of 13,775 settlements, of which 1,521 include SEPs.

Most EPA Case Numbers had one settlement. If there was more than one settlement, the first settlement was much more likely to include a SEP than subsequent settlements. Thus, settlements other than the first settlement were atypical and infrequent cases that may derive from a different data generating process, in comparison with the first settlement. When settlement was entered for a Case Conclusion, the settlement was assigned an "Enforcement Conclusion ID", a unique number identifying the settlement (ICIS/IDEA Download, 2006). Enforcement Conclusion ID's were numbered consecutively. Where an EPA Case Number has more than one settlement, and, thus more than one Case Conclusion ID,we dropped all but the first Case Conclusion ID. This resulted in dropping 54 settlements from the sample, four of which included SEPs. There werenow 13,721 settlements in the sample, of which 1,517 include SEPs.

The Responsible Office for nine settlements was the Eastern Field Office, and the Responsible Office for seven settlements was the Western Field Office. None of these settlements included a SEP, possibly due to the sparseness of the data. Since there were so few settlements involving these offices, and, our focus is typical settlements,we dropped settlements for which the Eastern Field Office or Western Field Office were the Responsible Office. The result is dropping a total of 16

settlements from the sample, none of which included SEPs. There were now 13,705 settlements in the sample, of which 1517 settlements include SEPs. When cases were assigned to the Headquarters Division for Mobile Source Violations (abbreviated "MOB"), there were only 2 settlements with SEPs out of 342 settlements. So, settlements with the Mobile Source Violations as the Headquarters Division were dropped from the sample. There are now 13,363 settlements in the sample, of which 1515 settlements include SEPs.

When the SIC Code Division of the facility was Division A: Agriculture, Forestry, and Fishing, there were no settlements with SEPs entered during the Bush Administration and seven settlements with SEPs entered during the Clinton Administration. This perfect collinearity may stem from a sparseness of data. Thus, settlements with facilities in SIC Division A were dropped from the sample, resulting in 133 dropped settlements, including seven settlements with SEPs. There were now 13,230 settlements in the sample, of which 1508 settlements include SEPs.

Administrative complaints seldom allege violations of certain statutes. Wedid not want to include such cases for which the complaint alleges violations that were not typical. So,we dropped settlements for which the complaint alleged violation of a seldom alleged statute, and, that statute was the only statute of which the complaint alleged violation.The only statute allegedly violated for nine settlements is the Marine Protection, Research, and Sanctuaries Act (MPRSA). These nine settlements, one of which included a SEP, were dropped from the sample. The only statute allegedly violated for one settlement was the Medical Waste and Tracking Act (MWTA). This one settlement, which did not include a SEP, was dropped from the sample. After dropping settlements alleging MPRSA and MWTA violations, there were 13,220 settlements in the sample, of which 1507 include SEPs.

Larger cases, in terms of potential penalties and the resulting SEPs, may have been litigated differently by both the EPA and the alleged violators. More attorneys and support staff are required to litigate a larger case. The increased dollar amounts involved may lead to greater pressures to settle. The personnel assigned to larger cases may have been the better attorneys and support staff.The differences in litigating larger cases may have led to a distinctly different data-generating process for whether a SEP was included in the settlement. Our focus was on settlements of typical administrative cases. Thus,we limited the sample to the types of settlements most commonly eligible for SEPs. We dropped settlements involving cases with outliers for certain variables: the variable SEP Amount ($SEPAMT_i$), which was the amount (cost) of the SEP; and the variable Penalty Sought ($PENALTY_i$), which was the amount of the monetary penalty sought in the complaint.

SEP Amounts were skewed, and the highest amounts were atypical. Settlements in which the variable $SEPAMT_i$was in the highest five percent of the settlements

with SEPs (above $524,500) were dropped from the sample. And, for balance, settlements in which $SEPAMT_i$ was inthe lowest five percent (below $2,000) were also dropped. As a result, 138 settlements, all of which include SEPs (of course), were dropped from the sample. There were now 13,082 settlements in the sample, of which 1,369 include SEPs. Settlements in which the Penalty Sought ($PENALTY_i$) was greater than $145,000 were dropped from the sample. As a result, 756 settlements were dropped from the sample. One hundred fifty-seven of the 756 settlements include SEPs. There were now 12,326 settlements in the sample, of which 1,212 include SEPs.

The Federal Penalty Assessed is the amount of the federal penalty assessed for the Case Conclusion. Settlements in which the Federal Penalty Assessed is greater than $60,000 were dropped from the sample. As a result, 537 settlements were dropped from the sample. Twenty-six of the 537 settlements include SEPs. There were now 11,789 settlements in the sample, of which 1186 include SEPs. The Census data included missing observations, and, thus missing demographic data, for some tracts. A total of 1,491 settlements with missing values for the Census Data variables were dropped. These 1,491 settlements include 126 settlements with SEPs.The final estimations sample contained 10,298 settlements (observations) of administrative settlements entered between January 21, 1993 and January 5, 2005. The 10,298 settlements included 1,060 settlements with SEPs. We refer to the entire estimations sample as the "Pooled" sample. We divide the final estimations sample by whether the settlement was entered during the Clinton or Bush Administration.

Summary statistics of settlements for the Pooled final estimations sample are contained in Table 2. Slightly over 10 percent (10.3 percent) of settlements included a SEP. The SIC Code Division dummy variable for Manufacturing indicates that almost 30 percent (29.2 percent) of settlements involved facilities in the business of manufacturing. All of the other SIC Code Divisions together are involved in less than 10 percent of the settlements. Complaints allege violations of the CWA (27.7 percent of complaints), followed by complaints alleging violations of EPCRA (19.3 percent of complaints) and TSCA (15.0 percent of complaints). The average Penalty Sought is 0.022 in millions (about $22,000.)

