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Accounting for ‘how we know’ about the safety/risks with hydrofracking: an intergovernmental hearing on the revised Environmental Impact Statement on whether to permit hydrofracking in New York state

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ABSTRACT
An intergovernmental hearing on permitting hydrofracking in New York State is examined. This hearing proved to be a key moment in the debate on hydrofracking. The Department of Environmental Conservation (DEC) advocates for accepting their revised Environmental Impact Statement (EIS), while some Assembly members raise concerns about the risks and are critical of the EIS. The focus is on how techno-scientific discourse is formulated to argue for or against permitting hydrofracking. In particular, models are cited. The DEC uses extreme-case formulations to amplify their knowledge claims about their modeling. ‘Extreme-case formulations’ involve heightened, maximal descriptions of how they know through modeling. Formulations can also be used to deflate the accuracy of modeling. The boom-and-bust cycle model is challenged by the DEC through the practice of reformulation. The boom-and-bust cycle is reformulated to a more benign process to counter the Assembly member’s account. Such techno-scientific discourse of modeling and with their extreme-case formulations need to be seen as a situated social activity and for their discursive, rhetorical, or affective dimensions in contexts such as intergovernmental hearings.

Horizontal, high-volume hydraulic fracturing, commonly called hydrofracking or fracking, is an emerging technology for capturing previously untapped deposits of natural gas. Hydrofracking involves injecting millions of gallons of water, chemicals, and sand under great pressure into horizontal wells to fracture the shale and release the gas or oil (Duggan-Hass, Ross, and Allom 2013; Prud’homme 2014). This unconventional drilling technology first began in a big way in the Texas Barnett Shale in the late 1990s (Briggle 2015). ‘Unconventional’ in the sense that the gas is not found underground in a reservoir but must be fractured from the shale (Finkel 2015). This emerging technology allowed for access to the Marcellus Shale, an extraordinarily rich play of natural gas deposits in the in the Northeast US (Duggan-Hass, Ross, and Allom 2013; Wilber 2015). The Marcellus Shale is found in the states of Pennsylvania, Ohio, West Virginia, Maryland, and New York; the first horizontal well was ‘fracked’ in this region in Pennsylvania in 2003.
The controversy over hydrofracking

Natural gas is a cleaner burning source of energy than coal and has been touted as a way to reduce greenhouse gas emissions and serve as a bridge to non-fossil fuel energy. Hydrofracking was initially supported by environmentalists, but problems began to appear in states which readily allowed the industry in, such as Colorado and Pennsylvania (McKibben 2012). The most eye-catching moment came when a homeowner was able to light his kitchen faucet on fire with a match due to gas in his water as seen in the documentary *Gasland* (Fox 2010; Vasi et al. 2015). Other problems began to surface: a gas well exploded in Dimock, PA and water wells became contaminated; methane emissions from wellheads degraded local air quality; flow-back waste fluids were spilled on site or dumped into rivers; increased seismic activity; truck traffic and road building fragmented natural areas and damaged local roads; and community disruption due to an influx of workers (Perry 2012; Guignard 2013; Wilber 2015).

The social science literature has largely focused on the opposing viewpoints on hydrofracking. Opposing viewpoints have been fueled by competing messages, discourses, and rhetoric, for instance, the natural gas industry’s web sites and advertisements tout economic benefits along with the patriotic message of energy independence or regional pride supported by scientific images of expertise (Finewood and Stroup 2012; Guignard 2013; Matz and Renfrew 2015). The industry counters environmental risk by framing the debate as jobs versus the environment. Industry narratives romanticize labor identities of the extraction industry of the past in Pennsylvania projected to the present (Rich 2016).

Studies on ‘the human face of hydrofracking’ examined narratives from *You Tube* on the social and psychological costs of living near a gas well (Jaspal, Turner, and Nerlich 2014), or from grassroots citizen groups speaking of the threat to their sense of place (Guignard 2013). During public hearings in Pennsylvania, anti-fracking speakers portray hydrofracking by positioning the audience on the ground standing near the drilling site and provide details of the process. In contrast, pro-fracking speakers present more of an aerial view of wider portions of the region, distant from the drilling site, and described in more general terms. These conflicting representations of hydrofracking and place were used during public hearings in advocating for or against the technology (Mando 2016).

