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Seema Kakade

University of Maryland Francis King Carey School of Law, skakade@law.umaryland.edu

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Detecting Corporate Environmental Cheating

Seema Kakade* and Matt Haber**

As evidenced by the Volkswagen diesel emissions scandal, corporations cheat on environmental regulations. Such scandals have created a surge in the academic literature in a wide range of areas, including corporate law, administrative law, and deterrence theory. This Article furthers that literature by focusing on one particular area of corporate cheating—the ability to learn of the cheating in the first place. Detecting corporate cheating requires significant information about corporate behavior, activity, and output. Indeed, most agencies have broad statutory authority to collect such information from corporations, through targeted records requests and inspection. However, authority is different from ability. The corporate world moves quickly, the number of regulated entities are many, and agencies often face legal and resource challenges to information collection processes that can impede detection of cheating. As a result, this Article advocates for a shift in focus to mandatory self-monitoring and reporting mechanisms that place the initial burden of detection on the regulated corporate entity instead of the agency. This Article uses, as a case study, sulfur dioxide air pollution standards in the shipping industry to demonstrate that such a shift can improve the likelihood of detecting cheating. International standards for the harmful pollutant sulfur dioxide became more stringent in January 2020, and the price difference between compliance and noncompliance is high. Therefore, there is a significant incentive for shipping companies to cheat. Failure of agencies to catch the cheaters not only undermines the anticipated public benefits of the regulations but also creates an uneven playing field for those regulated entities that spend the money to comply. However, agencies alone simply cannot be expected to detect all corporate cheating. They need help from those that have the requisite information, specifically the regulated entities themselves.

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* Seema Kakade is an Assistant Professor and Director of the Environmental Law Clinic at the University of Maryland Carey School of Law.

** Matt Haber is an independent consultant and Senior Engineer with the Eastern Research Group. Both authors formerly worked together in the U.S. Environmental Protection Agency's Air Enforcement Division.

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INTRODUCTION

Corporate compliance scandals are pervasive, especially in recent years.¹ Indeed, *Fortune Magazine* published articles reporting on the “biggest business scandals” of the year in 2015, 2016, and 2017.² The Volkswagen diesel emissions crisis made the top of the list in 2015, but other scandals dominated the news cycle as well, including the scandals involving Bank of America’s contribution to the housing crisis and Wells Fargo’s credit fraud.³ How did agencies, which are supposed to monitor corporate activity, fail to see the scandals coming? Ideally, when agencies write regulations, regulated corporate entities will comply. After all, such regulations are vitally important to society and impact everything from the price of goods and services to public health and natural resource protection. It is of little use to have such regulations if the

1. John Armour et al., *Taking Compliance Seriously*, 37 YALE J. ON REG. 1 (2020) (describing multiple corporate cheating scandals involving Volkswagen, British Petroleum, Duke Energy, and several banks).

2. Chris Matthews & Stephen Gandel, *The 5 Biggest Corporate Scandals of 2015*, FORTUNE (Dec. 27, 2015, 10:47 AM), <https://fortune.com/2015/12/27/biggest-corporate-scandals-2015/>; Chris Matthews & Matthew Heimer, *The 5 Biggest Corporate Scandals of 2016*, FORTUNE (Dec. 28, 2016, 10:00 AM), <https://fortune.com/2016/12/28/biggest-corporate-scandals-2016/>; Lucinda Shen, *The 10 Biggest Business Scandals of 2017*, FORTUNE (Dec. 31, 2017, 12:16 PM), <https://fortune.com/2017/12/31/biggest-corporate-scandals-misconduct-2017-pr/>.

3. Paul Blake, *Timeline of the Wells Fargo Accounts Scandal*, ABC NEWS, (Dec. 28, 2016, 4:15 PM), <https://abcnews.go.com/Business/timeline-wells-fargo-accounts-scandal/story?id=42231128>; Alex Pickett, *Homeowners Claim Bank of America Schemed to Steal Their Homes*, COURTHOUSE NEWS SERVICE, (June 29, 2017), <https://www.courthousenews.com/homeowners-claim-bank-america-schemed-steal-homes/>; Suzy Khimm, *The Truth Behind the \$17 Billion Bank of America Settlement*, (Aug. 29, 2014, 4:27 PM), <http://www.msnbc.com/msnbc/the-truth-behind-the-17-billion-bank-america-settlement>.

regulated entities flout them. Not only does corporate noncompliance undermine the public benefits that these regulations are designed to achieve, but it also offends fundamental notions of fairness in the marketplace for those regulated entities that work hard to comply.

This Article is focused on deliberate noncompliance, or cheating. To be sure, understanding what compliance means in the first place can be difficult. Regulations are complex. They often include exceptions, alternative forms of compliance, and subjective standards. Many regulated entities have elaborate internal compliance departments that work hard to understand regulations and detect potential noncompliance on their own.⁴ Such an investment in internal corporate compliance comes at the same time that corporations are experiencing pressures from shareholders, consumers, and suppliers to not only comply with regulations but also weave socially and environmentally responsible decisions into every aspect of the entities' functioning.⁵ Nevertheless, it is clear that such internal corporate compliance and accountability mechanisms are deficient.⁶ Pressure on middle management to perform, tight profit margins, and competition make cheating an attractive option for corporations.⁷ In addition, where the cost differential between noncompliance and compliance is large, the economic incentive to cheat is great. Therefore, while some noncompliance may be inadvertent or the result of honest mistakes, there is undoubtedly some level of noncompliance that is simply cheating.

The question then becomes: What should be the role of agencies in the detection of corporate cheating? Information is an essential first step in detection. Federal statutes attempt to make it easy for agencies to collect information from regulated entities through a variety of means. Several statutes provide agencies with administrative subpoena and search authority, which courts have interpreted broadly.⁸ Agencies use such authority to request confidential business

4. See Veronica Root Martinez, *Complex Compliance Investigations*, 120 COLUM. L. REV. 249, 255 (2020) (noting that “despite spending a great deal of time, effort, and money to enact structural reforms and improvements within organizations’ compliance programs, every year brings a new, more stunning example of how organizations’ attempts to reign in misconduct often fail to prevent even the most extensive compliance failures within industries and firms.”).

5. See, e.g., Robert G. Eccles & Svetlana Klimenko, *The Investor Revolution*, HARV. BUS. REV. (May–June 2019), <https://hbr.org/2019/05/the-investor-revolution> (discussing the growing interest of investors in corporations’ ESG performance).

6. See Veronica Root, *The Compliance Process*, 94 IND. L.J. 203, 205 (2019) (noting that “[c]ompliance refers to a firm’s effort to ensure that it and its agents adhere to legal and regulatory requirements, industry practice, and the firm’s own internal policies and norms. Organizations from all over the world, out of fear of sanction, harm, retribution, or ridicule, initiate programs aimed at making certain that their employees and members maintain compliance with external and internal norms and requirements. Yet every year seems to bring another set of significant scandals within organizations.”).

7. Telephone interview with shipping company (notes on file with author).

8. Rory Van Loo, *Regulatory Monitors Policing Firms in the Compliance Era*, 119 COLUM. L. REV. 369, 432–33 (2019) (describing the oversight authority of agencies and noting that “Congress has typically imposed less procedural oversight of regulatory monitors. A Department of the Interior authorizing statute requires formal adjudicative processes including, for example, subpoena power

information from regulated entities, gain access to private areas, and collect evidence through inspections. Several statutes also provide whistleblower protections for individuals with inside access to help agencies detect potential cheating.⁹ Indeed, in the shipping industry, whistleblowers have been the primary means of notification to the United States Coast Guard (USCG) when crewmembers have illegally attached pipes to ships in order to discharge oil-contaminated ballast water.¹⁰

However, as this Article discusses, agencies still face numerous challenges in information collection. There is only so much agencies can do, given the large number of regulated entities that need careful watching. Budgets are tight. Agencies also face legal challenges from regulated entities, including pushback on the burden and scope of agency information collection authority, which makes agencies risk averse about collecting information in the first place. Further, not only are some regulated areas highly technical, they are also increasingly international in scope, making information collection even more difficult. As a result, the seemingly expansive ability for agencies to collect information about potential corporate cheating only goes so far in reality.

This Article argues for increased reliance on the regulated entity to provide information to agencies about potential cheating, through self-monitoring and reporting. Indeed, the idea of self-monitoring and reporting is not new. Many agencies, both in the environmental context and outside the environmental context, have had longstanding programs in place for voluntary self-monitoring and reporting.¹¹ Such programs incentivize regulated entities to self-monitor and report in exchange for potential enforcement discretion or penalty reductions.¹² However, incentives are not enough because they leave gaps in information coming to agencies and regulated entities are able to self-select when, how, and which violations to monitor and report to agencies.¹³ It also leaves regulated entities in a quandary, having to decide which violations to monitor and report.¹⁴

mirroring that in ‘the district courts of the United States’ for offshore oil platform investigations, but not for inspections.’’) (citing 43 U.S.C. § 1348(c)–(d),(f) (2012)).

9. See Clean Air Act § 322, 42 U.S.C. § 7622 (2019); Comprehensive Environmental Response, Compensation, and Liability Act § 110, 42 U.S.C. § 9610 (2019); Clean Water Act § 507, 33 U.S.C. § 1367 (2019); Safe Drinking Water Act § 1450, 42 U.S.C. § 300j-9(i) (2019); Toxic Substances Control Act § 23, 15 U.S.C. § 2622 (2019).

10. Press Release, *Princess Cruise Lines to Pay Largest-Ever Criminal Penalty for Deliberate Vessel Pollution*, U.S. DEP’T OF JUSTICE (Dec. 1, 2016), <https://www.justice.gov/opa/pr/princess-cruise-lines-pay-largest-ever-criminal-penalty-deliberate-vessel-pollution>.

11. This is discussed further below in Part II.

12. Amanda Raad et al., *Self-Reporting to the Authorities and Other Disclosure Obligations The US Perspective*, GLOB. INVESTIGATIONS REV. (Jan. 3, 2017), <https://globalinvestigationsreview.com/chapter/1079272/self-reporting-to-the-authorities-and-other-disclosure-obligations-the-us-perspective>.

13. *Id.*

14. Todd Ehret, *Self-Reporting Is a Difficult Decision for Some Firms*, REUTERS (Mar. 24, 2019), <https://www.reuters.com/article/bc-finreg-self-reporting-idUSKCN1QL1X0>; Richard Reichman, *Self-Reporting of Corporate Wrongdoing Should Be Further Encouraged*, EURONEWS (July 29, 2019), <https://www.euronews.com/2019/07/26/self-reporting-of-corporate-wrongdoing-should-be-encouraged-view>.

Indeed, multiple blog posts by law firms seek to advise regulated entities on when and when not to monitor and report violations that are detected by internal corporate compliance departments.¹⁵ Instead, self-monitoring and reporting should be mandatory for regulated entities.

This Article presents an important opportunity to detect potential corporate cheating on new sulfur dioxide (SO₂) air pollution standards through enhanced use of mandatory monitoring and reporting mechanisms in the shipping industry. SO₂ air pollution from the combustion of fuel on ships causes significant health and natural resource impacts worldwide.¹⁶ Indeed, some of the largest cargo ships are so huge, and combust so much fuel, that they produce as much air pollution as fifty million cars.¹⁷ Thus, cheating on SO₂ fuel standards by even one ship has tremendous consequences for air pollution. Further, the economic incentive to cheat is enormous, with one shipping company representative commenting that full compliance with the new standards will cost his company \$300 million.¹⁸ An industry alliance of responsible shipping companies has demanded increased agency attention to detect potential corporate cheating, in particular advocating for increased agency inspection and fuel sampling.¹⁹ Further, the industry alliance has advocated for increased use by agencies of remote sensing technologies on drones and satellites that fly over ships and

15. Shoshana Thoma-Isgur, *When and What to Self-Report — And How to Benefit from It*, LAW360 (Jan. 6, 2016), <https://www.law360.com/articles/742885/when-and-what-to-self-report-and-how-to-benefit-from-it; To Tell or Not to Tell Best Practices for Managers Considering Whether to Self-Report Legal or Regulatory Violations>, HEDGE FUND LEGAL & COMPLIANCE DIG. (Nov. 18, 2016), <http://www.bakerbotts.com/~media/images/news/2016/to-tell-or-not-to-tell-best-practices-fo.pdf>; Junaid A. Zubairi & Brooke E. Conner, *Is SEC Cooperation Credit Worthwhile?*, LAW360 (Aug. 30, 2016), <https://www.law360.com/articles/833392/is-sec-cooperation-credit-worthwhile->; Deborah Carpentier, *Self-Reporting Routine Compliance Violations*, CROWELL & MORING LLP (July 2014), www.crowell.com/files/NERC-Enforcement-Issues-Self-Reporting-Routine-Compliance-Violations.pdf; Olga Greenberg et al., *Considerations before Self-Reporting under New FCPA Policy*, LAW360 (Dec. 8, 2017), us.eversheds-sutherland.com/portalresource/Considerations-Before-Self-Reporting-Under-New-FCPA-Policy.pdf; Ruth Cowley et al., *Self-Reporting Bribery The Ongoing Dilemma*, PLC MAG., (July 26, 2018).

16. *Shipping's Impact on Air Quality*, TRANSP. & ENV'T, <https://www.transportenvironment.org/what-we-do/shipping-and-environment/shipping's-impact-air-quality#:~:text=Through%20chemical%20reactions%20in%20the%20air%2C%20SO2%20and,Tiny%20airborne%20particles%20are%20linked%20to%20premature%20deaths>.

17. Paul Evans, *Big Polluters One Massive Container Ship Equals 50 Million Cars*, NEW ATLAS (Apr. 23, 2009), <https://newatlas.com/shipping-pollution/11526/>; see also Fred Pearce, *How 16 Ships Create as Much Pollution as All the Cars in the World*, DAILY MAIL (Nov. 21, 2009), <https://www.dailymail.co.uk/sciencetech/article-1229857/How-16-ships-create-pollution-cars-world.html> (citing to studies by University of Delaware Professor James Corbett and specifically noting “the largest ships can emit as much as 5,000 tons of sulphur in a year—the same as 50 million typical cars, each emitting an average of 100 grams of sulphur per year.”).

18. Telephone interview with shipping company (notes on file with author).

19. *Who We Are*, TRIDENT ALLIANCE, <http://www.tridentalliance.org/who-we-are> (last visited Sept. 30, 2020); see also Ship & Bunker News Team, *New Shipping Initiative to Work for Strong ECA Enforcement*, SHIP & BUNKER (last visited Nov. 19, 2020), <https://shipandbunker.com/news/world/693043-new-shipping-initiative-to-work-for-strong-eca-enforcement>.

estimate the amount of sulfur dioxide in the exhaust.²⁰ However, as this Article describes, such agency tools are hugely expensive and time consuming, and they raise legal questions as to when agencies are authorized to conduct advanced inspections.

Thus, responsible companies in the shipping industry need to consider their own role in helping to detect cheating. If all ships were required to directly measure and report their own sulfur dioxide emissions to relevant port agencies, detection of cheating would undoubtedly increase. However, even responsible companies are not yet embracing this approach.²¹ After all, why would regulated entities agree to direct monitoring and reporting requirements? Discussions with individuals in the shipping industry and a review of shipping industry publications make clear that there are now direct monitoring capabilities that are technically feasible and cost-effective. Further, as described in this Article, direct monitoring and reporting allows shipping companies to conclusively state that they are “compliant” with all relevant laws, as is frequently required by vendor contracts and other similar private agreements. On a broader level, direct monitoring and reporting ensure that if companies spend the money to comply, they will not be undercut by companies engaging in undetected cheating.

This Article proceeds in five Parts. Part I frames the issues surrounding corporate cheating, focusing on why corporate environmental cheating remains a problem despite the trend toward greater corporate social and environmental responsibility. Part II describes the legal, policy, and resource difficulties associated with agency information collection and detection of corporate cheating. While Part II focuses on information collection by environmental agencies, it draws upon the experiences of enforcement agencies that work to detect corporate cheating in other areas as well, such as financial fraud, energy market manipulation, and food safety violations. Part III argues that regulated entities should help agencies collect information needed to increase detection of cheaters because while increased detection benefits the public, it also benefits regulated entities in unexpected and underappreciated ways. In particular, Part III focuses on self-monitoring and reporting. Part IV provides a detailed case study of the shipping industry and advocates for mandatory self-monitoring and reporting coupled with the use of direct emissions monitoring and reporting. The Article ends with concluding thoughts about other areas of detection of corporate environmental cheating that could benefit from self-monitoring and reporting by regulated entities.

20. *Drones Lead the Way in Emissions Compliance*, RIVIERA, <https://www.rivieramm.com/opinion/drones-lead-the-way-in-emissions-compliance-35819> (last visited Sept. 30, 2020).

21. *Emissions Monitoring Maintaining a Level Playing Field Post-2020*, RIVIERA, <https://www.rivieramm.com/opinion/opinion/emissions-monitoring-maintaining-a-level-playing-field-post-2020-23341> (last visited Sept. 30, 2020) (“The mandatory installation of CEMS was actually proposed by IMO, but to no avail. And while some owners have mooted the notion of voluntary CEMS installation and reporting to their customers, interest from the shippers community in general has been minimal.”).

I. FRAMING THE ISSUE

There is an interesting dichotomy at play in the corporate world: Corporations are violating the nation's federal environmental laws at the same time that they are investing heavily in internal corporate compliance and social/environmental responsibility programs. This Part sets forth the background for understanding this dichotomy and the role of enforcement agencies in enforcing environmental regulations.

A. Corporate Cheating

The government regulates corporate behavior and activity with the goal of public protection. Environmental regulations alone bring benefits to the public in a wide range of areas, including natural resource quality, visibility, ecosystem health, safety, and human health benefits such as avoidance of premature mortality.²² For example, the regulatory impact assessment for EPA's mercury air toxics rule, applicable to the utility industry, anticipated hundreds of thousands of dollars in benefits from reduced hospital visits.²³ However, such regulations rarely take into account any anticipated noncompliance or cheating by regulated entities. As the former head of EPA's Office of Enforcement and Compliance Assurance under the Obama administration recently wrote, "most environmental policy practitioners, including government regulators, regulated companies, legislators, academics, and advocates—*assume[]* compliance."²⁴ Noncompliance or cheating ultimately impacts the underlying benefits of the regulation. The Volkswagen diesel emissions scandal exemplifies the harm of failing to detect corporate cheating. In the case of Volkswagen, actual emissions of harmful nitrogen oxides from violating cars were ten to forty times higher than the standards allowed.²⁵ Thus, every day the violating cars stayed on the road, they created significantly higher levels of air pollution than what the standards established as necessary to protect public health.

However, there is very little information about how often, how much, and in what context regulated entities violate regulations. To be sure, there are different kinds of violations. Some violations are simply mistakes; corporate entities may be unaware of what it takes to comply with the regulations.²⁶ Some

22. See, e.g., EPA, REGULATORY IMPACT ANALYSIS FOR THE FINAL MERCURY AND AIR TOXICS STANDARDS ES-3 (2011) (discussing multiple benefits from regulation).

23. *Id.*

24. Cynthia Giles, *Next Generation Compliance: Environmental Regulation for the Modern Era*, HARV. L. SCH. ENV'T & ENERGY L. PROGRAM 3 (2020), <http://eelp.law.harvard.edu/wp-content/uploads/Cynthia-Giles-Intro-FINAL.pdf> (emphasis added).

25. Noelle Eckley Selin, *The Not-So-Invisible Damage from VW Diesel Cheat: \$100 Million in Health Costs*, CONVERSATION BLOG (Sept. 29, 2015, 4:44 PM), <https://theconversation.com/the-not-so-invisible-damage-from-vw-diesel-cheat-100-million-in-health-costs-48296>.

26. See, e.g., *United States v. Economy Muffler & Tire Ctr., Inc.*, 762 F. Supp. 1242, 1244 (E.D. Va. 1991) (noting that "Economy Muffler also claims that its employees did not knowingly violate the Clean Air Act because they were not aware of the Act's requirements with respect to converters").

are inadvertent; corporate entities tried to comply, but something went wrong in the process.²⁷ Some are debatable; it is likely that an action by a corporate entity constitutes a violation, but it may also fall within an exception.²⁸ However, some violations, like the ones present in Volkswagen case, are clear; the corporate entity deliberately cheated because there was a benefit to doing so. Indeed, the lack of information about violations, including how much is inadvertent, debatable, or outright cheating, is part of the problem that this Article seeks, in part, to address.

Moreover, measuring corporate cheating is difficult because regulations are rarely straightforward. To be sure, sometimes regulations do set specific thresholds that are easy to follow, such as a maximum and minimum speed limit on a highway. However, even for such quantitative standards, there may be exceptions or alternative methods of compliance.²⁹ Other standards are qualitative, measured by whether a regulated corporate entity engaged in a particular behavior or with a specific intent.³⁰ Other standards simply impose administrative obligations on regulated entities, such as requirements to send reports or keep records for a certain period of time.³¹ Therefore, understanding whether a corporate regulated entity is compliant or not is not always as straightforward as might be expected.

