

**A REVIEW OF THE PROCESSES
OF PREPARATION AND DISTRIBUTION
OF THE REPORT
“FACT-BASED REGULATION FOR
ENVIRONMENTAL PROTECTION IN SHALE
GAS DEVELOPMENT”**

Review Prepared at the Request of the
University of Texas at Austin

November 30, 2012

CAVEAT

The review documented herein was performed at the request of the University of Texas, Austin, to address the *process* of preparing and distributing the report, "Fact-Based Regulation for Environmental Protection in Shale Gas Development." As such, the authors of the review take no position herein with regard to the merits or liabilities of hydraulic fracturing.

REVIEW PARTICIPANTS:

NORMAN R. AUGUSTINE
(CHAIR)

RITA R. COLWELL



JAMES J. DUDERSTADT

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1.0 Background

During 2011 and 2012 the Energy Institute of the University of Texas at Austin conducted a study that led to the preparation and release of a report entitled, “Fact-Based Regulation for Environmental Protection in Shale Gas Development.” The report, which focused on hydraulic fracturing, was the basis for, among other things, a press release by the University and a presentation at the American Association for the Advancement of Science meeting in Vancouver, Canada, in February, 2012.

Subsequent to the above events it was reported by the Public Accountability Initiative that the Principal Investigator, Dr. Charles (“Chip”) Groat, had received material compensation through his association with Plans Exploration and Production, a firm involved in hydraulic fracturing activities. Professor Groat confirmed to the committee that this was the case.

Given the resulting concern within the media and the University itself over the non-disclosure of this apparent conflict of interest the Executive Vice President and Provost of the University of Texas at Austin, Dr. Steven Leslie, requested that an independent review be conducted to verify what had taken place and to recommend actions that should be pursued by the University with regard to the *process* of conducting and releasing the results of future work of the Institute. A written charge was provided to the reviewers and no constraints were placed upon their activities as they carried out their responsibilities. Administrative support was provided by the Energy Institute under the leadership of Dr. Raymond Orbach. It was emphasized to the reviewers that an assessment of the advantages and disadvantages of hydraulic fracturing was *not* being sought—a topic that would require far more time and a review panel differently constituted in terms of professional backgrounds than the present one. Rather, an assessment of the report preparation and release *process* was desired.

In performing this assessment the reviewers examined approximately four hundred pages of documents, including various drafts of the Energy Institute’s report as well as Conflict of Interest policies obtained from the National Academies of Science; Engineering and Medicine; the American Association for the Advancement of Science; the National Science Foundation; the National Institutes of Health; the Society of Petroleum Engineers; and the University of Texas.

The reviewers further obtained from the American Association for the Advancement of Science a videotape of the presentation at which the Energy Institute’s findings were presented as well as a video of the press conference that was held in conjunction with the abovementioned meeting.

Face-to-face interviews were held with Prof. Groat, Principal Investigator for the Energy Institute Report; Dr. Thomas Grimshaw, Co-Principal Investigator; Dr. Ian

Duncan, Senior Contributor; Prof. Hanna Wiseman, Senior Contributor; Prof. Matt Easton, Senior Contributor; Dr. Orbach, Director of the Energy Institute; Dr. Juan Sanchez, University Vice President for Research; Mr. Gary Susswein, Director of University Media Relations; Mr. Gary Rasp, Energy Institute Communications Director; and Prof. Thomas McGarity, University of Texas Law School, who had previously written critically of the process followed in the preparation and release of the subject report. A telephone interview was held with Mr. Scott Anderson, an attorney with the Environmental Defense Fund, who had participated in an outside review of the subject report during its preparation.

The members of the committee conducting this review were given full access to all requested materials and individuals. Their report was provided in final draft form to the Executive Vice President and Provost of the University of Texas at Austin for the sole purpose of indicating any factual errors. The report's content, other than direct quotations, is entirely that of the Review Committee.

2.0 Biographies of Reviewers¹

2.1 Norman R. Augustine, Chair

Norman R. Augustine is the retired chairman and CEO of the Lockheed Martin Corporation. He received Bachelors and Masters degrees in Aeronautical Engineering from Princeton University and was elected to Phi Beta Kappa and Tau Beta Pi and has been awarded 29 honorary degrees.

Mr. Augustine is a former Under Secretary of the Army and served as a Lecturer with the Rank of Professor on the Faculty of the Princeton University School of Engineering and Applied Science. He is a Regent of the (12-university) System of Maryland, a former trustee of Princeton and MIT and a trustee emeritus of Johns Hopkins. He has served as chairman of the National Academy of Engineering, President of the American Institute of Aeronautics and Astronautics, chairman of the Defense Science Board, chairman of the Aerospace Industries Association, and is 16-year member of the President's Council of Advisors on Science and Technology. He has been a member of the Board of Directors of the Ethics Resource Center and is a member of the National Academy of Sciences, the American Philosophical Society, the American Academy of Arts & Sciences and is a Life Fellow of the Institute of Electrical and Electronic Engineers, a Fellow of the American Association for the Advancement of Science, a Fellow of the Royal Aeronautical Society, and an Honorary Fellow of the American Institute of Aeronautics and Astronautics. He has served on the Board of Advisors of NASA and the Departments of Homeland Security and Energy and he has served on the Board of Directors of Procter & Gamble, ConocoPhillips, Black & Decker and Lockheed Martin and as chairman of the American Red Cross and as President of the Boy Scouts of America. He was awarded the National Medal of Technology by the President of the United States.

Note

Mr. Augustine served on the Board of Directors of ConocoPhillips until May 2008, currently holds stock in that firm and has deferred compensation remaining at the firm. He also holds stock in Phillips 66.

¹ All reviewers served without compensation other than reimbursement of out-of-pocket expenses associated with travel performed in conjunction with the subject review.

2.2 Rita L. Colwell

Dr. Rita Colwell is Distinguished University Professor both at the University of Maryland at College Park and at Johns Hopkins University Bloomberg School of Public Health, Senior Advisor and Chairman Emeritus, Canon US Life Sciences, Inc., and President and Chairman of CosmosID, Inc. Her interests are focused on global infectious diseases, water, and health, and she is currently developing an international network to address emerging infectious diseases and water issues, including safe drinking water for both the developed and developing world.

Dr. Colwell served as the 11th Director of the National Science Foundation, 1998-2004. In her capacity as NSF Director, she served as Co-chair of the Committee on Science of the National Science and Technology Council. One of her major interests include K-12 science and mathematics education, graduate science and engineering education and the increased participation of women and minorities in science and engineering.