Studies on the evolution of the hydrofracking debate over time looked at how opposing groups formed and change in light of events and of opposing positions. Opposing groups frame the facts in contrast to opponents’ position by ‘discursive boundary work’ leading to ‘frame contests’ (Metze 2014; Metze and Dodge 2016). In the Netherlands, the business-as-usual coalition faced the environmental risk narrative, which then evolved into new discourse coalitions of ‘gas as a bridge fuel to the future’ versus ‘gas as fossil fuel addiction.’ By contrast in New York, the economic opportunity and landowners’ rights coalition faced the environmental risk coalition with multiple threats: health, economic, climate change, and environmental justice. In Pennsylvania, opponents vied over issue management to gain public acceptance and legitimate their decisions (Smith and Ferguson 2013).

As seen from this reading of the literature on hydrofracking, the focus has been on the conflicting messages in the press, industry, and pro- and anti-fracking groups. A context that has received little scholarly attention is the deliberative process of governmental agencies in deciding whether or not to permit hydrofracking. In a prior study of deliberation during an intergovernmental hearing, advocates for permitting hydrofracking seemed to evade certain problem questions by reworking or challenging the question (Buttny 2015). In response, they were called to account by critics for such agenda shifting. To extend this study of deliberation during intergovernmental hearings, we examine the epistemic support governmental agents draw on to support or challenge claims about the risk with hydrofracking.

Context, rationale, and analytic approach

In the course of deliberating during an intergovernmental hearing, participants make knowledge claims regarding the risks with hydrofracking. Here, the focus will be on how participants offer epistemic support for their claims involving risk.
To describe the context of our study, the agency responsible for writing the Environmental Impact Statement for New York State is the Department of Environmental Conservation (DEC). As the lead agency in writing the Environmental Impact Statement (SGEIS), the DEC positions itself as objectively investigating the science and technology of hydrofracking and how it needs to be regulated in New York State (NYS). Upon release of their second draft of the Environmental Impact Statement (SGEIS¹), the DEC is invited by a committee of the New York State Assembly² – the Standing Committee on Environmental Conservation – to a hearing. This intergovernmental hearing is the context for our study.

The DEC’s initial draft of the SGEIS received an unprecedented number of comments and criticisms that led the DEC to do revisions and issue a second draft. In light of the intense controversy over hydrofracking, the DEC and the Governor have been pressured from all sides. To manage one of the most contentious environmental controversies in NYS history, Governor Andrew Cuomo announced that a decision on permitting hydrofracking should be made, not on politics, but on the science (Kiernan 2012). While science alone cannot make such a policy determination, using this rhetoric seems a safe positioning for the Governor and the DEC. As Wilber (2013) aptly put it, ‘Policy is where science meets politics.’

Communication on risk provides a useful perspective to examine this controversy on hydrofracking (Boholm and Corvellec 2014). Risk involves real dangers or hazards in the world as well as how people experience or socially construct risk (Krimsky and Plough 1988). Risk is conceived as part objective threat and part sociocultural experience involving peoples’ values of how they want to live (Beck 2000).

Analysis of risk proceeds through science and reason, feelings and intuitive reactions, and politics (Slovic et al. 2004). Ulrich Beck’s ‘relations of definition’ questions raise some basic issues about risk (Beck 2000, 224, 225).

(1) What kind of knowledge or non-knowledge about the causes, dimensions, actors, etc. is involved?

(2) To whom have evidence and ‘proof’ to be submitted?

These questions on risk point to the social accountability for the decision on hydrofracking. The main focus here will be on question one: *How is epistemic support used in claims involving risk?* In other words, *How do participants use techno-scientific terms or models, or reports? How are these formulated and described?* While the DEC representatives and Assembly members are not themselves scientists, they are informed by various techno-scientific calculations, reports, or testimony (Ozawa 1996). During the hearing, Assembly members raise questions that often contain concerns or challenges, while the DEC’s answers are designed to mitigate those concerns. This question–answer, concern–mitigation interaction is, at times, fraught with differences, disagreements, or drama over the risks with hydrofracking (Palmlund 1992; Hilgartner 2000). Given the differences in risk assessment, *How do participants support their positions? How do their differences interactively play out?*