Large corporate scandals of the last several years demonstrate that sophisticated companies are engaging in corporate cheating.³² In the environmental context, the Volkswagen diesel emissions scandal of 2015 stunned the environmental and legal community.³³ While this Article is focused

27. Pub. Interest Rsch. Grp. of N.J., Inc. v. Hercules Inc., 2003 WL 23519620, at *33 (D.N.J. Oct. 27, 2003) (“The 23 violations were inadvertent mistakes that were not part of any intentional plan to mislead or get away with a lesser environmental standard and they were not the basis of an ongoing pattern of indifference or misrepresentation, given the many thousands of opportunities for such errors in paperwork over those years.”).

28. See, e.g., Allison Holden, *When It Comes to the Clean Air Act's Routine Maintenance, Repair, and Replacement Exception, Everyone's a Loser*, GEO. WASH. J. ENERGY & ENV'T L. (Oct. 25, 2012), <https://gwjeel.com/2012/10/25/when-it-comes-to-the-clean-air-acts-routine-maintenance-repair-and-replacement-exception-everyones-a-loser/> (describing the lengthy litigation over the applicability of an exception under the CAA's New Source Review program).

29. For example, traffic laws may allow speeding exceptions for certain vehicles in specific situations, such as for health emergencies or inclement weather. See TEX. TRANSP. CODE § 545.365 (2019) (creating a speed limit exception for emergencies); *Speed Limits*, VA. DEP'T OF TRANSP., <http://www.virginiadot.org/info/faq-speedlimits.asp> (last visited Oct. 6, 2020) (stating that speed limits are for typical road conditions and motorists should adjust in non-typical conditions).

30. See, e.g., 42 U.S.C. § 7522 (2018) (prohibiting manufacturers of cars from distributing, selling, offering for sale, delivering, and importing any new car that does not have a certificate of conformity).

31. See *id.* (prohibiting any person from failing tests or refusing to perform tests or have tests performed).

32. Matthews & Gandel, *supra* note 2; Matthews & Heimer, *supra* note 2; Shen, *supra* note 2.

33. J.S. Nelson, *Disclosure-Driven Crime*, 52 U.C. DAVIS L. REV. 1487, 1496 (2019) (noting that the Volkswagen scandal, involving emissions cheating, is representative of “modern large-scale corporate wrongdoing”); Kelly Kollman & Alvis Favotto, *How VW Took the Corporate Ethics Industry to the Brink*, CONVERSATION BLOG (Nov. 2, 2015, 4:54 AM), <http://theconversation.com/how-vw-took-the-corporate-ethics-industry-to-the-brink-49351>.

on corporate cheating on environmental laws, corporate cheating in other policy areas has certainly been at the forefront of scandal as well. Multiple large companies, such as Valeant, Equifax, and Wells Fargo, have committed legal violations in a variety of market abuse areas, including racketeering, fraud, consumer protection, and price gouging.³⁴ These large corporate scandals, when they occur, dominate the news.

However, not all instances of corporate cheating even make the news. Everyday corporate cheating is more difficult to quantify and understand.³⁵ Several environmental enforcement offices report significant noncompliance by regulated entities. For example, the U.S. Environmental Protection Agency (EPA) reports that in 2018, over 29 percent of facilities that had National Pollutant Discharge Elimination System permits under the Clean Water Act (CWA) were in significant noncompliance with their permits.³⁶ The violations ranged from failure to submit reports to significant exceedances of effluent limits. The permittees that had high effluent violations discharged almost four billion pounds of pollutants above their permitted limits.³⁷ While in some cases, cheating may not be deliberate, it is hard to imagine that all such instances are merely inadvertent mistakes.³⁸ The reason for such everyday noncompliance may be that nobody is watching.

Moreover, statistics that do cite to violation rates can sometimes use faulty assumptions or misinformation. For example, EPA's Enforcement Compliance History Online database is supposed to provide information about environmental violation rates.³⁹ Yet, even though the Enforcement Compliance History Online database is useful for gaining general knowledge about violations, it has problems. For instance, the database only lists noncompliance for facilities every quarter, and even then, it often has incomplete information, meaning that there are potentially even more violations out there going unreported.⁴⁰ Similar data

34. Matthews & Gandel, *supra* note 2.

35. Robert L. Glicksman & Dietrich H. Earnhart, *The Comparative Effectiveness of Government Interventions on Environmental Performance in the Chemical Industry*, 26 STAN. ENV'T L.J. 317, 320 (2007) (“[R]elatively little is known about why regulated entities either do or do not comply with their regulatory obligations.”).

36. Memorandum from Susan Parker Bodine, Assistant Administrator, Off. of Enf't & Compliance Assurance, EPA, to Regional Administrators (June 7, 2019), <https://www.epa.gov/sites/production/files/2019-06/documents/2020-2023ncimemo.pdf>.

37. *Id.*

38. *See, e.g.*, *United States v. Weitzenhoff*, 35 F.3d 1275, 1286 (9th Cir. 1993) (discussing the defendants' choice to dump “thousands of gallons of toxic sludge into the ocean . . . so as to avoid a complete plant shutdown”).

39. *EPA Enforcement and Compliance History Online*, EPA, <https://echo.epa.gov/> (last visited Sept. 30, 2020) (“Use EPA's Enforcement and Compliance History Online website to search for facilities in your community to assess their compliance with environmental regulations.”).

40. Carole Gibbs & Sally S. Simpson, *Measuring Corporate Environmental Crime Rates Progress and Problems*, 51 CRIME, L. & SOC. CHANGE 87, 95 (2009).

gaps have been found in analysis of violation rates of the Safe Drinking Water Act.⁴¹

Corporate cheating becomes an even bigger problem to estimate when looking at companies with an international presence. We live in a global marketplace with goods and services routinely moving across borders. Thus, corporate cheating in one location can affect consumers, public health, and natural resources in another location. In addition, many countries have similar laws designed to protect the public from harm by corporations. As a result, corporate cheating in one country might mean that the corporation is engaging in cheating elsewhere as well.⁴² As one scholar notes, “It should command our attention that these scandals are enormous in size, occur within diverse industries, and increasingly pull across companies and borders.”⁴³

B. Corporate Accountability

At the same time large-scale corporate cheating is happening, corporate entities are spending significant resources implementing internal corporate social and environmental accountability strategies.⁴⁴ This dichotomy has generated a significant amount of legal scholarship.⁴⁵ Some of the pressure to “go green” comes from corporate stakeholders, who are demanding that corporate boards demonstrate social and environmental values in corporate decision making.⁴⁶ Further, the pressure comes from employees, customers, and suppliers that are demanding that companies recognize a broader scope of responsibility in addressing political, environmental, and social issues.⁴⁷

41. KRISTI PULLEN FEDINICK ET AL., NAT. RES. DEF. COUNCIL, WATERED DOWN JUSTICE 9 (2019), <https://www.nrdc.org/sites/default/files/watered-down-justice-report.pdf>.

42. Camilla Hodgson, *A History of Human Greed ' The 26 Different Ways People Have Cheated Markets over 200 Years*, BUS. INSIDER (Sept. 22, 2017, 2:00 AM), <https://www.businessinsider.com/market-misconduct-report-the-26-ways-people-have-cheated-markets-over-200-years-2017-9> (showing world map of where illegal market conduct has been detected).

43. Nelson, *supra* note 33, at 1499.

44. Alison Smith, *Fortune 500 Companies Spend More Than \$15bn on Corporate Responsibility*, FIN. TIMES (Oct. 12, 2014), <https://www.ft.com/content/95239a6e-4fe0-11e4-a0a4-00144feab7de>.

45. See Root, *supra* note 6, at 205; Miriam H. Baer, *Linkage and the Deterrence of Corporate Fraud*, 94 VA. L. REV. 1295 (2008); Michael P. Vandenbergh, *Private Environmental Governance*, 99 CORNELL L. REV. 129 (2013).

46. Bill Libit, *The Corporate Social Responsibility Report and Effective Stakeholder Engagement*, HARV. L. SCH. F. ON CORP. GOVERNANCE (Dec. 28, 2013), <https://corpgov.law.harvard.edu/2013/12/28/the-corporate-social-responsibility-report-and-effective-stakeholder-engagement/>; R. Edward Freeman & Heather Elms, *The Social Responsibility of Business Is to Create Value for Stakeholders*, MIT SLOAN MGMT. REV. (Jan. 4, 2018), <https://sloanreview.mit.edu/article/the-social-responsibility-of-business-is-to-create-value-for-stakeholders/>.

47. Libit, *supra* note 46; see also Daniel C. Esty & Quentin Karpilow, *Harnessing Investor Interest in Sustainability The Next Frontier in Environmental Information Regulation*, 36 YALE J. ON REG. 625, 631–32 (2019).

Private contracts also reinforce pressure to address corporate social and environmental responsibility.⁴⁸ Corporations increasingly have vendor codes of conduct that specify certain expectations that the corporations have of their partners, suppliers, or other groups that the corporations conduct business with.⁴⁹ Vendor codes of conduct set expectations that vendors will minimize their impacts to the environment and comply with all environmental regulations.⁵⁰ For example, a search of the word “comply” in the Volkswagen code of conduct shows that the word comes up fifteen times, setting an expectation that vendors will comply in multiple areas including human rights, taxes and customs, free and fair competition, worker safety, and environmental protection.⁵¹ Corporate codes of conduct also are meant to send signals to employees about corporate management commitments and priorities.⁵² Indeed, employees are essential to enforce internal corporate compliance programs and to deter violations within the corporation before they happen.⁵³

However, corporate accountability and compliance may not deserve the accolades that they sometimes get in the literature. While a corporation could, in theory, end a contract with a vendor if there was evidence of noncompliance, there is no evidence this happens in practice. In addition, there is no actual requirement that corporate entities engage in comprehensive internal compliance programs or strict vendor relationships, and so while there may be a trend towards such corporate activities, they do not exist everywhere.⁵⁴ Moreover, internal corporate compliance structures are not enough to ensure corporate compliance.⁵⁵ Corporate leaders themselves point to the lack of oversight within corporate compliance departments.⁵⁶ For example, former Deutsche Bank

48. Vandenbergh, *supra* note 45; David E. Adelman & Graeme W. Austin, *Trademarks and Private Environmental Governance*, 93 NOTRE DAME L. REV. 709, 709 (2017) (“Private environmental governance is premised on consumers ‘voting with their wallets’ by selecting products that reflect not just their instrumental preferences, but also their values.”); Stephen Kim Park, *Investors as Regulators: Green Bonds and the Governance Challenges of the Sustainable Finance Revolution*, 54 STAN. J. INT’L L. 1, 6 (2018); Amanda C. Leiter, *Fracking, Federalism, and Private Governance*, 39 HARV. ENV’T L. REV. 107, 126 (2015).

49. Veronica Root, *Coordinating Compliance Incentives*, 102 CORNELL L. REV. 1003, 1006 (2017).

50. See, e.g., S&P GLOBAL, VENDOR CODE OF CONDUCT 6 (2017), <https://www.spglobal.com/en/who-we-are/corporate-responsibility/spglobalvendorcodeofconduct.pdf>.

51. VOLKSWAGEN GROUP, CODE OF CONDUCT (2020), https://www.volkswagenag.com/presence/konzern/documents/coc_vw_konzern_en_2020_05_13.pdf.

52. Todd Haugh, *The Power Few of Corporate Compliance*, 53 GA. L. REV. 129, 139 (2018).

53. Susan Diehl & Monica Batsford, *Auto Industry Compliance: Will the Tone at the Top Go Tone Deaf in the Wake of Deregulation?*, 2 WAYNE ST. U.J. BUS. L. 1, 6–7 (2019) (noting that “[a] survey of over 800 compliance professionals found that a majority of those professionals expect that their compliance budgets will increase over the coming year.”).

54. Root, *supra* note 49, at 1010.

55. See *White-Collar Crime*, HARV. BUS. REV. (July–Aug. 2019), <https://hbr.org/2019/07/white-collar-crime>.

56. See, e.g., Todd Haugh, *The Trouble with Corporate Compliance Programs*, MIT SLOAN MGMT. REV. (Sept. 6, 2017), <https://sloanreview.mit.edu/article/the-trouble-with-corporate-compliance-programs/>; see also Jesse W. Markham, Jr., *The Failure of Corporate Governance Standards and Antitrust Compliance*, 58 S.D. L. REV. 499, 500 (2013) (describing lack of ability to deter antitrust law violations:

employees have said that the bank has a lax approach to money laundering laws and a pattern of protecting relationships with lucrative clients, even if the clients' actions are potential violations.⁵⁷ In a securities case involving KPMG, the Securities and Exchange Commission (SEC) found that auditors, including some senior partners, cheated on internal tests related to compliance training, sharing answers with other partners and staff to help them attain passing scores.⁵⁸ In addition, legal counsel for corporations have discovered environmental violations, only to find out that the internal corporate "plan" to fix the problems would never come to fruition.⁵⁹

A huge problem within corporate structures is simply that employees feel pressure to cheat. Top management can place significant pressure on middle management to deliver results, regardless of potential violations along the way.⁶⁰ As described by one journalist reporting on the Volkswagen scandal, "Poor, unaccountable corporate governance—and short-termist incentives for executives—are sadly pervasive."⁶¹ In addition, a Harvard study on Wells Fargo found that the bank's practice of setting daily sales targets put excessive pressure on employees to commit fraud.⁶² Wells Fargo assigned branch managers quotas for the number and types of products sold, and if a branch did not hit its targets, the shortfall was added to the next day's goals.⁶³ Studies on internal corporate culture point to pervasive problems that lead to large-scale violations, such as failure to set a positive example or promote an environment where it is safe to speak up about unethical or illegal behavior.⁶⁴

In many industries, it does not make financial sense for corporations to invest in compliance. Environmental consulting companies say that they get

In part because shareholders have no control over the conduct of personnel, large antitrust fines barely affect the individual shareholders of public companies. As a result, antitrust violations continue to occur with disappointing frequency).

57. David Enrich, *Deutsche Bank Staff Saw Suspicious Activity in Trump and Kushner Accounts*, N.Y. TIMES (May 19, 2019), <https://www.nytimes.com/2019/05/19/business/deutsche-bank-trump-kushner.html>.

58. Francine McKenna, *The KPMG Cheating Scandal Was Much More Widespread than Originally Thought*, MARKETWATCH (June 18, 2019, 5:03 PM), <https://www.marketwatch.com/story/the-kpmg-cheating-scandal-was-much-more-widespread-than-originally-thought-2019-06-18>.

59. Jim Nortz, *Some Reflections on Cheating in Business*, CORP. COMPLIANCE INSIGHTS (June 11, 2015), <https://www.corporatecomplianceinsights.com/reflections-cheating-business/>.

60. Nelson, *supra* note 33, at 1492–93; Armour et al., *supra* note 1, at 12.

61. Robert Armstrong, *The Volkswagen Scandal Shows that Corporate Culture Matters*, FIN. TIMES (Jan. 13, 2017), <https://www.ft.com/content/263c811c-d8e4-11e6-944b-e7eb37a6aa8e>.

62. Brian Tayan, *The Wells Fargo Cross-Selling Scandal*, HARV. L. SCH. F. ON CORP. GOVERNANCE (Feb. 6, 2019), <https://corpgov.law.harvard.edu/2019/02/06/the-wells-fargo-cross-selling-scandal-2/>; Elizabeth C. Tippet, *How Wells Fargo Encouraged Employees to Commit Fraud*, CONVERSATION BLOG (Oct. 6, 2019, 9:13 PM), <https://theconversation.com/how-wells-fargo-encouraged-employees-to-commit-fraud-66615>.

63. *Id.*

64. Ron Carucci, *Why Ethical People Make Unethical Choices*, HARV. BUS. REV. (Dec. 16, 2016), <https://hbr.org/2016/12/why-ethical-people-make-unethical-choices>; Armstrong, *supra* note 61.

questions from compliance officers as to whether compliance is worth the cost.⁶⁵ Complying with environmental regulations, for example, often requires corporations to purchase costly pollution control equipment. Such equipment can cost corporations millions of dollars to install and operate.⁶⁶ Corporations perform cost-benefit analyses, knowing that government pursuit of enforcement cases can take a long time to reach a conclusion and that enforcement cases are often not pursued at all.⁶⁷ Thus, if a corporate entity is able to fly under the regulatory radar, it is hard to justify the need to spend money on compliance. There is simply no return on investment.⁶⁸

C. Role of Agencies

The question then becomes: How do agencies formulate enforcement programs in a world in which there is undoubtedly significant interest by corporations to be “compliant,” while there are also financial reasons to be “noncompliant?” Corporations are inherently profit maximizing and, as such, will comply with regulations when it makes financial sense to do so.⁶⁹ Indeed, law firm blogs and third-party auditors focus on statutory maximum penalties in attempts to convince regulated corporate entities that it is worth the expense to invest in compliance.⁷⁰ Thus, the cost of noncompliance or cheating matters. As the late economist Gary Becker and several other scholars since have described, the cost of noncompliance is typically a function of both the likelihood of apprehension and the sanction imposed.⁷¹ However, most of the literature on

65. Timothy Cory & Michael R. Green, *The Cost of Environmental Non-Compliance*, ENV'T STANDARDS, <https://www.envstd.com/the-cost-of-environmental-non-compliance/> (last visited Oct. 1, 2020).

66. Nortz, *supra* note 59 (“For the following 10 years, until the plant was closed, no money was ever allocated for this project. As a consequence, the corporation had cheated and won. It enjoyed the time value of \$5 million for the decades the plant was in operation and paid no penalty. In so doing, they enjoyed an advantage over those competitors who chose to make expenditures necessary to comply with the law.”).

67. Nelson, *supra* note 33, at 1520–21.

68. Dennis Ruhlin, *Average Cost of Environmental Fines, Violations, and Settlements at Industrial Facilities*, RES. MGMT. ASSOCS., <https://www.rmagreen.com/rma-blog/average-cost-of-environmental-fines-violations-and-settlements> (last visited Oct. 1, 2020) (observing that “many businesses out there don’t see the ‘value’ in environmental compliance, because unlike other areas of their businesses, it’s normally not a money driver. If there’s no ROI [return on investment], what’s the point? This is especially true for people who have flown under the regulatory radar so to speak, making it extra difficult to highlight the need to spend money on getting into environmental compliance when they never spent a dime in the past.”).

69. See Charles J. Babbitt et al., *Discretion and the Criminalization of Environmental Law*, 15 DUKE ENV'T L. & POL'Y F. 1, 39 (2004) (describing generally the Gary Becker deterrence model); Baer, *supra* note 45, at 1301–02.

70. *The EPA's Next Regulatory Frontier Large Ship Emissions*, KIRKLAND & ELLIS (Apr. 21, 2014), <https://www.kirkland.com/publications/article/2014/04/the-epas-next-regulatory-frontier-large-ship-emiss> (noting that “[f]or civil violations, companies may be liable for a penalty of up to \$25,000 for each violation”).

71. Babbitt et al., *supra* note 69, at 39.

corporate compliance and cheating has focused on sanctions, or penalties.⁷² Certainly, these scholars argue, if penalties were just higher, there would be less corporate noncompliance and cheating.⁷³ However, a focus on penalties alone misses an equally important factor considered by corporations: the likelihood of apprehension.⁷⁴

The literature on compliance and cheating, especially in the environmental context, has focused on the ability of nonagency players, including the public and corporate shareholders, to access information about corporate behavior. This literature tends to focus not on increasing the likelihood of apprehension for regulatory violations but instead on encouraging corporations to be more environmentally and socially responsible in a more general sense.⁷⁵ This literature posits that there may be other ways for such benefits to come to fruition, including corporate environmental and social responsibility efforts and public shaming.⁷⁶ But regulatory cheating impacts more than society's ability to achieve the anticipated public benefit of the regulation.

Environmental scholars seem to have given up on agency enforcement, turning instead to recommendations that agency officials work collaboratively with corporations or alternatively rely on citizen suit enforcement.⁷⁷ Further, political administrations tend to go back and forth over the appropriate role of agency enforcement. Indeed, we have seen the pendulum swing between federal administrations as they variably focus on strong enforcement efforts versus attempting to coax corporations into compliance.⁷⁸ Professor Bill Andreen notes

72. Sally S. Simpson et al., *An Empirical Assessment of Corporate Environmental Crime-Control Strategies*, 103 J. CRIM. L. & CRIMINOLOGY 231, 233 (arguing that “[i]f the benefits of crime are high and the risk of discovery and punishment is low, then criminal opportunities increase as actors perceive less risk associated with illegal activities”).

73. See, e.g., Mark Atlas, *Enforcement Principles and Environmental Agencies: Principal-Agent Relationships in a Delegated Environmental Program*, 41 L. & SOC'Y REV. 939, 950 (2007) (“Penalties are particularly useful in evaluating the consistency and stringency of enforcement efforts.”).