II. EMPIRICAL MODEL

A maximum likelihood *probit* model was employed to estimate the probability that a settlement included a SEP. It is assumed that there is a latent (unobserved) underlying continuous variable for each case, the "propensity to include a SEP." This unobserved propensity to include a SEP is denoted SEP_i^*. For each case, denoted by subscript i, it is assumed that this unobserved propensity, SEP_i^*, depends systematically upon several categories of (exogenous) variables, x_i as well as a normally distributed error term, ε_i. If his propensity to include a SEP in the settlement is sufficiently large, a SEP is in the settlement is observed (the settlement

Table 2
Summary Statistics of Sample Variables

Variable	*Mean*	*Std. Dev.*	*Min*	*Max*
Dependent Variable				
SEP	0.103	—	0	1
SEPAMT (mil. $)	0.006	0.031	0	0.512
Demographic Variables				
BLACK	0.136	0.222	0	0.991
POOR	0.156	0.118	0	1
RICH	0.091	0.101	0	1
Administration				
BUSH	0.284	—-	0	1
SIC Code Division				
MINERAL	0.061	—-	0	1
CONSTRUCTION	0.035	—-	0	1
MANUFACTURING	0.292	—-	0	1
TRANSPORT	0.095	—-	0	1
WHOLESALE	0.093	—-	0	1
RETAIL	0.033	—-	0	1
FIN/INS/RE	0.019	—-	0	1
SERVICES	0.060	—-	0	1
PUBLIC ADMIN	0.020	—-	0	1
Statute				
CAA	0.103	—-	0	1
CERCLA	0.036	—-	0	1
CWA	0.277	—-	0	1
EPCRA	0.193	—-	0	1
FIFRA	0.138	—-	0	*1*
RCRA	0.089	—-	0	*1*
SDWA	0.037	—-	0	*1*
TSCA	0.150	—-	0	1
Other Case Variables				
PENALTY (mil. $)	0.022	0.030	0	0.145
Time-Trend				
TIME	143.313	10.242	120.74	164.41

Observations = 10298

includes a SEP). If it is small, we observe no SEP (the settlement does not include a SEP). Since we cannot know the location or scale of the latent dependent variable, we assume that "large" means "positive" and "small" means "negative," and we normalize the conditional error variance to unity. Thus:

$$SEP_i^* = x_i'\beta + \varepsilon_i, \quad \text{where } \varepsilon_i \sim N$$
$$SEP_i = \begin{cases} 1 \text{ if } SEP_i^* = x_i'\beta + \varepsilon_i > 0 \\ 0 \text{ if } SEP_i^* = x_i'\beta + \varepsilon_i \le 0 \end{cases} \tag{0.1}$$

The term $x_i' \beta$ is "the index function." The log-likelihood function to be maximized for this linear-in-parameters "index" $x_i' \beta$ with respect to the unknown parametersis

$$\ln L = \sum_{SEP_i=0} \ln\left[1 - \Phi\left(x_i'\beta\right)\right] + \sum_{SEP_i=1} \ln \Phi\left(x_i'\beta\right) \tag{0.2}$$

where Φ is the standard normal cumulative density function. The fitted probability of a SEP, $\Phi\left(x_i'\beta\right)$, is a nonlinear function of the estimated parameters and the data. The variables are denoted by subscript *j*. Thus, x_{ji} is explanatory variable *j*(with *i* referencing the "*i*th observation"). Likewise, if the index is linear-in-variables as well as linear-in-parameters, the derivative of this probability with respect to a particular explanatory variable, x_{ji}, is given by $\beta_j \phi\left(x_i'\beta\right)$, which is also a nonlinear function of the estimated parameters and the data.

The General Model

The latent propensity for a SEP, expressed as a general empirical modelincluding all groups of control variables is:

$$SEP_i^* = f(DEMOGRAPHIC_i, SIC_i, STATUTES_i, PENALTY_i, BUSH_i, TIME_i, \beta) + \varepsilon_i$$

Where:

$DEMOGRAPHIC_i$ = demographic variables: levels, quadratic terms, and two-way interactions among a set of sociodemographic variables (i.e. *X1*,*X1*X1*, and *X1*X2*) describing the population of the census tract where the facility islocated;

SIC_i = industry: indicator variables for nine different SIC Code Division categories for theindustry involved;

$STATUTES_i$ = statute(s) violated: indicator variables for eight different statutes that the complaint may allege violation of;

$PENALTY_i$ = Penalty Sought: a continuous measure of the amount of the penalty sought in the complaint for the violation;

$BUSH_i$ = Bush Administration: a dummy variable for the Bush Administration,including interactions with all other explanatory variables;

$TIME_i$ = Lapsed Time: a measure of the lapsed time in linear and quadratic form, which may control for changes in the effects of the variables over time.

Three Demographic variables are tested along with control variables.[7] TheDemographic Variables are the variables: $BLACK_i$, the proportion of the population of the tract that is black; $POOR_i$,the proportion of the population of the tract that is belowthe poverty line (as well as a proxy for poor health conditions); and, $RICH_i$, theproportion of households in the tract with annual income of $100,000 or more.

SIC Code Divisionvariables control for heterogeneity of firms. This heterogeneity includes: the industrial activity at the facility, which includes facility technologies and levels of TRI Releases; returns to a "green"image as a result of the improved image due to including a SEP in the settlement; and, whether the industry ispreferred by the Clinton or Bush Administration.

The Statute dummy variables $(STATUTE_i)$ controls for heterogeneity in the type of claim alleged in the complaint.

The variable Penalty Sought ($PENALTY_i$) is the amount of the penalty soughtin the complaint. As previously explained, a higher "proposed penalty" is expected toresult in an increased likelihood that a SEP will be included in the settlement. However, the proposed penalty is not an available variable. The penalty amount assessed is the amount that the defendant is required to pay. However, it is simultaneously determined—the decision to include a SEP in the case mitigates the amount of the penalty. In order to avoid simultaneity, the variable $PENALTY_i$, the penalty sought in the complaint, is chosen as an explanatory variable. Unlike the penaltyamount, the penalty sought in the complaint is not mitigated by the SEP Amount. Thus, $PENALTY_i$ is less likely to be endogenously determined than the penalty amount.

The Time Trend variable $TIME_i$, as explained above, controls for lapsed time.

