SUGGESTED INDICATORS OF ENVIRONMENTALLY RESPONSIBLE PERFORMANCE OF OFFSHORE OIL AND GAS COMPANIES PROPOSING TO DRILL IN THE U.S. ARCTIC

Harvard Law School
Emmett Environmental Law & Policy Clinic

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The Emmett Environmental Law and Policy Clinic at Harvard Law School (ELPC) works on a variety of local, national, and international projects covering the spectrum of environmental law and policy issues under the direction of Wendy B. Jacobs, Esq., a Clinical Professor at Harvard Law School and Director of the ELPC. This paper was authored by Wendy B. Jacobs, with assistance from David Baake and Mary Schnoor, who are, respectively, third- and first-year students at Harvard Law School. Other students who contributed to this project are Elisabeth Costa, Ephraim Olson, and Jocelyn Sedlet, all current or recently graduated Harvard Law School students.

Cover Image: BP arctic drilling rig, available at http://www.propublica.org/images/bp_slideshow/IMG_9930.jpg.

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EXECUTIVE SUMMARY

This paper suggests a set of performance indicators for use to evaluate and predict the environmental performance of companies proposing to drill for oil or gas in the U.S. Arctic. We use the term "performance indicator" to refer to an observable metric that correlates with an aspect of an operator's performance that is either too difficult to measure directly or too broad to be reduced to a single, precisely quantifiable metric.[1] Performance indicators can be used to compare an operator's performance in a particular year against its performance in previous years or against average industry performance.[2] Hence, these indicators provide important information for regulators, investors, members of the general public, and operators themselves.[3]

In the years since the Deepwater Horizon oil spill in the Gulf of Mexico, policymakers have been very interested in developing performance indicators for the offshore oil and gas industry.[4] Much of their focus has been on the development of process safety indicators – indicators that correlate with the risk of catastrophic accidents.[5] Less consideration has been given to the development of indicators that correlate with harm to public health or the environment resulting from the routine construction, operation, and decommissioning of offshore wells. Yet, a true culture of safety cannot limit its attention to the prevention of catastrophic accidents, but must also seek to protect against the cumulative harms

1 *See* Org. for Econ. Coop. & Dev., Guidance on Developing Safety Performance Indicators Related to Chemical Accident Prevention, Preparedness and Response 5 (2d ed. 2008) [hereinafter OECD Guidance] ("The term 'indicators' is used to mean observable measures that provide insights into a concept – safety – that is difficult to measure directly.").

2 *See* Ian Whewell, *Performance Indicators in Major Hazard Industries* 8; Chem. Safety Bd. Pub. Hearing: Safety Performance Indicators (2012), http://perma.law.harvard.edu/0xoqT9KTsTm.

3 Operators may benefit from performance indicators by integrating them into their managerial control systems. *See* Paolo Perego & Frank Hartmann, *Aligning Performance Measurement Systems With Strategy: The Case of Environmental Strategy*, 45 Abacus 397 (2009).

4 *See* Int'l Ass'n Oil & Gas Prod., Recommended Practice on Key Performance Indicators (Report No. 456, 2011), *available at* http://perma.law.harvard.edu/0jhs3Cvbynv; Chem. Safety Bd. Pub. Hearing, *supra* note 2; Comm. on the Effectiveness of Safety & Envtl. Mgmt. Sys. for Outer Cont'l Shelf Oil & Gas Operations, Transp. Research Bd., Evaluating the Effectiveness of Offshore Safety and Environmental Management Systems, Special Report 309, 5 (2012) [hereinafter Transp. Research Bd.].

5 *See* Int'l Ass'n Oil & Gas Prod., *supra* note 4; Chem. Safety Bd. Pub. Hearing, *supra* Note 2.

resulting from an operator's day-to-day operations.[6] Thus, although there remains an urgent need for continued development of process safety indicators, the development of environment-specific indicators is also imperative.

As the offshore oil and gas drilling industry expands into U.S. waters off the coast of Alaska, it is critical that policymakers develop both process safety and environment-specific indicators that are tailored for effective oversight of operator performance in this environmentally significant and challenging setting. The Arctic presents formidable new challenges to operators accustomed to working in temperate climate, including "extreme cold, varying forms and amount of sea ice, seasonal darkness, high winds, extended periods of heavy fog, and week-long storms that approach hurricane strength."[7] These demanding physical conditions can be expected to "both heighten the risk of an oil spill and limit the effectiveness of oil spill response operations."[8] Compounding these challenges is the fact that the Arctic is remote and far from the critical resources, infrastructure and supplies needed to clean up chemical spills and releases. Given the heightened accident risk in the Arctic, there is a pressing need for process safety indicators that can be used to evaluate the safety performance of companies operating in this region.

The development of environment-specific indicators is similarly crucial. The Arctic region is "home to a number of unique, diverse, and fragile ecosystems."[9] These ecosystems sustain a diverse collection of species (including many marine mammals and endangered species), as well as human communities that depend on these ecosystems for their food and way of life.[10] These interests are threatened, not only by catastrophic accidents, but also by environmental impacts resulting from routine drilling activities, including, but not limited to, exploration, construction of wells and pipelines, transporta-

6 *See* Emmett Envtl L. & Pol'y Clinic, Comments on Bureau of Safety and Environmental Enforcement (BSEE) Draft Safety Culture Policy Statement 3, Docket ID. BSEE-2012-0017 (March 20, 2013) ("While it is critical to prevent accidents of all sorts, accident prevention is not synonymous with safety. A true "culture" of "safety" is broader and protects against intended as well as unintended danger and damage to persons, property and the environment.").

7 Nat'l Comm'n on the BP Deepwater Horizon Oil Spill & Offshore Drilling, Offshore Drilling in the Arctic: Background and Issues for the Future Consideration of Oil and Gas Activities 10 (Staff Working Paper No. 13, 2011).

8 *Id.*

9 *Id.* at 22.

10 *See id.* at 13–15.

tion of oil and gas, and day-to-day operation of vessels, wells and associated structures.[11] To minimize damage to and adverse impacts on valuable human and environmental interests, environment-specific indicators must be developed and applied.

Choice of Indicators

In identifying appropriate performance indicators, we sought to include a mix of leading, intermediate, and lagging indicators. Leading indicators measure the strength of a company's safeguards against future failures in environmental performance. Intermediate indicators track relatively minor failures in an operator's performance that may be predictive of more substantial performance failures. Lagging indicators track past failures in an operator's environmental performance.[12] We include several leading indicators because they help industry and interested persons to focus on the need for changes in an operator's behavior before environmental harm occurs. Such a proactive approach is necessary where, as here, an operator's failure to act in an environmentally responsible manner risks degrading a precious and irreplaceable ecosystem, such as exists in the Arctic.