74. Armour et al., *supra* note 1, at 12 (“This virtuous circle of compliance presupposes that a violation triggers enforcement. In practice, the complexity of corporate affairs and the finite resources of enforcement agencies mean that the probability of enforcement may only be small.”).

75. Sarah E. Light, *The Law of the Corporation as Environmental Law*, 71 STAN. L. REV. 137, 166 (2019). Professor Sarah Light provides an excellent example of how ExxonMobil's 10-K filing prompted SEC to investigate a potential violation of the self-disclosure requirements. *See id.* ExxonMobil had failed to adequately inform SEC of information about its oil reserves. *Id.* at 167–68. The investigation deterred ExxonMobil from failing to disclose next time. *Id.* at 168. The investigation also prompted ExxonMobil to make different choices about its oil reserves, one of the underlying purposes of disclosure requirements about climate risks to begin with. *Id.* at 167–68.

76. Cary Coglianese & David Lazer, *Management-Based Regulation: Prescribing Private Management to Achieve Public Goals*, 37 L. & SOC'Y REV. 691, 696 (2003).

77. Adam Babich, *Legal Impacts of Increased Public Availability of Air Quality Data*, NO. 1 RMMLF-INST 2, ROCKY MT. MIN. L. INST. 2-1 (2018); Randy Dann et al., *Contemporary Issues in Citizen Enforcement of Environmental Laws*, NO. 6 RMMLF-INST 12 ROCKY MT. MIN. L. INST. 12-1 (2018).

78. See Adam Babich, *Back to the Basics of Antipollution Law*, 32 TUL. ENV'T L.J. 1, 26–27 (2018); Clifford Rechtschaffen, *Deterrence vs. Cooperation and the Evolving Theory of Environmental Enforcement*, 71 S. CAL. L. REV. 1181, 1205–12 (1998).

that Democratic administrations have generally pushed for strong deterrence models of environmental enforcement, and Republican administrations have generally advocated for cooperative models of environmental enforcement.⁷⁹ For example, one of the first changes that the Trump administration made to EPA's enforcement program was to change the national "enforcement" initiatives to national "compliance" initiatives.⁸⁰ Such a change in language may seem benign, but it signals a different approach. This change may alter expectations of regulated entities and impact the ability of agencies to push for information collection. Regulated agencies might view inspection requests as excessively burdensome, and there could be budget cuts in agency enforcement. Given the lack of dependency with agency enforcement, citizen enforcement might represent a more stable approach. Still, this literature misses the important role that information access plays in compelling regulatory compliance and the impact of cheating on fairness in the marketplace, another core societal value. It offends fundamental notions of the rule of law to let cheaters gain a competitive advantage by avoiding the cost of compliance. Cheating undermines not only the goals of regulation but also the ability of corporate entities to operate on a level playing field.

We must recognize that agencies face formidable barriers to enforcement. Agency enforcement cases often face uphill battles on key elements of proof such as causation or intent.⁸¹ Sometimes, agencies must demonstrate that a regulatory exception does not apply.⁸² Agency enforcement cases also are influenced by shifting political goals. Indeed, when the Office of Management and Budget held a request for comment period in January 2020, it suggested that the Trump administration could choose to require agencies to "show cause" to investigate or manage an initial presumption of "innocence" by corporate entities in proceedings.⁸³ While it remains unclear as to how the Office of Management and Budget request for comment will turn out, it exemplifies the kind of legal challenges imposed on agency enforcement offices.

However, information flowing to agency enforcement offices remains vitally important for detection of cheating. Without information, agency enforcers have little way to know where to target inspection resources or

79. See William Andreen, *Motivating Enforcement Institutional Culture and the Clean Water Act*, 24 PACE ENV'T L. REV. 67, 69 n.13 (2007); Marshall J. Breger, *Regulatory Flexibility and the Administrative State*, 32 TULSA L.J. 325, 325–26 (1996) (explaining that the Republican-controlled Congress sought to shift from an enforcement paradigm for regulation to a cooperative partnership with the regulated community in the mid-1990s).

80. Mike Soraghan, *Trump's EPA Turns to Less Punitive Responses to Pollution*, E&E NEWS (June 11, 2018), <https://www.eenews.net/stories/1060084031>.

81. Robert Glicksman et al., *Technological Innovation, Data Analytics, and Environmental Enforcement*, 44 ECOLOGY L.Q. 41, 61 (2017) (recognizing difficulties in making causal connections).

82. See, e.g., *United States v. La. Generating, LLC*, 2012 WL 4107129 (M.D. La. Sept. 19, 2012) (granting plaintiffs' summary judgment motion that the routine maintenance exception did not apply).

83. *Improving and Reforming Regulatory Enforcement and Adjudication*, 85 Fed. Reg. 5483 (Jan. 30, 2020).

otherwise begin to develop elements of proof for an enforcement case. Without information, agency enforcers do not know whether a particular violation is an indication that the violator is outright cheating or even a repeat offender. Without information, agency enforcers do not know the extent of the harm to the public from a violation—whether it is large or small—or located in a particularly sensitive area. In short, an increase in quality information to agencies is necessary for the agencies to be able to effectively do their jobs.

II. AGENCY INFORMATION COLLECTION

This Article focuses on strengthening enforcement by allowing enforcement agencies to access information that will increase the likelihood of apprehension. This Part sets forth the foundation for understanding the key role that information plays in detecting corporate cheating and the challenges that agencies face in getting such information. Its purpose is to demonstrate that much of the information that enforcement agencies receive about potential corporate cheating is ad hoc in nature, coming from multiple and varied sources.

A. Information Sources

In order to detect potential cheating, agencies must have information about what is happening inside a corporation.⁸⁴ Congress, in recognizing this need, has provided agencies with statutory authority to collect such information.⁸⁵ Agency information collection comes in multiple forms, including the ability to request information from specific regulated entities or conduct audits and physical inspections.⁸⁶ As described by Professor Rory Van Loo, “Overall, among the nineteen large federal regulators . . . [s]ixteen of the nineteen largest agencies have both strong visitorial monitoring and record-collection authority.”⁸⁷ The Clean Air Act (CAA), for example, authorizes EPA to request any information it “may reasonably require” to enforce emissions standards.⁸⁸ EPA may use its authority under the CAA to require a corporate entity to submit records, install and use monitoring equipment, and sample emissions.⁸⁹ The CAA also allows EPA “the right of entry to, upon or through any premises” where records are required to be maintained and “may at reasonable times have access to and copy any records, inspect any monitoring equipment . . . and sample any emissions.”⁹⁰

84. This Article focuses on agency information collection of business records that do not contain personal or individual information.

85. Van Loo, *supra* note 8, at 382–83 (describing numerous statutes that allow agencies to obtain nonpublic information from businesses, including agencies such as the Federal Aviation Administration, the Federal Communications Commission, and the Nuclear Regulatory Commission, amongst others).

86. *See, e.g.*, Clean Air Act § 114, 42 U.S.C. § 7414(a) (2019).

87. Van Loo, *supra* note 8, at 395–96.

88. 42 U.S.C. § 7414(a).

89. *Id.*

90. *Id.* § 7414(a)(2).

Most other federal environmental statutes contain similar records collection and inspection authority.⁹¹

Agencies collect information from regulated entities for purposes beyond detecting regulatory violations. In particular, agencies collect information from regulated entities in order to inform decisions about new programs or rulemakings.⁹² For example, EPA collects information about air emissions from regulated entities with the specific goal of updating regional emissions inventories for specific pollutants.⁹³ Such information is used to inform decisions about which sources contribute to unhealthy air quality and, therefore, should be considered for further emissions reductions in permitting.⁹⁴ In addition, agencies might collect information from regulated entities simply to understand a complex technical issue. For example, in December 2019, the Federal Motor Carrier Safety Administration issued an information collection request to motor carriers with the stated purpose of allowing the agency to study and assess the effectiveness of various technologies, programs, and policies on motor safety performance.⁹⁵

Agencies seek a wide range of information in order to be able to detect potential noncompliance or cheating. Information sought may be quantitative, such as prices, or narrative, such as formulas, names, dates, or phrases.⁹⁶ To determine whether markets are being manipulated, agencies may need information concerning market transactions, including the profitability of, and reasons for, specific transactions.⁹⁷ Agencies may also seek information

91. 33 U.S.C. § 1318(a)(B) (2019); 7 U.S.C. § 136g(a) (2019); 15 U.S.C. § 2610(a) (2019); 42 U.S.C. §§ 6927(a), 9604(e)(3) (2019).

92. CAA sections 114 and 208, CWA section 308, and section 104 of the Comprehensive Environmental Response, Compensation, and Liability Act all allow EPA to collect information to determine compliance and also for the development or modification of regulations. 33 U.S.C. § 1313; 42 U.S.C. §§ 7414, 7542, 9604.

93. 33 U.S.C. § 1313; 42 U.S.C. §§ 7414, 7542, 9604.

94. *Air Emissions Reporting Requirements (AERR)*, EPA, <https://www.epa.gov/air-emissions-inventories/air-emissions-reporting-requirements-aerr> (last visited Oct. 1, 2020) (describing state and local agency obligations to collect and submit air emissions information for the purpose of developing the National Emission Inventory); *Air Emissions Reporting Requirements (AERR) + State & Local Emissions Inventory System (SLEIS)*, STATE OF HAW. DEP'T OF HEALTH, <https://health.hawaii.gov/cab/air-emissions-reporting-requirements-aerr-and-state-local-emissions-inventory-system-sleis/> (last visited Oct. 1, 2020) (describing state reporting requirements for regulated facilities in order for state to fulfill reporting goals for the National Emissions Inventory).

95. Agency Information Collection Activities; New Information Collection: Beyond Compliance, 84 Fed. Reg. 69451 (Dec. 18, 2019).

96. See, e.g., EPA, REQUEST TO PROVIDE INFORMATION PURSUANT TO THE CLEAN AIR ACT (2015), <https://www.epa.gov/sites/production/files/2017-03/documents/shb-114-request-201503.pdf> (describing various items the regulated entity must submit to EPA, including proposed monitoring locations, a map of the facility, and daily logs of the monitors).

97. Mark J. Niefer, *Information and Competition in Electric Power Markets: Is Transparency the Holy Grail?*, 35 ENERGY L.J. 375, 394 (2014). FERC, in its data requests for detection of corporate cheating, for example, asks for financial and operational information, procedures manuals, organization charts, reports, and email and voice mail records. FERC, OFFICE OF ENFORCEMENT AUDIT PROCESS 2 (20), <https://www.ferc.gov/sites/default/files/2020-04/audit-process.pdf>.

regarding corporate status, with the goal of finding the proper regulated entity responsible for potential corporate noncompliance or cheating. EPA often requests information about parent corporations, successor liability, and asset purchase agreements to determine which regulated entity is liable for cleanup of a hazardous waste site.⁹⁸ While agencies are not always explicit as to the exact purpose of a specific information collection effort, corporate legal counsel, who keep tabs on the kinds of enforcement matters particular agencies are pursuing, often inform regulated entities that a particular information request has likely been issued to detect noncompliance or cheating.⁹⁹ Research has shown that corporate entities are more likely to mount challenges to information requests that are enforcement-related.¹⁰⁰

Remote sensing technologies have been particularly useful in detection of corporate cheating at natural gas fracking sites.¹⁰¹ For example, in fall of 2019, the EPA enforcement office, along with state enforcement offices, conducted helicopter flyovers over the Permian gas shale in the western part of the United States.¹⁰² Enforcement officials used infrared cameras to identify leaks from flares, tanks, and other types of equipment.¹⁰³ Of the 530 flares observed, thirteen were unlit and emitting methane and other pollutants.¹⁰⁴ In response, the enforcement agencies sent written notices to seven oil and gas operators seeking further information regarding the leaks.¹⁰⁵ As described later in Part IV, maritime agencies in the European Union have also been using remote sensing technologies to detect corporate cheating on SO₂ air pollution standards in the shipping industry.¹⁰⁶ Remote sensors sit on top of bridges or aircrafts such as

98. *Superfund Information Request Letters*, EPA, <https://www.epa.gov/enforcement/superfund-information-request-letters> (last visited Oct. 1, 2020).

99. Julie A. Cress & Todd S. Mikolop, *An RFI? Surely You Can't Be Serious*, NICKEL REPORT (Feb. 15, 2018), <https://www.huntonnickelreportblog.com/2018/02/an-rfi-surely-you-cant-be-serious/> (describing trends in requests for information and stating that “[i]n past years there was a sharp increase in EPA’s use of RFIs as a means to initiate an enforcement action”).

100. Van Loo, *supra* note 8, at 398 (noting that “[l]egal investigations cause information exchange to become ‘bogged down as target firms resist[] compliance and pursue[] blocking actions in the courts.’”).

101. See ENV’T INTEGRITY PROJECT, CLEAN AIR ACT VIOLATIONS AT SIX OIL & GAS COMPANIES: EPA’S ENFORCEMENT BENEFITS OKLAHOMA-BASED CORPORATIONS, 3–4 (July 23, 2018), <http://www.environmentalintegrity.org/wp-content/uploads/2017/02/Report-to-EPA-on-oil-and-gas-enforcement.pdf>.

102. *Environment Department Identifies Potential Emissions Violations from Oil and Gas Operators*, KRWG (Jan. 14, 2020), <https://www.krwg.org/post/environment-department-identifies-potential-emissions-violations-oil-and-gas-operators> (noting that “as part of NMED’s ongoing compliance assurance activities, helicopter flyovers were conducted in conjunction with the U.S. Environmental Protection Agency (EPA) in September and October of 2019”).

103. *New Mexico Puts Oil and Gas Firms on Notice Due to Methane*, U.S. NEWS & WORLD REPORT (Jan. 15, 2020, 12:28 AM), <https://www.usnews.com/news/best-states/new-mexico/articles/2020-01-15/new-mexico-puts-oil-and-gas-firms-on-notice-due-to-methane>.

104. *Id.*

105. *Id.*

106. See Gary Vegh, *CEMS Why Every Minute Matters for Environmental Compliance*, EHS TODAY (Aug. 16, 2012), <https://www.ehstoday.com/environment/article/21915590/cems-why-every-minute-matters-for-environmental-compliance> (discussing examples of remote sensing in the European Union); See, e.g., Act to Prevent Pollution from Ships, 33 U.S.C. § 1908(b)(2).

light planes or drones and read various parameters, such as SO₂ concentration, from the exhaust of the ships passing underneath to detect potential cheaters. Some types of remote sensors rely on the ability to physically pull a sample of the exhaust stream through analyzers.¹⁰⁷ Other remote sensing relies on optical analyzers, which do not need to be directly inside the exhaust stream but can instead be as much as ten to thirty meters away from the exhaust stream.¹⁰⁸ Remote sensing surveys can be an effective use of enforcement resources to target particular potential violators.

Further, agencies also collect information relevant to noncompliance and cheating from third-party individuals with unique access to corporations and corporate facilities. Third parties with access to the corporate entity can obtain helpful information about the corporate entity and pass it to agency officials, often through tip lines.¹⁰⁹ Indeed, the same kinds of remote sensing technologies used by agencies are used by citizens groups to detect corporate cheating.¹¹⁰ The Volkswagen scandal, in particular, came to the attention of EPA through scientists from a university lab.¹¹¹ In addition, citizens' groups have sent photos taken with personal drones to agency officials, prompting the agencies to send inspectors to the facilities.¹¹² Private research companies are also developing new technologies that have the potential to provide information to agency enforcement officials; for example, researchers with SkyTruth collected multiple satellite images of an oil spill, eventually prompting a USCG cleanup order to Taylor Energy.¹¹³

107. Steve Roman, *Pollution Police How Are Ship Emissions Monitored?*, WÄRTSILÄ (July 24, 2019), <https://www.wartsila.com/twentyfour7/environment/pollution-police-how-are-ship-emissions-monitored>.

108. *Id.*

109. See, e.g., *Report Suspected Securities Fraud or Wrongdoing*, U.S. SEC. & EXCH. COMM'N, <https://www.sec.gov/tcr> (last visited Oct. 1, 2020); *Contact Hotline Staff Anonymously*, FED. ENERGY REGUL. COMM'N, <https://www.ferc.gov/enforcement-legal/enforcement/enforcement-hotline/contact-hotline-staff-anonymously> (last visited Oct. 4, 2020).

110. Jonah M. Kessel & Hiroko Tabuchi, *It's a Vast, Invisible Climate Menace. We Made It Visible.*, N.Y. TIMES (Dec. 12, 2019), <https://www.nytimes.com/interactive/2019/12/12/climate/texas-methane-super-emitters.html?smid=nytcore-ios-share>; *Using FLIR Cameras to Show Oil & Gas Air Pollution Seeing Is Believing!*, HALT THE HARM NETWORK (Apr. 17, 2018), <https://halttheharm.net/event/using-flir-cameras-to-show-oil-gas-air-pollution-seeing-is-believing/>.

111. Jason Bisnoff, *Volkswagen Scandal Findings Can Be Traced Back to Last Year in West Virginia*, N.Y. DAILY NEWS (Sept. 23, 2015), <https://www.nydailynews.com/autos/news/volkswagen-scandal-discovered-west-virginia-year-article-1.2371162>.

112. See *Investigation Reveals Illegal Activity at Morgantown Coal Plant on the Potomac River*, POTOMAC RIVERKEEPER NETWORK (Sept. 26, 2019), <https://www.potomacriverkeepernetwork.org/morgantown/>. Professors Lee Paddock and Robert Glicksman have also written about such tips, citing, for example, the story of a drone hobbyist who documented massive unfiltered discharges of animal blood from a Dallas, Texas, meat packing plant into a nearby river and reported the images to agency officials. See, e.g., George Wyeth et al., *The Impact of Citizen Environmental Science in the United States*, 49 ENV'T L. REP. NEWS & ANALYSIS 10237, 10247 (2019).

113. John Amos, *Taylor Energy Oil Spill This Is How Change Happens*, SKYTRUTH (Dec. 11, 2018), <https://skytruth.org/2018/12/taylor-energy-oil-spill-this-is-how-change-happens/>; Lorraine Chow, *Clean Up 14-Year Oil Spill or Face \$40K Daily Fine, Feds Tell Taylor Energy*, ECOWATCH (Nov. 21, 2018), <https://www.ecowatch.com/taylor-oil-spill-cleanup-gulf-2621075177.html>. Oily water discharge rules

Third-party information also comes from investigative journalists, local government agencies, and whistleblowers. Investigative journalists have helped uncover insider trading.¹¹⁴ Local government authorities often work in close proximity to regulated entity facilities. For example, a case involving an Idaho resident who kept hazardous materials at his home without a permit was initially discovered by the local fire department, which was responding to nuisance complaints about the condition of the property.¹¹⁵ Whistleblowers have dominated as third-party tip providers in multiple areas of corporate cheating.¹¹⁶ Several federal statutes provide whistleblowers with protection and potentially large financial awards.¹¹⁷ In response to large-scale corporate violations, Congress has often responded by increasing whistleblower protection within specific statutes.¹¹⁸ A simple look at the enforcement websites for the Federal Energy Regulatory Commission (FERC) and SEC reveals that many enforcement cases originated with whistleblowers.¹¹⁹ In addition, some of the most prominent USCG enforcement cases in shipping involving “magic pipes,” or illegal bypass of a ship’s oil water separator,¹²⁰ have originated with whistleblowers.¹²¹

have been hard to prosecute because the crime often happens far from shore. See “*Magic Pipe*” MARPOL Violations Can Be Spotted from Space, MARITIME EXEC. (Feb. 13, 2020), <https://www.maritime-executive.com/article/magic-pipe-marpol-violations-can-be-spotted-from-space> (“With no one present to sight an oily sheen, and no monetary incentive for the crew to report wrongdoing, it has historically been easy to hide . . . SkyTruth has pioneered the use of radar satellite data to spot the distinctive slicks of bilge discharge on the water, with a tiny dot of a ship clearly visible at the head of the line. By time-matching the imagery with AIS data, the group’s researchers can make a good estimate of the identity of the [specific responsible] ship.”).

114. See generally Michael J. Borden, *The Role of Financial Journalists in Corporate Governance*, 12 FORDHAM J. CORP. & FIN. L. 311, 331 (2007).

115. *United States v. Spatig*, 870 F.3d 1079, 1082 (9th Cir. 2017).

116. Nancy M. Modesitt, *Causation in Whistleblowing Claims*, 50 U. RICH. L. REV. 1193, 1193 (2016); CORPORATE GOVERNANCE: AVOIDING AND RESPONDING TO MISCONDUCT § 10.01 (Law Journal Press 2018). Compared to other areas of corporate oversight, EPA seems to provide relatively fewer incentives for environmental whistleblowers. Daniel Purtell, *Considering Rewards for Environmental Whistleblowers*, MCELDREW YOUNG PURTELL MERRITT (Jan. 21, 2015), <https://www.mceldrewyoung.com/environmental-rewards-bp-fine/>.