Dr. Colwell has held many advisory positions in the U.S. Government, nonprofit science policy organizations, and private foundations, as well as in the international scientific research community. She is a nationally-respected scientist and educator, and has authored or co-authored 17 books and more than 800 scientific publications. She produced the award-winning film, *Invisible Seas*, and has served on editorial boards of numerous scientific journals.

Before going to NSF, Dr. Colwell was President of the University of Maryland Biotechnology Institute and Professor of Microbiology and Biotechnology at the University Maryland. She was also a member of the National Science Board from 1984 to 1990.

Dr. Colwell has previously served as Chairman of the Board of Governors of the American Academy of Microbiology and also as President of the American Association for the Advancement of Science, the Washington Academy of Sciences, the American Society for Microbiology, the Sigma Xi National Science Honorary Society, the American Institute of Biological Sciences, and the International Union of Microbiological Societies. Dr. Colwell is a member of the National Academy of Sciences, the Royal Swedish Academy of Sciences, Stockholm, the Royal Society of Canada, the Royal Irish Academy, and the American Academy of Arts and Sciences, and the American Philosophical Society.

Dr. Colwell has also been awarded 55 honorary degrees from institutions of higher education, including her Alma Mater, Purdue University and is the

recipient of the Order of the Rising Sun, Gold and Silver Star, bestowed by the Emperor of Japan, the 2006 National Medal of Science awarded by the President of the United States, and the 2010 Stockholm Water Prize awarded by the King of Sweden. Dr. Colwell is an honorary member of the microbiological societies of the UK, Australia, France, Israel, Bangladesh, Czechoslovakia, and the U.S. and has held several honorary professorships, including the University of Queensland, Australia. A geological site in Antarctica, Colwell Massif, has been named in recognition of her work in the polar regions.

Born in Beverly, Massachusetts, Dr. Colwell holds a B.S. in Bacteriology and an M.S. in Genetics, from Purdue University, and a Ph.D. in Oceanography from the University of Washington.

Note

Dr Colwell holds stock in several firms involved in oil exploration and in a variety of natural gas exploration products and transportation activities. She receives an honorarium as chair of the Research Board of the Gulf of Mexico Research Initiative funded by BP to address scientific issues associated with the Deep Horizon Oil Spill.

2.3 James L. Duderstadt

Dr. James J. Duderstadt is President *Emeritus* and University Professor of Science and Engineering at the University of Michigan. A graduate of Yale University and the California Institute of Technology, Dr. Duderstadt's teaching, research, and service activities include nuclear science and engineering, applied physics, computer simulation, science policy, and higher education. He has served on or chaired numerous boards and study commissions including the National Science Board, the Executive Board of the National Academies, the Policy and Global Affairs Division of the National Research Council, the Nuclear Energy Advisory Committee of the U.S. Department of Energy, the National Commission on the Future of Higher Education, and the National Academies Committee on Research Universities. He has received numerous awards and honorary degrees including the National Medal of Technology for exemplary service to the nation. At the University of Michigan he currently co-chairs the program in Science, Technology, and Public Policy in the Gerald R. Ford School

of Public Policy and directs the Millennium Project, a research center exploring the impact of over-the-horizon technologies on society.

Note

Dr. Duderstadt served until 2004 on the Board of Directors of CMS Energy and holds shares in that firm in Trust. CMS discontinued its gas exploration and development activities approximately a decade ago.

3.0 Charge to Review Committee

The Charge presented to the Review Committee by the Executive Vice President and Provost of the University of Texas at Austin is as follows:

3.1 Background

The full report, *“Fact-Based Regulation for Environmental Protection in Shale Gas Development”* was comprised solely of three ‘white papers’ and a Summary of Findings. Principal Investigator Charles (Chip) Groat, an associate director in the Energy Institute at The University of Texas at Austin, assembled a team and supervised the research conducted by Senior Contributors, who authored the white papers: *“Media Coverage and Public Perception,”* by Professor Matt Eastin (College of Communications, UT Austin); *“Environmental Impacts of Shale Gas Development,”* by Professor Ian Duncan (Bureau of Economic Geology, UT Austin); and *“Regulatory and Enforcement Framework,”* by Professor Hannah Wiseman (formerly with the UT Austin School of Law, now at Florida State University). Dr. Thomas Grimshaw, a research fellow in the Energy Institute, prepared the Summary of Findings in consultation with Professor Groat.

3.2 Specific Charges

While the panel is free to expand the scope of its review as it deems appropriate, its primary focus centers on the following question:

Did the process of preparing the subject report follow accepted standards of professionalism for scientific work?

In particular,

1. Were conflict of interest policies sufficient and were they followed?
2. Did the white papers appropriately reflect the substance of the scientific material upon which they were based?
3. Did the report summary and subsequent presentation accurately reflect the contents of the white papers?
4. Are there actions that should be taken by the University with respect to the above?

It is emphasized that the Review Panel is not being requested to assess the pros and cons of shale gas recovery; rather, it is being requested to opine on the adequacy of the process by which the subject report on this topic was prepared, particularly as it may affect the credibility of the report.

4.0 Executive Summary

4.1 Overview

The design, management, review and release of the study that led to the report, “Fact-Based Regulation for Environmental Protection in Shale Gas Development,” fell short of contemporary standards for scientific work. Primary among the shortcomings was the failure of the Principal Investigator to disclose a conflict of interest that could have had a bearing on the credibility a reader wished to assign to the resulting work. This circumstance was exacerbated by the University policy on conflicts of interest then in force that was poorly crafted and even less well enforced. (The policy has since been revised.) Further, the subject report summary, press release and presentations did not reflect in a balanced fashion the caveats presented in the body of the report itself.

The Review Committee found no evidence of intentional misrepresentation—rather, it noted the above instance of very poor judgment coupled with inattentiveness to the challenges of conducting research in an environment inevitably fraught with conflict of interest concerns. With regard to the latter, the University of Texas itself is unavoidably subject to a degree of skepticism when it conducts and reports on research in the energy sphere, given that a non-trivial portion of its funds, trustees and members of the Energy Institute’s Advisory Board are affiliated with the energy industry. This circumstance mandates special attention to any factor that bears on the credibility of its efforts. As stated in *Nature* magazine, “Universities could not exclude people who have industry connections from their ranks, nor would they want to. The same goes for government. There is also nothing inherently wrong with universities accepting donations from industry to conduct studies, as long as the proper protections are put in place. The key is transparency, because that is the basis for trust between institutions and the wider public...”