The indicators presented here are intended to provide a comprehensive portrait of an operator's environmental performance. We attempted to address all aspects of offshore oil and gas operations in the Arctic, including exploration, drilling, production, and product transportation, and to cover both the risk of catastrophic accidents and environmental impacts that occur during the course of normal operations. We chose indicators for which data is available or reasonably easy to acquire and, where possible, we drew from indicators that are used by other nations or industry groups. The collection of suggested indicators is large enough to be comprehensive, but small enough to permit tracking of all indicators. A summary of the indicators is presented in Table 1.

11 *See* Oil Ind. Int'l Exploration & Prod. Forum & UNEP, Environmental Management in Oil and Gas Exploration and Production 20 (1997) (listing environmental impacts associated with the day-to-day operation of an offshore well, including air, water, noise and light pollution).

12 *Cf.* OECD Guidance, *supra* note 1, at 5 (describing outcome and activities indicators).

Table 1: Suggested Indicators

Indicator	Metric	Data Already Collected by Operators?	Data Already Collected by BSEE?	Authority for Data Collection (relevant agency is BSEE unless otherwise indicated)	Notes & Precedent
Leading Indicators					
SEMS Personnel Survey Indicators	Satisfactory or unsatisfactory performance on questions pertaining to clarity of SEMS goals and responsibilities, supervisory involvement, worker professionalism/empowerment, reporting, performance feedback, safety values/commitment, procedures and equipment, and training?	No	No	30 C.F.R. 250.1924	Clear predictive value; incentive for operators to improve their SEMS programs; some administrative costs and need to comply with the Paperwork Reduction Act *Precedent*: NOPSEMA (Australia) process safety survey program
Safety and Pollution Prevention Equipment (SPEE) Maintenance Backlog	Percentage of SPEE maintenance projects not completed on time	Yes	No	30 C.F.R. 250.1916; 250.1924	Clear predictive value; incentive for operators to increase investment in SPEE maintenance; need to issue NTL *Precedent*: Oil & Gas UK's "safety critical maintenance backlog" indicator
Air Pollution	Metric tons of NO_x emitted per million barrels of oil produced Metric tons of SO_2 emitted per million barrels of oil produced Metric tons of VOCs emitted per million barrels of oil produced Metric tons of GHGs emitted per million barrels of oil produced	Yes	Yes for operators in the Gulf (every 3 years since 2005); No for operators in the Arctic	30 C.F.R. 550.303(k) (BOEM)	This indicator will provide information about air pollution resulting from the day-to-day operations of offshore wells and will tend to correlate with an operator's commitment to environmentally responsible performance; need to issue NTLs to begin tracking emissions in the Arctic
Intermediate Indicators					
Civil and Administrative Violations	Major violations per million barrels of oil produced; significant violations per million barrels of oil produced; minor violations per million barrels of oil produced	Yes	Yes	N/A	Clear predictive value; incentive for operators to improve compliance; data already available and accessible
Kick Frequency & Kick Response Time	Kicks per year (or per 10,000 well completions); time until response to kick	Yes	Yes (well kicks), No (response time)	30 C.F.R. 250.466; 250.469	Clear predictive value; incentive for operators to improve pressure management and kick management; difficult to manipulate and not open to interpretation; need to issue NTLs
Loss of Primary Containment (LOPC) Events – Tier 2	Tier 2 events per million barrels of oil produced; mass released from primary containment per year	Yes, if required by regulation	Yes, with exceptions (e.g., events involving super-threshold releases of hazardous substances that do not cause another reportable event)	30 C.F.R. 250.188	This indicator will provide information about events that cause some harm to people or the environment; data already publicly available for LOPC covered by Section 250.188 (not all LOPC are covered by regulation at present)

Indicator	Metric	Data Already Collected by Operators?	Data Already Collected by BSEE?	Authority for Data Collection (relevant agency is BSEE unless otherwise indicated)	Notes & Precedent
Lagging Indicators					
Loss of Primary Containment (LOPC) Events – Tier 1	Tier 1 events per million barrels of oil produced	Yes, if required by regulation	Yes, with exceptions (e.g., events involving super-threshold releases of hazardous substances that do not cause another reportable event)	30 C.F.R. 250.188	This indicator will provide information about events that cause significant harm to people or the environment in the form of fatalities, injuries, explosions, fires, or releases of hazardous pollutants; data already publicly available for LOPC covered by Section 250.188 (not all LOPC are covered by regulation at present)
Oil Releases	Major oil spills per million barrels of oil produced; significant oil spills per million barrels of oil produced; minor oil spills per million barrels of oil produced	Yes	Yes	30 C.F.R. 254.46 (BSEE) 49 C.F.R. 195.50 (PHMSA) 40 C.F.R. 300.125 (Coast Guard)	This indicator will provide information about a serious failure in an operator's environmental compliance program; will track catastrophic and non-catastrophic risk; data already publicly available
Work-Related Fatalities and Reportable Injuries	Work-related fatalities and injuries requiring evacuation or that result in one or more days away from work or one or more days of restricted work or job transfer	Yes	Yes	30 C.F.R. 250.188	This indicator will provide information about the ultimate failure of an operator's safety compliance program; data already publicly available

INTRODUCTION

The suggested performance indicators were chosen to track the environmental performance of offshore oil and gas companies operating in the U.S. Arctic. Below we define each selected indicator and explain its utility for evaluating an operator's environmental performance. We then consider whether the Department of the Interior's Bureau of Safety and Environmental Enforcement (BSEE) or another federal agency currently has the raw data that is needed to establish the indicator, and if not, which agency has the authority to collect the data. Finally, we consider how interested members of the general public and the communities that are potentially affected by drilling activities will be able to access this data.[13]

We offer two general suggestions regarding the use of the performance indicators. First, we suggest that indicators should be measured in normalized units to allow for meaningful comparison of the performance of different operators, facilities or projects. Thus, units such as "barrels of oil spilled per million barrels of oil produced" or "workplace injuries per hours worked" should be used instead of units that do not take into account the size of an operation, such as "barrels of oil spilled" or "workplace injuries."

Second, we suggest that indicators should track both the trend of an indicator measure and its current value. It is necessary to consider indicator trends because there may be circumstances where the current value of an indicator may correlate poorly with the prospective risk posed by an operator. For example, a single large hydrocarbon release is not necessarily predictive of poor future performance, especially if the operator responds to the event by implementing comprehensive changes to its safety and environmental compliance programs. At the same time, current value should be considered along with the trend, to reflect the fact that operators with consistently superior performance relative to the industry average have less opportunity to demonstrate improved performance.

13 *See* discussion *infra* pp. 13-15, 17-18, 21-22, 24-28.

LEADING INDICATORS

1. Personnel Surveys Regarding Operator's Safety and Environmental Management System

Definition

The Safety and Environmental Management System (SEMS)[14] and SEMS II[15] Rules (collectively referred to as the SEMS Rules) were adopted by BSEE in order to "focus attention on the role of human error and poor organization in accidents, drive continuous improvement in the offshore industry's safety and environmental records, encourage the use of performance-based operating practices, and encourage collaboration between industry to promote the interests of offshore worker safety and environmental protection."[16] The SEMS Rules require operators to develop and implement, inter alia, a facility-wide hazards analysis and a job safety analysis,[17] a set of "written operating procedures . . . for conducting safe and environmentally sound activities,"[18] and "a training program" to ensure that "all personnel are trained to work safely and are aware of environmental considerations offshore."[19]

The SEMS Rules require operators to audit their SEMS programs at least once every three years, and to submit the audit results to BSEE.[20] We recommend that BSEE supplement these audits by conducting periodic surveys of an operator's personnel (i.e., its employees and contracted workers).

