

SPL vs. SEL

This is the second article CRE has written about comments filed on the National Science Foundation's draft Programmatic Environmental Impact Statement ("DPEIS") for NSF's offshore and overseas seismic activities.¹ This second article discusses comments on the regulatory metric that U.S. agencies use to regulate seismic.

We are writing these articles in part because CRE has been asked by several Congressional committees to advise them on possible job-killing rules. CRE's Letter to Cong. Issa in response to one of these inquiries is attached as Appendix A to this article. An InsideEPA article on the letter is attached as Appendix B.

We informed Congress that too stringent regulation of seismic could prevent oil and gas exploration and injure small businesses and others dependent on a healthy U.S. offshore oil and gas industry. Because NMFS is a cooperating agency on the NSF DPEIS, we believe that the DPEIS indicates what may be the future for oil and gas seismic regulation on acoustic models, regulatory metrics and other issues.

There are two primary and different metrics for measuring the effect of seismic on marine mammals: sound pressure level ("SPL") and sound exposure level ("SEL").

SPL is a "measure of the root-mean square, or "effective" sound pressure, converted to dB. SPL is expressed in dB re 1 μ Pa for underwater sound and dB re to 20 μ Pa for airborne sound."²

By contrast, SEL "is the total noise energy produced from a single noise event and is the integration of all the acoustic energy contained within the event. SEL takes into account both the intensity and the duration of a noise event. SEL is stated in dB re 1 μ Pa² · s for underwater sound. For a seismic survey, the SEL can represent either all energy received at a particular location in the water column from either (1) a given seismic pulse, or (2) a sequence of pulses as the seismic vessel passes. The units are the same, but the numerical value will be higher for (1), often referred to as the cumulative SEL or C-SEL."³

Most U.S. federal agencies use the SPL metric to assess and regulate seismic effects on marine mammals. The industry Commenters "strongly recommend" the use of SEL instead:

¹ CRE's first article is available online by going to <http://www.thecre.com/archives/index.html> , clicking on "2011 Archive," then clicking on "Who's Right about Seismic Models?"

² DPEIS, page XIX, available online at http://www.nsf.gov/geo/oce/envcomp/peis_marine_seismic_research/draft_peis_with_appendices.pdf

³ *Id.*

“The current NMFS guidelines for Level A harassment under the MMPA are based on the root-mean-square (rms) sound pressure [SPL] metric. However, there is now scientific evidence that suggests that auditory effects of transient sound on marine mammals are better correlated with the amount of received energy than with the level of strongest pulse” (DPEIS, page 2-47). Therefore, we strongly recommend the use the Southall et al. noise exposure criteria, which uses a sound exposure level (SEL) metric or at least development of a criteria based on SEL and not rms.”⁴

Actually, the most recent “scientific evidence” shows some doubt among experts about SEL as a regulatory metric:

“SEL now seems not to be the silver bullet we were hoping it would be. Jim Finneran reported that SEL is appropriate only at fairly high exposures, and that context might be more appropriate at lower exposures.”⁵

The Industry Commenters’ recommendation that SEL be adopted may have something to do with the Commenters’ recommended use of acoustic models to regulate seismic. The models used in the DPEIS cannot accurately and reliably be used with an SPL metric:

“estimation of the pulse duration, and hence the SPL, is currently computationally prohibitive for complex, range-dependent environments such as those input to MONM [one of the DPEIS acoustic models].”

[R]egulatory practice in the U.S., insofar as impulsive underwater sounds are concerned, has to date been based on rms sound pressure level. Thus, there is also interest in predicting the rms RLs of airgun pulses. As discussed in Section 5.2.1, while existing safety radii regulations in the U.S. are based on the 90% rms SPL metric for impulsive noise sources, the sensitivity of rms levels to the specific multipath arrival patterns involved is such that model predictions of rms levels at any significant distance from the source are less accurate than are predicted SEL values. As such, the MONM algorithm does not attempt to directly model the rms level, but instead models the propagation of acoustic energy in 1/3- octave bands in a realistic, range-dependent acoustic environment.

⁴ Industry Comments, pages 4-5.

⁵ Trip Report: Cork, Ireland Conference on the Effects of Noise on Aquatic Life, Roger Gentry, August 31, 2010, available online at http://www.iagc.org/attachments/contentmanagers/1010/Gentry_JIP_doc_SummaryEffectsNoise_Conf_VF_2010_08_31.pdf

The rms values may then be estimated from predicted SEL values based on heuristic estimates of the pulse length. However, the rms estimates are less reliable than the SEL estimates, as the relationship between the two can vary considerably with range and propagation conditions. Site-specific field measurements would be necessary to resolve this uncertainty.”⁶

In other words, none of the models used in the DPEIS can be used unless the US federal agencies change their seismic regulatory metric from SPL to SEL.