### Data and methods

The data for this study come from a video recording of the 6 October 2011 intergovernmental hearing held in Albany, NY. A transcript of key moments from this hearing was drawn up (see Appendix 1 for symbols). A discursive analysis method is used to reveal the interactive moves and positionings that participants take in making claims about hydrofracking (Buttny 2004). The hearing is broadly structured around a question–answer format. In the course of asking questions, problems or concerns are raised by Assembly members that evoke various accounts from the DEC to alleviate or mitigate those concerns. We examine such question–answer sequences to reveal how participants present the problem or the mitigation.

Discursive analysis allows us to see better how risk is interactionally constructed. Excerpts from the hearing are selected which show instances of participants’ uses of techno-scientific considerations to support or challenge claims about risks with hydrofracking. The level of detail represented in the
transcripts is important because this helps us to understand better, what participants are saying and doing in their exchanges.

**Discursive uses of knowledge claims**

The intergovernmental hearing is structured by a question–answer format. Assembly members frequently raise problems or concerns as part of their questioning turns, while the DEC representatives respond with solutions or mitigations in their answering turns. The Assembly members’ questions at times display skepticism about claims from the SGEIS, while the DEC’s answers attempt to show how they know. Our interest here is in the discursive formulations used in epistemic support for participants’ risk claims.

**Modeling and extreme-case formulations**

One way DEC representatives support their claims about the safety of hydrofracking is through modeling. Modeling is a scientific technique used to make projections about future consequences. For instance, simulation modeling has received much attention in climate science claims on human-induced climate change (Pidgeon and Fischhoff 2011). Modeling is used here by the DEC to alleviate the concerns raised about hydrofracking. For instance, in the following we see modeling drawn on to respond to potential problems and to say how they know.

1. (Modeling: 32:47; AS is Assemblyman Sweeney, and DL is Deputy-Commissioner Eugene Leff)
01 AS: Okay the: EPA in their comments suggested = and I’l I’ll use
02 their words the document needed a greater emphasis on
03 <potential health impacts> um can you tell me how
04 those suggestions might have been ah incorporated into
05 this: document
((skip 8 lines))
14 DL: I believe you’re ah reading from the EPA’s 2009 comments?
15 Assemblyman? in response to those comments and others we
16 extensively increased the modeling effort of air 
17 emissions and we um did take into account the worst case
18 scenario for air pollution that could be caused at a well
19 pad and carefully analyzed that and determined that EPA
20 standards and state standards would not be exceeded but
21 that there was a need to take special mitigation measures
22 with respect to particulates? and all of the measures are
23 reflected in the revised 2011 (.) SGEIS and you can see a
24 a very detailed description of the additional modeling that
25 was done in response to EPA’s suggestion.

Here Assemblyman Sweeney holds the DEC accountable to the U.S. Environmental Protection Agency’s (EPA) comments on the DEC’s earlier SGEIS draft. Sweeney reads the passage, ‘potential health impacts’ (line 3), more slowly for emphasis. Of all the adverse impacts that hydrofracking has been said to pose – environmental, technical, economic, community, esthetic – health impacts arguably would rank as the most serious.

Deputy-Commissioner Leff’s response displays recognition by accounting for the DEC’s work in modeling. Leff refers to their modeling but he does not get into the specifics of the model (line 23–25). He formulates the measures they are proposing in a maximal way to demonstrate that they have taken extensive precautions to ensure safety. Leff claims that their modeling is ‘extensively increased’ (line 16), to guard against ‘the worst case scenario’ (lines 17–18), and has been ‘carefully analyzed’ (line 19), given their ‘special mitigation measures’ (line 21). Such maximal accounts have been called ‘extreme-case formulations’ (Pomerantz 1986). Extreme-case formulations involve word choice that describes events in a superlative way. As Leff summarizes, their SGEIS offers a ‘very detailed description of the additional modeling’ (line 24). By formulating their actions in an extreme case implicates that their response to the EPA’s recommendation is above and beyond the ordinary, that their modeling is ramped up to ensure preventing health impacts. Extreme-case formulations function to justify or defend their position.
against criticism. These heightened measures indicate that modeling can be done in different ways as a function of the demands of the situation. The uses of extreme case formulations in this account show the discursive character of the DEC’s technical claims to make these convincing.