The Review Committee also recognizes, and even emphasizes, that it would be unreasonable to deny the public the benefit of research conducted by institutions or individuals who are deeply immersed in a field in which geographical or other circumstances that contribute to their expertise also contrive to raise concerns over potential conflicts of interest. As stated in an article addressing the present matter in *Scientific American*, “Ties to industry are common to research universities. It [is] common in the engineering disciplines for research to be funded by an industry partner. That relationship is an explicit contract that the university offers some additional brainpower and expertise to overcome some technical challenge, or perform some fundamental science...”

Indeed, it would be impracticable, and likely inappropriate, to seek to eliminate all ties that help assure the relevance of university research to the world of practice, particularly in the field of engineering which by design straddles these two endeavors.

The essential obligation of a researcher and a sponsoring institution thus becomes one of disclosing such connections, thereby enabling the reader or listener to weigh that circumstance along with the merits of the reported results of the research.

In the present instance, not only was the public not given the benefit of knowledge of such a connection, neither were the collaborators in the research nor the university management that was responsible for its oversight.

Ironically, Dr. Groat was probably not in violation of the University's Conflict of Interest Policy as it existed at the time the subject work was performed. The applicability of the policy at that time was confined to endeavors undertaken on behalf of funding sources *outside* of the University, whereas the report in question was "*internally*" funded. (The policy has since been appropriately broadened to include all research.) Similarly, the organization sponsoring the meeting at which the report's findings were most prominently presented, while having strong disclosure rules for authors, did not have rules applicable to "presenters." (Its president has indicated to the Review Committee that such a policy is currently under advisement.)

4.2 Response to Specific Questions Contained in Committee's Charge

1. Were conflict of interest policies sufficient and were they followed?

Both conflict of interest and disclosure policies were largely ignored in the preparation of the subject report due to inadequacy in the formulation and implementation of the University policies that existed at the time of the study and the lack of oversight by participants and administrators.

2. Did the reports and presentations appropriately reflect the substance of the scientific material upon which they were based?

Since there is, as indicated extensively in the subject report itself, limited scientific research available on the health and environmental impact of shale gas fracturing, much of the report was based on literature surveys, incident reports and conjecture, tempered with frequent caveats by the Senior Contributors as to both interpretations and implications of the results. It should be stressed that the term "fact-based" would not apply to such an analysis in the sense characterizing scientific research since there were relatively little scientific data presented or, according to the authors, available to be presented.

3. Did the report summary and subsequent presentations accurately reflect the contents of the white papers?

The report summary failed to reflect either the tentative nature of the conclusions reached in the white papers or the often strong caveats conveyed by their individual authors. The Review Committee viewed the summary document, subsequent media releases, and oral presentations to be inappropriately selective in the use of material from the white papers such that they seemed to suggest that public concerns were without scientific basis and largely resulted from media bias—hence requiring no significant modification in the current regulatory and enforcement regimes. This apparent distortion of the substance of the white papers became increasingly evident as the project moved through the stages of drafting the summary, media releases, and public presentations.

4. Are there actions that should be taken by the University with respect to the above?

The Review Committee offers in this document several recommendations concerning: 1) the strengthening of the University’s conflict of interest and disclosure policies; 2) the management structure, responsibility, and accountability for projects conducted by the Energy Institute; 3) the general review process required before public release of reports; 4) the handling of the existing report and further presentations resulting from this this particular project; 5) the acknowledgement of major contributors to work products; and 6) the disposition of the report in question.

Given the conclusion that the current draft of the report generated by the subject study falls short of the generally accepted rigor required for the publication of scientific work, the Review Committee recommends that the current report, published to-date only online, be withdrawn and the Senior Contributors be given the opportunity to redraft their papers into forms suitable for publication in peer-reviewed scientific or academic journals or that it be made clear that the reports are indeed surveys and overviews. Given the contentiousness of the issue of hydraulic fracturing, further publication of this work as “fact-based” research should be undertaken only following a formal, independent peer review that meets the standards of journal publication, and all such public distribution activity should be subject to involvement and approval of the Senior Contributors.

4.3 Summary of Recommendations

- 1. The University of Texas should maintain and enforce rigorous policies governing conflict of interest, conflict of commitment, and financial and relationship disclosure for all university personnel, assigning appropriate responsibility and accountability for monitoring**

compliance with such activities. These policies should be consistent with those adopted by leading national research organizations such as the National Research Council, National Institutes of Health, and National Science Foundation, and best practices of other prominent research universities.

- 2. The Energy Institute should embrace and enforce the University policies relating to conflicts of interest in all of its activities.**
- 3. The UT Energy Institute should develop and implement more effective methods for project design, management, and review, with clear assignment of responsibility and accountability for both the quality and integrity of work products.**
- 4. The UT Energy Institute should develop and implement a rigorous quality control framework for all public relations and media activities, with strong oversight responsibility and accountability for the accuracy of such releases, including appropriate emphasis of the limitations of the work leading to the releases. This should be the responsibility of both the project directors and the Energy Institute leadership and such activities should be carefully coordinated with the University's Office of Communications.**
- 5. The role and contribution of all participants in such projects should be accurately and thoroughly documented in all reports, publications and presentations.**
- 6. Because of the inadequacies herein cited, publications resulting from the Energy Institute's project on shale gas fracturing currently displayed on the Energy Institute's website should be withdrawn and the document "Separating Fact from Fiction in Shale Gas Development," given its basis in the above, should not be further distributed at this time. Authors of the white papers should be allowed sufficient time and opportunity to finish their work, preparing their papers for submission for independent review by a broad panel of independent scientists and policy experts. Even if not published in a professional journal this approach is deemed appropriate when dealing with highly contentious issues. The summary paper should be redrafted to accurately reflect these revised white papers, with strong involvement from the Senior Contributors.**

More detailed findings and recommendations are provided in subsequent sections of this report.

5.0 Findings

5.1 Potential Conflicts of Interest

In studies of controversial topics, such as the impact on public health and the environment potentially stemming from shale gas hydraulic fracturing, credibility hinges upon full disclosure of any potential conflicts of interest by all participants and upon rigorous, independent reviews of findings. This study failed in both regards.