Probit Model Estimation of Whether Settlement of an EPA Case Includes a SEP: Four basic *probit* models were estimated. Varying degrees and types of restrictions regarding differences andsimilarities in the SEP generation process under the Clinton and Bush administrationsdistinguish the models. The "Pooled Model" includes all of the settlements (observations)in the sample that were entered during the Clinton and Bush administrations, withoutcontrolling for differences between the administrations. Thus, the Pooled Model restricted the estimated parameters (slopecoefficients and the variance) for settlements entered during the Clinton and Bush administrations to be equal.

The "Heteroscedastic Model" is the same as the Pooled Model with one keydifference. Like the Pooled Model, The Heteroscedastic Model pools the Clinton and Bush administrations'settlements and it restricts the slope and intercept coefficients for settlements entered during the Clinton and Bush administrations to be equal. However, the key difference is that the Heteroscedastic Model allows

the error dispersion to vary, with a different dispersion for each administration. This error dispersion in the Heteroscedastic Model, the function $\Phi(x_i'\beta)$ of the *probit* model, is generalized to a normal cumulative density function. It is assumed in the Heteroscedastic Model that normalized $\sigma = 1$ for settlements entered during the Clinton Administration, while $\sigma = 1 + \gamma$ for settlements entered during the Bush Administration.

The "Bush Interactions Model" included all of the settlements (observations) in the sample that were entered during the Clinton and Bush administrations. The Bush Interactions Model allowed the estimated intercept and slope coefficients to vary depending upon whether the settlement was entered into during the Clinton or Bush administration. It accomplished this by including a dummy variable, $BUSH_i$, which has a value of zero if the settlement was entered into during the Clinton Administration, and one if the settlement was entered into during the Bush Administration. The Bush dummy variable is included both as an intercept shifter, and, by interacting it with all explanatory variables, as a slope shifter. The Bush Interactions Model assumes that the variance, σ, normalized such that $\sigma = 1$, is the same for settlements entered during both the Clinton and Bush administrations.

The completely unrestricted "Separate Model" estimates a Clinton sample of settlements entered during the Clinton Administration. Separately, it estimates a Bush sample of settlements entered during the Bush Administration. Identical *probit* model specifications are estimated for each sample. Thus, the "Separate Model" is completely unrestricted. It allows the estimated parameters (intercept coefficients, slope coefficients, and variance) for settlements entered during the Clinton and Bush Administration to be different.

The Pooled, Heteroscedastic, Bush Interactions, and Separate Models are estimated using the four Groups of variables.We tested four basic groups of explanatory variables using the four models: Group (1) "Black"; Group (2) "Full Demographic"; Group (3) "Full Demographic and SIC"; and Group (4) "Full Demographic, SIC, and Case."

We use nonlinear-in-variables functions of the Demographic Variables to determine whether the effects of the demographic variables on the propensity to include a SEP in the settlement depend on their own levels or levels of other variables.

The Group (1) Black variables are $BLACK_i$ in its linear and its quadratic form. (In our models the variable $BLACK_i$ in its quadratic form was not statistically significant and was thus dropped.)

The Group (2) Full Demographic variables add additional demographic variables $POOR_i$ and $RICH_i$, to Group (1). Thus, the Group (2) demographic variables are $BLACK_i$, $POOR_i$, and $RICH_i$. All of these explanatory variables are

tested inlinear and quadratic form, and,interacted with each other (e.g.$BLACK_i$*$POOR_i$).

The Group (3) Full Demographic and SIC variables add the SIC Code Division dummy variables (*SICi)* to the Full Demographic variables.

The Group (4) Full Demographic, SIC, and Case Control variables addadditional explanatory variables concerning the characteristics of the case as controls: (i) A set of statute dummy variables for the statute(s) allegedly violated in the complaint *(*$STATUTES_i$*)*; and (ii) The amount of the penalty sought in the complaint ($PENALTY_i$).

We tested the restrictions using likelihood-ratio tests. The restrictions of Pooled Modelwere tested against each of the other Models, andrejected for all Groups of variables in all Models except for Group (4) (Full Demographic, SIC, and Case Controls) in the Heteroscedastic Model. Thus, the restrictions of the most restrictedPooled Model, are generallyrejected.

The slope and intercept restrictions of the Heteroscedastic Modelwere rejected for all Groups of variables when tested against unrestricted Separate Model. Thus, for Models with separate error dispersions for Clinton andBush Administration settlements, the restriction of equal slopes and intercepts as inthe Heteroscedastic Model for Bush and Clinton settlements was rejected in favor of unequal slopes as in the Separate Model.

The Bush Interactions Model as explained above allows for separate slopes and interceptsfor Clinton and Bush Administration settlements as in the Separate Model, but pools the Clintonand Bush settlements. However, the Bush Interactions Model restricts the error dispersion for Clinton andBush Administration settlements to be equal. This restriction is not rejected in any of the Groups of variables when testing the Bush Interactions Model against the Separate Model. We used this common error dispersion assumption of the Bush Interactions Model to test hypotheses regarding whether variables had different effects on the propensity of a settlement to include a SEP for Clinton and Bush Administration settlements.

4. EMPIRICAL RESULTS

Results are provided for the Bush Interactions Model in Table 3. We also computed marginal effectsfor the Demographic Variables at their means for the Pooled Model and the Separate Model, using Stata 9.2. Models testing for robustness of the estimates with respect to exclusion criteriafor the Pooled, Bush Interactions, and Separate Models are estimated. Generally, the estimated coefficients did notchange substantially as a result of the exclusion criteria.

(1) Probit Coefficients: The results for the Pooled, Heteroscedastic, and Separate models are generally consistent with the results for the Bush Interactions Model.