Later in the hearing another Assembly member describes air quality problems from hydrofracking to which the DEC Commissioner invokes modeling for how they know that air quality will not be compromised given their regulations.

Assemblyman Kavanagh describes the known air contaminates from hydrofracking. Detailing the known effects of hydrofracking on air quality is hearably problematic for the DEC. Listing the contaminants and their causes along with a query about others allows him to take an implicitly critical stance as well as an investigative one.

Commissioner Martens responds with a more mitigated version: instead of ‘the effects of this activity on air quality’ (line 3), he formulates the situation as just a possibility, as ‘potential air contaminants’ (line 14). To counter Kavanagh’s list of contaminates, Martens seemingly needs an equivalent strong response. Modeling is invoked for how they know that air quality standards will not be violated. In his account on modeling, he uses the extreme-case formulation, ‘fairly exhaustive about um modeling those:’ (line 15). This formulation is softened or qualified here as ‘fairly exhaustive’ so as not to seem hyperbolic (Edwards 2000). But he adds the extreme-case formulation, ‘a whole series of controls that we would insist upon…’ (lines 16–17). He avoids discussing the specific air contaminants cited by Kavanagh, but offers a summary account. The discourse marker, ‘again’ (line 14), indicates that air contaminants has been discussed previously thereby warranting his summary account.

In excerpts 1 and 2, modeling is presented as a solution for the problems raised by Assembly members. In both cases, the Assembly member does not challenge the modeling answer, but moves on to the next question. In the following, we see modeling used again, but this time it gets challenged by the Assembly member.

Assemblywoman Lifton describes the known air contaminates from hydrofracking. Detailing the known effects of hydrofracking on air quality is hearably problematic for the DEC. Listing the contaminants and their causes along with a query about others allows him to take an implicitly critical stance as well as an investigative one.

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The problem of cumulative impacts on air quality is raised by Assemblywoman Lifton.

Commissioner Martens addresses this, ‘again’ (line 13), through modeling. He explains how they did the modeling by using the extreme case formulation, ‘the more aggressive scenario, the high scenario’ of wells (line 16). Through a kind of summary statement, he characterizes their modeling efforts as doing ‘a very thorough job’ (lines 19–20). Implied here is that they modeled the maximum number of wells, and given their proposed controls, they were able to meet air quality standards. Extreme-case formulations again are used to render their modeling as impressive.

Assemblywoman Lifton challenges the DEC’s explanation due to contrary accounts from others (lines 22–23), but does not mention the specifics of the critical assessment and leaves it as an appeal to others’ testimony. The Commissioner’s response of wanting to hear that reflects the dual stance the DEC takes: implicitly advocating that their SGEIS is sufficient to ensure safety while also being open to further input.

Modeling is used by the DEC to show how they know, as seen in the prior three excerpts. In the following, modeling is used to defend a knowledge claim but also used to challenge the model. Assemblyman Sweeney questions why the DEC has specific numbers for the estimate of the jobs that will be created from hydrofracking but nothing on the costs to communities (see Buttny 2015, excerpt 7).

4. (Modeling: 42:15, DR is Deputy-Commissioner Russo; AUD is the audience) (AS is responding to DR’s claim that the DEC cannot offer an estimate of job losses because the SGEIS is generic).
54  as: I appreciate that but you kn(h)ow the document projects
55  17,364 jobs to be fill(h)ed by New Yorkers, † that seems
56  pretty specifi[c I mean so why can you create a=
57  AUD: [h h h h
58  AS: = number like that:
59 DR: Those are all based on modeling on economic modeling
60  and it’s all in there but I don’t think any of us think
61  that that is exactly the number of just that’s going to be
62  created >these are all just projections< but when it
63  comes to actual- how many ambulances a particular town or
64  village you’re going to need to † add it’s a ↓ much more
65  difficult exercise to be able to do.
66 AS: Which economic modeling can probably help you with there
67  † too ↓ would be my guess? I mean I just don’t understand why
68  you can be very specific about some things (.) um largely
69  based it would appear on data provided by the industry
70  but not so specific (.) on-
71  but >ya know< we’ll move on ![mean the same thing- please!
72 AUD: [XXXXXXXXXXXXXXXXXXXXXXXXXXX
73 AS: Please