Principal Investigator, Dr. Groat, failed to disclose his material financial relationship as a member of the board of directors of Plains Exploration and Production, a gas exploration and development company. Dr. Groat did file an earlier disclosure while serving as acting dean in 2009; however, he has indicated the focus of that submittal was on outside time commitments, not financial matters. He portrayed the failure to file a disclosure for the current year as an oversight and that the University had not requested an updated statement. Similarly, he also indicated that he believed he did not need to file nor disclose at the time the subject report was being prepared because it was supported with “University funds” and, further, he had contributed no original work nor had he changed the body of the document. Rather, he had overseen the project and participated in summarizing it. The Principal Contributors indicate that their work was indeed unchanged either by, or at the urging of, Dr. Groat,

The project manager, Mr. Thomas Grimshaw, also did not file any disclosure, noting that he was unaware of any conflict of interest or disclosure policies of the Energy Institute that would affect him as a part-time employee.

Senior Contributor Hannah Wiseman deemed it unnecessary to file a disclosure statement because she was a visiting Assistant Professor at the University of Texas. She stresses that contrary to some media reports, she had no knowledge of Dr. Groat’s involvement with Plains Exploration and Production, although she was aware that he had some past relationship with the gas industry and was occasionally quoted by energy firms.

Senior Contributor Dr. Ian Duncan routinely filed annual disclosure statements in support of his research activities and apparently had no direct financial support from or relationship with the gas industry. He also noted that he received no direct salary support for his effort on the Energy Institute hydraulic fracturing project, instead working on his white paper on a voluntarily basis during evenings and weekends.

Finally, there was no routine follow-up by the University to ascertain why individuals contributing to a project bearing the University's name had not submitted conflict of interest forms.

Beyond shortcomings in the oversight in disclosing the potential conflict of interest of the Principal Investigator, there was also inadequate consideration given to a discussion of the relationship of the Energy Institute and the University of Texas to the oil and gas industry. Both the Energy Institute and the University have substantial interests in the industry through philanthropy and research support; the income from the Permanent University Fund and direct shale gas production on the UT-Arlington campus; and substantial representation of the industry on both the Advisory Board of the Energy Institute and the University of Texas Board of Regents. While the Energy Institute maintains that the shale gas hydraulic fracturing study was entirely funded from discretionary funds, it was acknowledged that these came from the Permanent University Fund, as did other support of the Institute. It is noted that some activities of the Energy Institute and its associated faculty also receive material funding from the oil and gas industry.

Dr. Groat's attention to any potential conflict of interest appeared to be confined to the source of funding for the project itself. When asked at the press conference accompanying the presentation of the results of the study about the independence of the work leading to the subject report he replied, "This study was funded entirely by University of Texas funds," not taking the opportunity to comment on his own financial interests. This was, he told the Committee and others, because "...my role in the study was to organize it, coordinate the activities, and report the results." "I did not alter their [the Principal Contributors] conclusions." This detached management approach was a contributor to a number of the problems cited herein.

5.2 University of Texas Conflict of Interest and Disclosure Process

The policies governing conflict of interest and disclosure for both the Energy Institute and the University of Texas more generally were both inadequate and poorly administered during the period of the shale gas fracturing project. They fall short of such policies as those of the National Research Council, federal agencies such as the National Science Foundation and the National Institutes of Health, and other major research universities.

At the time the shale gas fracking report was prepared the university's policy on conflicts of interest appeared to be intended to comply only with rules relating to outside research grants, stating, for example (emphasis added):

“This policy is established to comply with the regulations of the Public Health Service (PHS) and the National Science Foundation (NSF), and the responsibility of the University of Texas at Austin, to promote objectivity in research by requiring that an *employee* of the University who applies for grants or cooperative agreements *from the federal government* for research or other educational activities or otherwise submits a proposal for *sponsored research from any entity,*” etc.

The University policy from which the above paragraph is extracted does offer reasonable actions to manage actual or potential conflicts of interest that may appear:

- Public disclosure of significant financial interests
- Monitoring of the research by independent reviewers
- Modification of the research plan
- Disqualification from participation in all or a portion of the research project in question
- Divestiture of significant financial interests
- Severance of relations that create actual or potential conflicts.

The relevant portions of the Conflict of Interest Policies of several highly regarded organizations are illuminative (emphasis added):

- The American Association for the Advancement of Science (Science Magazine): “...*manuscripts should be accompanied by clear disclosures* from all authors of their affiliations, funding sources, or financial holdings that might raise questions about possible sources of bias.”
- The National Institutes of Health: “Significant Financial Interests that are subject to disclosure by an Investigator to an Institution are those that reasonably appear to be related to the Investigator’s Institutional responsibilities as defined by the Institution.”
- The National Academies (applies to “current” conflicts only): “Except for those situations in which the institution determines that a conflict of interest is unavoidable *and promptly and publicly discloses the conflict of interest*, no individual can be appointed to serve (or continue to serve) on a committee of the institution used in the development of reports...”
- The Society of Petroleum Engineers: “Any conflict of interest on the part of any member of the S.P.E. Board *should be disclosed* and made a matter of record at the time of election to the Board and maintained through an annual procedure and at the time becomes a matter of Board action. If a

Board member is unsure whether an interest in an entity is a conflict of interest, disclosure is recommended.”

Further, in the conduct of the subject study there appeared to be confusion over the application of existing University policies governing conflict of interest and commitment developed for academic units to quasi-independent organizations such as the Energy Institute.

The danger of inadequate policies governing potential conflicts of interest, financial relationships, and conflicts of commitment was stressed by Professor Thomas McGarity in the Committee’s interview with him, noting his analysis² of past distortions of science through inappropriate influence on academic research by other industries such as the tobacco, pharmaceutical, and chemical industries. Such practice is not only damaging to an institution and its faculty but to the integrity of science more generally.³ While it is probably impossible for professionals in a given field to avoid all such relationships, their negative aspects can be minimized through diligence in disclosure.

5.3 Participants

The project team has been portrayed in Energy Institute documents as “consisting of faculty members and research scientists who are conducting state-of-the-art research in their respective fields.” In reality, the only active scientific member of the team was Professor Duncan, since Dr. Groat’s role was largely confined to assembling the work of the contributors and participating in the preparation of a summary thereof. Dr. Grimshaw was broadly experienced as a project manager but possessed little experience in scientific research. The project description suggests numerous “hydraulic fracturing experts” at UT-Austin, but there was no evidence found that any other UT science faculty were significantly involved in the project. Professor Eastin is a mid-career faculty member in communications, with limited experience in assessing environmental impact analyses. No members of the faculty actively conducting research on health affects of hydraulic fracturing participated in the study. Although Dr. Wiseman was a junior law faculty member at the University of Tulsa, she is experienced in environmental matters related to shale gas fracturing.

In addition to the above participants there was originally a fourth team member, Dr. Suzanne Pierce, a former assistant to Dr. Groat with expertise in

² Thomas O. McGarity and Wendy E. Wagner. *Bending Science: How Special Interests Corrupt Public Health Research*. Harvard University Press: Cambridge, 2008.