If NMFS and the other US agencies do wish to change their regulation of offshore seismic to an SEL metric, then NMFS should propose this change in the context of its ongoing acoustic criteria proceeding. The USGS has explained:

“NMFS is proposing to replace current Level A and B harassment criteria with guidelines based on exposure characteristics that are specific to particular groups of mammal species and to particular sound types (NMFS 2005). Recently, a committee of specialists on noise impact issues has proposed new science-based impact criteria (Southall et al. 2007). Thus, for projects subject to U.S. jurisdiction, changes in procedures may be required in the near future.”⁷

The referenced NMFS proceeding “(NMFS 2005)” is the proper process for proposing these dramatic changes. These changes would affect several different agencies (*e.g.*, USGS, FWS and BOEMRE), and many stakeholders (*e.g.*, scientific researchers, the Navy, oil and gas exploration, shipping, indigenous communities and NGOs). NMFS should be express, direct and transparent if it intends to make these changes. NMFS should also consider other regulatory approaches such as exposure context for regulating behavioral effects. Leading experts in this area have explained:

“[I]t has become clear that *exposure context* is a better index of behavioral response than is the dose-response relationship. Researchers looked for a dose-response relationship for decades but never found one. Bill Ellison has pushed the idea of context ever since SURTASS LFA Phase 2 when a sound source outside the gray whale migratory corridor failed to elicit the same response as a source directly in the corridor. The context of the exposure (source placement) was more important than the magnitude of the exposure. Rebecca Dunlop reported how the Australian team has made context a central feature in our humpback study. [The JIP was seen to be at the cutting edge in this context issue]. Brandon Southall is including context in the Navy’s attempts to measure noise effects on toothed whales in Southern California. Both studies involve a large number of possibly

⁶Draft PEIS/OEIS, page 2-55 and pages B-42 to 43, available online at <http://www.nsf.gov/geo/oc/envcomp/index.jsp>. See Draft PEIS/OEIS, pages 2-55, B-17 to 18, for additional discussion of this limitation on MONM’s utility.

⁷ USGS IHA Application to NMFS, page 95 (May 27, 2010), available online at http://www.nmfs.noaa.gov/pr/pdfs/permits/usgs_arctic_iha_application2010.pdf.

explanatory variables. This new development since Nyborg from exposure magnitude to exposure context represents a paradigm shift in our thinking.”⁸

Notwithstanding the considered views of the Industry Commenters, CRE believes that long-standing regulation of seismic using an SPL metric adequately protects marine mammals and other species. If NMFS and other federal agencies wish to move away from an SPL metric, then they should carefully and publicly consider exposure context as a regulatory approach for behavioral effects.

⁸ Gentry trip report, available online at http://www.iagc.org/attachments/contentmanagers/1010/Gentry_JIP_doc_SummaryEffectsNoise_Conf_VF_2010_08_31.pdf

APPENDIX A: CRE'S LETTER TO CONG. ISSA

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December 24, 2010

Congressman Darrell E. Issa
Ranking Member
Committee on Oversight and Government Reform
2157 Rayburn House Office Building
Washington, DC 20515-6143

Dear Congressman Issa:

The Center for Regulatory Effectiveness (CRE) appreciates the opportunity to assist the Committee on Oversight and Government Reform in identifying regulatory programs that have negatively impacted job growth. We are limiting our response to those rules for which we have a detailed working knowledge of their shortcomings. We are in a position to provide additional details if you wish.

CMS Competitive Bidding Program

The Centers for Medicare and Medicaid Services' (CMS) competitive bidding program for durable medical equipment (DME) is a regulation that will be directly responsible for destroying thousands of small businesses and the associated jobs. CMS admittedly "expect[s] that this final rule will have a significant impact on a substantial number of small suppliers." Results from the Round 1 Rebid confirm that most existing home medical equipment suppliers will lose all Medicare business in the affected areas.¹

It is important to recognize that many of the job losses are not inherent in competitive bidding itself, but rather in the way in which CMS implemented the program. Importantly, CMS received a letter, signed by over 160 economists including two Nobel laureates, detailing specific problems with the way CMS conducted the bidding program.² The inefficiencies and lack of transparency in the bidding process ultimately displace existing home medical equipment suppliers and thousands of associated jobs. Notably, CRE has received hundreds of calls from Medicare recipients across the country who are scared and angry that they will lose trusted home medical equipment providers because of CMS' bidding program. You can hear the voices of Medicare recipients opining on CMS' program on our competitive bidding discussion forum, <http://www.thecre.com/Forum/>.

¹ <http://www.thecre.com/blog/wp-content/uploads/2010/11/cramton-change-in-market-structure.pdf>

² <http://www.thecre.com/blog/wp-content/uploads/2010/09/stark-letter.pdf>

³ On May 19, 2010, Minerals Management Service was reorganized. The relevant agency is now the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE).