Here Deputy-Commissioner Russo responds to Sweeney’s critical assessment by invoking ‘economic modeling’ as the basis for how they know about the jobs to be created (line 59). To defend this modeling, Russo uses the extreme-case formulation: ‘it’s all in there’ (line 60), but then immediately qualifies their epistemic stance, ‘but I don’t think any of us think that is exactly the number’ (lines 60–61), and further that the 17,364 jobs number are ‘just projections’ (line 62). In other words, the DEC cannot be held accountable for this specific jobs number. This is one of the few instances in which the DEC minimizes their knowledge claims. More commonly the DEC uses extreme-case formulations to communicate assurance of their position.

Throughout the hearing the DEC uses modeling for epistemic support and it has seemed to serve as a sufficient account. Here, Assemblyman Sweeney responds to Russo’s claim of modeling by also invoking modeling as a way to project costs as well as benefits (lines 66–70). Sweeney implicates the DEC’s bias in offering numbers for benefits but not for costs. Modeling, of course, involves choice in what to look at, what data to use, and what assumptions to make. The audience’s applause (line 72), overlapping with Sweeney’s criticisms of the DEC, underscores that this hearing is not solely about technical adequacy, but also about political contestation.
Assemblyman Sweeney segues from his criticism of the DEC’s bias to what he takes to be the main risk with hydrofracking, to public health. He uses extreme case formulations along with modeling to support how he knows about this risk.

Sweeney recounts what he learned about the threats to health from hydrofracking in a prior hearing. He uses the extreme-case formulation, ‘a lot of,’ in characterizing the experts who testified at that prior hearing, they had ‘a lot of training in this field and they did a lot of modeling’ (lines 78–79) and there’s ‘a lot of research’ (line 74). Their ‘models about air pollution’ show the threat to health to be, not only local, but the downstate New York City area as well. That is, the model shows the pollution extending over a wide region. Again, we see extreme case formulations used in support of modeling as the basis for how the speaker knows.

Modeling was used in all the above excerpts to lend epistemic support for the speaker’s position. A communication practice to present modeling is through the use of extreme case formulations to say how we know. We have seen extreme case formulations in accounts of modeling such as: ‘a very detailed description of the additional modeling’ (#1), ‘extensively increased the modeling’ (#1), or ‘all based on modeling on economic modeling’ (#4). Extreme case formulations are reflected in word choice: very, every, all, a lot of, huge, worst case, and special. We began looking at the DEC’s discursive use of modeling along with extreme case formulations, but saw that Assemblyman Sweeney also used this practice in arguing for a different position. Modeling does not discursively stand alone; modeling needs to be presented in a convincing way and extreme-case formulations are used to make their case convincing.

Reformulating the boom-and-bust model

One way that concerns about hydrofracking are expressed is by making projections about its impacts and modeling is one way of making such projections. Projections are a way of talking about risk. For instance, a concern raised is that hydrofracking leads to a boom-and-bust economy for local communities. Indeed, a boom-and-bust cycle is itself a socioeconomic model. In the excerpt below, Assemblyman Sweeney reads a criticism of the SGEIS raised in a letter from a well-known expert.
By reading from the expert’s letter, Assemblyman Sweeney is able to raise a problem while positioning himself with an investigative stance, as seeking information. The problem of the ‘boom-and-bust cycle’ is formulated in the letter as ‘well known’ (line 2) but yet is ignored in the SGEIS.

Commissioner Martens insists that this cycle is acknowledged in the SGEIS; indeed, he states that it is ‘acknowledged’ at three different points in his answer. What is really at issue here is the nature of this cycle – is it a ‘boom and bust’ or something less ominous? Instead of a ‘boom-and-bust cycle,’ Martens reformulates the economic consequences of hydrofracking in his preferred way: ‘the number of jobs will go up and then will decrease over time’ (lines 9–10), or ‘a gradual ramp up it will be a number of years of peak production and then there will be a gradually- a tapering down’ (lines 13–15).