117. Clean Air Act, § 322, 42 U.S.C. § 7622 (2019); Comprehensive Environmental Response, Compensation, and Liability Act, § 110, 42 U.S.C. § 9610 (2019); Clean Water Act, § 507, 33 U.S.C. § 1367 (2019); Safe Drinking Water Act, § 1450, 42 U.S.C. § 300j-9(i) (2019); Toxic Substances Control Act, § 23, 15 U.S.C. § 2622 (2019).

118. See Purtell, *supra* note 116 (reporting that “calls for reform of whistleblower procedures in the securities industry gained momentum because of the unsuccessful efforts of a hedge fund manager to expose the fraud on investors perpetuated by Bernie Madoff”).

119. Michael Brooks et al., *FERC Proceeds with Enforcement Action against Total Gas & Power North America*, BRACEWELL (May 3, 2016), <https://www.energylegalblog.com/blog/2016/05/03/ferc-proceeds-enforcement-action-against-total-gas-power-north-america>.

120. An oil water separator is a filter that is used to treat the oil-water mixture from any compartment in the ship where water has accumulated, before discharging into the sea. See *Oily Water Separator – Working and Construction*, BRIGHT HUB ENG’G (Apr. 11, 2009), <https://www.brighthubengineering.com/marine-engines-machinery/31676-shipboard-oily-water-separators-how-do-they-work/>.

121. In the United States, this is one of the most frequently prosecuted maritime crimes, thanks to generous whistleblower awards, the ease of finding physical evidence, and an enthusiasm for MARPOL

B. Agency Challenges

It would seem that such broad legal authority and avenues for accessing information would leave agencies well equipped to detect corporate noncompliance and cheating. However, this is not so. The use of targeted records collection and inspection authority depends heavily on agency resource levels.¹²² It takes significant time for agencies to conduct physical inspections, as inspectors may travel for extended periods, sifting through extensive paperwork and using complex equipment.¹²³ Recently, in light of the coronavirus pandemic, agencies reported that they were halting field inspections because of health concerns about in-person investigations.¹²⁴ Reduced enforcement budgets undoubtedly also have a significant impact on agency activity. Many environmental agencies have seen significant declines in resources devoted to basic inspection.¹²⁵ For example, in its 2014–2018 Strategic Plan, EPA predicted that it would be forced to make 25 percent fewer compliance inspections and bring one-third fewer enforcement actions than it had in the years 2005 to 2009 because of declining budgets.¹²⁶ Periodic federal government shutdowns also mean that fewer and fewer agency inspectors are out detecting violations.¹²⁷ While political administration changes may increase enforcement budgets at various points in time, there is generally pressure to do more with less within enforcement agency offices.¹²⁸

Targeted records collections are also prone to legal challenge, delays, or limitations in receipt of needed information. Regulated entities often argue that administrative records requests are too burdensome to fulfill.¹²⁹ Regulated

(Annex XXX) enforcement. See “Magic Pipe” MARPOL Violations Can Be Spotted from Space, *supra* note 113.

122. Van Loo, *supra* note 8, at 407 (describing generally the resources it takes for agencies to monitor).

123. *Id.* at 406; see also Light, *supra* note 75, at 146–49; Rechtschaffen, *supra* note 78, at 1215.

124. See Tony Barboza, *How the Coronavirus is Hampering Enforcement of California’s Air Pollution Rules*, L.A. TIMES (May 1, 2020, 6:00 AM), <https://www.latimes.com/environment/story/2020-05-01/coronavirus-california-air-pollution-enforcement>.

125. Madison Condon, *Citizen Scientists, Data Transparency, and the Mining Industry*, 32 NAT. RES. & ENV’T 24 (2017); Rechtschaffen, *supra* note 78, at 1214.

126. Coral Davenport, *Shutdown Means E.P.A. Pollution Inspectors Aren’t on the Job*, N.Y. TIMES (Jan. 9, 2019), <https://www.nytimes.com/2019/01/09/climate/epa-pollution-inspection-shutdown.html>.

127. See *id.* Other reports have noted the impact of shutdowns on nonenvironmental agencies. The *Wall Street Journal* reported in the summer of 2019 that the Occupational Safety and Health Administration, which investigates and regulates workplaces for health and safety issues, had the fewest inspectors in decades. See Alex Leary, *Trump Administration Pushes to Deregulate with Less Enforcement*, WALL ST. J. (June 23, 2019, 7:12 PM), <https://www.wsj.com/articles/trump-administration-pushes-to-deregulate-with-less-enforcement-11561291201>.

128. See Abby Smith & Josh Siegel, *Daily on Energy Wheeler Tells Democrats the EPA Can Do More with Less*, WASH. EXAM’R (Feb. 27, 2020), <https://www.washingtonexaminer.com/policy/energy/daily-on-energy-wheeler-tells-democrats-the-epa-can-do-more-with-less>.

129. See Motion to Quash and/or Limit Subpoena Duces Tecum, *In re Graco*, No. 9350 (F.T.C. 2012), <https://www.ftc.gov/sites/default/files/documents/cases/2012/01/120118moquashlimitsubpducec.pdf>; *EEOC v. Royal Caribbean Cruises, Ltd.*, 771 F.3d 757 (11th Cir. 2014) (finding that the Equal

entities also argue that administrative records requests are outside the scope of agency authority.¹³⁰ While agencies often ultimately win such legal challenges, judges may limit the scope of the requests, thereby impacting the agencies' access to information that might help in detection of potential corporate cheating.¹³¹ Further, a legal challenge itself, even if the agency might ultimately win, can be risky for agencies.¹³² After all, it only takes one judge limiting the scope of information-gathering authority to set a precedent that impacts agencies' future information requests.

Inspections, like information requests, are prone to legal challenges. To be sure, courts have interpreted agency inspection authority broadly, particularly in relationship to challenges over privacy concerns. While the Fourth Amendment of the Constitution prohibits unreasonable searches and seizures without a warrant, the Supreme Court has held that numerous exceptions apply to its applicability in a corporate context.¹³³ Even when a warrant is required, courts have found that agencies need only obtain an administrative search warrant, which requires a lower probable cause standard than in the kind of warrant involved with searches of private individuals or in criminal matters.¹³⁴ Courts

Employment Opportunity Commission's information request on employees discharged by Royal Caribbean Cruises in response to a disability discrimination suit in district court was unduly burdensome).

130. See, e.g., *United States v. Xcel Energy, Inc.*, 759 F. Supp. 2d 1106 (D. Minn. 2010) (regulated entity challenging scope of authority for EPA information request).

131. See, e.g., *id.* (in a case involving a CAA information request to a coal-fired power plant, holding that EPA could only seek information about a corporate entity's planned construction activities for a two-year period, instead of the requested five-year period).

132. Andrew Park, *The Endless Cycle of Corporate Crime and Why It's So Hard to Stop*, DUKE L. (Jan. 13, 2017), <https://law.duke.edu/news/endless-cycle-corporate-crime-and-why-its-so-hard-stop/> (observing that "[p]rosecutors have limited resources and generally only bring cases they believe they can win").

133. While the Fourth Amendment's prohibition against unreasonable searches and seizures most commonly arises in the context of private individuals, it also applies to corporate entities. See *See v. Seattle*, 387 U.S. 541, 543 (1967); David James, *The Fourth Amendment, Future Methods of Environmental Enforcement, and Warrantless Inspections*, 33 REV. LITIG. 183 (2014). However, numerous exceptions apply to this general rule, including, of particular relevance to agencies, the "open fields," "pervasively regulated," and "special needs" doctrines. See Steven A.G. Davison, *Fourth Amendment and Statutory Limitations on Entry and Inspection of Commercial Property in Environmental Enforcement*, 3 UCLA J. ENV'T L. & POL'Y 75 (1982).

134. *Camara v. Mun. Court of San Francisco*, 387 U.S. 523, 538 (1967) (explaining that probable cause for an administrative warrant exists if reasonable legislative or administrative standards are satisfied). Some statutes provide explicit language authorizing agencies to obtain warrants to obtain entry and access if a violation is suspected. See, e.g., FIFRA, 7 U.S.C. § 136g(b) (2019) (authorizing officers or employees duly designated by EPA to obtain and execute warrants for the purposes of entry, inspection, and copying of records). Other statutes do not provide such clear language, though courts have largely held that agencies may seek administrative warrants anyway. See, e.g., *Bunker Hill Co. Lead & Zinc Smelter v. EPA*, 658 F.2d 1280, 1285 (9th Cir. 1981) (noting that EPA was not claiming a right to conduct a warrantless inspection as applied to "pervasively regulated" industries but instead justifiably relied on the CAA-specific provision allowing the agency to conduct inspections); *In re Alameda County Assessor's Parcel Nos. 537-801-2-4 & 537-850-9*, 672 F. Supp. 1278, 1287 (N.D. Cal. 1987) (finding that EPA has authority to seek an *ex parte* administrative warrant under section 308 of the CWA); *In re Order Pursuant to § 3013(d) RCRA*, 550 F. Supp. 1361, 1364 (W.D. Wash. 1982) (determining section 3013 of

recognize that “probable cause” in the criminal law sense is not required for an administrative warrant.¹³⁵ Nonetheless, agencies still must demonstrate that there are reasonable neutral standards imposed on the inspection or that there is evidence of a violation.¹³⁶

Conducting random inspections at facilities usually requires a demonstration that the targeting is part of a general plan to pursue and eliminate suspected industry-wide violations.¹³⁷ Agencies often announce “enforcement initiatives” that target particular kinds of violations or industries.¹³⁸ For example, in 1999, EPA began a national enforcement initiative aimed at uncovering potential violations of the CAA within the coal-fired power plant sector.¹³⁹ Over the next fifteen years, EPA proceeded to send records collection requests to virtually all coal plants, requesting that the entities send information that included data about emission levels for various pollutants, anticipated upgrades to the plants, and expected demand for power.¹⁴⁰ After the Volkswagen scandal, EPA made “defeat device” cases one of the new national enforcement initiatives.¹⁴¹ However, designating national enforcement initiatives can be a lengthy process and depends largely on whatever priority a particular administration wants to pursue.

Further, it is challenging for agencies to show that the target of the inspection is suspected of violations. Such a demonstration requires facts explaining the reason for the warrant request, the scope of the proposed inspection, and affidavits describing how the agency selected the particular facility for inspection.¹⁴² Thus, seeking an administrative warrant can be information and resource intensive.¹⁴³ In one case, the Food and Drug Administration (FDA) tried five times to conduct a voluntary inspection of a

the Resource Conservation and Recovery Act allowed for entry, albeit at reasonable times, and created a system of ensuring reasonable advance notice to the regulated facility).

135. *Camara*, 387 U.S. at 523.

136. *Marshall v. Barlow's, Inc.*, 436 U.S. 307, 320 (1978).

137. *Id.*

138. See, e.g., *National Compliance Initiatives*, EPA, <https://www.epa.gov/enforcement/national-compliance-initiatives> (last visited Feb. 13, 2020).

139. *Coal-Fired Power Plant Enforcement*, EPA, <https://www.epa.gov/enforcement/coal-fired-power-plant-enforcement> (last visited Feb. 13, 2020).

140. *Id.*

141. *National Compliance Initiative Stopping Aftermarket Defeat Devices for Vehicles and Engines*, EPA, <https://www.epa.gov/enforcement/national-compliance-initiative-stopping-aftermarket-defeat-devices-vehicles-and-engines> (last visited Feb. 13, 2020) (describing the new compliance initiative and also describing defeat devices as “hardware and software specifically designed to defeat required emissions controls on vehicles and engines”).

142. EPA, PRACTICE HANDBOOK: ADMINISTRATIVE ENFORCEMENT 5 (2000).

143. In one case, it took just under one month from the time EPA applied for an administrative warrant under the Comprehensive Environmental Response, Compensation, and Liability Act to the district court’s denial of the application. *In re Yoder’s Slaughterhouse Site*, 519 F. Supp. 2d 574, 576 (D. Md. 2007). In another case involving suspected violations of the CWA, an initial inspection of public areas took place on March 9, and the ex-parte warrant was not issued until April 28. See *In re Search Warrant*, No. 04-00079-MPT, 2004 U.S. Dist. LEXIS 10902, at *4 (D. Del. June 9, 2004).

regulated entity after a nationwide outbreak of salmonella was linked to a plant-based food product distributed by the regulated entity.¹⁴⁴ Despite evidence linking it to the contaminated plant-based food product, the regulated entity refused to cooperate with the FDA inspectors.¹⁴⁵ The FDA thus sought to require the regulated entity to make statements and provide passwords for computers seized by the FDA.¹⁴⁶ The regulated entity sought to quash the warrant.¹⁴⁷ The court denied the FDA's request to compel the regulated entity to speak with investigators on the grounds that the administrative warrant did not affirmatively require the regulated entity to engage in interviews; the warrant only authorized the seizure of records.¹⁴⁸ However, as commentators on the decision noted, it is unclear whether the administrative warrant could have included an affirmative requirement to conduct interviews since the statute authorizing such inspections did not include anything about interviews.¹⁴⁹ Notably, some outside counsel advise regulated entities to immediately file a motion to quash a warrant or seek an injunction challenging its scope if an FDA warrant includes things that are arguably out of scope.¹⁵⁰

Third-party tips from citizens, journalists, and whistleblowers also present challenges for agencies. Some agencies, particularly in the environmental context, doubt the credibility and rigor of information collected by private citizens.¹⁵¹ Reliance on whistleblowers, too, has proven untimely because often, the whistleblower employee reports to the enforcing agency only after they become dissatisfied with the employer.¹⁵² Whistleblowers can also be discounted if they are seen as disgruntled former employees.¹⁵³ Whistleblowers can also be perceived as biased if the agency has promised to defer or forgo

144. *In re Administrative Establishment Inspection*, No. 1:18-MC-546, 2019 U.S. Dist. LEXIS 65476 (M.D. Pa. Apr. 17, 2019); see also Anne K. Walsh, *Court Blesses FDA's Rarely Used Administrative Search Warrant Authority*, FDA BLOG (May 3, 2019), <http://www.fdalawblog.net/2019/05/court-blesses-fdas-rarely-used-administrative-search-warrant-authority/>.

145. Walsh, *supra* note 144.

146. *Id.*

147. *Id.*

148. *Id.*

149. *Id.*

150. Kathy Hardee, *FDA's Right to Take Photographs in Your Facility Or Not*, FOOD SAFETY MAG. (Sept. 16, 2014), <https://www.foodsafetymagazine.com/enewsletter/fdae28099s-right-to-take-photographs-in-your-facility-or-not/> (citing taking photographs as one example of an investigative activity that may be outside the scope of an administrative warrant).

151. See George Wyeth et al., *The Impact of Citizen Environmental Science in the United States*, 49 ENV'T L. REP. NEWS & ANALYSIS 10,237, 10,244 (2019) (observing that "many officials are concerned that the studies citizen scientists conduct will not meet scientific standards" and "concerns remain that low-cost sensors and other technologies used by citizen scientists do not yet meet high accuracy standards").

152. Kim G. Bruno, *Should Affiliated Marketers Be Treated as Insiders?*, 21 ENERGY L.J. 465, 468-69 (2000).

153. Jonathan Macey, *Getting the Word Out about Fraud: A Theoretical Analysis of Whistleblowing and Insider Trading*, 105 MICH. L. REV. 1899, 1914 (June 2007) (observing that "[w]hen, as is often the case, the whistleblower is a disgruntled employee, people are less inclined to believe the whistleblower's story").

action against them or provide them with financial compensation in exchange for their testimony.¹⁵⁴ In addition, agency enforcement staff have to dedicate time and energy to regularly checking public tip lines and databases for whistleblower complaints and determining which complaints are serious or substantial.¹⁵⁵ Such checks are important because complaints sometimes overreport small violations or overlook more significant violations.¹⁵⁶ Thus, as this Part has shown, without better access to information, agency efforts to deter corporate cheating will have modest results.

III. MOVING TO SELF-MONITORING AND REPORTING

This Part argues for a change in the detection of corporate cheating, from one that is solely focused on the role of agencies to one that places increased responsibility on regulated entities themselves. In particular, it advocates for increased mandatory self-monitoring and reporting obligations for regulated entities, so that agencies are able to receive continuous information about corporate behavior and activity. Such mandatory self-monitoring and reporting puts the onus on the owners of the requisite information—that is, the regulated entities themselves—to provide information that is responsive to detection of cheating.

A. Increasing Detection

If agencies had more continuous information through corporate self-monitoring and reporting, it is likely they would more consistently detect noncompliance and cheating. The idea of shifting to a world where regulated entities self-monitor and report violations is not new. Indeed, the two major environmental statutes, the CWA and the CAA, contain self-monitoring and reporting programs. The CWA's National Pollutant Discharge Elimination System program requires regulated entities to self-monitor and send the results to EPA electronically in a "discharge monitoring report" (DMR).¹⁵⁷ EPA's regulatory program under the CAA's acid rain program requires regulated entities to install continuous emission monitoring systems (CEMS) and send the results to EPA.¹⁵⁸ While neither the DMR nor the acid rain database program is perfect, both provide EPA with ongoing information about corporate behavior

154. The Dodd-Frank Act established a reward program to provide financial compensation for any original information voluntarily provided to SEC that results in monetary sanctions of more than \$1 million. See 15 U.S.C. § 78u-6 (2019).

155. U.S. SEC, DIV. OF ENF'T, ENFORCEMENT MANUAL 7 (2017).

156. See Bruno, *supra* note 153.

157. *NPDES eReporting*, EPA, <https://www.epa.gov/compliance/npdes-ereporting> (last visited Feb. 13, 2020).

158. 42 U.S.C. § 7651k(a) (2019). A CEMS is a monitor installed on-site at or near the point of air pollution discharge. CEMS are the best method for measuring compliance because they are certified to high standards and contain continuous, real-time data of actual emissions. See Jim Hecker, *The Difficulty of Citizen Enforcement of the Clean Air Act*, 10 WIDENER L. REV. 303, 306 (2004).

and activity through self-admissions of liability.¹⁵⁹ As has been discovered in the shipping industry in particular, with regard to oil spills, monitoring oil transfer operations has caused shipping crews to take more care because they know the relevant agency, the USCG, is watching.¹⁶⁰

Agencies have been able to gain similar benefits from mandatory self-disclosures. For example, SEC requires issuers of registered securities and other financial instruments to issue annual 10-K reports.¹⁶¹ However, such mandatory disclosures often only provide cursory information about regulated entities, instead of detailed information that may be required to detect noncompliance or cheating.¹⁶² Thus, mandating general disclosures about corporate relationships and structure, like as required by SEC's 10-Ks, is not enough. Mandating specific disclosures about actual violations, referred to here as self-monitoring and reporting, is where the shift needs to happen.

Mandatory self-monitoring and reporting is different than mere self-disclosures. While the terminology is often used interchangeably by agencies and in the literature, this Article advocates that *all* regulated entities be *required* to monitor for noncompliance and cheating and report any nefarious activity that is discovered. Self-monitoring and reporting allow agencies to see, from a computer screen, admissions of liability from regulated entities and know whether those admissions represent a significant deviation from the regulatory requirements. The key benefit of self-monitoring and reporting is that these methods move agencies away from the reactive, ad hoc approach to information collection. It is of little use to force agencies to wait to see if budgets will allow inspections or if a third-party tip coming through an agency hotline will prove

159. Frank M. Thomas Jr., *Citizen Suits and the NPDES Program: A Review of Clean Water Act Decisions*, 17 ENV'T L. REP. 10050, 10051 (1987) (explaining that in enforcement cases, district courts have simply compared terms of the discharging party's National Pollutant Discharge Elimination System permit and corresponding data pulled from the DMR); *Sierra Club v. Pub. Serv. Co. of Colorado, Inc.*, 894 F. Supp. 1455, 1461 (D. Colo. 1995) ("I hold that in this citizen action under the Clean Air Act violations of the 20% opacity standard may be established by CEM records and reports as that data carries with it high indicia of reliability and probative value").

160. Marc A. Cohen, *Oil Spills: The Deterrent Effects of Monitoring, Enforcement, and Public Information*, RES. FOR THE FUTURE, (Apr. 20, 2009), <https://www.resourcesmag.org/common-resources/oil-spills-the-deterrent-effects-of-monitoring-enforcement-and-public-information/>.

161. See Robert H. Feller, *Environmental Disclosure and the Securities Laws*, 22 B.C. ENV'T AFF. L. REV. 225 (1995); Christopher J. Barry & Charles R. Blumenthal, *Practical and Ethical Considerations in Counselling Clients Concerning Environmental Reporting and Disclosure*, 38 ROCKY MT. MIN. L. INST. 4-1 (1992).