14 Oil and Gas and Sulphur Operations in the Outer Continental Shelf – Safety and Environmental Management Systems; Final Rule, 75 Fed. Reg. 63,610 (Oct. 15, 2010) (codified at 30 C.F.R. Part 250, Subpart S) [hereinafter SEMS Rule].

15 Oil and Gas and Sulphur Operations in the Outer Continental Shelf – Revisions to Safety and Environmental Management Systems; Final Rule, 78 Fed. Reg. 20,423 (Apr. 5, 2013) (codified at 30 C.F.R. Part 250, Subpart S) [hereinafter SEMS II Rule].

16 *Id*. at 20,424.

17 *See* 30 C.F.R. § 250.1911.

18 *Id.* at § 250.1913.

19 *Id.* at §250.1915.

20 *See id.* at §250.1920(b).

These surveys would ask personnel to answer questions related to the operator's compliance with the SEMS Rules and about their own understanding of safety and environmental policies and procedures.[21]

In developing such a survey program, BSEE could draw upon the experience of Australia's National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), which has recently started to administer a process safety survey to offshore workers at operations under its jurisdiction.[22] NOPSEMA's worker survey includes questions on eight topics: clarity of goals and responsibilities, supervisory involvement, worker professionalism/empowerment, reporting, performance feedback, safety values/commitment, procedures and equipment, and training.[23] Offshore workers are asked whether they agree, tend to agree, tend to disagree, or disagree with a series of propositions, such as "In my work group, process safety concerns are secondary to achieving production goals;" "I can report hazardous conditions without fear of negative consequences;" and "My supervisor/immediate manager puts a high priority on process safety through actions and not just empty slogans."[24] Once collected, an operator's scores are compared to benchmarks provided by a professional services company to determine whether the operator's performance is satisfactory or unsatisfactory.[25]

At present, NOPSEMA reports the results of its surveys in aggregate,[26] which prevents interested persons from using this data to compare the performance of different operators. We recommend rating each operator individually, so that interested persons (i.e., investors, regulators, and the public generally) can encourage underperforming companies to make improvements.

21 Such interviews would also advance the recommendations of the Transportation Research Board. *See* Transp. Research Bd., *supra* note 4, at 5, 21.

22 *See Process Safety Surveys,* NOPSEMA, http://perma.law.harvard.edu/0p66iLGFng3.

23 *See* NOPSEMA, Offshore Health and Safety Performance Report 23 (2010) [hereinafter Offshore Health and Safety Performance Report], http://perma.law.harvard.edu/0EYDfs6e52X. *Cf.* OECD Guidance, *supra* note 1, at 42-57.

24 *Offshore Process Safety Culture Survey*, NOPSEMA, http://perma.law.harvard.edu/0YTCfRqJG3s.

25 *See* Offshore Health and Safety Performance Report, *supra* note 23, at 23.

26 *See id.*

Why are such surveys useful indicators?

Survey answers concerning an operator's compliance with the SEMS Rules would provide important information regarding the operator's safety culture and, hence, its prospective risk. The importance of an effective safety culture in preventing catastrophic accidents cannot be overstated; indeed, the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling ("National Commission") concluded that the inadequacy of the relevant companies' safety cultures was "the clear root cause of the blowout" on the Deepwater Horizon.[27] But a far more common manifestation of an inadequate safety culture will be less dramatic, less visible (but nonetheless unacceptable) harm to people and the environment resulting from daily, routine operations. Because personnel surveys will offer insight into both catastrophic and non-catastrophic risk, they are especially useful for highlighting environmentally responsible performance and risk-minimizing behaviors.

In addition to providing information to regulators, investors, and other interested persons, regular personnel surveys would have two additional benefits: they would incentivize operators to improve their SEMS programs and raise personnel awareness of the SEMS program.

How will the necessary information be obtained?

Surveys could be conducted on paper or online and could be administered by BSEE or a reliable third party. BSEE has ample legal authority to establish such a program (though it would need to comply with the procedures set forth in the Paperwork Reduction Act before doing so[28]). Existing regulations permit BSEE to evaluate a facility to determine whether an operator's SEMS program "is in place, addresses all required elements, and is effective in protecting the safety and health of workers, the environment, and preventing incidents."[29] BSEE has authority to verify that personnel are following the SEMS program as part of this evaluation.[30] Therefore, BSEE has authority to conduct a personnel

27 *See* Nat'l Comm'n on the BP Deepwater Horizon Oil Spill & Offshore Drilling, Deep Water: The Gulf Oil Disaster and the Future of Offshore Drilling 133 (2011); *see also id.* at 217 (calling on industry to embark on "sweeping reforms that accomplish no less than a fundamental transformation of its safety culture.").

28 *See* 44 U.S.C. § 3507(a) (2006) (providing that an agency must comply with certain procedures before conducting a "collection of information"); *id.* at 3502(3) (defining "collection of information" as, *inter alia*, "the obtaining . . . of facts or opinions by or for an agency, regardless of form or format" calling for "answers to identical questions posed to . . . ten or more persons"); *see also* Memorandum from Cass R. Sunstein, Adm'r, Office of Info. & Regulatory Affairs, to Heads of Exec. Dept's & Agencies, & Indep. Regulatory Agencies (April 7, 2010), http://perma.law.harvard.edu/077yjb6wyq1 ("The requirements of the [Paperwork Reduction Act] apply to voluntary collections as well as to mandatory collections . . . .").

29 30 C.F.R. § 250.1924(a).

30 *See id.* at § 250.1924(c)(1).

survey to verify that an operator's SEMS program addresses all required elements and that personnel are complying with the SEMS program.

Upon collecting survey data and determining whether an operator's performance on each program component is satisfactory, BSEE can and should publish the results[31] so that other agencies and interested members of the public can make use of this indicator.

2. Safety and Pollution Prevention Equipment Maintenance Backlog

Definition

Safety and pollution prevention equipment (SPPE) are components of an installation the failure of which could cause or contribute substantially to a major accident or pollution incident.[32] The purpose of SPPE is to prevent or limit the effect of a major accident or pollution incident. SPPE maintenance is the inspection, testing, and other maintenance needed to ensure that SPPE "remain in good working order and continue to meet defined performance standards."[33] SPPE maintenance backlog is a performance indicator that measures the percentage of SPPE inspections, tests, and other maintenance operations that are not completed on time.