Table 3
Bush Interactions Probit

	Group (1) BLACK		*Group (2) Demographics*		*Group (3) Demographics, Facility*		*Group (4) Demographics, Facility Case*	
	Clinton admin.	*Bush differential*	*Clinton admin.*	*Bush differential*	*Clinton admin.*	*Bush differential*	*Clinton admin.*	*Bush differential*
Demographic variables:								
BLACK	.272	-.554	-.0889	-1.96	-.0955	-2.09	-.165	-1.95
	(3.28)***	(3.08)***	(0.32)	(2.72)***	(0.34)	(2.84)***	(0.56)	(2.37)**
POOR			1.2	1.19	1.2	1.65	1.09	2.24
			(1.61)	(0.68)	(1.62)	(0.92)	(1.43)	(1.12)
POOR^2			-2.57	-3	-2.42	-4.06	-2.05	-5.64
			(2.01)**	(0.89)	(1.91)*	(1.17)	(1.63)	(1.45)
RICH			-.17	1.17	-.422	1.17	-.321	1.08
			(0.19)	(0.63)	(0.49)	(0.62)	(0.35)	(0.51)
RICH^2			-1.52	-.909	-1.03	-1.11	-1.32	-1.03
			(0.97)	(0.27)	(0.67)	(0.32)	(0.79)	(0.27)
BLACK*POOR			.905	4.04	.649	4.52	.541	4.27
			(1.12)	(2.01)**	(0.80)	(2.19)**	(0.64)	(1.84)*
BLACK*RICH			1.78	6.58	1.89	7.22	2.57	5.48
			(1.09)	(1.38)	(1.15)	(1.50)	(1.52)	(1.03)
POOR*RICH			-7.49	-3.38	-5.72	-5.4	-7.28	-1.62
			(1.66)*	(0.37)	(1.27)	(0.59)	(1.49)	(0.16)
SICgroups:								
MINERAL					-.168	-.664	.226	-.84
					(1.74)*	(2.61)***	(2.03)**	(2.84)***
CONSTRUCTION					.00925	-.397	.138	-.364
					(0.08)	(1.52)	(1.11)	(1.34)
MANUFACTUR-ING					.306	-.144	.0526	-.198
					(7.00)***	(1.55)	(1.06)	(1.75)*
TRANSPORT					.197	-.281	.287	-.346
					(2.98)***	(2.02)**	(3.87)***	(2.18)**
WHOLESALE					-.232	-.0977	-.00909	-.296
					(3.10)***	(0.57)	(0.11)	(1.46)
RETAIL					-.126	.0397	-.0395	-.0367
					(1.02)	(0.17)	(0.29)	(0.14)
FIN/INS/RE					-.154	-.0561	-.054	-.251
					(0.60)	(0.18)	(0.20)	(0.73)
SERVICES					-.0692	.318	.0134	.207
					(0.78)	(1.92)*	(0.14)	(1.12)
PUBLICADMIN					.127	.293	.26	.0777
					(0.98)	(1.03)	(1.88)*	(0.27)

contd. table 3

	Group (1) BLACK		*Group (2) Demographics*		*Group (3) Demographics, Facility*		*Group (4) Demographics, Facility Case*	
	Clinton admin.	*Bush differential*	*Clinton admin.*	*Bush differential*	*Clinton admin.*	*Bush differential*	*Clinton admin.*	*Bush differential*
Statute; penalty:								
CAA							-1.14	1.26
CERCLA							(7.15)***.	(4.77)***
							717	.926
							(6.33)***	(4.31)***
CWA							-1.34	1.06
EPCRA							(8.83)***	(4.14)***
							-.388	.698
FIFRA							(2.83)***	(2.98)***
							-1.24	.021
							(7.63)***	(0.05)
RCRA							-.734	1.19
SDWA							(4.85)***	(4.56)***
							-1.53	1.22
TSCA							(7.10)***	(3.23)***
							-.853	1.07
							(5.63)***	(3.99)***
PENALTY(mil.$)							8.73	-.77
							(14.23)***	(0.62)
Constant	-1.25	-.116	-1.24	-.249	-1.33	-.152	-.747	-.996
	(55.21)***	(2.53)**	(12.78)***	(1.15)	(13.54)***	(0.69)	(4.16)***	(2.83)***
Observations	10298		10298		10298		10298	

Absolute value of t statisticsin parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Thus, this discussion focuses on some of the more interesting results fromthe Bush Interactions Model.

Results for Demographic Variables: The effect of the variable $BLACK_i$ was generally not statistically significant for Clinton Administration settlements: The variable $BLACK_i$ was positive and statistically significant with the Group (1) Black Variables. But, $BLACK_i$ did not have a statistically significant effect on the propensity for a settlement to include a SEP significance using the Groups (2), (3) and (4) Variables, which control for other influences on the propensity of a settlement to include a SEP. Thus, for Clinton Administration settlements, an increase in the proportion of Blacks in the tract the facility was located in did not increase the propensity to include a SEP in the settlement. This was a surprising result because given the high levels of Black support for the Clinton Administration and the EPA policy of using SEPs to promote environmental justice.

Results for the effect of the variable $BLACK_i$ were closer to expectations for Bush Administration settlements: The variable $BLACK_i$ interacted with $BUSH_i$ was negative and statistically for significant for all four Groups of variables. Additionally, joint hypothesis tests of the coefficients interacting $BUSH_i$ with the variable $BLACK_i$ in its linear and interaction forms indicated that there were statistically significant differences between Clinton and Bush administration settlements regarding how the level of $BLACK_i$ affects the propensity for a settlement to include a SEP. Thus, political considerations, which administration is in power, seem to interact with the demographics of the area of the facility involved in the alleged violation and thus affect the propensity of the settlement to include a SEP.

Joint hypothesis tests of the variable $POOR_i$ indicated that the level of $POOR_i$ did not have a statistically significant effect on the propensity for a settlement to include a SEP under the Clinton or Bush. Similarly, joint hypothesis tests of the variable $RICH_i$ indicated that the level of $RICH_i$ did nothave a statistically significant effect on the propensity for a settlement to include a SEP.

Results for SICVariables: An industry may be preferred by one administration relative to another administration. A priori, it is uncertain whether a settlement involving the facility of an industry preferred by anadministration is expected to be more or less likely to include a SEP.For example, suppose that for an industry SEPs tends to provide benefits that are greater than the cost of the SEP. In order to provide benefits to the preferred industry, the administration may take steps to increase the likelihood that a settlement involving the facility of a preferred industry includes a SEP. These steps may involve expending more resources to negotiate and supervise SEPs, increasing the mitigation percentage, and more flexibility in the approval of SEP projects. The result is that, *ceteris paribus*, a settlement involving the facility of a preferred industry would be more likely to include a SEP.