³ Committee on Science, Engineering, and Public Policy, National Academies. *On Being a Scientist: A Guide to Responsible Conduct in Research*. National Academy Press: Washington, DC 2009.

computer informatics; however, her involvement ended midway through the conduct of the project.

Dr. Duncan indicated that he had asked Mr. Scott Anderson, a member of the Environmental Defense Fund and an attorney with considerable oil and gas experience, to review key parts of his report. Although Mr. Anderson was budgeted for his participation, he did not submit bills for his input. He indicated to the Committee Chair his unawareness of Dr. Groat's financial interests but does not object to the substance of the report. He expressed the concern that the press release "distorted" the Principal Contributors' findings and that the report should not have been released in draft form, as was actually the case.

5.4 Project Leadership

The Energy Institute director, Dr. Raymond Orbach, was generally removed from the details of the Energy Institute hydraulic fracturing study delegating such responsibility to Dr. Groat as project director. Dr. Groat, in turn, delegated project management responsibility to Dr. Grimshaw, an Energy Institute staff member. During interviews with those involved with the project, it was clear that Dr. Groat also delegated the responsibility for much of the rest of the project to others. Dr. Groat indicated during an interview with the Review Committee that he did not read the white papers prepared by the Senior Contributors.

Dr. Grimshaw stressed that his role and expertise was in project management, largely acquired from his experience in industry. He thus developed the timetable for the effort and managed the overall project. He was largely responsible for drafting the summary of findings and assisting the Energy Institute Communications Director, Mr. Gary Rasp, in preparing the media effort and Dr. Groat in presenting the findings of the report. Dr. Grimshaw met infrequently with the contributors, apparently relying largely upon monthly telephone conversations. Toward the end of the studies, Dr. Grimshaw and Dr. Groat did discuss with Dr. Duncan the findings of the latter's draft of the environmental section, and notes taken in this discussion were used by Dr. Grimshaw to assist in his preparation of the summary paper.

The project was hampered by the absence of knowledgeable senior leadership that should have been provided by the Principal Investigator. During interviews, the Review Committee learned that this was the first attempt by the Energy Institute to mount its own project, since it had been created initially as an "umbrella" organization to support existing faculty research conducted principally through the University's academic departments. As the Institute's first project, it is understandable that there might be some indecision in how to

create and manage projects in such sensitive areas as hydraulic fracturing. Nonetheless, the absence of knowledgeable day-to-day leadership was clearly a factor that impaired both the quality of the report and the accuracy of its presentation to the public through the summary paper, media releases, and other avenues.

5.5 Project Design

Dr. Duncan described how the shale gas hydraulic fracturing study was originally part of a much larger scientific research project developed with technical staff from the gas industry and proposed for support to the American National Gas Association (ANGA). This original project design included not only policy surveys in areas such as regulation and environmental impact but also extensive original scientific research. However, it was stated to the Review Committee that ANGA insisted upon managing the project in detail, including removing one of the investigators and editing the report prior to its release. Hence, it was understandable, and commendable, that under these circumstances Dr. Groat and the Energy Institute sought alternate funding that would hopefully allow a truly independent study.

As a result of the resulting funding shortfall, the decision was made to omit the scientific research component from the project design and retain only surveys of existing literature in the areas of public opinion, environmental impact, and regulation. Since, as noted by the authors, there currently exists limited scientific research and technical literature in many of the areas of public concerns associated with the impact of hydraulic fracturing on health and the environment, it was a misstatement to suggest that this study was based on “factual evidence.” Rather, it became apparent, at least to the Senior Contributors, that the findings of their studies would necessarily be dependent upon incomplete information. In most cases, the white papers were careful in stating caveats about this uncertainty. Unfortunately, the thrust of these caveats was not adequately reflected in the Summary of Findings, the press releases, or the presentations by Dr. Groat.

The Review Committee must also question the final design of the project: commissioning three white papers concerning shale gas hydraulic fracturing—a media and public opinion survey, a survey of existing literature on environmental impact, but not including health aspects, and a survey of regulation and enforcement—and then linking the findings from these studies in a brief summary paper that was then promoted through media releases and public presentations. Connecting these three papers together as was done in the Summary of Findings would in itself seem to leave the project open to the suggestion that it was structured to portray media bias as influencing public

concerns, then using a literature survey of hydraulic fracturing to demonstrate that there was “no scientific evidence” for these concerns, and finally to conclude in the report’s summary that there was little need for further regulation.

5.6 Project Management

The centerpiece of the project was the survey of literature pertaining to the environmental impact of shale gas hydraulic fracturing that was commissioned from Dr. Duncan. He agreed to accept this assignment even though it would be performed as an overload to his current teaching and scientific research activities. As noted earlier, his contribution was primarily based on work conducted on evenings and weekends that he did not charge to the project budget. Even so, he was under continual pressure to complete the draft of his white paper. Dr. Groat and Dr. Grimshaw called him periodically, both to check on his progress, not so much to discuss content but rather to urge greater haste, and to add new areas to his investigations (perhaps triggered by the public concerns being identified in the media and public survey activities pursued as part of the report’s preparation process).

Dr. Grimshaw acknowledged that he applied pressure to Dr. Duncan to complete the draft, as he also did with Dr. Hanna Wiseman, in order to keep the project on schedule. Although Dr. Grimshaw suggested in interviews that he believed that the team was working too slowly, he also noted that the scheduling of the presentation of the report at the February 2012 American Association for the Advancement of Science (AAAS) meeting was regarded as a firm deadline. The report was thus placed online in what was considered to be “preliminary” form. As stated in the Public Accountability Initiatives critique, “Though the report was introduced at an academic conference, the Energy Institute’s report does not appear to have been ready for public release. Two of the report’s main sections are marked as rough drafts. In the ‘Environmental Impacts’ section, numerous citations are missing, including some that are marked in red ink.”

Dr. Wiseman had little interaction with Dr. Groat and Dr. Grimshaw during the course of her studies aside from the urging from Dr. Grimshaw to complete her draft. In fact, she contacted Mr. McGarity to convey her concern about the pressure placed on her to meet the AAAS meeting schedule.