162. The Securities Exchange Act of 1934 requires that every issuer of a registered security, or financial instrument, report certain information to SEC and the corporation's stockholders through electronic, web-based forms, such as the annual 10-K form. See Securities Exchange Act of 1934, 15 U.S.C. § 78m (2018); see also *Form 10-K Annual Report Pursuant to Section 13 OR 15(d) of the Securities Exchange Act of 1934*, U.S. SEC 8-11, <https://www.sec.gov/about/forms/form10-k.pdf> (last visited Feb. 13, 2020). The Federal Power Act, too, requires public utilities to have their rates and charges on file in a convenient form and place, and FERC requires by regulation that such public utilities fulfill the requirement by submitting electronic, web-based, quarterly reports. *Electric Quarterly Report Filing Requirements Guide*, FERC, 4, 16 (Nov. 15, 2017), <https://ferc.gov/docs-filing/eqr/eqr-requirements-guide.pdf>.

credible. Mandatory self-monitoring and reporting instead allow agencies to receive regular, consistent, and timely information without having to expend significant resources.

Ongoing access to information about corporate behavior and activity is so important to enforcement agencies that they actively seek out opportunities to get it.¹⁶³ For example, in settlement agreements for cases involving significant corporate cheating, enforcement agencies have required that the regulated entities implement mandatory internal corporate compliance programs that include regular self-monitoring and reporting to the relevant agency.¹⁶⁴ The Volkswagen diesel emissions scandal settlement agreement required Volkswagen to establish an internal testing program of future vehicles and report the results of such tests to EPA and state environmental agencies on a periodic basis.¹⁶⁵ In 2018, settlements with glass companies for violations of the CAA required that the companies install and operate CEMS and report the data to EPA.¹⁶⁶ These settlements indicate that enforcement offices see value in receiving ongoing information about corporate behavior and activity even after detecting violations. The idea is that mandating such self-monitoring and reporting, even via settlement agreements, will help prevent the violations from recurring because it increases the likelihood that cheating will be detected.¹⁶⁷

Enforcement agencies also try to incentivize regulated entities to voluntarily self-monitor and report violations. EPA has an audit policy that allows corporate entities to self-report violations discovered by an internal audit in exchange for enforcement discretion or reduced penalties.¹⁶⁸ State environmental agencies also encourage voluntary self-reporting of violations, sometimes promising specific penalty reduction credit that is determined on a fact-specific basis.¹⁶⁹ Multiple nonenvironmental agencies have similar enforcement discretion or penalty reduction programs; examples include FERC's enforcement of energy

163. Root, *supra* note 6, at 213 (noting that “[t]he mandate to adopt certain compliance programs can come, as it did in the case of Hobby Lobby, through a settlement agreement, but mandates are also sometimes found directly within statutory or regulatory requirements”).

164. See, e.g., *id.* (discussing the compliance programs negotiated as part of the Hobby Lobby settlement); see also *In re Volkswagen “Clean Diesel” Marketing, Sales Practices, and Products Liability Litigation*, Third Partial Consent Decree, ¶ 15(e) (N.D. Cal. Jan. 11, 2017), <https://www.epa.gov/sites/production/files/2017-01/documents/vwthirdpartial-cd.pdf> (discussing the internal testing programs Volkswagen was required to implement as part of its settlement).

165. See *In re Volkswagen “Clean Diesel” Marketing*, *supra* note 164.

166. See, e.g., Consent Decree ¶¶ 74–113, *United States v. Anchor Glass Container Corp.*, (M.D. Fla. Aug. 3, 2018), <https://www.epa.gov/sites/production/files/2018-08/documents/anchorglasscontainercorp-cd.pdf>.

167. Rechtschaffen, *supra* note 78, at 1186; see also Darlene R. Wong, *Stigma: A More Efficient Alternative to Fines in Deterring Corporate Misconduct*, 3 CAL. CRIM. L. REV. 3, ¶ 1 (2000).

168. Incentives for Self-Policing: Discovery, Disclosure, Correction and Prevention of Violations, 65 Fed. Reg. 19,618, 19,619 (Apr. 11, 2000) (widely applicable to all federal regulations enforced by EPA)

169. See, e.g., N.J. DEP’T OF ENV’T PROT., *Compliance and Enforcement Self-Disclosure Report* (Rev. 2014), <https://nj.gov/dep/enforcement/docs/sdreport-rev5-12-14.pdf>.

market regulations and the Federal Aviation Administration's enforcement of hazardous material regulations.¹⁷⁰

Indeed, self-monitoring and reporting are not perfect. There is always a concern that regulated entities will not be able to exercise independent judgment in self-reporting violations, resulting in underreporting or outright lying. As a result, some practitioners advocate for third-party or neutral human monitors to conduct the monitoring.¹⁷¹ In environmental matters, using measurement devices to conduct neutral testing and sampling can mitigate concerns about independence. Under the CWA, regulated entities that are required to send DMRs to environmental agencies must physically sample waters where facilities are discharging at specific parameters and locations.¹⁷² Regulated entities required to report CEMS data as part of the CAA acid rain program must install the CEMS in such a way as to ensure proper measurement of emissions.¹⁷³ Thus, while not always foolproof, there are ways to help ensure that self-monitoring is objective and neutral.

Ultimately, mandatory self-monitoring and reporting saves agency resources by allowing enforcement offices to better target key violators and key violations. Indeed, some of the academic literature has suggested that self-monitoring and reporting, when it does occur, can reduce the need for agencies to check a particular regulated entity.¹⁷⁴ Some empirical research suggests that agencies will assume that regulated entities that self-monitor and report are policing themselves adequately and will therefore simply leave them alone.¹⁷⁵ Thus, self-monitoring and reporting has significant advantages for an agency's ability to detect violations.

B. *A Shift for Regulated Entities*

If self-monitoring and reporting is not new and has significant advantages for agency detection of cheating, why is such monitoring and reporting not mandated in the regulations themselves? A major part of the answer is likely that regulated entities fight against any mandatory requirements for self-monitoring

170. See *Self-Reports*, FED. ENERGY REGUL. COMM'N, <https://www.ferc.gov/enforcement-legal/enforcement/self-reports>; *Voluntary Disclosure Reporting Program*, FED. AVIATION ADMIN., https://www.faa.gov/hazmat/air_carriers/report_incident/voluntary_disclosure/ (describing the penalty reduction policies of FERC and the Federal Aviation Administration, respectively).

171. See, e.g., John Hanson, *FCPA Settlement Agreements, Monitors, and Self-Monitoring*, THE FRAUD GUY (Aug. 1, 2011), <https://thefraudguy.wordpress.com/2011/08/01/fcpa-settlement-agreements-monitors-and-self-monitoring/> (arguing that "there is no 'independent' in self-reporting").

172. See, e.g., *Discharge Monitoring Reports*, DEP'T OF ENV'T PROT., <https://www.dep.pa.gov/Business/Water/CleanWater/WastewaterMgmt/DischargeMonitoring/Pages/default.aspx>.

173. 40 C.F.R. § 75 (1993).

174. David Markell, et al., *Dynamic Governance in Theory and Application, Part I*, 58 ARIZ. L. REV. 563, 580 (2016).

175. Michael W. Toffel & Jodi L. Short, *Coming Clean and Cleaning Up Does Voluntary Self-Reporting Indicate Effective Self-Policing?* 54 J.L. & ECON. 609 (2011) (finding that "regulators used self-reports of legal violations as a heuristic for identifying firms that are effectively policing their own operations, shifting enforcement resources away from those that voluntarily disclose").

and reporting. After all, such requirements would probably result in increased detection of violations, including both substantive violations and violations associated with the monitoring and reporting requirement themselves. In addition, more monitoring and reporting requirements could increase short-term compliance costs for regulated entities dealing with technical problems of monitoring equipment.¹⁷⁶ However, this Article suggests that such thinking is short-sighted. Self-monitoring and reporting can benefit regulated entities in underappreciated ways, particularly in industries where a significant number of regulated entities publish environmental and social responsibility codes of conduct.

Detection of corporate cheating through self-reporting and monitoring requirements promotes a level playing field in the long run for regulated entities that comply. Because compliance can be costly, corporate players gain a significant competitive advantage in a given marketplace by avoiding the costs involved with complying.¹⁷⁷ Allowing corporate cheaters to avoid the cost of compliance undermines fundamental notions of fairness in the marketplace. The desire to maintain a level playing field informs enforcement decisions on multiple levels, including at the beginning, when agencies make decisions as to where and how to begin targeting for records collection or inspection.¹⁷⁸

Indeed, the cost of compliance is real, and as a result there remains an incentive to avoid that cost in order to get ahead. Volkswagen, for example, saw that compliance with new EPA nitrogen oxide (NO_x) standards was not going to allow it to sell diesel cars in the United States.¹⁷⁹ Since the mid-1970s, EPA has introduced progressively more stringent emissions standards for cars.¹⁸⁰ The requirements for model year 2004 were among the toughest ever, requiring car

176. Environmental audits can cost very small, simple facilities about \$2,500 and very large, complicated facilities about \$40,000. *The True Cost of an Environmental Audit*, RES. MGMT. ASSOCS., <https://www.rmagreen.com/rma-blog/price-cost-of-an-environmental-audit> (last visited Feb. 13, 2020).

177. See, e.g., Jeff Sessions, U.S. Attorney General, *Remarks at the Ethics and Compliance Initiative Annual Conference* (Apr. 24, 2017), <https://www.justice.gov/opa/speech/attorney-general-jeff-sessions-delivers-remarks-ethics-and-compliance-initiative-annual> (pledging to enforce the Foreign Corrupt Practices Act to ensure an “even playing field for law-abiding companies”); see also Rechtschaffen, *supra* note 78, at 1223–24 (“If, however, only some companies within an industry are permitted to evade such control requirements, . . . the evaders can unfairly obtain an advantage over their competitors, who will in response quickly resist making continued or additional pollution control investments themselves.” (quoting George Van Cleve & Keith W. Holman, *Promise and Reality in the Enforcement of the Amended Clean Air Act Part II Federal Enforceability and Environmental Auditing*, 27 ENV’T L. REP. (ENV’T L. INST.) 10,151, 10,157 (1997) (alteration in original))).

178. For example, EPA’s national enforcement initiatives have often targeted a particular industrial sector for investigations, in part so that all similarly situated competitors are treated equally in enforcement. See, e.g., *EPA Enforcement National Petroleum Refinery Initiative*, EPA (Feb. 11, 2011), <https://www.epa.gov/sites/production/files/documents/refineryinitiative-powerpoint021111.pdf> (commenting on the “level playing field” in describing the national enforcement initiative for the refining sector).

179. Leah McGrath Goodman, *Why Volkswagen Cheated*, NEWSWEEK (Dec. 14, 2015, 1:01 AM), <https://www.newsweek.com/2015/12/25/why-volkswagen-cheated-404891.html>.

180. *Id.*

companies to slash the amount of NOx from tailpipe emissions by more than 94 percent.¹⁸¹ The new standards posed an enormous challenge to automakers looking to offer diesel cars to the U.S. market.¹⁸² Meanwhile, in Europe, where emissions standards are not as strict as in the United States, more than 50 percent of vehicles sold were diesels.¹⁸³ Volkswagen's rivals, including Mazda, Honda, Nissan, and Hyundai, also had their eyes on the U.S. diesel market—but they took one look at EPA's new standards and decided to scrap their plans.¹⁸⁴ The main challenge, several of the companies said, was that it was too difficult to meet the new standards while maintaining engine performance and staying on budget.¹⁸⁵ Volkswagen, on the other hand, decided to flout the new NOx standards and thus became the top seller of diesel cars in the United States.¹⁸⁶

While achievement of expected public benefit is a laudable goal of enforcement, a completely separate goal involving fairness is also important. Enforcement agencies in both Democratic and Republican administrations emphasize the need for a level playing field in enforcement, so cheaters do not gain an advantage. During the Obama administration, lead enforcement officials described the importance of a level playing field.¹⁸⁷ Even the Trump administration, not otherwise known for promoting the environmental benefit of enforcement, promotes the level playing field benefit of enforcement.¹⁸⁸ Industry associations also promote the idea that there should be a level playing field in enforcement.¹⁸⁹ Thus, if nothing else, fairness and a level playing field should be part of the enforcement scholarship conversation.

Regulated entities continue to stress the importance of “regulatory certainty” in interactions with agencies. Regulated entities have made

181. *Id.*

182. *Id.*

183. *Id.*

184. *Id.*

185. *Id.*

186. *Id.*

187. *Oversight of U.S. Environmental Protection Agency Enforcement and Compliance Programs Hearing Before the S. Comm. on Environment and Public Works*, 114th Cong. 11 (2016) (Testimony of Cynthia Giles, Ass't Adm'r, Ofc. of Enforcement and Compliance Assurance, U.S. E.P.A.) (explaining that “we also all know that a strong compliance and enforcement program is necessary both to achieve those health protections and to ensure that the companies that play by the rules are not put at an unfair competitive disadvantage”).

188. *See, e.g., Acting Principal Deputy Assistant Attorney General Trevor N. McFadden Speaks at Anti-Corruption, Export Controls & Sanctions 10th Compliance Summit*, U.S. Dep't of Justice (Apr. 18, 2017), <https://www.justice.gov/opa/speech/acting-principal-deputy-assistant-attorney-general-trevor-n-mcfadden-speaks-anti> (“FCPA prosecutions are intended to level the playing field for honest businesses that are undercut by businesses that engage in corrupt behavior.”).

189. U.S. CHAMBER OF COMMERCE, EXAMINING U.S. SECURITIES AND EXCHANGE COMMISSION ENFORCEMENT: RECOMMENDATIONS ON CURRENT PROCESSES AND PRACTICES 2 (2015), https://www.centerforcapitalmarkets.com/wp-content/uploads/2015/07/021882_SEC_Reform_FIN1.pdf (noting that “[t]he mission of the SEC is to promote investor protection, competition, and capital formation. Capital markets that are efficient for both investors and businesses must be a level playing field with the certainty that clear rules provide. This level playing field can occur only if there is a strong Enforcement Program that helps to keep bad actors out of the marketplace”).

“regulatory certainty” arguments to agency officials for one key reason: planning. Regulated entities that own facilities subject to environmental regulation need to plan for facility upgrades and debt repayment schedules.¹⁹⁰ For example, regulated entities that own coal plants cite needs to plan investment and research and development choices, including whether to upgrade plants to keep them running, switch to other fuel sources, or evaluate carbon capture technologies.¹⁹¹ Arguably, enforcement certainty is part and parcel of regulatory certainty. Indeed, in one of former EPA Administrator Scott Pruitt’s first speeches to agency staff, he stressed the importance of regulatory certainty, stating, “Regulators exist to give certainty to those that they regulate. Those that we regulate ought to know what we expect of them, so that they can plan and allocate resources to comply.”¹⁹²

In general, more information in the hands of agencies simply allows agencies to do their jobs more effectively, enhancing performance and confidence in the market.¹⁹³ Thus, trade associations for regulated entities should work with their members to develop agreement to advocate for increased monitoring and reporting. Industry trade associations have a significant impact on agency regulations. Agencies are often in regular contact with regulated entities through trade associations to discuss a wide range of concerns, including compliance, cheating, disclosure, and new technologies.¹⁹⁴

Additionally, increased monitoring and reporting may help provide regulated entities a greater understanding of terminology used in contracts between two private parties. As scholars have described, regulated entities with a corporate social responsibility focus are increasingly including compliance as a factor in deciding which suppliers to purchase goods from or work with.¹⁹⁵ Regulated entities might include in a “vendor code of conduct” a provision that

190. See, e.g., *What is “Regulatory Certainty,” and How Is it Implemented?*, MINN. POLLUTION CONTROL AGENCY 4 (June 30, 2016), <https://www.pca.state.mn.us/sites/default/files/wq-wwprm1-27.pdf>.

191. See Gail Reitenbach, *Power Industry Wish Granted Greater Regulatory Certainty*, POWER MAG. (July 29, 2013), <https://www.powermag.com/power-industry-wish-granted-greater-regulatory-certainty/>.

192. Nathan Rott, *Nothing Certain in Search for Regulatory Certainty at EPA*, NPR (May 22, 2018, 5:00 AM), <https://www.npr.org/2018/05/22/611819300/nothing-certain-in-search-for-regulatory-certainty-at-epa>; see also Michael Piwowar, Acting Chairman, Remarks Before the 27th International Institute for Securities Market Growth and Development (Mar. 27, 2017), <https://www.sec.gov/news/speech/remarks-27th-international-institute-securities-market-growth-and-development> (commenting on the need for regulatory certainty in the context of securities markets).

193. Niefer, *supra* note 97, at 394.

194. Geoffrey T. Chalmers, *The SEC Dealing (or Not Dealing) with Trends in the Regulatory Climate*, 2009 WL 1008507 (Aspatore 2009).

195. Michael P. Vandenbergh, *The New Wal-Mart Effect: The Role of Private Contracting in Global Governance*, 54 UCLA L. REV. 913, 932–33 (2007); Aaron Einhorn, *The Evolution and Endpoint of Responsibility: The FCPA, SOX, Socialist-Oriented Governments, Gratuitous Promises, and a Novel CSR Code*, 35 DENV. J. INT’L L. & POL’Y 509, 537–38 (2007). Industry groups such as the Exhaust Gas Cleaning Systems Association also require that individual members do not violate codes of conduct and ethical standards. *Code of Conduct*, EGCSA, <https://www.egcsa.com/membership/code-of-conduct/> (last visited Feb. 19, 2020).

requires vendors to comply with all relevant laws.¹⁹⁶ Regulated entities might also obtain credit agreements that include provisions that require borrowers to be compliant.¹⁹⁷ However, it is entirely unclear how the term “compliance” is defined in such codes of conduct and credit agreements. The suggestion here is that regulated entities, if they were to self-disclose more consistently, could rely on such self-disclosure as a basis for determining whether the relevant party in a private-private agreement was indeed meeting compliance requirements. Without the requisite information to detect noncompliance, it is unlikely that the contractual requirement to “comply” will be meaningfully enforced or used as the basis of a breach of contract claim.

These are new ideas of how regulated entities benefit from increased self-monitoring and reporting. It should not be that investors alone clamor for increased self-disclosure requirements by SEC about matters that impact the environment. It also should not be that public interest groups and pro-environmental legal scholars alone push for more requirements that regulated entities sample water discharges or measure air emissions and report the results. Because the regulated entities themselves can also benefit from such reporting and verification by creating a level playing and enforceable contracts, it behooves the regulated entities to also sound the bell for increased monitoring and reporting requirements.

C. *Anticipated Problems*

Mandatory self-monitoring and reporting is not the perfect solution to detecting corporate cheating. Simply managing large amounts of information coming to agencies in multiple forms is overwhelming. More information can place an additional burden on agencies struggling to process and analyze incoming information.¹⁹⁸ Indeed, a significant criticism of existing mandatory self-monitoring and reporting tools is that even when these violations are obvious, the agencies still have inadequate resources to follow up and issue fines or file cases for actual enforcement. For example, a report on the Safe Drinking Water Act criticizes agencies for failure to do anything about violations that are blatantly obvious as a result of a self-monitoring and reporting system.¹⁹⁹ Thus, complicated issues still arise regarding prioritization of enforcement cases. While such prioritization is not the subject of this Article, it is an area of concern for any proposal to mandate self-monitoring and reporting to agencies.

At a more basic level, many government agencies are behind the curve when it comes to computing power and may simply not have the ability to receive self-

196. See Einhorn, *supra* note 195.

197. Michael Vandenberg, *The Private Life of Public Law*, 105 COLUM. L. REV. 2029, 2052–53 (2005).

198. Glicksman et al., *supra* note 81, at 82 (arguing that “[i]f agencies are to take advantage of these new streams of data, they will need to develop protocols for collecting, storing, processing, and using the information”).

199. FEDINICK ET AL., *supra* note 41, at 11.

monitoring data and reports. For example, according to an analysis by the U.S. Government Accountability Office, three-quarters of the federal government's current spending on information technology goes to supporting legacy systems—"that is, to 'increasingly obsolete' systems that are dependent on 'outdated software languages and hardware.'"²⁰⁰ Without upgraded electronic platforms to receive information, simply increasing requirements for monitoring and reporting will be for naught. To be sure, some agencies, such as FERC, have made large advances in their ability to receive information electronically. FERC's annual report in 2017 noted a significant increase in referrals for formal enforcement because of data analytics that rely on advanced electronic reporting systems.²⁰¹ Such electronic reporting allows FERC to use computer programs that pull out of periodic corporate disclosures specific information that might help the agency detect corporate cheating.²⁰²

However, a seemingly simple transition to electronic reporting is not always straightforward. Forcing agencies to move self-disclosures or self-reporting from paper to electronic forms would require a time-consuming rulemaking effort that could raise fierce opposition. For example, only in 2015 did EPA begin to require that regulated agencies submit DMRs via a web-based electronic system.²⁰³ The rulemaking effort took almost two years.²⁰⁴ In 2016, FERC issued a proposed rule to streamline data collection needed to regulate market-based rates.²⁰⁵ The rule, among other things, would have required corporate entities that trade virtual products to report information regarding their legal and financial connections.²⁰⁶ The agency had discovered that information regarding the legal and contractual

200. Cary Coglianese, *Deploying Machine Learning for a Sustainable Future*, in A BETTER PLANET: FORTY BIG IDEAS FOR A SUSTAINABLE FUTURE 200–08 (David Esty ed., 2019) (quoting U.S. GOV'T ACCOUNTABILITY OFF., GAO-16-696T, INFORMATION TECHNOLOGY: FEDERAL AGENCIES NEED TO ADDRESS AGING LEGACY (2016)), available at https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=3182&context=faculty_scholarship.