Alternatively, suppose that for an industry SEPs are viewed as a way to improve the relationship with the administration when the industry is *not* preferred by the administration. The result is that, *ceteris paribus*, a settlement involving the facility of an industry that is not preferred would be more likely to include a SEP.

SIC Code Division variables are generally jointly significant. The Bush differential for $MINERAL_i$ (which includes oil extraction) is negative and statisticallysignificant. If the Bush Administration is assumed to favor the oil industry, then such aresult is consistent with hypothesis that preferred industries are less likely to include aSEP in the settlement.

Results for Case Control Variables (Penalty Sought and Statute Variables): The Group (4) Full Demographic, SIC, and Case Control variables, as explained previously, add as regressors the Case Control variables: thestatute dummy variables $STATUTES_i$ and the variable $PENALTY_i$ (Penalty Sought). The statute dummy variables generally have a statistically significant effect for the Clinton

Administration settlements and for the Bush Differential statute dummy variables. Thus, the statute alleged affects the propensity of a settlement to include a SEP, and, the effect of the statute alleged on the propensity to include a SEP varies depending upon whether the settlement occurred during Clinton or Bush administration. And, the effect of the statute on the propensity of a settlement to include a SEP differs depending upon whether the Clinton or Bush administrations are in office. The statistically significant Bush differential suggests that at least in part the differences in the propensity of a settlement to include a SEP that result from the statute alleged depend on the administration and not just SEP opportunities arising from the nature of the technologies associated with the statute violations.

Higher penalties, as expected, increase the propensity of a settlement to include a SEP. The variable $PENALTY_i$ is positive and statistically significant for Clinton Administration settlements, and the Bush Differential $PENALTY_i$ variable is not statistically significant. Thus, higher penalties sought increases the propensity of a settlement to include a SEP by about the same magnitude for Clinton and Bush Administration settlements.

Time-Trend: We estimated the Bush Interactions Model with the variable $TIME_i$in both linear andquadratic form, and, interacted with $BUSH_i$. The results were similar to the results of the Bush Interactions Model that did not include $TIME_i$, and, the variable $TIME_i$was statistically significant at the onepercent level in all of its forms.

Robustness of Probit Results to Exclusion Criteria: The focus of this paper is on Results of the Pooled, Bush Interactions, and Separate Models for sample selection are generally robust to exclusion criteria.And results for the Bush Interactions Model are generally consistent with results for the Separate Models.

Results for Demographic Variables: Marginal Effects of Demographic Variables in Pooled and Separate Models: We also estimated marginal effects of the Demographic Variables for the Pooled Model andthe Separate Model at the mean values of the explanatory variables. In the Separate Model, the marginal effects of the Demographic Variablesreflect the differences in environmental justice policies of the Clinton and Bush Administration.

As explained previously, the Pooled Model combines all of the settlements entered during the Clinton and Bush administrations. The marginal effects of Demographic Variables in the Pooled Models are, as expected,"in between" those of the Clinton and Bush administrations. Thus, we discuss some of the more interesting results from the Separate Model below.

Separate Model Marginal Effects of Demographic Variables: The marginal effect of $BLACK_i$ was expected to be positive for settlements entered during the Clinton

Administration, and, not statistically significant for settlements entered during the Bush Administration.

However, for Clinton Administration settlements the marginal effect of an increase in $BLACK_i$ was not statistically significant. And, for Bush Administration settlements the marginal effect of an increase in $BLACK_i$ was negative and statistically significant for estimates using the Group (1-3) Demographic and SIC variables. However, the marginal effect of an increase in $BLACK_i$ was not statistically significant using the Group (4) Case variables. The unexpected results for the marginal effect of $BLACK_i$ may reflect the EPA under the Bush Administration not emphasizing SEPs in areas with high levels of $BLACK_i$because Blacks traditionally vote for Democrats rather than Republicans. However, the negative marginal effect of $BLACK_i$ in Bush Administrationsettlements for the Demographic and Facility variables may be the result of omitted variables $STATUTES_i$ and $PENALTY_i$. When these omitted variables are included, the marginal effect of $BLACK_i$ was not statistically significant.

The marginal effect of $POOR_i$, which is also a proxy for poor health and disproportionate environmental risk, was expected to be positive for settlements entered during both the Bush and Clinton Administrations. However, the marginal effect of $POOR_i$ was not statistically significant for either Clinton or Bush Administration settlements. Thus, although businesses may in principle seek SEPs to improve SEPs to improve relationships with communities where there are more environmental risks, and the EPA may seek to use SEPs to promote environmental justice, settlements in areas with a higher percentage of poor, ceteris paribus, were not more likely to include SEPs.

The marginal effect of $RICH_i$ was expected to be negative for settlements entered during the Clinton Administration, and, not statistically significant for settlements entered during the Bush Administration. The marginal effect of $RICH_i$ was negative and statistically significant for all of the Clinton settlements. The statistical significance of the marginal effect of $RICH_i$ for Clinton settlements decreased from the 1 percent level of significance using the Group (2-3) Demographic and SICvariables, to the 5 percent level of significance using the Group (4) Case variables. The marginal effect of $RICH_i$ was positive and not statistically significant at the 10 percent level of significance for all specifications of the Bush settlements.

The negative and statistically significant marginal effect of $RICH_i$ in the Clinton Models is consistent with the Clinton Administration environmental justice policy that favors low-income populations, and policies of business that seek to use SEPs to promote positive relationships with less affluent communities. By implication, such a policy disfavors high-income populations. And, the lack of statistical significance of the marginal effect of $RICH_i$ for settlements entered during the Bush Administration is consistent with the Bush Administration environmental justice policy not favoring low-income populations from which Bush receives less support.