5.7 Fracturing Study Findings

5.7.1 White Paper 1: “News Coverage and Public Perception of Hydraulic Fracturing” (Senior Contributor: Dr. Matthew Eastin)

Dr. Eastin’s areas of professional interest are in advertising and the degree to which media influences public opinion. His role in the

project was to analyze how media affected public attitudes concerning hydraulic fracturing. The surveys that were examined demonstrated that the dominant concern of two-thirds of the public was the impact of fracking on public health and the environment rather than the cost or availability of energy. Hence, Dr. Eastin's survey work suggested that such public concerns, whether validated by "scientific evidence" or not, needed to be taken far more seriously by both producers and regulators (not to mention the science community).

5.7.2 White Paper 2: "Environmental Impacts of Shale Gas Development" (Senior Contributor: Dr. Ian Duncan)

The white paper concerning the environmental impact of hydraulic fracturing became a literature survey after the decision not to accept funding for original scientific research from the natural gas industry. Dr. Duncan pointed out that this elimination of scientific effort from the project was unfortunate since there were issues, such as the presence of cavities above the fracturing regions that might allow the leakage of chemicals into groundwater reservoirs, notably with potential impact on public health. He indicated that there was very little published scientific information on many of the matters he was asked to investigate so he had to assemble his report from various unreviewed sources (violation reports, etc.).

Dr. Duncan indicated that his literature review suggested ideas for further scientific research, but that he chose not to include them in his report because he planned to pursue them in later research proposals. His original intent was to submit the material he provided as a series of papers to international journals; however, the rushed nature of the effort required him to provide only a draft of the report that he hoped to refine later.

Dr. Duncan's white paper on environmental impact is balanced with important caveats concerning the absence of adequate scientific research on many of the issues he investigated, including the possible contamination of groundwater by the chemicals used in shale fracturing. Further, several important areas of environmental impact are treated in only a cursory fashion in this section of the report, such as the seismic impact of shale fracturing and the deep injection of wastewater, the implications of greenhouse gases releases, and a very cursory treatment of public health implications with little epidemiological analysis or discussion.

The white paper concludes with strong caveats, such as:

- “Not only is there limited scientific knowledge about the impacts of oil and natural gas production, but current regulations as well as enforcement capabilities are insufficient.”

And states that:

- “Society benefits from high-quality research that advances knowledge and ultimately makes us more comfortable with the difficult choices we face.”

5.7.3 White Paper: “Regulatory and Enforcement Framework” (Senior Contributor: Dr. Hannah Wiseman)

Dr. Wiseman’s white paper appears to be balanced, carefully researched, and is well written. It attempts to identify best practices in both the regulation and enforcement of shale gas hydraulic fracturing. It indicates where better regulation is needed as well as where serious gaps exist in the availability of data (including data concerning the contamination of groundwater). The paper stresses the complexity and incomplete nature of regulation (much of which was established before widespread hydraulic fracturing was undertaken) and concludes that “significant gaps remain.” Examples of this balanced treatment include statements such as:

- “Although scientific analysis will be necessary to identify the source of gas and other substances in groundwater, the literature and incidents that have occurred in Pennsylvania suggest that drilling and improper casing of wells are in some cases associated with methane migration into groundwater, surface water, soil, and structures.”
- “The transportation of chemicals and their transfer to water on site poses one of the highest potential risks for environmental harm.”
- “Handling the large quantities of waste generated by shale gas development may be the greatest environmental challenge facing states with enhanced shale development activity.”
- “The majority of state regulations that apply to shale gas development were written before shale gas development became common, although some states have revised regulations to

specifically address shale gas development and hydraulic fracturing.”

- “Despite the regulatory updates in several states and existing, protective regulations in others, significant gaps remain.”
- “The maze of regulation that applies to shale gas development, much of which is state regulation, is difficult to navigate. Much more work is needed, but the authors hope that the regulatory examples here will provide valuable source material for future projects.”
- “As Professor Eastin’s paper discusses, despite the many stages of shale gas development process, much of the media attention has been focused on fracturing alone and particularly on the concern that fracturing will contaminate underground water supplies”. Wiseman cautions” “Specifically, the strong focus on contamination of underground water resources in the media and scientific literature could pull attention from the potentially higher risk of surface incidents. Substantially more data is needed to confirm or deny the apparently low level of water contamination caused by fracturing so far. A nearly exclusive focus on this area of concern, however, is short-sighted. Underground water contamination—particularly from improperly cased wells that leak during drilling (or old, improperly cased wells)—is indeed a concern. So too are surface effects.”
- “Just as media reports and scientific investigations should turn more attention to risks at the surface, inspectors—who appear to focus nearly exclusively on surface incidents—should consider increasing underground water testing and more closely monitoring activities such as pit and tank construction, proper casing of wells and use of blowout prevention equipment, and safe transport of fracturing chemicals to sites and transfer of chemicals on sites.”

5.8 Project Review

The project implemented a highly informal plan for reviewing the content of the white papers. The first stage of review involved an internal assessment of each of the white papers by the three Senior Contributors themselves. Although this yielded several important recommendations concerning the tone and balance of the papers (particularly the comments offered by Dr. Wiseman that

will be detailed in the next section), the fact that the Senior Contributors came from quite different professional disciplines (media surveys and public opinion, environmental science, and law) made it impossible for this to be viewed as a significant review of the technical content of the papers.

A second stage of review was conducted using external experts, but rather than the usual blind and independent peer review characterizing most academic work, each Senior Contributor was asked to send their draft to individuals whom they considered to be established in their field for comments. This unusual and informal approach to review would be found seriously deficient in establishing the accuracy and credibility of a study in most academic or policy environments.

Hence, the Review Committee concludes that the white paper drafts prepared by the Senior Contributors were not subjected to serious peer review and therefore were not ready to be considered for public release as fact-based scientific work.

5.9 Work Products Caveats

As already noted, the white papers drafted by the Senior Contributors include numerous caveats arising from the lack of data and insufficient research on, among other things, the public health and environment impacts of shale gas hydraulic fracturing. Throughout the individual white papers are caveats such as:

- "It is almost impossible to develop a detailed understanding of the local impact of water usage."
- "Sources for water used for hydraulic fracturing is not well documented."
- "The dangers from the chemicals used in fracturing is highly controversial."
- "The factors controlling the relative volume of water returned from shale are not understood."
- "The factors controlling the chemistry of flowback waters appear to be only partially understood."
- "The nature of the organic chemicals used in flowback waters are of considerable concern."

- "The implications of the discovery of microbial communities in the shale gas reservoir and flowback remain to be assessed."
- "The time between hydrocarbon production and sample collection is unknown."
- "Questions have been raised by researchers at Texas A&M as to whether filtering techniques are adequate."
- "Little information is available on the short and long term consequences of surface spills."
- "Regulatory agencies either do not collect this information or do not make it publicly available."
- "Statistical information on blowouts are limited and most go unrecognized or unreported."