We wish to emphasize that SPPE must be understood to include computer control systems and similar software. Automated systems are essential for the safety, reliability, and performance of modern offshore drilling vessels,[34] and the failure of these systems are among the most common causes of reported incidents on these vessels.[35] Given the importance of computer systems to process safety,

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31 *See* U.S. Dep't of Justice, Freedom of Information Act Guide 686 (noting that agencies are generally free to make "discretionary disclosures").

32 30 C.F.R. § 250.1916 (requiring operators to establish a mechanical integrity program to ensure the integrity of "all equipment and systems used to prevent or mitigate uncontrolled releases of hydrocarbons, toxic substances, or other materials that may cause environmental or safety consequences."). *cf.* Oil & Gas UK, Health & Safety Report 5 (2012), *available at* http://perma.law.harvard.edu/0Wo8JceiDpQ (defining "safety-critical elements").

33 Bob Lauder, *Major Hazard (Asset Integrity) Key Performance Indicators in use in the UK Offshore Oil and Gas Industry*, Chem. Safety Bd. Pub. Hearing, *supra* note 2.

34 *See* Jon Espen Skogdalen & Oyvind Smogeli, *Reliability of Safety Critical Control Systems on Offshore Drilling Vessels* 1 (Univ. Cal. Berkeley, Deepwater Horizon Study Grp., Working Paper, 2011).

35 *See id.* at 7 (noting that computer issues were responsible for the majority of incidents reported to the International Marine Contractors Association in 2007).

it is critical that computer inspection and maintenance be included in an indicator tracking SPPE maintenance backlog.[36]

Why is this a useful indicator?

An operator's SPPE maintenance backlog is a useful indicator because it provides information about how consistently the operator maintains critical equipment and systems in the face of competing concerns. This indicator offers strong predictive value because equipment failure and ensuing environmental harm are more likely to occur when SPPE have not been regularly tested and maintained according to established procedures. Once the basic parameters of a SPPE maintenance indicator are established, the indicator could be further improved by assigning different weight to different equipment, such that timely inspections of comparatively more fragile, more essential equipment could be given greater weight than timely inspections of comparatively less fragile, less essential equipment.

How will the necessary information be obtained?

BSEE does not currently collect an operator's SPPE maintenance backlog, but it has ample authority to do so. Under the SEMS Rule, operators are required to document "each inspection and test that has been performed on" "all equipment and systems used to prevent or mitigate uncontrolled releases of hydrocarbons, toxic substances, or other materials that may cause environmental or safety consequence" (i.e., SPPE).[37] The SEMS Rule also requires operators to make available to BSEE all "documents or other information" pertaining to their SEMS programs upon BSEE's request.[38] Thus, BSEE has authority to obtain any documents or information related to an operator's SPPE maintenance simply by requesting it. To reduce administrative costs, BSEE could issue a notice to lessees (NTL) specifying the manner, timeframe, and format for submissions of requested information.[39] Operators who are compliant with the SEMS Rules should already have records of

36 Computer programs fit comfortably within the definition of "equipment and systems" that must be included in an operator's "mechanical integrity program." *See* 30 C.F.R. § 250.1916.

37 30 C.F.R. § 250.1916(d) (requires operators to document "each inspection and test that has been performed on [all equipment and systems used to prevent or mitigate uncontrolled releases of hydrocarbons, toxic substances, or other materials that may cause environmental or safety consequence]").

38 *Id.* at § 250.1924(b)(5).

39 *See id.* at § 250.103 ("BSEE may issue Notices to Lessees and Operators (NTLs) that clarify, supplement, or provide more detail about certain requirements. NTLs may also outline what you must provide as required information in your various submissions to BSEE.").

planned, deferred, and delayed maintenance work;[40] therefore, organizing this data for submission to BSEE should not be burdensome.

Upon compiling this information, BSEE should publish the results. If BSEE declines to do so, interested persons should be able to obtain the information by filing a Freedom of Information Act (FOIA) request.[41] FOIA requests are not the preferred option.

3. Air Pollution

Definition

This indicator would track emissions of certain air pollutants from an operator's offshore facilities. Offshore drilling facilities and support vessels emit nitrogen oxides (NO_x), sulfur dioxide (SO_2), volatile organic compounds (VOCs), particulate matter (e.g., black carbon) and greenhouse gases (GHGs) as the result of flaring and venting of gases, combustion processes, mud degassing, and other activities.[42] These pollutants harm the environment locally (in the case of NO_x, SO_2, VOCs and particulate matter) and globally (in the case of GHGs). NO_x and SO_2 contribute to acid precipitation, which harms "lakes, streams, and forests and the plants and animals that live in these ecosystems."[43] VOCs and NO_x contribute to the formation of ground-level ozone, which adversely "affects sensitive vegetation and ecosystems" and can cause "loss of species diversity and changes to habitat quality and water and nutrient cycles."[44] GHGs contribute to climate change, which is causing changes in the global water cycle, melting of Arctic sea ice, ocean warming and sea level rise, ocean acidification, and other significant environmental changes, and adversely affecting human communities and ecosystems worldwide.[45] Black carbon absorbs solar energy and as it settles on ice and snow causes melting, thus

40 *See id.* at § 250.1916(c) (requiring operators to maintain written procedures to address the "frequency of inspections and tests"); *id.* at § 250.1916(d).

41 *See* 5 U.S.C. § 552(a)(3)(A).

42 *See* Oil Ind. Int'l Exploration & Prod. Forum & UNEP, *supra* note 11, at 12; BOEMRE, Year 2008 Gulfwide Emission Inventory Study 1-2 (2010).

43 EPA, Acid Rain, http://perma.law.harvard.edu/08LcuzGztbc.

44 EPA, Ground Level Ozone: Ecosystem Effects, http://perma.law.harvard.edu/0maBY9Dehoc.

45 *See generally* IPCC, Summary for Policymakers, Climate Change 2013: The Physical Science Basis (2013); *See generally* IPCC, Summary for Policymakers, Climate Change 2007: Impacts, Adaptation, and Vulnerabilities (2007).

exacerbating environmental change and damage, particularly in the Arctic.[46]

Emissions of these pollutants from offshore drilling facilities and support vessels should be measured and regularly reported. This information would allow regulators to take appropriate action to protect the Arctic environment and could be used by investors and other interested persons to advocate for changes in operator behavior. Emissions should be reported in normalized units, such as "kg SO_2 per million barrels of oil produced."

Why is this a useful indicator?

Although offshore drilling will inevitably produce some air pollution, it is possible for operators to significantly reduce their emissions through the use of "emerging technologies and improved practices," including more efficient gas turbines, improved flare design, and improved well testing procedures and technologies.[47] Operators with a strong commitment to environmentally responsible performance and effective internal governance mechanisms can be expected to adopt technologies and practices that minimize their emissions. By contrast, operators that lack a strong commitment to environmentally responsible performance or effective internal governance mechanisms are unlikely to adopt emission control technologies and practices voluntarily. Thus, emissions data can be helpful for ascertaining which operators place the greatest priority on environmentally responsible performance.

How will the necessary information be obtained?