5. CONCLUSION

This paper is the first empirical analysis of what determines whether settlementof an EPA case includes a SEP. *Probit* Model estimation of what determines whethersettlement of an EPA case includes a SEP includes some consistencies with theenforcement policies of the Clinton and Bush administrations. The *probit* coefficientresults are generally robust to exclusion criteria. And, the marginal effects are generallyconsistent across specifications.Environmental justice considerations appear to be important. Demographics (ethnicity and income) of the area of the facility involved appear to affect whether thesettlement includes a SEP. The marginal effect of an increase in the level of $BLACK_i$ is generally negative for settlements during the Bush Administration. And, the level of poverty does not affect the propensity to include a SEP in the settlement, indicating thatalthough SEP policy may not be favoring low-income populations. However, the level of the variable $RICH_i$ does seem to affect the propensity to include a SEP in thesettlement.These results for industry (SIC) variables are consistent with political economy considerations affecting whether an EPA settlement includes a SEP. SEPs have beenincreasingly become important in the environmental enforcement process at the federaland state level. This gives rise to issues regarding fairness concerns regarding the use of SEPs, both in terms of the communities that may benefit from SEPs, and, theindustries that may implement a SEPs. It also gives rise to concerns regarding whether SEPs are used to further enforcement objectives rather than political ends of theAdministration.Also, the Statute allegedly violated appears to affect whether the settlementincludes a SEP, and, this effect varies depending upon the Administration. And, as expected, the penalty sought in the complaint positively affects whether a settlementincludes a SEP.The results are for a sample of EPA Administrative settlements, rather than allsettlements or violations.

Acknowledgements

This paper is based on an essay from the Dissertation of William B. Galose, "Three Empirical Essays Regarding the U.S. Environmental Protection Agency's Supplemental Environmental Projects Policy." Dr. Galose is grateful and thankful for the contributions of his dissertation committee at the University of Oregon: Dr. Trudy Ann Cameron (Chair); Dr. Wesley W. Wilson; Dr. Robin McKnight; and Dr. Richard York. Dr. Cameron's expertise in environmental economics was particularly beneficial. Gratitude and thanks are also extended to the U.S. Environmental Protection Agency, which provided data and answered the frequent that arose during the research.

Notes

1. For example, the Miscellaneous Receipts Act (31 U.S.C. Section 3302) mandates that penalty amounts collected by the EPA must be paid to the United States Treasury.
2. The number and dollar value of the SEPs was calculated by adding the fiscal year totals, which are provided on page 9 of *Fiscal Year 2013 EPA Enforcement and Compliance Assurance Results* (U.S. Environmental Protection Agency, 2013).

3. Professor Cameron provided generous and invaluable assistance during the entire process.
4. The October 3, 1994 EPA Policy Memorandum "Support of the Enforcement DOCKET for Information Management in OECA," required that the following be entered into DOCKET: beginning in Fiscal Year 1995 "all new formal administrative penalty actions"; and "[b]y the end of the second quarter of FY1995, all administrative penalty orders issued or filed but not yet concluded" . . . . Also, in a telephone conversation with Merle Miller of the EPA, I was told that beginning in FY 1995, the EPA mandated the entry of information by the EPA Regions regarding SEPs and administrative penalty cases.
5. Of the 10298 facilities in the sample I use for this paper, 64.5% of addresses could be exactly geocoded and 35.5 % could be matched at least to their zip codes.
6. Hereafter, I generally refer to a Case Conclusion as a "settlement" for the sake of using plain words to communicate with a broader audience, unless I believe that using the term Case Conclusion communicates more clearly.
7. Models including the ethnicity variables White and Hispanic were estimated. These variables did not have a statistically significant effect on SEP generation.

References

Adarande Constructors, Inc. v. Pena, (1995), 515 U.S. 200, 227.

Alesina, Alberto and La Ferrara, Eliana. (1999), "Participation in Heterogeneous Communities," NBER Working Paper No. 7155.

Anton, Wilma R.Q., Deltas, G., and, MadhuKhanna (2004), "Incentives for Environmental Sself-Regulation and Implications for Environmental Performance," *Journal of Environmental Economics and Management, Vol*. 48, No. 1, pp. 632-54.

Association of State and Territorial Solid Waste Management Officials, (1997), "Supplemental Environmental Projects (SEPs) Survey of States and Territories."

Atlas, Mark (2001), "Rush to Judgment: An Empirical Analysis of Environmental Equity in U.S. Environmental Protection Agency Enforcement Actions," *Law and Society Review* Vol. 35, No. 3, pp. 633-82.

Atlas, Mark (2001), "Safe and Sound Judgement," *Law and Society Review, Vol*. 35, pp. 699-707.

Becker, Monica, and Nicolas A.Ashford, (1995), "Recent Experience in Encouraging the Use of Pollution Prevention in Enforcement Settlements," U.S. EPA 300-R-95-006.

Been, Vicki (1995), "Analyzing Evidence of Environmental Justice," *Journal of Land Use & Environmental Law*, Vol. l1, No. 1, pp. 1-36.

Been, Vicki (1997), "Coming to the Nuisance or Going to the Barrios? A Longitudinal Analysis of Environmental Justice Claims," *Ecology Law Quarterly,* Vol. 24, No. 1, p. 1.

Bennear, Lori Snyder (2007), The Effect of Reporting Thresholds on the Validity of TRI Data as Measures of Environmental Performance: Evidence fromMassachusetts, *http://www.nicholas.duke.edu/solutions/documents/bennear-thresholds-paper.pdf*

Boergers, Kathleen (1999), "The EPA's Supplemental Environmental Projects Policy," *Ecology Law Quarterly*, Vol. 26, No. 1, pp. 777-794.

Brohle, Keith, Griffiths, Charles, and Ann Wolverton (2004), "The Use of Voluntary Approaches for Environmental Policymaking in the U.S." *Working Paper #04-05, National Center for Environmental Economic*s, U.S. Environmental Protection Agency, May 24.

Cameron, Trudy, A. and Ian T. McConnaha (2006), "Evidence of Environmental Migration," *Land Economics*, Vol. 82, No. 2, pp. 273-90.