201. FERC, 2017 REPORT ON ENFORCEMENT 5 (2017). The Report states that Enforcement's Division of Investigations opened twenty-seven new investigations in fiscal year 2017, up from seventeen investigations opened in fiscal year 2016. *Id.* Nevertheless, twenty-seven is a large number of investigations to be opened in a single year. *Id.* The Report also states that the "vast majority" of these new investigations arose from referrals from Enforcement's Division of Analytics and electronic reporting, which surveils electricity and natural gas trading markets, and Independent System Operator and Regional Transmission Organization market monitors. *Id.* at 23; U.S. SEC, DIV. OF ENF'T, ANNUAL REPORT: A LOOK BACK AT FISCAL YEAR 2017 (2017).

202. AKIN GUMP STRAUSS HAUER & FELD LLP, ENERGY REGULATION, MARKETS AND ENFORCEMENT ALERT 4 (2017), <https://www.akingump.com/images/content/6/2/v2/62448/Energy-Regulation-Markets-and-Enforcement-Alert-FERC-Enforcem.pdf>.

203. National Pollutant Discharge Elimination System (NPDES) Electronic Reporting Rule, 80 Fed. Reg. 64,063 (Sept. 24, 2015).

204. *National Pollutant Discharge Elimination System (NPDES) Electronic Reporting Rule*, REGULATIONS.GOV, <https://www.regulations.gov/docket?D=EPA-HQ-OECA-2009-0274> (last visited Feb. 16, 2020) (showing that from the first comment period in 2013 to signing, the rule took approximately two years to finalize).

205. *Data Collection for Analytics and Electronic Reporting and Market-Based Rate Purposes*, 156 FERC ¶ 61,045, 61,405 (2016) (NOPR).

206. *Id.*

relationships among market participants was essential for watching wholesale market trading activity and potentially manipulative acts.²⁰⁷ After industry complained about difficulties and burdens associated with the increased reporting, FERC did not adopt that portion in the final rule.²⁰⁸

In addition, some self-monitoring systems, like CEMS, struggle with technical or emotional concerns. For example, CEMS are subject to tampering by individual employees. In one criminal case involving a CEMS on a natural gas power plant, the general manager directed their employees, over a period of years, to tamper with the CEMS to save money, delay repairs, and avoid reporting to federal and state regulators that the plant, at times, was releasing certain pollutants in excess of its legal limits.²⁰⁹ However, arguments against CEMS have also involved an emotional reaction; regulated entities simply do not want to be watched at all times.

Another key issue of concern for regulated entities regarding monitoring and reporting is whether such information will be publicly available. This Article, in Part I, began with the premise that the information needed for detection is inside information about what happens within a regulated entity or facility owned/operated by a regulated entity. However, as soon as such information reaches agencies, public transparency laws may dictate release of the information to the public, either upon specific request or as a matter of routine. The public accessibility of otherwise private information raises multiple issues that cannot be ignored.²¹⁰

At the same time, public release of monitoring and other reporting information can have a positive impact on detection (and deterrence) of corporate cheating. Monitoring and reporting data under both the DMR and CAA acid rain programs are publicly available through open websites.²¹¹ The public accessibility of the data has allowed citizen groups to bring enforcement cases under the CWA and CAA citizen suit provisions.²¹² Further, even in regulatory

207. Richard Glick, Commissioner, FERC, Dissent in Part Regarding Data Collection for Analytics and Surveillance and Market-Based Rate Purposes (July 18, 2019), <https://www.ferc.gov/news-events/news/commissioner-richard-glick-dissent-part-regarding-data-collection-analytics-and-0>.

208. *Id.*

209. *United States v. Baker*, No. 3:15-cr-30002-MGM, 2015 WL 8216041 (D. Mass. 2015).

210. Some companies have raised concerns about release of confidential business information when emissions information is publicly accessible. *See, e.g., Coal Combustion Residuals Impoundment Assessment Reports*, EPA, https://www.epa.gov/sites/production/files/2016-06/documents/cr_impoundmnt_asesmnt_rprts.pdf (last visited Jan. 31, 2021) (“Some companies have at some point claimed some information they have provided to the EPA related to their coal ash impoundments is confidential business information (CBI)”). However, many statutes place limits on what information may be considered confidential. For example, the CAA 114(c) states that emissions information may not be considered confidential, and 40 C.F.R. § 82.182 allows EPA to disclose information for which the regulated party has not submitted a claim of confidentiality at the time of data submission.

211. *See Air Markets Program Data*, EPA, <https://ampd.epa.gov/ampd/> (last visited Sept. 30, 2020); *Enforcement and Compliance History Online*, *supra* note 39.

212. *See, e.g., Sierra Club v. Pub. Serv. Co. of Colorado, Inc.*, 894 F. Supp. 1455, 1458 (D. Colo. 1995) (“The issue, then, is whether in this citizen’s enforcement action the CEM data and reports constitute evidence of emissions violations. If they do then no reasonable trier of fact could fail to conclude that

areas where the relevant federal statute does not have citizen suit provisions, public accessibility to monitoring and reporting data has the potential to change behavior of the regulated entity.²¹³

IV. SHIPPING CASE STUDY

This Part provides a detailed case study on an area in which mandatory self-monitoring and reporting would increase the detection of corporate cheating: the shipping industry and the related SO₂ emission standards. It advocates for the International Maritime Organization (IMO) to require that all ships self-monitor using CEMS and report the data through the existing automated information system (AIS). It focuses on why regulated shipping entities in particular should want to advance such a proposal, despite the fact that at first glance, it may not appear to be beneficial to their financial bottom line.²¹⁴

A. Framing the Case Study

Because ships in international commerce sail from one jurisdiction to another, national regulations by themselves are not effective in regulating pollution from these ships. Therefore, parties to the IMO established the International Convention for the Prevention of Pollution from Ships (MARPOL).²¹⁵ Annex VI of MARPOL contains air pollution regulations applicable to ships. SO₂ air pollution is limited by regulating the kind of fuel that a ship can burn.²¹⁶ Pursuant to MARPOL Annex VI, when a ship operates in a

Sierra Club has proved claims one and two of it's [sic] complaint. I conclude in light of the applicable statutory and regulatory scheme viewed in common sense fashion that the CEM data and reports constitute competent evidence of ongoing emissions violations." In addition, particularly relevant for the case study in this Article is that the Act to Prevent Pollution from Ships includes a citizen suit provision that has not been used. See 33 U.S.C. § 11 (1910).

213. Niefer, *supra* note 97, at 394 ("Another benefit of publishing market information is that if market participants know that information concerning their behavior will be public, they may be less inclined to manipulate markets or exercise undue market power. For example, if information about an individual generators' offers into an ISO-run auction market will be made public, the generator may be reluctant to submit offers for a generating unit that substantially exceed the units' costs for fear of drawing the attention of regulators, buyers, or the public.").

214. This Article uses the term "regulated shipping entities" generally to denote the particular shipping company or companies that are responsible for compliance with SO₂ standards. The authors acknowledge that there might be multiple kinds of shipping companies ultimately responsible for compliance, including owners, operators, and charters, but use the more general term "regulated shipping entities" for ease and in order to make the broader points in this Article.

215. All ships that are registered or flagged in a country that is party to MARPOL must abide by MARPOL requirements. Over 170 countries are party to MARPOL, including the United States. IMO, STATUS OF IMO TREATIES 111–15 (2020), <http://www.imo.org/en/About/Conventions/StatusOfConventions/Documents/Status%20-%202020.pdf>.

216. Bunker fuel—the fuel typically used in large ocean-going ships—is a mixture of petroleum-based fuel oils. Heavy fuel oil typically has higher sulfur content than distillate fuels, such as marine gas oil, which is similar in sulfur content to diesel. See, e.g., Dudley Curtis, *Sulphur in Marine Fuels*, TRANSPORT & ENV'T (Jan. 25, 2012) <https://www.transportenvironment.org/publications/sulphur-marine-fuels>.

designated “emission control area (ECA),” it cannot burn fuel with a sulfur content of greater than 0.10 percent (the “ECA standard”).²¹⁷ Prior to January 1, 2020, however, when the same ship moved to operate in the high seas, outside of an ECA, it could burn a much dirtier fuel, at up to 3.5 percent sulfur content.²¹⁸ As of January 1, 2020, the maximum sulfur content of fuel on the open seas dropped to 0.50 percent (the “2020 global standard”).²¹⁹

While the basic SO₂ requirements seem clear, MARPOL contains many complicating factors for determining potential noncompliance. First, a ship does not need to comply directly with the ECA standard or the 2020 global standard if it is equipped with an approved onboard stack gas “scrubber” system.²²⁰ Second, operators can use an acceptable alternative marine fuel such as liquefied natural gas or methanol, instead of meeting the ECA standard or the 2020 global fuel standard.²²¹ In addition, operators may receive special enforcement considerations if they can demonstrate that fuel that is compliant with the ECA standard or the 2020 global standard was not available and if the operator submits a fuel oil nonavailability report to the incoming port of call.²²² Thus, determining compliance with MARPOL SO₂ requirements is not always clear.

The incentive for regulated shipping entities to cheat on SO₂ standards is high because of the extreme price differential between compliant and noncompliant fuels. To be sure, the price differential of fuel changes frequently, and as a result the incentive to cheat changes frequently as well. In the month of February 2020 alone, for example, the price differential between high sulfur and low sulfur fuel “dropped \$82/mt [metric ton], from \$181/mt on February 3 to \$99/mt on February 28.”²²³ Yet, in early September 2019, ECA compliant fuel

217. An ECA is defined as a boundary at a distance from a country’s shoreline, within which additional air pollution requirements apply. MARPOL includes four ECAs: the North American ECA, the North Sea ECA, the Baltic Sea ECA, and the Caribbean ECA. Other countries may opt to create or join an ECA. For example, China has formed a domestic ECA for the South China Sea and may seek IMO approval to create an ECA under MARPOL. *Air Pollution*, INT’L MAR. ORG., <http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Air-Pollution.aspx> (last visited Sept. 30, 2020).

218. *Id.*

219. *Id.* This Article does not delve into the merits of the fuel-based standards. One could argue, for example, that movement to an emissions-based standard would be better, so that ships have to meet a certain level of SO₂ pollution on average over a specified time period and the compliance mechanism does not matter. However, that is not the issue addressed by this Article.

220. A scrubber is a piece of equipment that sprays alkaline water into a ship’s exhaust to remove sulfur and other unwanted chemicals. See, IMO, MEPC.259(68), 2015 GUIDELINES FOR EXHAUST GAS CLEANING SYSTEMS (2015) [http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Documents/MEPC.259\(68\).pdf](http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Documents/MEPC.259(68).pdf).

221. *Broadly Applicable Approved Alternative Test Methods*, EPA, <https://www.epa.gov/emc/broadly-applicable-approved-alternative-test-methods> (last visited Feb. 16, 2020).

222. See *Sulphur 2020 Implementation – IMO Issues Additional Guidance*, INT’L MARINE ORG. (May 20, 2019), <http://www.imo.org/en/MediaCentre/PressBriefings/Pages/10-MEPC-74-sulphur-2020.aspx>.

223. Charlotte Bucchioni & Britt Russell-Webster, *Scrubbers Bet Pays Off for Shipowners as Marine Fuels Spread Remains Wide*, S&P GLOBAL PLATTS INSIGHT (Mar. 3, 2020) <https://blogs.platts.com/2020/03/03/scrubbers-bet-pays-off-for-shipowners-as-marine-fuels-spread-remains-wide/>.

was almost twice as expensive as worldwide fuel (fuel that is legal to use in other than ECA areas) for a ship fueling in Rotterdam, a major fueling port in the Netherlands.²²⁴ As stated by one researcher, “noncompliance may be the N[umber] 1 response to the new standards You make money by being noncompliant”²²⁵ An official from one major shipping company stated in an anonymous telephone interview that it will cost the company \$300 million per year to comply.²²⁶ Undoubtedly, the economic incentives to cheat can be very high.

At a December 2019 public hearing held by USCG, the Vice President of Environmental Policy at the World Shipping Council, a trade industry association, warned that minimal enforcement of new SO₂ air pollution standards coming into effect in 2020 would likely result in corporate cheating.²²⁷ The industry needs a reason to comply.²²⁸ Further, the 2020 global standard will displace more than two million barrels per day of high sulfur fuel from the global marine fuel pool in the first year of the rule’s implementation, assuming effective enforcement measures that will minimize cheating.²²⁹ As one analysis shows, “many analysts are predicting between 10–20 percent noncompliance in the first year of implementation. This is a staggeringly high percentage”²³⁰

Indeed, while the European Union has reported a less than 5 percent noncompliance rate, it is unclear whether the low percentage truly illustrates low corporate cheating or instead the difficulty in detecting noncompliance.²³¹ For example, USCG has assumed low violation rates in analyzing the shipping industry’s compliance with SO₂ air pollution regulations, but it conducts very

224. *Rotterdam Bunker Prices*, SHIP & BUNKER, <https://shipandbunker.com/prices/emea/nwe/nl-rtm-rotterdam#VLSFO> (last visited Feb. 28, 2020). For example, IFO (intermediate fuel oil) 380 was reported to cost \$280/MT, while very low sulfur fuel oil (VLSFO) was reported to cost \$500/MT. *Id.* The slowdown in the world economy, and its impact on shipping as a result of the COVID-19 pandemic has greatly reduced the price differential between high sulfur and lower sulfur marine fuels. *See, e.g., Scrubber Advocates Shift Focus to Environmental Case as HSFO Discount Narrows*, SHIP & BUNKER (Mar. 23, 2020), <https://shipandbunker.com/news/emea/389011-scrubber-advocates-shift-focus-to-environmental-case-as-hsfo-discount-narrows>. However, the authors believe the price differential will return to historic levels as economies recover.

225. Laura Blewitt, *World’s Dirtiest Fuel Seen Holding Out Even as Ships Clean Up*, BLOOMBERG (May 11, 2017, 5:46 PM), <https://www.bloomberg.com/news/articles/2017-05-09/world-s-dirtiest-fuel-seen-holding-out-even-as-ships-clean-up>.

226. *See* telephone interview, *supra* note 18.

227. *See* Notice of Public Meeting on Consistent Implementation of Regulation 14.1.3 of MARPOL Annex VI (Global 0.50% Sulfur Limit), 84 Fed. Reg. 64,094 (Nov. 20, 2019).

228. *Id.*

229. Ralph Grimmer, *Expected Pricing and Economic Impacts of the IMO 2020 Rule*, STILLWATER ASSOCS. (July 11, 2018), <https://stillwaterassociates.com/expected-pricing-and-economic-impacts-of-the-imo-2020-rule/>.

230. *IMO 2020 Enforcement Magic Pipe Cases All-Over Again?*, HELLENIC SHIPPING NEWS (Nov. 28, 2019), <https://www.hellenicshippingnews.com/imo-2020-enforcement-magic-pipe-cases-all-over-again/>.

231. *Reducing Sulphur Emissions from Ships The Impact of International Regulation*, INT’L TRANSP. FORUM 41 (2016), <https://www.itf-oecd.org/sites/default/files/docs/sulphur-emissions-shiping.pdf>.

little actual testing.²³² As a result, the real rate may be quite a bit higher than the reported rate. In contrast, the Netherlands, in its 2017 report on SO₂ compliance, shows a violation rate of 21 percent for ships where samples were taken and analyzed.²³³ These ships in violation represented about 5 percent of all ships where Dutch authorities conducted onboard inspections.²³⁴ Denmark has also reported violations that exceed 20 percent of the standard.²³⁵ These are not trivial violation rates.

Cheating on the SO₂ standards in shipping has significant implications for public health and natural resources. Scientists have long documented the huge deleterious human health impacts from SO₂.²³⁶ SO₂ is also a precursor for particulate matter pollution, and several densely populated urban areas of the United States and the world already have unhealthy levels of particle pollution.²³⁷ Ships are a large contributor to SO₂ pollution overall, and emissions from ocean-going ships affect large areas.²³⁸ Indeed, during the formation of the North American ECA, EPA estimated that annual benefits in 2020 would include preventing between 5,500 and 14,000 premature deaths, 3,800 emergency room visits, and 4.9 million cases of acute respiratory symptoms in 2020.²³⁹ The agency expected that coastal areas would experience the largest improvements and significant improvements would extend hundreds of miles inland to reach nonattainment areas in states such as Nevada, Tennessee, and Pennsylvania.²⁴⁰

232. Gary Wollenhaupt, *IMO Ships Violating New Sulfur Cap Could Be Labeled Unseaworthy*, PROF. MARINER (Feb. 28, 2018, 3:19 PM), <http://www.professionalmariner.com/March-2018/IMO-Ships-violating-new-sulfur-cap-could-be-labeled-unseaworthy/> (noting that “USCG has seen good compliance with the 2015 0.1 percent sulfur cap and we intend to continue using the same process (for enforcement)”); *U.S. Pilot Suggests Good Supplier Compliance with ECA Sulphur Limit*, INT’L BUNKER INDUS. ASS’N (July 29, 2016), <https://ibia.net/us-pilot-suggests-good-supplier-compliance-with-eca-sulphur-limit/> (noting USCG reluctance to collect and test fuel samples).

233. The Netherlands report shows this rate as 6.7 percent, because they exclude results between 0.10 percent and 0.13 percent. Inspectie Leefomgeving en Transport, Ministerie van Infrastructuur en Milieu, *Netherlands Yearly Report on Sulphur Inspections, Report on sulphur compliance data of the Netherlands – 2017* (2017).

234. *Id.*

235. See Ship & Bunker News Team, *Five Shipping Companies Reported in Denmark after Bunker Samples Show ECA Violations*, SHIP & BUNKER (June 21, 2016) <https://shipandbunker.com/news/emea/287614-five-shipping-firms-reported-in-denmark-after-bunker-samples-show-eca-violations>.

236. SO₂ is a lung irritant that can harm the human respiratory system and make breathing difficult. Perhaps more importantly, SO₂ reacts in the atmosphere to form fine particles. *Sulfur Dioxide Basics*, EPA, <https://www.epa.gov/so2-pollution/sulfur-dioxide-basics#effects> (last visited Feb. 13, 2020). Fine particle pollution can cause a host of health problems, including cardiac and lung problems, and is a particular problem for asthmatics. *Health and Environmental Effects of Particulate Matter (PM)*, EPA, <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm> (last visited Feb. 13, 2020).

237. See *Green Book PM-2.5 (2012) Area Information*, EPA, <https://www.epa.gov/green-book/green-book-pm-25-2012-area-information> (last visited Feb. 13, 2020).

238. *Designation of North American Emission Control Area to Reduce Emissions from Ships*, EPA, OFFICE OF TRANSP. & AIR QUALITY 5 (2010), <https://nepis.epa.gov/Exe/ZyPDF.cgi/P100AU0I.PDF?Dockey=P100AU0I.PDF>.

239. *Id.*

240. *Id.*

The California Air Resources Board has reported that air quality data indicate that ship emissions travel up to 102 miles inland from California's coast.²⁴¹ Multiplying the pollution level of one ship times the number of ships worldwide gives an indication of the enormity of the impact of SO₂ pollution from the industry as a whole—the fifteen largest ships in the world, when operated with high sulfur fuel, emit more SO₂ than all cars on the planet, combined.²⁴²

Cheating in shipping also has significant implications for the creation of a level playing field in the industry. In 2014, several ship owners met to discuss a worry that without a robust check of ships, those shipping companies in compliance with the standard would be at a competitive disadvantage to those in violation.²⁴³ The ship owners formed the Trident Alliance, which, throughout the 2014 to 2020 period, regularly pushed for strong enforcement and the importance of creating a level playing field in the industry.²⁴⁴ For example, in 2016, Maersk, a Trident Alliance member, expressed strong concerns with the global sulfur cap, stating, “an unclear legal framework, no dissuasive sanctions, inadequate detection methods and limited resources have created a window for risk-free noncompliance with the upcoming global cap.”²⁴⁵ A 2019 literature study on the sulfur regulations also found that “a homogeneous enforcement regime is required to ensure a level playing field amongst ship operators.”²⁴⁶

B. USCG/EPA Detection

Implementation of MARPOL Annex VI is entirely conducted through the domestic agencies of member countries. In the United States, the key implementing statute is the Act to Prevent Pollution from Ships, which provides primary regulatory authority to USCG and secondary authority to EPA.²⁴⁷ In particular, EPA has served in a cooperative role with USCG on enforcement and has provided input on applications from regulated shipping entities requesting

241. CAL. AIR RES. BD., APPENDIX B: ARB'S LEGAL AUTHORITY B-3, <https://ww3.arb.ca.gov/regact/2008/fuelogv08/appbfuel.pdf>.