Since 2005, the Bureau of Ocean Energy Management (BOEM) has performed a Gulfwide Emissions Inventory every three years.[48] To create this inventory, BOEM requires operators to "report activity information including facility, equipment, and fuel usage" over the course of a year.[49] Using this data and standardized emissions factors provided by EPA, BOEM estimates the facility's emissions of NOx, SO2, VOCs, and GHGs (among other pollutants).[50] BOEM has published the activity information it used to estimate the emissions of each offshore drilling rig.[51] That information could be used to

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46 EPA, Effects of Black Carbon, http://www.epa.gov/blackcarbon.

47 Oil Ind. Int'l Exploration & Prod. Forum & UNEP, *supra* note 11, at 13, 55.

48 *See* BOEM, 2014 Gulfwide OCS Emissions Inventory (Western Gulf of Mexico) (NTL No. 2014-G01).

49 *See id.*

50 *See id.*

51 *See* BOEMRE, Year 2008 Gulfwide Emission Inventory Study F-6 (2010).

estimate and compare the emissions and emissions intensity of each operator's operations.

In addition, BOEM has authority to collect monthly emissions data for Alaska and operations in the U.S. Arctic; indeed, BOEM already requires lessees (i.e., operators) to monitor their emissions.[52] BOEM should do so, and the information should be made public.

52 *See* 30 C.F.R. § 550.303(k) (providing that "[t]he lessee shall monitor, in a manner approved or prescribed by the Regional Supervisor, emissions from the facility" and "shall submit this information monthly in a manner and form approved or prescribed by the Regional Supervisor.").

INTERMEDIATE INDICATORS

4. Civil and Administrative Violations

Definition

This indicator tracks the number of successful civil and administrative enforcement actions taken and incidents of noncompliance issued against an operator in response to its safety and environmental violations. At a minimum, this indicator should include actions taken by BSEE and BOEM in response to violations of 30 C.F.R. Parts 250 and 550 and actions taken by the Environmental Protection Agency (EPA) in response to violations of the Clean Air Act and the Clean Water Act and their implementing regulations. The indicator could thereafter be expanded to include enforcement actions taken by other agencies, such as the Department of Transportation or the U.S. Coast Guard. Violations should be categorized based on their severity (which will typically correlate with penalty size or extensiveness of injunctive relief). This indicator should be normalized to allow for meaningful comparison of the performance of different operators (e.g., in units of "major violations per million barrels of oil").

Why is this a useful indicator?

If an operator regularly incurs penalties for violating safety and environmental laws, it is likely that the operator has systemic problems with its compliance programs and safety culture. Conversely, if an operator has a relatively spotless record, it is likely that the operator has strong compliance programs and a strong safety culture. Therefore, an operator's compliance record is a predictor of its future safety and environmental performance. However, it must be remembered that offshore drilling is inherently risky; hence, even operators with a relatively spotless compliance record must remain vigilant to risk at all times.[53]

How will the necessary information be obtained?

BSEE has published a list of all incidents of noncompliance issued to offshore operators since 2000[54] and all civil penalties assessed against offshore operators since 1998.[55] This data could be organized by operator, categorizing violations based on their severity, and normalized to account for differences in

53 *Cf.* James A. Baker, et al., The Report of the BP U.S. Refineries Independent Safety Review Panel 3 (2007).

54 BSEE, Incidents of Noncompliance, http://perma.law.harvard.edu/0dn1hqNynMP.

55 BSEE, Civil Penalties and Appeals, http://perma.law.harvard.edu/0iSR5TXq9Ay.

each operator's output.

By contrast, EPA has not routinely made information about its past enforcement actions against offshore operators publicly accessible. EPA should establish a database similar to BSEE's database to facilitate access by BSEE, other agencies, investors, and other members of the public.[56] Until EPA creates such a database, the information is available through FOIA.[57]

5. Kick Frequency and Kick Response Time

Definition

This indicator would measure an operator's ability to prevent and manage well kicks (also referred to as "well control incidents"). A kick occurs when the weight of "drilling mud" (the liquid used to counterbalance upward pressure exerted by the hydrocarbon formation) is insufficient to maintain equilibrium within the formation, causing fluids to flow upwards through the well and drill pipe.[58] A kick can cause a blowout unless personnel promptly take the appropriate response action (i.e., closing the well's blowout-preventer valves).[59]

Following safety expert Professor Andrew Hopkins of Australian National University in Canberra,[60] we suggest two indicators related to well kicks: the number of kicks per well year (kick frequency)[61] and the average time it takes personnel to notice and respond to a well kick (kick response time).

Why are these useful indicators?

Kick frequency is a useful indicator because it is directly correlated with blowout risk (since a kick "is

56 *See infra* p. 24 and note 79.

57 *See* 5 U.S.C. § 552.

58 *See* Nat'l Comm'n on the BP Deepwater Horizon Oil Spill & Offshore Drilling, Deep Water: The Gulf Oil Disaster and the Future of Offshore Drilling 91 (2011) [hereinafter Nat'l Comm'n Report].

59 *See id.*; Anthony Hopkins, *Safety Indicators for Offshore Drilling* 8 (Working Paper, 2012) (noting that a kick is "the immediate precursor to a blowout.").

60 *See* Hopkins, *supra* note 45, at 6, 8.

61 If data is available, it may be preferable to measure frequency in terms of kicks per well completion.

an immediate precursor to a blowout"[62]). Moreover, because this indicator will track a single aspect of operator performance (pressure management),[63] it should be easy for operators to modify their behavior in response to unacceptable performance (e.g., by providing additional training to relevant personnel or providing additional resources). If an operator consistently reports high kick frequency relative to others in the industry (even after adjustments are made for the fact that some wells are inherently more likely to kick[64]), this may indicate that the operator undervalues safety relative to the industry.

Like kick frequency, kick response time is directly correlated with blowout risk. This is because gaseous hydrocarbons expand with ever-increasing speed as they travel up the wellbore, causing the strength of the kick to increase with time.[65] Like kick frequency, kick response time tracks a single aspect of operator performance (in this case, kick management). Thus, an operator must modify its behavior to address unacceptable performance, and its repeated failure to do so is likely indicative of a corporate culture that undervalues safety.

Kick frequency and kick response time have one additional advantage as indicators: they measure unambiguous events that are recorded in real time by the operator's computer systems.[66] For this reason, they are less open to interpretation or manipulation than other indicators.[67]

How will the necessary information be obtained?

BSEE already requires operators to report well kicks as part of their weekly (daily, in Alaska) Well Activity Report,[68] and reports all well control incidents on its website, along with the identity of the

62 Hopkins, *supra* note 61, at 6.

63 *See generally* Nat'l Comm'n Report, *supra* note 44, at 91 (noting that kick frequency is largely a function of the crew's ability to monitor and adjust the density of the drilling mud to maintain equilibrium).

64 These adjustments could be made by using the Dodson Mechanical Risk Index, which assigns wells to one of five categories based on its "complexity" (i.e., its propensity to kick). *See* Hopkins, *supra* note 45, at 6–7.