NOAA/NMFS Gulf of Mexico Take Rules

In 2004, Minerals Management Service³ petitioned NOAA's National Marine Fisheries Service (NMFS) to promulgate rules under the Marine Mammal Protection Act for the oil and gas industry's use of seismic air guns to explore for oil and gas in the Gulf of Mexico. The purpose of these rules is to impose conditions on seismic exploration in the Gulf of Mexico that prevent any unacceptable effects on marine mammals, such as whales. NOAA/NMFS has not yet proposed any of these rules. The oil and gas industry does not oppose Gulf of Mexico take rules. Moreover, the industry wants NOAA/NMFS to publish the rules soon, because the rules will provide certainty and protection against NGO attacks. However, environmental NGOs have a track record of demanding and litigating for seismic rules (as well as Navy sonar rules) that are impossible to comply with. If NGOs succeed in having NOAA/NMFS or a court implement seismic rules, then oil and gas exploration will shut down in the Gulf of Mexico. This result would cause a substantial loss of jobs throughout the Gulf area and throughout the rest of the United States. It would also increase the United States dependence on foreign oil.

EPA Endocrine Disrupter Screening Program

The Endocrine Disruptor Screening Program is EPA's response to a statutory requirement in the Food Quality Protection Act and the Safe Drinking Water Act Amendments in 1996. These amendments require that EPA screen pesticide chemicals for their potential to produce effects similar to those produced by the female hormones (estrogen) in humans. They give EPA the authority to screen certain other chemicals and to include other endocrine effects. In October 2009, after years of wasteful effort and millions of tax dollars spent, EPA produced a list of pesticide chemicals to be tested and list of 11 tests to be used in a so-called Tier 1 test program. Companies that fail the Tier 1 tests will have to conduct Tier 2 tests, which don't exist yet. The Tier 2 tests will determine whether the chemicals will be further regulated or perhaps even banned.

The cost of performing the EDSP tests will not likely cost many jobs, but the test results might. Failing these tests could result in a product ban or regulations so stringent that persons involved in their manufacture could lose their jobs. Farmers who depend on these pesticides might be unable to produce a profitable crop. These adverse consequences would be unacceptable, because most of the EDSP tests are unreliable. Many of the tests are new, and many of them did not pass peer review for their accuracy and reliability. Therefore, jobs could be lost on the basis of tests that have not been demonstrated to be adequate for their intended use.

Conclusion

As a nationally recognized clearinghouse for methods to improve the federal regulatory process, CRE is very well acquainted with the significant impact and costs the regulatory framework can have on the U.S. economy. Accordingly, CRE is pleased to learn that the Committee on Oversight and Government Reform will be examining this essential issue.

CRE is pleased to have the opportunity to identify existing and proposed regulations that negatively impact job growth for the Committee on Oversight and Government Reform. CRE welcomes the opportunity to assist the Committee in the future as it considers the impact of these and other regulations on U.S jobs. Should you have any questions or require additional information, please contact me at (202) 265-2383.

Sincerely,

/s/

Jim Tozzi

Member, Board of Advisors

APPENDIX B: INSIDE EPA ARTICLE ON CRE'S LETTER TO REP. ISSA

Targeting 'Job-Killing' Rules

Posted: January 5, 2011

An industry think tank is urging the new chairman of the House Oversight & Government Reform Committee, Rep. Darrell Issa (R-CA), to investigate EPA's endocrine disruptor screening program (EDSP) as part of the lawmaker's plan to review "job-killing" regulations from the Obama administration.

Issa Dec. 8 sent letters to 150 trade associations, companies and conservative think tanks as he assembles his agenda for the 112th Congress, which convened Jan. 5. The new chairman asked for input on new and upcoming federal regulations from EPA and other agencies that have "negatively impacted job growth" and suggestions for needed reforms.

In a [Dec. 24 response](#), the Center for Regulatory Effectiveness (CRE) highlighted the potential for what it says are unreliable EDSP tests to cause EPA to ban pesticides, potentially costing jobs in the agriculture and chemical industries. "Failing these tests could result in a product ban or regulations so stringent that persons involved in their manufacture could lose their jobs," CRE writes. "Farmers who depend on these pesticides might be unable to produce a profitable crop."

Industry officials [have recently raised concerns](#) about EPA's tight, two-year deadline for makers of some 67 pesticide ingredients to submit EDSP tests, noting that the agency has been lax in responding to requests to alter minor aspects of the testing requirements or respond to suggestions that existing data meets the same need as the new tests would.

CRE in its letter to Issa echoes those concerns about the reliability of EDSP tests and their potential impact on the pesticide sector.

"These adverse consequences would be unacceptable, because most of the EDSP tests are unreliable," the group tells Issa. "Many of the tests are new, and many of them did not pass peer review for their accuracy and reliability. Therefore, jobs could be lost on the basis of tests that have not been demonstrated to be adequate for their intended use