Cameron, Trudy A., and Graham D. Crawford (2010), "Independent Dimensions of Sociodemographic Variability in Neighborhood Characteristics at the Tract Level of the 2000 Census: A Note" *Working Paper # 2012-12*, University of Oregon, Department of Economics.

Cragg, John G. (1971), "Some Statistical Models for Limited Dependent Variables With Application to the Demand for Durable Goods," *Econometrica* 39, No. 5, pp. 829-44.

Carey, Christopher D. (1998), "Negotiating Environmental Penalties: Guidance on the Use of Supplemental Environmental Projects," *The Air Force Law Review,* Vol. 44, No. 1, pp. 1-32.

Dana, David A. (1998), "The Uncertain Merits of Environmental Enforcement Reform: The Case of Supplemental Environmental Projects," *Wisconsin Law Review, 1998,* pp. 1181-1221, *http://ssrn.com/abstract=183018.*

Dana, David A. (2000), "The New "Contractarian" Paradigm in Environmental Regulation." 2000 *University of Illinois Law Review* 35, *http://ssrn.com/abstract=183016*

Dinno, Alexis. (2000), "Health and Community Based Urban Residential Restoration: An Investigation into the Utility of the Traditional Epidemiological Approach," *Working Paper No. 47*, Urban Resources Institute.

Droughton, Laurie (1995), "Supplemental Environmental Projects: A Bargain for the Environment." *Pace Environmental Law Review*, Vol. 12, No. 2, pp. 789-824.

Elliot, M.R., Wang, Y., Lowe, R.A., and P.R. Kleindorfer (2004), "Environmental Justice: Frequency and Severity of US Chemical Industry and the Socioeconomic Status of Surrounding Communities." *Journal of Epidemiological and Community Health,* Vol. 58, No. 1, pp. 24-30.

Fontaine, Peter J. (1993), "EPA's Multimedia Enforcement Strategy: The Struggle to Close the Environmental Compliance Circle." *Columbia Journal of Environmental Law Vol.* 18, No. 1, pp. 31-101.

Gamper-Rabindran, Shanti (2006), "Did the EPA's Voluntary Industrial Toxics Program Reduce Emissions? A GIS Analysis of Distributional Impacts and By-Media Analysis of Substitution." *Journal of Environmental Economics and Management, Vol.* 52, No. 1, pp. 391-410.

Ganguly, Jeff (1998), "Environmental Remediation Through Supplemental Environmental Projects and Creative Negotiation: Renewed Community Involvement in Federal Enforcement." *Boston College Environmental Affairs Law Review,* Vol.26, No. 1, pp. 189-223.

Glicksman, Robert L., and Dietrich H. Earnhart (2007), "The Comparative Effectiveness of Government Interventions in the Chemical Industry," *Stanford Environmental Law Journal,* Vol. 26, No. 1, *p. 317, http://ssrn.com/abstract=944828*.

Graham, John D., Beaulieu, Nancy Dean, Sussman, Dana, Sadowitz, March, and Yi-Ching Li, (1999), "Who Lives Near Coke Plants and Oil Refineries? An Exploration of the Environmental Equity Hypothesis," *Risk Analysis*, Vol. 19, No. 2, pp. 171-86.

Green, Jonathan (1994), "Negotiating Pollution Prevention Supplemental Environmental Projects in State Environmental Enforcement Settlement Agreements," National Association of State Attorneys General, Vol. 21, No. 3, pp. 345-60.

Greene, William H. *Econometric Analysis:* Upper Saddle River, New Jersey 07458, Prentice Hall, *(2003), 5th Edition.*

Grodsky, Jamie A. (2003), "Environmental Protection as a Jurisdynamic Experience: the Paradox of (Eco)Pragmatism." *Minnesota Law Review*, Vol. 87, No. 1, p. 1037.

Hamilton, James (1999a), "Exercising Property Rights to Pollute: Do Cancer Risks and Politics Affect Plant Emission Reductions?" *Journal of Risk and Uncertainty*, Vol. 18, No. 2, pp. 105-120.

Hamilton, James T. (1999), "How Costly is "Clean"? An Analysis of the Benefits and Costs of Superfund Site Remediations," *Journal of Policy Analysis and Management*, Vol. 18, No. 1, pp. 2-27.

Heckler v. Chaney, 420 U.S. 821, 831 (1985).

Heckman, James A. (1978), "Dummy Endogenous Variables in a Simultaneous Equation systems." *Econometrica,* Vol. 46, No. 4, pp. 931-60.

Hughes, Paul (2006), "Do EPA Defendants Prefer Republicans? Evidence From The 2000 Election." *Economic Inquiry,* Vol. 44, No. 3, pp. 579-85.

Johnston DiNardo: *Econometric Methods:*Upper Saddle River, New Jersey 07458, Prentice Hall , *(1999), 4th Edition.*

Jones, Carol A., and C.A. Pease (1997), "Restoration-Based Compensation in Natural Resource Liability Statutes," *Contemporary Economic Policy,* Vol. 15, No. 4, pp. 111-22.

Khanna, Madhu (2001), "Non-Mandatory Approaches to Environmental Protection," *Journal of Economic Surveys*, Vol. 15, No. 3, pp. 291-324.

Khanna, Madhu, and Lisa A. Damon (1999), "EPA's voluntary 33/50 Program: Impact on Toxic Releases and Economic Performance of Firms," *Journal of Environmental Economics and Management,* Vol. 37, No. 1, pp. 1-25.

Khanna, Madhu, Quimio, Wilma R.Q., and D. Bojilova (1998), "Toxics Release Information: A Policy Tool for Environmental Protection,*Journal of Environmental Economics and Management,* Vol. 36, No. 3, pp. 243-66.

Pearson, James, Sekor, James, and P. Wong, (1995), "Supplemental Environmental Projects under EPCRA §313 : A Review of EPCRA SEPs in Region 10, *http://yosemite.epa.gov/r10/OWCM.NSF/87b3a0af7a396bf9882564f8002c4080/b448a8443fbf9ea9882565*

Penn, Tony (2007), "A Summary of the Natural Resource Damage Assessment Regulations Under the United States Oil Pollution Act," *http://europa.eu.int/comm/environment/liability/tp_enveco.pdf*

Public Law Research Institute (2006), "Supplemental Environmental Projects: A Fifty State Survey of Model Practices."