65 *See* Nat'l Comm'n Report, *supra* note 44, at 109.

66 *See* Hopkins, *supra* note 45, at 6, 8.

67 *Id.*

68 Form BSEE-0133, http://perma.law.harvard.edu/0BBrSPBpYzD.

responsible operator.[69] This data provides a usable indicator when organized by operator and well type.[70] Thus, indicators could be reported in units such as "kicks at high complexity wells per year."

BSEE has ample authority to require the reporting of kick response time.[71] It could issue an NTL requiring operators to include this information in their Well Activity Reports.[72]

69 *See* BSEE, Loss of Well Control: Statistics and Summaries, http://perma.law.harvard.edu/0YD335ZSsgg.

70 *See* Hopkins, *supra* note 45, at 6–7 (discussing the Dodson Mechanical Risk Index, which assigns wells to one of five categories based on its propensity to kick).

71 *See* 30 C.F.R. § 250.469 (providing that an operator may be required to submit any record maintained pursuant to Section 250.466); *id.* at § 250.466(g) (requiring operators to maintain, *inter alia*, information "required by the District Manager in the interests of resource evaluation, waste prevention, conservation of natural resources, and the protection of correlative rights, safety, and environment.").

72 Interested members of the public could request BSEE to issue such an NTL. *See* 5 U.S.C. § 555(b) ("an interested person may appear before an agency . . . for the presentation . . . of an issue, request, or controversy . . . in connection with an agency function."). If BSEE did not grant such a request, interested persons could file a petition for rulemaking with the agency. *See* 5 U.S.C. § 553(e) ("Each agency shall give an interested person the right to petition for the issuance, amendment, or repeal of a rule."); 43 C.F.R. Part 14 (DOI regulations implementing Section 553(e)). Interested persons should encourage BSEE to make this information public if it begins collecting it.

LAGGING INDICATORS

6. Loss of Primary Containment Events

Definition

This indicator tracks the number of loss of primary containment (LOPC) events occurring at an operator's wells, building upon the work of the American Petroleum Institute and the American National Standards Institute (API/ANSI). API/ANSI define LOPC as "[a]n unplanned or uncontrolled release of any material . . . including non-toxic and non-flammable materials" from the primary vessel or equipment intended to hold it.[73] API/ANSI has established two tiers of LOPC. Tier 1 events involve fatalities, hospital admissions, injuries causing "days away from work," community evacuations, fires or explosions resulting in at least $25,000 in direct cost to the company, or discharges exceeding a specified mass threshold over a one hour period.[74] Tier 2 events are non–Tier 1 events that involve a reportable injury to any worker, fires or explosions resulting in at least $2,500 of direct cost to the company, or discharges exceeding a less stringent mass threshold over a one hour period.[75] (Tier 2 events are treated as an intermediate indicator on our Table 1).

Related indicators could be established to track the mass of material released from primary containment. All indicators should be reported in normalized units (e.g., "Tier 1 events per million barrels of oil produced;" "mass of material released per million barrels of oil produced").

Why is this a useful indicator?

Tier 1 events are classified as lagging indicators because they cause significant harm to people or the environment in the form of fatalities, injuries, explosions, fires, or releases of chemicals and pollutants. For this reason, the number of Tier 1 events that occur on an offshore rig can serve as an important lagging indicator of the operator's safety and environmental performance. Repeated Tier 1 events indicate that an operator's process safety and environmental compliance programs are ineffective, and that the operator is ill-equipped to prevent future process safety or environmental incidents. By contrast, a relatively spotless history should inspire confidence that an operator has strong process safety and environmental compliance programs. However, it must be remembered

73 *See* Am. Petroleum Inst. & Am. Nat'l Standards Inst., Process Safety Performance Indicators for the Refining and Petrochemical Industries: Recommended Practice 754, § 3.1.17 (1st ed. 2010); *see also id*. at § 3.1.4 (defining "containment, primary").

74 *See id.* at § 5.2; *see also id.* at 10 (Table 1) (listing mass thresholds for Tier 1 events).

75 *See id.* at § 6.2; *see also id.* at 12 (Table 2) (listing mass thresholds for Tier 2 events).

that "[t]he passing of time without a process accident is not necessarily an indication that all is well;"[76] hence, operators and regulators must remain vigilant to risk at all times.

Tier 2 events can be considered lagging or intermediate indicators.[77] These events are typically associated with some harm to people or the environment, and although this harm is not as significant as that associated with a Tier 1 event, it is an important indicator in its own right. Moreover, because Tier 1 and Tier 2 events typically have a common etiology, the number of Tier 2 events that have occurred at an operator's facilities can be expected to correlate with the likelihood that the operator will experience a Tier 1 event in the future. Hence, Tier 2 events serve an important predictive function as well.

How will the necessary information be obtained?

Operators are already required to report certain LOPC to BSEE, including all reportable releases of H_2S, all gas releases that initiate equipment or process shutdown, and all LOPC that cause fatalities, injuries, fires, or explosions, or that require personnel to muster for evacuation or that cause property or equipment damage greater than $25,000.[78] BSEE includes information about these events on its website.[79] This information can be organized by operator and normalized to account for differences in each operator's output. To determine whether an event listed on these databases involved LOPC, reference should be made to the "incident description" provided for the event to confirm that the incident involved "[a]n unplanned or uncontrolled release of any material" and not, for example, a fire caused by an engine malfunction.

BSEE's existing reporting requirements cover many, but not all, Tier 1 and some Tier 2 events (e.g., operators are not currently required to report LOPC events involving super-threshold releases of hazardous substances unless this release causes another reportable event[80]). BSEE has authority to

76 James A. Baker, et al., *supra* note 55, at 3.

77 *See* Int'l Ass'n Oil & Gas Prod., *supra* note 4, at 3 ("most LOPC events will have no actual consequences but are still failures and therefore lagging outcomes, but low consequence LOPC events also provide leading information when predicting the likelihood of major incidents with serious consequences").

78 *See* 30 C.F.R. § 250.188.

79 *See* BSEE, Inspections and Enforcement: Incident Statistics and Summaries, http://perma.law.harvard.edu/09YDEEf31kR.

80 These releases would probably also be exempted from the reporting requirements of the Emergency Planning and Community Right-to-Know Act (EPCRA). 42 U.S.C. §§ 11001–11050. Although EPCRA generally requires facility owners to report releases of "extremely hazardous substance[s]," there is an exception

require operators to include information about otherwise non-reportable LOPC in their Well Activity Reports.[81] BSEE could issue an NTL on its own initiative or in response to a request. Similarly, interested persons could encourage BSEE to issue an NTL requiring operators to report the mass of material released from primary containment and include LOPC data in Well Activity Reports.

7. Oil Releases

Definition

This indicator would track the number of oil releases that occur at an operator's offshore facilities or during product transport (i.e., from oil pipelines or tankers). Following the system adopted by the U.K. Health and Safety Executive, releases could be classified as major, significant, or minor, depending upon the mass of oil released and the potential of the release to cause a major accident upon ignition.[82]

Why is this a useful indicator?