242. The largest fifteen ships on the planet running on high-sulfur fuel emit more sulfur oxides than all cars on the planet combined. *Shipping Facts*, INT'L CHAMBER OF SHIPPING, <https://www.ics-shipping.org/shipping-facts/shipping-facts> (last visited Feb. 13, 2020).

243. Ship & Bunker News Team, *New Shipping Initiative to Work for Strong ECA Enforcement*, SHIP & BUNKER (May 15, 2014), <https://shipandbunker.com/news/world/693043-new-shipping-initiative-to-work-for-strong-eca-enforcement>.

244. *Id.*; see also NED MOLLOY, THE IMO'S 2020 GLOBAL SULFUR CAP: WHAT A 2020 SULFUR-CONSTRAINED WORLD MEANS FOR SHIPPING LINES, REFINERIES AND BUNKER SUPPLIERS 9 (Richard Rubin ed., 2016), available at <https://www.isemar.fr/wp-content/uploads/2017/01/SR-IMO-2020-Global-sulfur-cap-102016.pdf>; Ship & Bunker News Team, *Sulfur Regs Group Trident Alliance Wound Up at End of 2020*, SHIP & BUNKER (Jan. 12, 2021), <https://shipandbunker.com/news/world/748773-sulfur-regs-group-trident-alliance-wound-up-at-end-of-2020>.

245. MOLLOY, *supra* note 244, at 9.

246. See Thalís P.V. Zis & Kevin Cullinane, *The Desulphurisation of Shipping Past, Present and the Future under a Global Cap*, 82 TRANSP. RSCH. 102316, 102316 (May 2020).

247. Act to Prevent Pollution from Ships, 33 U.S.C. §§ 1901–1912 (2019).

alternative compliance mechanisms.²⁴⁸ Furthermore, some states, including California, have further restrictions on air pollution from ships.²⁴⁹

Detection of SO₂ violations occurs at the port of call for ships entering into a specific country. Inspections of foreign-registered ships are usually conducted by the maritime agency of the country that the ship has entered, such as USCG. This inspection regime is known as Port State Control (PSC).²⁵⁰ The overall goal of PSC is “to verify that the condition of the ship and its equipment complies with the requirements of international conventions,” such as MARPOL.²⁵¹ Thus, PSC concurrently checks for compliance with multiple environmental laws and regulations involving air pollution, water pollution, and oily discharge. Further, PSC is in charge of checking for compliance with numerous safety regulations.

PSC inspections for SO₂ standards in the United States are largely a paper check. That is, the USCG job aid protocol for inspectors only requires that PSC inspectors check to see if fuel purchase documents reflect that the ship purchased compliant fuel.²⁵² Inspectors do not verify that the ship actually burned such fuel.²⁵³ Nor do inspectors verify when the ship began burning such fuel. Thus, in theory, the ship could have purchased compliant fuel but also purchased noncompliant fuel and burned that instead. Or, the ship could have purchased compliant fuel but only burned it a few miles away from coming into port, in case it was at risk of inspection, but not at the 200 nautical miles entry point to the North American ECA, for example. Only with some kind of verification, like

248. EPA and USCG have established a memorandum of understanding (MOU) governing their enforcement relationship. The latest iteration of that MOU can be found at *Revised Protocol on Referrals under MARPOL Annex VI, as Implemented by APPS*, EPA & U.S. COAST GUARD (June 20, 2019), <https://www.epa.gov/sites/production/files/2019-07/documents/annexvifonarrevreferralprotocolfinaljointexecuted.pdf>. In addition, to see an example of the kind of “alternative compliance method” granted to one regulated shipping company, see *TOTE Granted ECA Exemption during LNG Conversion*, SHIP & BUNKER (Aug. 8, 2012), <https://shipandbunker.com/news/am/385950-tote-granted-eca-exemption-during-lng-conversion>.

249. Federal authorization under the CAA is required for regulating new marine engines and for requiring retrofits on existing engines. However, no CAA authorization is required for implementing in-use operational requirements on existing marine ship engines. Further, federal cases have supported a state’s authority to protect the state’s air quality by imposing operational requirements on ship operators carrying out activities in the state and U.S. territorial waters, as well as on the high seas, in certain circumstances. See, e.g., *Chevron USA, Inc. v. Hammond*, 726 F.2d. 483 (9th Cir. 1984) (upholding Alaska’s regulatory scheme, which imposed requirements on ships for the purpose of water pollution control).

250. PSC is an inspection system for countries to inspect foreign ships in ports other than those of the flag state, where the ship is registered. IMO originally intended PSC inspections to be a backup to inspections that were supposed to happen by the country where a ship is registered or licensed—the flag state. However, PSC inspection has become the primary means for implementation because flag state inspection has been woefully inadequate. *Port State Control*, INT’L MARINE ORG., <http://www.imo.org/en/OurWork/MSAS/Pages/PortStateControl.aspx> (last visited Feb. 13, 2020); see also Antoine Halff, *Slow Steaming to 2020 Innovation and Inertia in Marine Transport and Fuels*, COLUM. SCH. INT’L & PUB. AFFS. 22 (Aug. 2017).

251. *Port State Control*, LLOYD’S REG., www.lr.org/en/port-state-control (last visited Feb. 13, 2020).

252. U.S. COAST GUARD, OFFICE OF COMMERCIAL VESSEL COMPLIANCE, ECA JOB AID 1 (2012), https://homeport.uscg.mil/Lists/Content/Attachments/891/ECA_Job_Aid_3.pdf.

253. *Id.*

actually sampling and testing the fuel during an inspection, would inspectors be able to truly assess whether the ship burned compliant fuel, as opposed to simply purchasing it. Indeed, USCG 2017 and 2018 PSC inspection reports do not list any detected violations of SO₂ fuel standards.²⁵⁴ It is unclear whether this is because all regulated ships were compliant in these years or whether the inspection protocol is simply too weak to detect cheating.

International law does impose restrictions on PSC's ability to conduct any more extensive inspections of ships, including anything involving testing of fuel. The Law of the Sea Convention, widely recognized as the general legal framework within which all activities in the oceans and seas must be carried out, provides that any physical inspection of a foreign ship shall be limited to an examination of certificates, records, and documents.²⁵⁵ However, and most importantly, the Convention instructs that physical inspection of the ship may be undertaken when there are *clear grounds* to do so.²⁵⁶ Guidance documents provide that clear grounds exist when a PSC inspector finds evidence warranting such an inspection.²⁵⁷ Such evidence could include missing or invalid documentation, evidence that the master or crew are not familiar with shipboard operations, or evidence that the quality of fuel oil appears to be substandard.²⁵⁸ USCG relies on such case-by-case information, including informant tips, to establish clear grounds for physical inspection.²⁵⁹ Several of USCG's most well-known cases, including violations of oil-discharge regulations from "magic pipes," began with tips from whistleblowers.²⁶⁰

In practice, port authorities around the world interpret the clear grounds standard differently. Interestingly, the European Union member countries, Canada, and Hong Kong routinely inspect and sample fuel for verification, even when there is no obvious clear grounds indication of a violation by a particular ship. The European Union, in particular, requires member states to test the sulfur

254. See generally U.S. COAST GUARD, PORT STATE CONTROL IN THE UNITED STATES (2018), <https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/CG-5PC/CG-CVC/CVC2/psc/AnnualReports/annualrpt18.pdf>.

255. U.N. Convention on the Law of the Sea, art. 226, Dec. 10, 1982, 1833 U.N.T.S. 397.

256. Similarly, MARPOL states that any inspection shall be limited to verifying that there is on board a valid certificate, unless there are clear grounds for believing that the condition of the ship or its equipment does not correspond substantially with the particulars of that certificate. See International Convention for the Prevention of Pollution from Ships, art. 5, Feb. 17, 1973, 1340 U.N.T.S. 61. The International Convention for Safety of Life at Sea also states that certificates, if valid, shall be accepted unless there are clear grounds for believing that the condition of the ship or of its equipment does not correspond substantially with the particulars of any of the certificates. See International Convention for the Safety of Life at Sea, ch. V, Reg. 19, 1184 U.N.T.S. 3, entered into force May 25, 1980.

257. U.N. Convention on the Law of the Sea, art. 220, Dec. 10, 1982, 1833 U.N.T.S. 397 255; IMO, 30th Sess., Res. 1119, at 10 (Dec. 6, 2017).

258. See *Mission Management System Work Instruction*, U.S. COAST GUARD OFFICE OF COM. VESSEL COMPLIANCE (Jan. 13, 2020), https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/CG-5PC/CG-CVC/CVC_MMS/CVC-WI-022_signed.pdf.

259. *Enforcing Maritime Laws Roles of Private Citizens*, ENV'T L. INST. (Apr. 16, 2019), <https://www.eli.org/events/enforcing-maritime-laws-role-private-citizens>.

260. See "Magic Pipe" MARPOL Violations Can Be Spotted from Space, *supra* note 113.

content of fuel for a specified percentage of inspected ships, depending on whether or not the member state borders a sulfur emission control area.²⁶¹ Similarly, Transport Canada, the enforcement agency for Canada's ECA, routinely obtains and tests fuel during its port state exams.²⁶² In Hong Kong and Shenzhen, hundreds of ships are currently randomly selected for spot checks.²⁶³ On occasion, USCG PSC has conducted *voluntary* sampling programs. In 2016, for example, USCG conducted a two-week sampling program at the Port of Baltimore and the Port of Los Angeles/Long Beach as a pilot test. In a public blog post, written after the sampling, Rear Admiral Paul F. Thomas of USCG said that the voluntary fuel sampling and testing pilot was "initiated in response to industry concern" about lack of accountability and enforcement.²⁶⁴ The inspectors asked ship masters for permission to sample and informed ships that they would not receive sanctions if the voluntary samples were noncompliant.²⁶⁵ Inspectors in the program asked forty-seven ships to participate.²⁶⁶ Ten of the forty-seven ships declined.²⁶⁷ USCG took two samples each from thirty-seven ships, for a total of seventy-four samples.²⁶⁸ EPA inspectors joined USCG inspectors in the sampling program and used portable fuel samplers to test fuel on site. The results of USCG PSC's voluntary sampling demonstrate the existence of cheating and the need for involuntary sampling. Six of the thirty-seven ships had noncompliant fuel. Also telling is that all the bunker delivery notes, including the six noncompliant ships, stated that the fuel was compliant, at 0.10 percent sulfur or less.²⁶⁹ Further, ten of forty-seven, or over 20 percent of the ships, did not provide consent for USCG to sample at all.²⁷⁰ USCG has not conducted another pilot since 2016.²⁷¹

Without inspection and sampling of fuel, detection and deterrence of SO₂ violations remains severely limited. Ship operators are unlikely to have record books or bunker delivery notes documenting that fuel used on board is noncompliant.²⁷² Bunker delivery notes are known to contain irregularities and

261. 2015 O.J. (L 41) 253, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32015D0253>.

262. U.N. Convention on the Law of the Sea, art. 226, Dec. 10, 1982, 1833 U.N.T.S. 397, 255

263. See Ernest Kao, *Hong Kong Authorities Set to Ramp Up Fight against Air Pollution from Ships by Flying Drones to Monitor Emissions*, S. CHINA MORNING POST (Jan. 30, 2019, 6:53 PM), <https://www.scmp.com/news/hong-kong/health-environment/article/2184344/hong-kong-authorities-set-ramp-fight-against-air>.

264. See *U.S. Pilot Suggests Good Supplier Compliance with ECA Sulphur Limit*, *supra* note 232.

265. *Voluntary Vessel Fuel Oil Sampling Program*, U.S. COAST GUARD (Feb. 1, 2016), https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/MSIB/2016/003_16_2-17-2016.pdf.

266. *Id.*

267. *Id.*

268. *Id.*

269. *Id.*

270. See *id.*

271. While it would be useful for USCG to conduct another pilot, the fact that the sampling is voluntary, as well as other limits cited in this Article, suggests that a different approach would be more fruitful.

272. See Half, *supra* note 250.

fraud.²⁷³ Individual ship operators may have also falsified other onboard records, such as the fuel change over logs, to attempt to conceal cheating.²⁷⁴ Without a specific tip, however, the USCG PSC process can do no more than simply board a ship, on occasion, and check the bunker delivery note to see if it appears the ship received compliant fuel and review documents to determine if the records show the ship changed fuel at the appropriate location.²⁷⁵ Such a restriction on investigation, without other methods of obtaining information, is a significant barrier to effective enforcement.

C. Self-Monitor and Report

Regulated shipping entities have advocated for regulatory changes that help agencies better detect corporate cheating of the SO₂ standards.²⁷⁶ Perhaps in response, the IMO passed a fuel carriage ban, which became effective on March 1, 2020.²⁷⁷ Under the ban, ships are no longer allowed to carry noncompliant fuel on board for use in operating the ship.²⁷⁸ Thus, the theory is, if a ship is subject to USCG inspection at port, the inspector can simply look to see if noncompliant fuel is on board, and then sampling is not required. The carriage ban has been lauded as a success story in helping make agency detection of cheating much easier. Indeed, the point of the ban was to make detection easier,²⁷⁹ and the ban's enactment demonstrates how effective the voices of regulated shipping entities can be.

However, the carriage ban is not enough to support consistent detection of corporate cheating. In part, the carriage ban does not apply to ships with scrubbers, and as a result, some argue that a ship could invest in a scrubber to avoid paying the high costs of compliant fuel but not actually operate the

273. *Id.*; see *Reducing Sulphur Emissions from Ships*, *supra* note 231; FRED A FUNG, NRDC, ENFORCEMENT OF FUEL SWITCHING REGULATIONS PRACTICES ADOPTED IN THE US, EU AND OTHER REGIONS, AND LESSONS LEARNED FOR CHINA 4 (2016), https://www.nrdc.org/sites/default/files/enforcement-of-fuel-switching-regulations-practices-adopted-in-the-us-eu-and-other-regions-and-lessons-learned-for-china_2017-12-18.pdf.

274. FUNG, *supra* note 273, at 1.

275. See Halff, *supra* note 250; Letter from Capt. E.P. Christensen, U.S. Coast Guard, on Guidelines for Ensuring Compliance with Annex VI to MARPOL 73/78 (Feb. 4, 2009), https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/CG-5PC/CG-CVC/Policy%20Letters/2009/CG-543_pol09-01.pdf.

276. *Emissions Monitoring Maintaining a Level Playing Field Post-2020*, RIVIERA (Sept. 17, 2018), <https://www.rivieramm.com/opinion/opinion/emissions-monitoring-maintaining-a-level-playing-field-post-2020-23341>.

277. Press Release, IMO, Implementation of Sulphur 2020 Limit – Carriage Ban Adopted (Oct. 26, 2018), <http://www.imo.org/en/MediaCentre/PressBriefings/Pages/19-Implementation-of-sulphur-2020-limit-.aspx>.

278. *Id.* Notably, an exception remains that a ship may carry and use noncompliant fuel if it falls within an approved exception as discussed in Subpart IV.A of this Article, for example if the ship has a scrubber.

279. See Eoin Bannon, *IMO Moves to Outlaw Carriage of High Sulphur Marine Fuel Ahead of 2020 Usage Ban*, TRANSP. & ENV'T (Feb. 9, 2018, 14:20), <https://www.transportenvironment.org/press/imo-moves-outlaw-carriage-high-sulphur-marine-fuel-ahead-2020-usage-ban>.

scrubber, causing significant emissions in excess of the SO₂ standards.²⁸⁰ Moreover, because port state control inspectors cannot check every ship that comes into port, regulated shipping entities may decide to take the risk and carry and burn noncompliant fuel. The high economic incentive is tempting, particularly given that regulated shipping entities may be able to guess when they will be subject to inspections, which typically occur on a relatively scheduled basis.²⁸¹ Regulated entities and corresponding trade associations continue to push for increased agency surveillance and enforcement.

This Article therefore recommends that regulated shipping entities continue to advocate for more robust self-monitoring and reporting. Regulated shipping entities should specifically advocate for requirements that *all* ships monitor SO₂ using CEMS and report those data via AIS.²⁸² CEMS requirements for all ships would likely require new IMO guidance and perhaps changes to MARPOL itself.²⁸³ While many regulated shipping companies and trade associations are resistant to the idea of required CEMS,²⁸⁴ there is no question that use of CEMS would make a dramatic difference in agency ability to detect cheating.²⁸⁵

CEMS provide needed ongoing information to agencies to detect not just cheating, but minor or inadvertent violations as well. The fear of agencies' indiscriminate use of CEMS data, resulting in lumping together significant emissions violations with more minor violations, existed amongst regulated entities during EPA's 1997 proposal of the compliance assurance monitoring rule.²⁸⁶ During development of the rule, industry groups commented "because

280. See Halff, *supra* note 250.

281. See Malcolm Latache, *Policing IMO Regulations—the Role of Port State Control*, SHIPINSIGHT (Apr. 27, 2018), <https://shipinsight.com/articles/policing-imo-regulations> (describing historically lax enforcement of IMO rules); LT Amy Midgett, *6/18/2018 Posidonia 2018 – Coast Guard Perspective on IMO 2020 Sulphur Cap*, Coast Guard Maritime Commons (June 18, 2018), <https://mariners.coastguard.dodlive.mil/2018/06/18/6-18-2018-posidonia-2018-coast-guard-perspective-on-imo-2020-sulphur-cap/> (explaining the USCG conducts regularly scheduled port state control exams, which includes Annex VI compliance checks).

282. Another equally effective alternative to CEMS may be continuous inline fuel sulfur monitors. Although the authors are presently unaware of any installations, in concept this technology should be as viable as CEMS. One example of a commercially available fuel sulfur monitor can be found at NEX XT TOTAL SULFUR PROCESS ANALYZER, RIGAKU CORP., <https://www.rigakuedxrf.com/nex-xt.php> (last visited June 10, 2020).

283. See also Dimitra Topali & Harilaos N. Psaraftis, *The Enforcement of the Global Sulphur Cap in Maritime Transport*, 4 MARITIME BUS. REV. 207 (2019) ("A regulation imposed by the IMO that obliges all ship owners to use these devices [CEMS] would be the only solution"). The ability for nations on their own to require CEMS on all vessels is not the subject of this Article, though it is a question worth pursuing. Similarly, it remains to be seen whether state governments in the United States could require CEMS on all vessels coming into specific ports.

284. *Emissions Monitoring Ensuring a Level Playing Field Post-2020*, *supra* note 21 (observing that there remains some considerable resistance among many flag states and shipowner associations to the mandatory use of CEMS).

285. See *id.* (arguing that "[t]here is no doubt that emissions monitoring [] is an important tool in the enforcement of the sulphur rules").

286. See COMPLIANCE ASSURANCE MONITORING RULEMAKING (40 CFR PARTS 64, 70 AND 71): RESPONSES TO PUBLIC COMMENTS (PART I) 401 (1997). The rule was finalized in October 1997. See Compliance Assurance Monitoring, 62 Fed. Reg. 54,900 (Oct. 22, 1997).

increased data is [sic] supplied to the government under . . . CEMS requirements, industry believes that EPA, states and citizen groups will bring enforcement actions for minor violations.”²⁸⁷ Industry also commented that monitoring that reflects slight deviations from emissions standards due to operational variations or other unavoidable causes could be used against the source to prove minor short-term CAA violations.²⁸⁸ Indeed, pervasive use of CEMS will surface deviations and violations that could not be detected with cruder methods. However, most enforcement authorities give considerable latitude to industrial sources that discover and rapidly correct such deviations and violations, as long as they disclose them and put in place procedures to prevent recurrence.²⁸⁹

Moreover, CEMS on ships are now technically feasible and inexpensive.²⁹⁰ For a long time, there have been concerns that because CEMS are placed in or near the exhaust of ships, they are subject to extremes of temperature, acidity, vibration, erosion, and the corrosive effects of salt air, which could impact their reliability.²⁹¹ However, ships operating with scrubbers have been using CEMS since approximately 2012 and have been able to accurately analyze exhaust gases from the combustion of fuel in real time, automatically record all information, and display the information on a computer screen in the ship’s engine room.²⁹² Each new generation of CEMS is more reliable and accurate, and the cycle of improvement is much faster than regulations are typically able to keep up with.²⁹³ There have already been several improvements since the first CEMS on vessels went into operation.²⁹⁴ Thus, regulated shipping entities that have experience with scrubbers and CEMS can and should propose technical guidance on the operation of scrubbers to the IMO. Such technical guidance could be modeled in part on the experience of operationalizing CEMS on ships, but it

287. Arnold W. Reitze, Jr. & Steven D. Schell, *Self-Monitoring and Self-Reporting of Routine Air Pollution Discharges*, 24 COLUM. J. ENV’T L. 63, 130 (1999) (citing to 62 Fed. Reg. at 54,902).

288. *Id.* at 130 (citing to 62 Fed. Reg. at 54,902).

289. Moreover, while not the focus of this Article, agencies have significant enforcement discretion and penalty discretion after detection of violations. *See, e.g.*, Clean Water Act, 33 U.S.C. § 1319(d) (2019); Clean Air Act, 42 U.S.C. § 7413 (2019).

