UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7
11201 Renner Boulevard
Lenexa, Kansas 66219

January 17, 2014

MEMORANDUM

Subject: NTW work product: Minimizing and Managing Potential Impacts of Injection-Induced Seismicity from Class II Disposal Wells: Practical Approaches

From: Kurt Hildebrandt, Chair
National Technical Workgroup
EPA Region 7

To: Ronald Bergman, Chief
Protection Branch
Office of Ground Water and Drinking Water

I am pleased to transmit for your review and approval the final version of the Underground Injection Control Program National Technical Workgroup (NTW) Project Topic # 2011-3 - *Minimizing and Managing Potential Impacts of Injection-Induced Seismicity from Class II Disposal Wells: Practical Approaches*. This work product completes the NTW assignment authorized on July 20, 2011, by Ann Codrington, Director, Drinking Water Protection Division, Office of Ground Water and Drinking Water. This NTW Project was initially titled: *Technical Recommendations to Address the Risk of Class II Disposal Induced Seismicity*.

Members of the Working Group (WG) who developed the work product consisted of UIC staff from EPA Regions, EPA HQ, and State Agencies. A list of the WG members is included in Table 1. In addition to the members of the WG and NTW, technical experts were consulted and participated in discussions or provided feedback on various aspects of the draft report. These subject matter experts were from state agencies, academia, researchers, and industry. A list of the expert panel is included in Table 2.

The strategy adopted by the WG for this project is described in detail in the report, but included sections discussing the three key components for disposal induced seismicity from both a geoscience and petroleum engineering framework. Four case study focus areas were assessed forming the basis of a decision model that provides a practical tool for addressing concerns about induced seismicity by UIC Directors. Additionally the report contains an extensive scientific literature review.

The process involved several iterations of the draft report. The first draft was sent to the NTW for review and comment on December 21, 2011. In May 2012, USGS provided comments on the draft report at the request of HQ. Comments received from the NTW and USGS were incorporated into the report. On November 30, 2012, the report was then sent back to the NTW and to the expert panel for review and comment. All comments received were considered. The WG completed their review of the comments and associated edits, and submitted the final draft of report to NTW on December 24, 2013 for review and approval as a final work product. The review by the NTW membership was completed on January 15, 2014, and found a few cases of typographical errors and also some suggested edits to strengthen the document or correct grammar (none of these had been indicated by the commentators as needing to be included in the final document). These items were forwarded to Region 6 and an updated version of the document (attached) was provided to me which corrected the typographical errors and incorporated most of the significant comments.

As per the NTW charter, before a work product can be called final and forwarded on to Headquarters, the members of the NTW needed to provide their vote on if they are in agreement with the findings contained in the work product or if they are not in agreement, an explanation of why and what needs to be changed. The results of the voting had only one member objecting to paper due to it not recommending that all Class IID wells be required to have seismic monitoring. The request to incorporate this change was made to align the paper with a policy set by the Regional Administrator in Region 2 which requires all Class IID wells to have seismic monitoring. I have included a copy of the materials provided by Region 2 as an attachment to this memorandum.

The NTW normally would work to resolve any concerns that are raised by an NTW member during our review process before forwarding it on to Headquarters but given the nature of the concern, this is one where that isn't going to be possible. The work product does suggest that seismic monitoring is something that a UIC program Director may wish to consider under certain conditions but both the author's and I are not comfortable in having the work product recommend seismic monitoring for every Class IID well across the country as there are just too many variables that exist. Additionally, given the nature of the work product, we would also not be able to say that seismic monitoring should be required in all cases as this would require a regulatory change. Incorporation of either a recommendation in this work product or a regulatory change to require seismic monitoring at all Class IID wells is something that Headquarters will need to consider if it wishes to pursue.

Upon your approval, the NTW would appreciate your distribution of this work product to each of the EPA Regions and to the Ground Water Protection Council for distribution

to their State members. When distributing the work product, it will be important to note that the decision model contained in it is not required to be used but simply provides a tool to assist regional or state UIC programs in determining what things may be appropriate when attempting to minimize and/or manage the potential impacts of injection-induced seismicity related to Class II Disposal wells. If you have any questions concerning this work product, please contact me at (913) 551-7413 or Philip Dellinger in Region 6 at (214) 665-8324.

cc: Regional UIC Program Managers
NTW members

Table 1: Working Group Members

Philip Dellinger	US EPA R6	Robert Smith	US EPA DC
Susie McKenzie	US EPA R6	Sarah Roberts	US EPA R8
Nancy Dorsey	US EPA R6	Steve Platt	US EPA R3
Ken Johnson	US EPA R6	Chuck Lowe	OH EPA
Rob Lawrence	US EPA R6	Tom Tomastik	OH Dept. of Natural Resources
Keara Moore	US EPA DC	Jim Milne	CO Oil and Gas Conservation Commission
William Bates	US EPA DC	Denise Onyskiw	CO Oil and Gas Conservation Commission
Jill Dean	US EPA DC	Charles Lord	OK Corporation Commission
Brian Graves	US EPA R6	Vince Matthews	CO Geologic Survey, retired
Dave Rectenwald	US EPA R3	Douglas Johnson	Railroad Commission of TX
David Basinger	US EPA R9	James A Peterson	WV Dept. of Environmental Protection
George Robin	US EPA R9	Lawrence Bengal	AR Oil and Gas Commission

Table 2: Expert Panel

Brian Stump	Southern Methodist University	Cliff Frohlich	BEG, University of Texas
Chris Hayward	Southern Methodist University	David Dillon	National Academy of Science
Scott Ausbrooks	Arkansas Geological Survey	Shah Kabir	Hess Energy
Steve Horton	CERI, University of Memphis	Bill Smith	National Academy of Science
Ernest Majer	Lawrence Berkeley Nat'l Lab	Roy Van Arsdale	University of Memphis
Norman Warpinski	Pinnacle	Justin Rubenstein	USGS
John Satterfield	(formerly) Chesapeake Energy		