Texas Commission on Environmental Quality, (November, 2006), *Annual Enforcement Report, Fiscal Year.*

United States Environmental Protection Agency Sources U.S. EPA (2007a). The EPA's Civil Penalties Policy website is available on June 21, 2007 at: *http://cfpub.epa.gov/compliance/resources/policies/civil/penalty/*

U.S. EPA, (2007b), "IDEA\ICIS Download." This document was extracted from *http://63.160.3.204/echo/images/ICIS%20Download.pdf on March 20, 2007.*

U.S. EPA, (2007c), The Facility Reports were obtained from the U.S. EPA website "Enforcement & Compliance History Online"

U.S. EPA, (2007d), "Detailed Facility Report: Data Dictionary." This document is available at the website: *http://63.160.3.204/echo/dfr_data_dictionary.html* on March 19, 2007.

U.S. EPA (2006a), This information was obtained from "Timeline of the Integrated Compliance Information System," available on June 21, 2007 at the U.S EPA web address: *http://www.epa.gov/compliance/data/systems/modernization/timeline.html*

U.S. EPA FY 2005a Compliance & Enforcement Annual Results (November 15, 2005) was obtained via the Internet at the web address: *http://epa.gov/compliance/resources/reports/endofyear/eoy2005/2005resultscharts.pdf#page=6*

U.S. EPA FY (2005b), Compliance and Enforcement Annual Results: FY 2005 Numbers at a Glance (January 4, 2005) was on the U.S. EPA website at: *http://epa.gov/compliance/resources/reports/endofyear/eoy2005/2005numbers.html*

United States Environmental Protection Agency, (2005), Letter from Granta Nakamaya to The Honorable Hilda L. Solis, U.S. House of Representatives, dated September 9, 2005. This letter includes the undated United States Environmental Protection Agencydocument "Environmental Justice Strategic Plan Frequently Asked Questions," (U.S. EPA, undated). These documents are available at the following web address on March 8, 2007 : urbanhabitat.org/files/EPA%20EJ%20ltr%20to%20Solis.pdf

United States Environmental Protection Agency, (2004), *FY 2004 Memorandum of Agreement (MOA) Guidance Update.*

United States Environmental Protection Agency, (2003a), *Memorandum from John Peter Suarez, Assistant Administrator, to Regional Counsels, et al.*, dated December 15, 2003.

United States Environmental Protection Agency, (2003b), *Memorandum from John Peter Suarez, Assistant Administrator, to Assistant Administrators, et al.,* dated June 11, 2003, including its Attachment.

United States Environmental Protection Agency, (2001), *Memorandum from Christine Todd Whitman, EPA Administrator, to Assistant Administrators, et al.*, dated August 9, 2001.

United States Environmental Protection Agency, (2000), *Civil Enforcement Docket System (DOCKET) Data Elements Included in IDEA.*

United States Environmental Protection Agency, (1999), *EPA 33/50 Program – The Final Record.* U.S EPA 745-R-99-004.

United States Environmental Protection Agency, (1998), *EPA Final Supplemental Environmental Projects Policy*. 63 Federal Register 24,796.

United States Environmental Protection Agency, (1995), *Interim Revised EPA Supplemental Environmental Projects Policy.* 60 Federal Register 24,856.

Becker, Monica, and Ashford, Nicolas A. (1995), "Recent Experience in Encouraging the Use of Pollution Prevention in Enforcement Settlements."U.S EPA 300-R-95-006.

United States Environmental Protection Agency, (1993), *Innovations in Compliance and Enforcement: Supplemental Environmental Projects in the EPA's Toxics and Pesticides Program.*

United States Environmental Protection Agency, (1991), *Policy on the Use of Supplemental Environmental Projects in EPA Settlements*.

United States Environmental Protection Agency, (undated). "Environmental Justice Strategic Plan Frequently Asked Questions." This was attached to the Letter of Granta Nakamaya to The Honorable Hilda L. Solis, U.S. House of Representatives, dated September 9, 2005. These documents are available at the following web address on March 8, 2007: *urbanhabitat.org/files/EPA%20EJ%20ltr%20to%20Solis.pdf*

U.S EPA Office of Inspector General

U.S. EPA Office of Inspector General, (January 18, 2002), Audit Report, *Information Technology: Unreliable Data Affects Usability of DOCKET Information,* EPA OIG Report Number 2002-P-00004.

U.S. EPA Office of Inspector General, (March 1, 2004), Evaluation Report, *EPA Needs to Consistently Implement the Intent of the Executive Order on Environmental Justice*, EPA OIG Report No. 2004-P-00007.

U.S. EPA Office of Inspector General, (September 18, 2006), Evaluation Report, *EPA Needs to Conduct Environmental Justice Reviews of Its Programs, Policies, and Activities*, EPA OIG Report No. 2006-P-0034.

United States General Accounting Office

United States General Accounting Office GAO/RCED-00-108, (June, 2000). *More Consistency Needed Among EPA Regions in Approach to Enforcement*

Statutes and Executive Orders

Clean Air Act Section 113, 42 U.S.C. §7413

Clean Air Act, 42 U.S.C. §7413(c)(2)

Endangered Species Act, 16 U.S.C. §1531-1534.

Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, (February 11, 1994). Executive Order Number 12898. 59 Federal Register 7,629.

Miscellaneous Receipts Act, 31 U.S.C. §3302 (2003).

Pollution Prevention Act of 1990, 42 U.S.C. Section 13101 et seq. (2005) (prioritizing pollution prevention over the "last resort" of safe pollution disposal).

Clean Air Act §113, 42 U.S.C. §7413.

Protection of Children From Environmental Health Risks and Safety Risks, (April 21, 1997). Executive Order Number 13045. 62 Federal Register 1983.

United States Supreme Court Decisions

Adarande Constructors, Inc. v. Pena,515 U.S. 200, 227 (1995).