During the internal reviews of the white papers by the Senior Contributors—and even with the presence of caveats such as the above—Dr. Wiseman submitted several important written suggestions as the report was being drafted:

- " I think a bit more support for the statement *As far as we are aware there is no scientific evidence that the fracturing process has resulted in contamination of groundwater* is needed in light of all the incidents that you list above and perhaps we should change this statement. In light of the politicized nature of this field and the likelihood of strong criticism of anything stated in this report, a more neutral-sounding statement might be, *There is as yet insufficient data to enable a determination of whether the fracturing process has resulted in contamination of groundwater, or No available isotopic data have shown a causal connection between fracturing and the methane or other chemicals found in groundwater; more data collection, disclosure, and analysis are necessary to further research contamination concerns.* Alternatively, perhaps you should save your statement that *no scientific evidence that the fracturing process has result in contamination of groundwater* to later in the paper, after you have explained why none of these incidents yet prove contamination—or that there simply is not enough data to tell whether they proved contamination.

- “To the statement insufficient information currently exists to understand and evaluate the long term, cumulative risks associated with the processes associated with hydraulic fracturing at depth in the long term, after gas production has ceased I would suggest adding: More research and particularly scientific data is needed to inform short-term and long-term claims of risk. The key take away point that I get from this project is that **we need more information** and that regulators should be encouraging and/or requiring more collection and recording of data. They also need to make this data available to scientists, which some states currently are not (as we have seen in Pennsylvania).”

Unfortunately these suggestions to enhance balance were not adequately carried over into the summary paper drafted by Dr. Grimshaw, the media releases, or the presentations’ summaries by Dr. Groat.

The Project Manager, Dr. Grimshaw, indicated that he took the notes from conversations and telephone discussions concerning the preliminary drafts of the white papers and prepared the draft summary. In interviews, each of the Senior Contributors indicated that they had no substantive role in drafting the summary of findings, but that neither Dr. Groat nor Dr. Grimshaw had changed the substance of their sections, and that they were not in disagreement with the report’s summary. Dr. Grimshaw did state that the summary of findings was reviewed by the the Project Director (Dr. Groat), the Deputy Director of the Energy Institute, Dr. Charles Cook, and the Institute’s Communications Director (Mr. Rasp) before release and publication. Dr. Grimshaw confirmed that he did not influence the project design or findings but acknowledged that he substantially drafted the summary, produced a memo to guide the media release, and prepared the PowerPoint slides for Dr. Groat’s subsequent presentations.

Unfortunately, the Summary of Findings ignored most of the caveats in the findings and discussions of the white papers themselves. For example, the summary stresses that the study is designed to promote shale gas policies and regulations based on facts that are well grounded in scientific understanding rather than claims or perception, yet the Senior Contributor for the environmental and health impact studies (Dr. Duncan) stressed throughout his white paper that there is very limited scientific evidence in these areas, but rather an array of reports of highly mixed reliability and rigor.

Much of the focus of both the Summary of Findings and subsequent press releases was on the impact of hydraulic fracturing on groundwater contamination, a topic with limited scientific evidence as suggested by the fact that topic was considered in only four pages of the 107-page paper on

environmental impacts. The assertion in the Summary of Findings and subsequent press releases that, “There is at present little or no evidence of groundwater contamination from hydraulic fracturing at normal depths” would thus seem to lack balance. The same conclusion can be drawn with regard to the statement that “Claims of migration of fracturing fluids out of the target shale zone and into aquifers have not been confirmed with firm evidence.”

The Summary of Findings discounts the absence of scientific research on the chemicals used in hydraulic fracturing by noting that several of the carcinogens “are widely used in the manufacture and use of many commercial products and other applications.” Apparently during final editing of the summary, a paragraph was added suggesting that many of the carcinogenic chemicals acknowledged for hydraulic fracturing are “used for many applications and should be evaluated within the framework of other broad uses and environmental releases as well as the depth of release, which is typically several thousand feet below the surface(in hydraulic fracking).”

Although the study failed to include any epidemiological analysis or data on public health issues in the white papers, the Summary of Findings states “In general, none of the studies reviewed for this initiative showed a clear link between shale gas activities and documented adverse health effects.”

In the Summary of Findings discussion of the Regulation and Enforcement white paper, there was little attention directed to the implications of waiving certain federal regulation relating to public health or environmental impact, not to mention cost, because of the differing standards in 16 states. No mention was made of the exemption of hydraulic fracturing from certain federal regulations such as the Safe Drinking Water Act that covers most entities that inject substances underground.

The Summary of Findings also tends towards provocative language, e.g. “Shale gas has become embroiled in controversy over alleged impacts on public health and the environment.” With respect to this manner of communicating, in her later analysis of the summary draft, Dr. Wiseman suggested that “the language sounds too political.”

In conclusion, the Summary of Findings fails to reflect accurately the magnitude of concerns and caveats contained in the white papers drafted by the Senior Contributors. It uses statements such as “there is no evidence” to counter public concerns, when, in fact, the white papers themselves stressed quite the opposite viewpoint that the absence of adequate scientific research and data demanded serious consideration and that regulation would be needed to address

concerns over hydraulic fracturing's impact on public health and the environment, at least until sufficient scientific evidence was accumulated.

5.10 Report Release and Media Releases

The project design stated that the aim of the communications strategy was "to promote a fact-based regulatory approach for shale gas development". To this end, "the findings and recommendations from the analysis of environmental issues and regulatory response will be systematically communicated to key stakeholders." To this end, arrangements were made to present the findings of the report at a special session on hydraulic fracturing at the February 2012 AAAS meeting held in Vancouver, Canada.

The tendency to ignore the caveats of the white papers regarding potential environmental and public health impacts of shale gas hydraulic fracturing characterizing the draft summary of findings was intensified in the media effort launched by the Energy Institute to disseminate the study.

The media brochure was replete with overstated "leads" such as:

- "Scientific investigation into groundwater contamination and other environmental impacts"
- "Separating fact from fiction in shale gas development"
- "Assessing the real and perceived consequences of shale gas development"

The media releases of the Energy Institute were similarly unsuitably qualified:

- "New study shows no evidence of groundwater contamination from hydraulic fracturing"

During the press conference that accompanied the presentation at the American Association for the Advancement of Science meeting Dr. Groat acknowledged some of the uncertainties involved in fracking :

- "The scientific evidence is not profuse."
- There is need for a lot more data for both the scientific community and the regulatory community."