Oil releases can cause major environmental impacts and threaten public and personnel safety; hence, an operator that is unable to prevent oil releases will be at a higher risk of both forms of harm. Large-scale releases can cause severe habitat destruction and widespread plant and animal mortality,[83] and even small releases can cause unacceptable environmental harm (e.g., marine mammal mortality as the result of oil inhalation or ingestion[84]). Hence, responsible operators will minimize if not eliminate the number of oil releases that occur at their facilities.

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for releases that result in exposure to persons solely within the site where the facility is located. 42 U.S.C. § 11004(a)(1), (4).

81 *See* 30 C.F.R. § 250.469 (providing that an operator may be required to submit any record maintained pursuant to Section 250.466); *id.* at § 250.466(g) (requiring operators to maintain, *inter alia*, information "required by the District Manager in the interests of resource evaluation, waste prevention, conservation of natural resources, and the protection of correlative rights, safety, and environment.").

82 *See Hydrocarbon Releases System: Internet Help File*, Health & Safety Exec., http://perma.law.harvard.edu/0Uh8KNh6jMZ (listing mass and mass flow rate thresholds for "major" and "significant" releases).

83 *See generally* Int'l Petroleum Indus. Envtl. Conservation Ass'n [IPIECA], Guidelines on Biological Impacts of Oil Pollution (1991).

84 *See* NOAA Marine Fisheries Serv., Impacts of Oil on Marine Mammals and Sea Turtles, http://perma.law.harvard.edu/0uiAJ7jC6e5.

How will the necessary information be obtained?

Releases within BSEE's Jurisdiction. Operators are already required to report to BSEE all oil releases at their offshore facilities.[85] Pursuant to BSEE regulations and a Memorandum of Understanding between the Department of the Interior (DOI) and the Department of Transportation (DOT), pipeline facilities that are under the control of a "producing operator" are covered by this rule.[86] Operators are required to report spills of one barrel or more immediately,[87] and to submit a written follow up report within 15 days of the end of the spill. The follow up report must include the cause of the release, its location and volume, and the response action taken.[88] Releases of less than one barrel must be reported to BSEE as part of the Performance Measures Data included in Form BSEE-0131.[89]

BSEE publishes annual data for oil spills of 50 barrels or more and identifies the operator responsible for each spill.[90] BSEE does not distinguish between releases from pipelines and releases from other offshore facilities; data for both types of releases can be found in the same report. This data could be organized by operator and normalized by reference to the number of releases per million barrels of oil produced in order to account for differences in each operator's output.

BSEE also publishes annual data for spills of one barrel or greater, but does not identify the responsible operator.[91] Without the identity of the responsible operator, the data on smaller spills is not useful for comparing operators' performance. BSEE can and should identify the operators

85 *See* 30 C.F.R. § 254.46(b) (BSEE's reporting requirements for oil spills).

86 *See* 30 C.F.R. § 254.6 (defining "facility" to include pipelines not covered by the Deepwater Port Act of 1974); Memorandum of Understanding Between the Department of Transportation and the Department of the Interior Regarding Outer Continental Shelf Pipelines 2 (Dec. 10, 1996) ("DOT will [have jurisdiction over] all OCS transportation pipelines beginning downstream of the point at which operating responsibility transfers from a producing operator to a transporting operator.").

87 *See* 30 C.F.R. § 254.46(b).

88 *See id.* at § 254.46(b)(2).

89 *See id.* at § 254.46(b)(2).

90 *See* BSEE, OCS Spills of 50 Barrels (2,100 Gallons) and Greater, Calendar Year 1964–2012, http://perma.law.harvard.edu/0tDEzCH8gsJ.

91 *See* BSEE, All Petroleum Spills ≥ 1 Barrel from OCS Oil & Gas Activities by Size Category and Year http://perma.law.harvard.edu/0CPgYBxHtf4/.

responsible for each recorded spill in future reports.

Releases within PHMSA's Jurisdiction. Pursuant to a Memorandum of Understanding between DOI and DOT, pipeline facilities that are under the control of a "transporting operator" are under the jurisdiction of DOT's Pipeline and Hazardous Materials Safety Administration (PHMSA).[92] PHMSA requires pipeline owners to report all spills of five barrels or more.[93] PHMSA publishes these incidents on its website,[94] and provides a page for each operator that lists the offshore incidents for which the operator is responsible.[95] Hence, interested persons already have access to most of the information necessary to track offshore spills that occur within PHMSA's jurisdiction; additional data (e.g., release mass) could be obtained by filing a FOIA request.

Releases from Tankers. It is expected that oil produced offshore in the Arctic will be transported to shore by pipeline.[96] However, in the event that operators begin transporting oil by tanker, releases from these vessels should also be tracked. Existing regulations require responsible persons to notify the Coast Guard immediately in the event of an oil release from a vessel.[97] The Coast Guard makes available on the National Response Center website annual data regarding incidents to which it

92 *See* 30 C.F.R. § 254.6 (defining "facility" to include pipelines not covered by the Deepwater Port Act of 1974); Memorandum of Understanding Between the Department of Transportation and the Department of the Interior Regarding Outer Continental Shelf Pipelines 2 (Dec. 10, 1996) ("DOT will [have jurisdiction over] all OCS transportation pipelines beginning downstream of the point at which operating responsibility transfers from a producing operator to a transporting operator.").

93 *See* 49 C.F.R. § 195.50(b).

94 *See Significant Pipeline Incidents: Hazardous Liquids (Offshore)*, PHMSA, http://perma.law.harvard.edu/0te9wq37XU7. To determine the identity of the responsible operator, click on the number of incidents that occurred during a given year. This brings up a page with a table listing incidents by their cause. Clicking on the incident number total brings up a third page that identifies the operator responsible for each release and the amount of property damage that resulted.

95 *See Operator Information*, PHMSA, http://perma.law.harvard.edu/0cdtjTqreWq.

96 *See* BOEM, Outer Continental Shelf Oil and Gas Leasing Program 2012–2017: Final Programmatic Environmental Impact Statement 2-7 (2012) ("Oil from the Beaufort Sea and Chukchi Sea Planning Areas would be transported by new subsea and overland pipelines to the TAPS [Trans-Alaska Pipeline System] and delivered to the marine terminal facilities in Valdez, where it would be loaded onto tankers and shipped primarily to West Coast ports.").

97 *See* 40 C.F.R. § 300.120(a)(1).

responds.[98] Interested persons should refer to this data in the event that operators begin using tankers to transport oil from offshore facilities in the Arctic.

8. Work-Related Fatalities and Reportable Injuries

Definition

This indicator tracks the number of work-related fatalities and reportable injuries that occur at an operator's offshore facilities. Tracking BSEE's regulations, we use the term reportable injury to refer to injuries that either require the evacuation of the injured person from the offshore facility or result in one or more days away from work or one or more days of restricted work or job transfer.[99]

Why are these useful indicators?