290. *Parker Kittiwake – Procal Expands Emissions Monitoring Systems’ Global Distribution, Service Capability*, SHIP & BUNKER (Sept. 8, 2015), <https://shipandbunker.com/news/world/543836-parker-kittiwake-procal-expands-emissions-monitoring-systems-global-distribution-service-capability/>; *Parker Kittiwake Doubles Production of Emissions Monitoring Systems*, SHIP & BUNKER (Nov. 14, 2014), <https://shipandbunker.com/news/emea/627337-parker-kittiwake-doubles-production-of-emissions-monitoring-systems> (describing a “sizeable increase” in demand for CEMS among the shipping industry); Memorandum from John B. Rasnic, Director, Office of Air Quality Planning and Standards, to Jehuda Menczel, Chief, New Jersey/Caribbean Section (June 8, 1992), <https://archive.epa.gov/airquality/ttnsr01/web/pdf/memo-d-2.pdf>.

291. *Emissions Monitoring Ensuring a Level Playing Field Post-2020*, *supra* note 21 (“Sensor manufacturer SICK’s strategic industry manager Hinrich Brumm said: ‘The CEMS technology came from onshore and was not always suitable in the harsh marine environment. However, as a manufacturer, this led us to develop a new CEMS especially for marine use and for undergoing type approvals.’”).

292. *See ECA Compliance through Continuous Emission Monitoring*, GREENPORT (Sept. 23, 2014), <https://www.greenport.com/news101/opinion/eca-compliance-through-continuous-emission-monitoring>.

293. Telephone interview with large shipping company (notes on file with author).

294. Telephone interview with CEMS manufacturer company (notes on file with author).

could also incorporate lessons learned from the use of CEMS on land-based pollution sources.²⁹⁵ For example, EPA has long had missing-data regulations for land-based sources with CEMS, which provide operators with specific sampling procedures to use that will conservatively estimate emissions data during the time that a CEMS is down.²⁹⁶ Further, the cost to install and use a CEMS is relatively minor and not a major argument against CEMS requirements.²⁹⁷ Indeed, one company has quoted the price for a CEMS to be just €43,000.²⁹⁸

In addition, CEMS can identify mechanical problems for ship operators. Environmental engineers who have experience operating CEMS with land-based sources have discovered that CEMS are helpful to discover violations caused by mechanical issues and enable regulated entities to take corrective action. In one case involving a facility, an engineer discovered that a large piece of machinery and its control equipment suddenly stopped functioning properly, causing the facility to fall out of compliance with its permit.²⁹⁹ The CEMS allowed the manager to proactively move to minimize the impact of the malfunction.³⁰⁰ In addition, the CEMS provided concrete records of exactly how long the malfunction lasted, allowing the manager to accurately explain the noncompliance to EPA.³⁰¹ Ultimately, the manager estimated that without the CEMS, the noncompliance period would have tripled.³⁰²

Finally, current agency efforts to monitor ship SO₂ emissions remotely, while useful, are not enough to detect cheating in open waters. To be sure, several

295. In March 2018, Norwegian authorities assessed a large fine against the Color Line vessel for violations of the SO₂ standard. Nick Blenkley, *Color Line Faces Record Sulfur Fine*, MARINELOG (Mar. 14, 2018) <https://www.marinelog.com/shipping/environment/color-line-faces-record-sulfur-fine/>. Color Line representatives stated that the ship had experienced problems with cooling water intakes and exhaust gas and that the company had committed considerable resources to fixing both. *Id.* Further information from company representatives on such technical issues could provide useful to authorities in the future wishing to establish technical guidance. *Id.*

296. See 40 C.F.R. § 75.33 (2020) (explaining standard missing data procedures for SO₂, NO_x, and flow rate).

297. The capital cost for an SO₂ CEMS on a small diesel unit, for example, is about \$120,000, with an annual operation and maintenance cost of \$30,000. See Memorandum from John B. Rasic, *supra* note 290 (estimate from Kilkelley Environmental Associates). In addition, telephone interviews with CEMS manufacturers for vessels in particular have estimated a similar cost for the marine industry. Telephone interview with shipping company (notes on file with author).

298. Ship and Bunker News Team, *2020 Sulfur Cheats Can Monitoring the Emissions of the Entire Global Fleet Ever Be Possible? This Company Says "Yes,"* SHIP & BUNKER (Sept. 20, 2017), <https://shipandbunker.com/news/features/industry-insight/182646-2020-sulfur-cheats-can-monitoring-the-emissions-of-the-entire-global-fleet-ever-be-possible-this-company-says-yes>.

299. Gary Vegh, *CEMS Why Every Minute Matters for Environmental Compliance*, EHS TODAY (Aug. 16, 2012), <https://www.ehstoday.com/environment/article/21915590/cems-why-every-minute-matters-for-environmental-compliance>.

300. *Id.*

301. *Id.*

302. *Id.* The noncompliance period, or length of the violation, is often one of many factors that agencies use in ultimately calculating a penalty. See, e.g., Act to Prevent Pollution from Ships, 33 U.S.C. § 1908(b)(2).

European Union countries have had very successful detection results from remote monitors on bridges that ships pass under when coming into specific ports. In one example, the Danish maritime agency was able to discover a potential violation after a remote monitor, located on the Great Belt Bridge, under which ships pass as they travel between Norway and Germany, detected higher than permitted readings.³⁰³ The Danish maritime agency alerted the Norwegian maritime agency, which made a spot check inspection upon the ship's arrival in Oslo.³⁰⁴ Ultimately, the Norwegian maritime agency issued the largest SO₂ ECA penalty to date to that ship, which came into the port of Oslo, Norway, from Kiel, Germany.³⁰⁵ While information from the remote monitor at the Great Belt Bridge has not yet been used as evidence in a court proceeding, the information gained from remote monitors supports the targeting of ships that should be slated for port inspection.³⁰⁶ In other words, if the Great Belt Bridge monitor reports that a ship has high emissions, the authorities at the location where the ship next docks should inspect it and sample and analyze the fuels it has used. However, remote monitors on bridges, while useful for detection within emission control areas, are not useful to detecting cheating of IMO 2020 open water standards. There are simply no bridges in the middle of the ocean. Further, results from information gained at the Great Belt Bridge fixed monitor show a generally higher SO₂ content far from shore than right under the monitor, implying that some ships change to compliant fuel just before passing under the bridge rather than at the required 200 nautical mile mark.³⁰⁷

Recognizing the limited capabilities of remote monitors on bridges, several European Union countries and Hong Kong are in the process of experimenting with remote monitors on drones and satellites. In particular, both Norway's maritime authority and the Danish environmental agency have started experimental trials with drones.³⁰⁸ Government agencies in Hong Kong also are conducting trials using drones.³⁰⁹ The Finnish Meteorological Institute has tried

303. *Emissions Monitoring Ensuring a Level Playing Field Post-2020*, *supra* note 21.

304. *Id.*

305. The Norwegian newspapers reported the 2018 record-breaking fine for an ECA SO₂ violation at \$77,000 USD. Gary Dixon, *Color Line Contests 'Biggest Ever' Sulphur Fine*, TRADEWINDS (Mar. 14, 2018), <https://www.tradewindsnews.com/legal/color-line-contests-biggest-ever-sulphur-fine/2-1-294808>.

306. *Emissions Monitoring Ensuring a Level Playing Field Post-2020*, *supra* note 21; DANISH ENV'T PROT. AGENCY, REMOTE SENSING OF SULPHUR AND PARTICLE POLLUTION FROM SHIPS –FROM A COST-EFFICIENT APPROACH 13 (2018).

307. Allan Skouboe, *Thoughts on Compliance Reporting*, EGCSA 1, 3 (2017), <https://www.egcsa.com/wp-content/uploads/EGCSA-Compliance-Reporting-Danfoss-IXA.pdf>; Johanna Wilde, *Most Ships Follow the New Sulphur Regulations in Northern Europe*, CHALMERS (Apr. 20, 2018), <https://www.chalmers.se/en/departments/see/news/pages/ships-in-the-english-channel-have-the-highest-rate-of-sulphur-violations-in-northern-europe.aspx>.

308. Jack Wittels & Ann Koh, *Sniffer Drones Will Start Patrolling the World's Busiest Shipping Ports*, BLOOMBERG (May 20, 2019), <https://www.bloomberg.com/news/articles/2019-05-20/super-sniffer-drones-and-jail-regulators-get-tough-on-shipping>.

309. *Hong Kong to Trial Drones in Ship Pollution Campaign*, SHIP & BUNKER (Jan. 20, 2019), https://shipandbunker.com/news/apac/404432-hong-kong-to-trial-drones-in-ship-pollution-campaign?utm_source=newsletter&utm_medium=email&utm_campaign=newsletter-01/31/19; Ernest Kao, *Hong*

monitoring emissions via satellite, and while it was possible to measure the average SO₂ content in the air over a large area, the satellites could not readily identify the level of SO₂ emissions from a specific source.³¹⁰ It remains to be seen what all the technical factors will be for large drone and satellite projects. USCG should also consider investing in such pilot projects, just as EPA is doing for land-based sources like oil and gas fracking sites.³¹¹ Regardless, the cost for agencies to engage in such projects will undoubtedly prevent massive use of remote monitoring as the primary method for detecting cheating.³¹² As a result, remote monitoring should serve as a backup check to detect potential tampering or failures associated with mandatory CEMS.³¹³ In addition, remote monitoring should continue until the more permanent solution of mandatory CEMS comes to being.

The AIS can provide the needed electronic platform to receive CEMS data.³¹⁴ The AIS is an automated, autonomous tracking system used for the exchange of navigational information between ships and AIS-receiving stations, such as AIS-equipped terminals, including port state controls or environmental agency authorities.³¹⁵ The IMO requires large ships that travel internationally to carry an AIS transponder.³¹⁶ In layman's terms, vessels send out a signal every couple of seconds that includes static elements such as vessel identifiers and dynamic elements such as location (latitude/longitude), vessel speed, and destination, which is typically provided by the vessels' global positioning systems. These signals are received by other vessels, offshore platforms, terrestrial bases, and satellites for operations in international waters. There is no reason that there could not be a dedicated channel for broadcast of CEMS data through the existing AIS. Interestingly, the AIS can also receive information

Kong Authorities Set to Ramp Up Fight against Air Pollution from Ships by Flying Drones to Monitor Emissions, <https://www.scmp.com/news/hong-kong/health-environment/article/2184344/hong-kong-authorities-set-ramp-fight-against-air> (Jan. 30, 2019, 6:53 PM) (describing Hong Kong's funding of a university project to test drones to monitor SO₂ emissions from ships).

310. *Emissions Monitoring Ensuring a Level Playing Field Post-2020*, *supra* note 21.

311. *See supra* Part I.

312. *See Halff, supra* note 250. In 2018, the Norwegian Maritime Authority purchased drone technology and other specialized equipment for measuring sulfur emissions from ship exhaust for 14 million Norwegian Krone, or approximately \$1.5 million dollars. *More Sulphur Testing with Drones*, NORWEGIAN MARITIME AUTH. (Oct. 10, 2018), <https://www.sdir.no/en/news/news-from-the-nma/more-sulphur-testing-with-drones/>.

313. Tampering with CEMS under the CAA, for example, is a criminal act. *See* Press Release, U.S. Attorney's Office: District of Mass., *Former Berkshire Power Technician Sentenced for Conspiring to Tamper with Air Pollution Monitors*, (June 9, 2017), <https://www.justice.gov/usao-ma/pr/former-berkshire-power-technician-sentenced-conspiring-tamper-air-pollution-monitors>.

314. *See What Is the Automatic Identification System (AIS)?*, MARINETRAFFIC, <https://help.marinetraffic.com/hc/en-us/articles/204581828-What-is-the-Automatic-Identification-System-AIS-> (last visited Feb. 13, 2020).

315. *Id.*

316. *See* AIS Transponders, INT'L MARINE ORG., <https://www.imo.org/en/OurWork/Safety/Pages/AIS.aspx> (last visited Jan. 31, 2021).

directly from satellites.³¹⁷ Such a centralized reporting system has the key benefit of allowing multiple agencies to access ongoing information about regulated entity behavior at one time.³¹⁸

Public accessibility of CEMS monitoring and reporting data will undoubtedly be a concern for regulated shipping entities. The AIS was originally developed by IMO as a standard which would help ships to avoid collisions and assist port authorities in controlling marine traffic.³¹⁹ However, it became clear that the AIS could be used in a variety of business- and research-related areas as well. Now, the AIS is used by a variety of people, industries, and agencies. All that is needed is an AIS access account. An AIS account can cost between \$75 and over \$9,000 per month, depending on the number of vessels being tracked, whether satellite tracking is needed, the response rate of the transmissions, the inclusion of historical data, and customized data configurations.³²⁰ Thus, if agencies were to publicize CEMS data through the AIS, the information would be publicly available. Such transparency may be just what regulated shipping entities need to ensure that any cheating on IMO 2020 standards will not go unnoticed.

Indeed, the concept of continuous monitoring should not be unfamiliar to regulated shipping entities or IMO. MARPOL Annex I, which controls oil pollution discharges from ships, already includes continuous monitoring requirements.³²¹ The costs and technical arguments against mandatory CEMS are so minor that they are outweighed by the relative benefits to industry as a whole from an increase in the likelihood of detecting cheating. That is, CEMS helps the shipping industry ensure that cheaters will be caught, thereby making it worth the cost for individual shipping companies to spend money on compliant fuel in the first place. Further, CEMS helps the shipping industry know when individual shipping companies are in violation, thereby helping in making business decisions to avoid entering into contracting relationships with such noncompliant companies.

Lastly, governments, recognizing the practical and financial limits of remote monitoring, should see the benefit of CEMS and the AIS and also push

317. *What Is the Automatic Identification System (AIS)?*, *supra* note 314.

318. THE BOARD OF THE INT'L ORG. OF SEC. COMM'NS, TECHNOLOGICAL CHALLENGES TO EFFECTIVE MARKET SURVEILLANCE ISSUES AND REGULATORY TOOLS (2013), <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD412.pdf>; *see also* Heather Perez et. al., *Automatic Identification Systems (AIS) Data Use in Marine Vessel Emission Estimation*, E. RSCH. GRP., <https://www3.epa.gov/ttnchie1/conference/ei18/session6/perez.pdf> ("AIS is a unique program that provides a means for ships to electronically broadcast ship data at regular intervals including: vessel identification, position, course, and speed. These and other data are transmitted continuously, providing a comprehensive and detailed data set for individual vessels . . .").

319. *See What Is the Automatic Identification System (AIS)?*, *supra* note 314.

320. *Pricing Plans*, FLEETMON, <https://www.fleetmon.com/pricing-plans/> (last visited Jan. 31, 2021); *Pricing*, SPIRE MARITIME, <https://maritime.spire.com/pricing/> (last visited Jan. 31, 2021).

321. *Annex I – Regulations for the Prevention of Pollution by Oil*, MARPOL TRAINING, http://www.marpoltraining.com/MMSKOREAN/MARPOL/Annex_I/r31.htm (last visited Feb. 13, 2020).

for their adoption by IMO as a required monitoring and reporting method. The authors note that it still takes significant work for government agencies to sort through CEMS data.³²² However, the advantage in targeting inspections and sampling should more than make up for the investment in data targeting software. In addition, electronic monitoring and reporting should save agencies money and improve inspection and enforcement targeting to the ships most likely to be (or to have been) in violation. Systems will need to be developed to scan the incoming data and provide assessments to port state and flag state³²³ authorities. Ideally, the IMO would provide this service; if it does not, that responsibility would fall either to the individual port and flag states or to the regional groupings of port states, such as the Paris MOU or the Tokyo MOU.³²⁴

We should not risk a high level of global noncompliance before the shipping community at large embraces the merits of mandatory installation of CEMS.³²⁵ As early as 2014, the Clean Shipping Coalition called for the installation of CEMS on all ships and for the use of such CEMS during the entire journey of the ship.³²⁶ Maersk, a shipping entity, has stated, “We need a black box on every ship to measure what it is emitting.”³²⁷ It is time for everyone to get on board.

CONCLUSION

The goal of this Article is to focus on mandated self-monitoring and reporting as a way to help agencies detect corporate noncompliance, and particularly corporate cheating, with regulations that we all benefit from. While the case study at issue here is on the shipping industry and detection of cheating with new international SO₂ pollution standards, the overall point of this Article has application in other areas of environmental regulation. Two potential areas where technology can help in mandatory self-monitoring and reporting are detection of defeat devices in vehicles and detection of methane leaks at oil and gas sites.

322. See Coglianesse, *supra* note 200, at 5 (noting that governments “need to manage all the information it amasses so that environmental data can be linked with other datasets and analyzed”)

323. See Karan Chopra, *What Are Flag States in the Shipping Industry and What’s Their Role?*, MARINE INSIGHT (Oct. 13, 2019), <https://www.marineinsight.com/maritime-law/what-are-flag-states-in-the-shipping-industry-2/>.

324. See *Port State Control*, INT’L MARINE ORG. (last visited Nov. 18, 2020), <http://www.imo.org/en/OurWork/MSAS/Pages/PortStateControl.aspx>. MOUs are “inter-governmental co-operative organization[s] on port State control.” See *About Tokyo MOU*, TOKYO MOU (last visited Jan. 21, 2021), http://www.tokyo-mou.org/organization/about_tokyo_mou.php. Their purpose “is to eliminate the operation of sub-standard ships through a harmonized system of port State control.” See *Organisation, PARIS MOU ON PORT STATE CONTROL* (last visited Jan. 21, 2021), <https://www.parismou.org/about-us/organisation>.

325. *Emissions Monitoring Ensuring a Level Playing Field Post-2020*, *supra* note 21.

326. *Continuous Emissions Monitoring – Why Knowledge Is Power for ECA Compliance*, CLEANER SEAS (Sept. 29, 2014), <https://www.cleanerseas.com/continuous-emissions-monitoring-knowledge-power-eca-compliance/>.

327. See MOLLOY, *supra* note 244.

State agencies, in particular, are exploring various technologies to help in detection of defeat devices. California Air Resources Board, the agency responsible at the California state level for enforcement of air pollution standards, has also been looking at technology, including the Real Emissions Assessment Logging (REAL) program, to detect NO_x defeat device violations, similar to what occurred in the Volkswagen scandal.³²⁸ REAL would require internal onboard diagnostic systems in vehicles to collect and store NO_x emissions data on medium- and heavy-duty diesel vehicles, starting in the 2022 model year.³²⁹ The REAL data would be retrieved from the vehicle by plugging a scan tool or data reader into the vehicle. As a result, REAL would operate similarly to a mandatory self-monitor and report system. As noted by one California Air Resources Board official, “REAL will provide the ability to monitor all vehicles for emissions performance, and allow us to spot trouble faster. Had this program been available sooner, we would likely have recognized widespread, serious problems with manufacturers such as Volkswagen . . . much earlier.”³³⁰

Further, there is significant potential for use of sensors to detect noncompliance and cheating with methane standards at oil and gas facilities. For example, a collaboration between industry, environmental groups, and universities, called Project Astra, is working on a sensor network for the oil and gas producing regions of the United States.³³¹ The stated goal of the project is to provide near-continuous monitoring, allowing producers and regulators to find and fix significant methane releases which are currently only measured on an annual or semi-annual basis.³³² Of note, EPA has found significant widespread noncompliance with Leak Detection and Repair regulations.³³³ Sensors like those described in Project Astra have the potential to curb widespread noncompliance.

Detection is key in multiple areas of environmental enforcement. Agencies must have information that is reliable and continuous in order to keep up. It is in the interest of industry, too, to ensure that agencies are able to effectively enforce regulations, particularly where cheaters that go undetected are able to gain an advantage in the marketplace. Mandatory self-monitoring and reporting, especially with the help of technology, can help both agencies and industry

328. *CARB Gets “REAL” to Further Cut Pollution from Diesel and Gas Vehicles*, CAL. AIR RES. BD. (Nov. 15, 2018), <https://ww2.arb.ca.gov/news/carb-gets-real-further-cut-pollution-diesel-and-gas-vehicles>.

329. *Id.*

330. *Id.*

331. *Sensor Network Could Change How Methane Emissions Are Detected*, U. TEXAS NEWS, <https://news.utexas.edu/2020/05/19/sensor-network-could-change-how-methane-emissions-are-detected/> (May 19, 2020).

332. *Id.*

333. EPA, LEAK DETECTION AND REPAIR: A BEST PRACTICES GUIDE 1 (Oct. 2007), <https://www.epa.gov/sites/production/files/2014-02/documents/ldarguide.pdf>.

achieve such intended goals. Technology provides a way for enforcement agencies to get ahead of violations before they occur. There is no need to wait for the next corporate cheating scandal.

We welcome responses to this Article. If you are interested in submitting a response for our online journal, *Ecology Law Currents*, please contact cse.elq@law.berkeley.edu. Responses to articles may be viewed at our website, <http://www.ecologylawquarterly.org>.