- Referring to gas in water supplies, “[This] need[s] scientific attention.”
- Regarding micro-quakes, “It’s one area that is not settled yet...”
- Speaking of casing failures, “That is an issue that needs further attention.”

Unfortunately, these cautionary observations were lost in the overall thrust of the presentation, certainly as reflected in the media’s quite uniform interpretation of what was being reported.

The Energy Institute’s Communications Director, Mr. Rasp, did not have, nor could he be expected to have, the technical background to fully appreciate the caveats included in the various white papers drafted by the Senior Contributors. He thus depended primarily on the Summary of Findings and discussions with Dr. Grimshaw and Dr. Groat to develop the media releases. This led to a lack of balance in presenting the substance of the studies of the Senior Contributors.

The basic message of the media campaign, at least as portrayed by the media who reported on it, seemed to be: “This study has demonstrated that there is no evidence that shale gas hydraulic fracturing damages the environment or threatens public health.” Little reflection was contained regarding the limitations of the evidence supporting that statement. Of comparable concern were the PowerPoint presentations created by Dr. Grimshaw and delivered by Dr. Groat during the rollout of the study, since these also failed to adequately emphasize the many caveats and more cautious tone of the white papers themselves.

5.11 Acknowledgement of Contributors

The Review Committee finds it disturbing that the study was released with very little mention of the primary roles of the Senior Contributors. Curiously, during the original planning of the project, a memorandum from Dr. Groat and Dr. Grimshaw to the “Senior Participants” (Senior Contributors) offered the following reminder, stated in the form of a question: “Does the White Paper give adequate credit to GRA’s and others who helped prepare the White paper?”

Nonetheless, Dr. Groat consistently failed to mention in his public presentations the contributions of the authors of the white papers. Similarly, the publicly released reports rarely, if ever, mentioned the report’s contributors or, in some instances, even Dr. Groat’s role. One consequence of this anonymity is that

the released materials, by default, appear to be statements by the Energy Institute or even the University of Texas.

6.0 Recommendations

The Review Committee offers the following six recommendations:

R-1. The University of Texas should adopt and implement rigorous policies governing conflict of interest, conflict of commitment, and financial and relationship disclosure for all university personnel that publish or speak in a University capacity, clearly assigning responsibility and accountability for assuring compliance and monitoring of such activities. These policies should be consistent with those adopted by leading national research organizations such as the National Research Council, National Institutes of Health and National Science Foundation as well as best practices of other prominent research universities. (One such practice that has been found particularly helpful in the conduct of National Academies studies is to allocate time at the initial meeting of a study group for each member to disclose any potential conflicts or concerns that they may harbor. Had this been done in the present instance much of the eventual criticism might have been avoided.)

It is noted that the Regents have imposed a new system-wide Conflict of Interest policy, effective August 2012. However, in discussions with both faculty and administrators, concerns were expressed about whether these policies were sufficiently comprehensive. Uncertainty exists over the extent to which policies should be promulgated that might bear on academic freedom and the degree to which quasi-independent organizations such as the Energy Institute should be required to comply with University academic rules. With regard to the latter it is the Committee's view that to the extent that the Energy Institute or other like-entities bear the University's imprimatur they should abide by all regulations insofar as they are relevant to the work being performed or reported upon.

R-2. The UT Energy Institute should take the necessary steps to implement the above policies for conflict of interest assessment, disclosure and controls, assuring not only annual disclosure of all relevant financial and commitment relationships of all participants in its projects, but as well a thorough assessment plan for managing possible personal or institutional bias before launching any study. The responsibility and accountability for such a process should rest with the Director of the Energy Institute.

This concern arises over the manner in which quasi-independent research units such as the Energy Institute, with missions and cultures differing substantially from academic departments, can be held to the same standards of scholarly rigor, balance, disclosure of conflicts of interest and commitment, and academic freedom that must characterize the core education and research activities of the University as a whole.

R-3. The UT Energy Institute should develop and implement more effective methods for project design, management, and review, with clear assignment of responsibility and accountability for both the quality and integrity of its studies.

The shale gas hydraulic fracturing project, one of the first undertaken entirely by the Energy Institute, provides important lessons on how the Institute should approach future projects, placing high priority on disclosure and potential conflicts; knowledgeable, engaged leadership and management; setting a high bar for rigorous, independent review of studies; and thorough review of media releases critical to the credibility of the study, the Institute, and the University.

R-4. The UT Energy Institute should develop and implement a rigorous quality control framework for all public relations and media activities, with strong oversight responsibility and accountability for the accuracy of such releases on the part of both project directors and the Energy Institute leadership. Such activities should be carefully coordinated with the University's Office of Communications.

The shortcomings of media and public presentations associated with this project undermined its credibility, along with that of the Energy Institute. While high public visibility is an understandable goal of the Institute and the University, it must be carefully managed and modulated to maximize accuracy—including statements of limitations, rather than visibility.

R-5. The role and contribution of all participants in such projects should be thoroughly documented in all reports, publications, and presentations, both to assure that credit is presented where credit is due and to assure accountability.

The failure to embrace this practice not only diminishes the contributions of the authors but places undue responsibility upon the University as an institution.

R-6. Because of the inadequacy of project definition, management and review of the current project on shale gas fracturing and the damage to the credibility of the project caused by inadequate disclosure of potential conflict of interest on the part of the Principal Investigator, the publication resulting from Energy Institute's project on shale gas fracturing should be withdrawn from the Institute's website and the document "Separating Fact from Fiction in Shale Gas Development," given its basis in the above, should not be further distributed at this time. Authors of the white papers should be allowed sufficient time and opportunity to finish their work, preparing their papers for submission for truly independent review by a broad panel of independent scientists and policy experts. The summary paper should be redrafted to accurately portray these revised white papers, with strong involvement from the Senior Contributors, and potential conflicts of those involved should be stated.

7.0 Concluding Observations

The members of the Review Committee emphasize that they make no judgment as to the merits or demerits of hydraulic fracturing; this is not an area of their collective expertise nor is it an area of focus of this review. The authors simply conclude that the particular report they were requested to address, along with its presentation, was severely diminished by the failure of the Principal Investigator to disclose a clear conflict of interest—albeit, we are satisfied, without ill-intent. Similarly, the many caveats presented in the body of the report simply were not adequately reflected in the public presentation of the report—as is supported by the tone of the media’s coverage of the effort.

The members of the Review Committee appreciate the openness and candor with which we were received as we carried out our assignment and hope that the recommendations offered herein can have a positive impact on future activities of the Energy Institute.