A work-related fatality or reportable injury is the ultimate failure of an operator's safety compliance program. An operator that consistently fails to protect its workers from on-the-job harm cannot be expected to effectively address other safety and environmental concerns. Such an operator should not be permitted to operate in a sensitive area such as the Arctic until it is able to show that it has made significant improvements to its compliance programs.

How will the necessary information be obtained?

BSEE already requires operators to report all fatalities and reportable injuries that occur at their offshore facilities.[100] BSEE publishes annual fatality and reportable injury data on its website, along with identification of the responsible operator.[101]

98 *See Download NRC Data*, Nat'l Response Ctr., http://perma.law.harvard.edu/0U6YzK4jEWi.

99 *See* 30 C.F.R. § 250.188(a)(2), (b)(1).

100 *See* 30 C.F.R. § 250.188(a)(1), (a)(2), (b)(1).

101 BSEE, Fatalities – Statistics and Summaries 2007–2012 ytd, http://perma.law.harvard.edu/0Ho9PBsWxSf; BSEE, Injuries – Statistics and Summaries 2007–2012 ytd, http://perma.law.harvard.edu/0brH5zTQmtP.

CONCLUSION

Regulators, investors, affected communities and other members of the general public who are interested in evaluating the environmental performance of different operators already have a wealth of useful information at their disposal. Although much of the information is not easily obtained from the regulated industry or the Department of Interior, some is. Data regarding an operator's civil and administrative violations and the well control incidents, explosions, fires, oil releases, reportable injuries, and fatalities that occur at its facilities are already publicly available on BSEE's website. This information provides important insights into an operator's past safety and environmental performance and the prospective risk its operations pose.

Although existing information can provide important insights, there is a pressing need for additional information. BSEE should begin requiring operators to report their SPPE maintenance backlog, average kick response time, atmospheric emissions of pollutants, and certain LOPC events that are currently not reported. BSEE should also conduct periodic surveys of an operator's personnel to determine the strength of the operator's safety culture. This additional information will provide important new insights into the safety and environmental performance of offshore operators.

Interested persons should actively encourage BSEE to institute these new reporting and monitoring programs. Interested persons can begin by submitting formal requests to the agency.[102] If these requests go unheeded, interested persons can file petitions for rulemaking with the agency.[103] Judicial review can be sought if the petition is denied.[104]

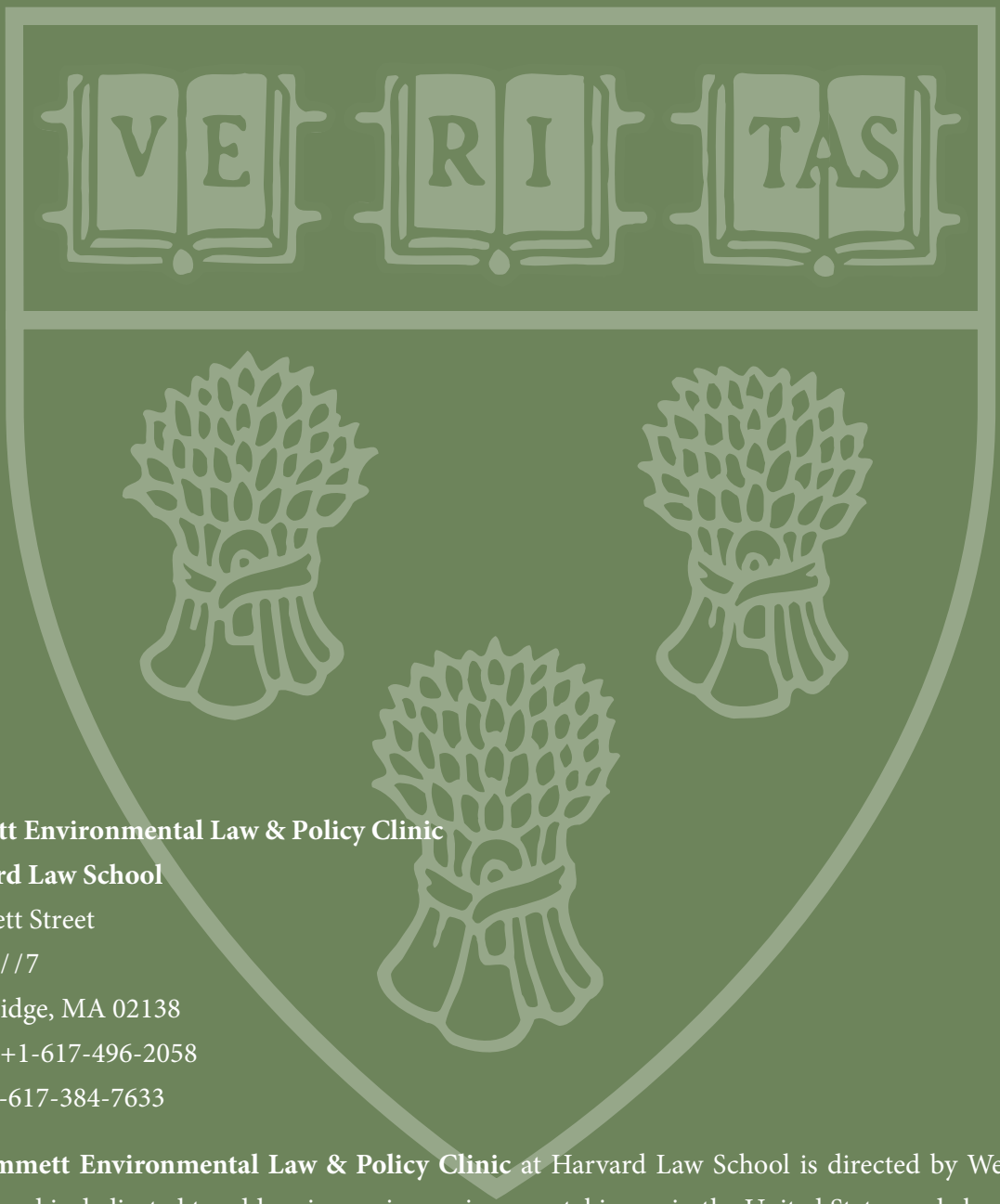
In response to the Deepwater Horizon tragedy, the National Commission concluded that "no less than an overhauling of both current industry practices and government oversight is now required . . . to displace a culture of complacency."[105] The indicators we propose will make it easier for interested persons—and regulators—to press for increasingly responsible performance in the Arctic, thereby helping to displace complacency in the offshore industry.

102 *See* 5 U.S.C. § 555(b) ("an interested person may appear before an agency . . . for the presentation . . . of an issue, request, or controversy . . . in connection with an agency function.").

103 *See* 5 U.S.C. § 553(e) ("Each agency shall give an interested person the right to petition for the issuance, amendment, or repeal of a rule."); 43 C.F.R. Part 14 (DOI regulations implementing Section 553(e)).

104 *See* Mass. v. EPA, 415 F.3d 50, 53–54 (D.C. Cir. 2005).

105 Nat'l Comm'n Report, *supra* note 44, at 293.



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