How an activity or process is described, clearly affects how it is understood or assessed. An economic ‘bust’ for a community is significantly direr than a ‘tapering down’ of jobs. This is not merely a semantic difference. They seem to concur on the cyclical nature of the process, but not on the magnitude or economic consequences, that is, a ‘bust’ versus a ‘tapering down.’ Discursively ‘a tampering down’ minimizes the ill effects of a ‘bust.’ Instead of an extreme-case formulation we get a minimization formulation. The Commissioner’s response displays caution with his choice of words; he does not want to be heard as allowing that a ‘boom and bust’ may occur.

A while later in the hearing the boom-and-bust question is brought up again in a more pointed way by another Assembly member.

7. (boom & bust: 1:29:06)
04 AL: um the Christopherson report clearly ah says
05 that there are () ah job losses the current economy gets
06 crowded out? when the industry comes in? >yes< there’s a
07 boom >you said you’re not so sure there’s a boom and bust?<
08 every study is saying boom and bust, uhm I was surprised to
09 hear you say it’s not so clear there’s a boom and bust=
10 CM:=Well i acknowledge that it- it accelerates over time and
11 it will descend, I mean everybody acknowledges you know
12 when you’re extracting a natural resource that it is a
13 finite resource that doesn’t continue on indefinitely,
14 there is a thirty year- approximately a thirty year cycle
15 from the beginning of the drilling process to the end of
16 the well production.

Here Assemblywoman Lifton cites ‘the Christopherson report’ in support of the boom-and-bust economic projection, using the extreme case formulation ‘every study is saying’ (line 8). Lifton contrasts what ‘every study’ says to Commissioner Martens’ prior minimization of the cycle (as seen in excerpt 6). Her summary speech, ‘you’re not so sure there’s a boom and bust’ (line 7 and again at line 9), paraphrases Martens’ prior epistemic stance, and then contrasts it to what ‘every study is saying.’ This contrast between the extreme-case formulation, ‘every study,’ and Martens’ minimized formulation is clearly critical of Martens’ positioning and of the SGEIS.

In reply, the Commissioner begins by using this term, ‘acknowledge,’ though here as ‘I acknowledge.’ Martens’ acknowledgment is not conceding to a problem, but to the recognition that the gas will eventually be exhausted; that it is part of the cyclical process of ‘extracting a natural resource’ (line 12). To match Lifton’s extreme-case formulation, ‘every study,’ Martens claims ‘everybody acknowledges’ (line 11) to implicate that he is not out of step with expert opinion. In excerpts 6 and 7, we get two widely differing projections of the economic consequences of hydrofracking. The Assembly members do not further challenge the Commissioner on this discrepancy but move on to their next question.

In the cases examined so far modeling has been used by both the DEC and Assembly to support their stance on hydrofracking. Modeling is presented or challenged using discursive strategies of extreme-case formulations or minimization techniques. While modeling is cited as an epistemic resource, it can
be challenged in various ways. As we have seen by claiming that costs are not included in the model (excerpt 4), by reformulating the process (excerpts 6–7), or by citing contrary opinions (excerpt 3).

**Discussion**

As can be seen from this intergovernmental hearing there is little consensus on scientific or technical claims on the risks from hydrofracking. Competing expert’s accounts at hearings is not uncommon. *What our analysis adds is how these competing accounts on the risks with hydrofracking are interactively accomplished through question-answer, problem-mitigation exchanges. Participants say how they know by citing modeling. Such knowledge claims on modeling get amplified by formulating the measures they took in an extreme case so as to present them as more convincing.*

By way of summary, we have seen Assembly members raise concerns about hydrofracking as regards public health (excerpts 1, 5), air quality (excerpt 2), cumulative impacts (excerpt 3), costs to communities (excerpt 4) and the local economy (excerpts 6–7), and the DEC’s responses to how they will manage these problems. The DEC uses extreme-case formulations in their responses to argue that their modeling or regulations will prevent these potential problems. Extreme-case formulations serve a central part in the DEC’s responses to make their modeling sound more convincing. Given the weightiness of the potential problems, a correspondingly weighty account in response seems in order. Participants’ uses of extreme-case formulations ramp up their epistemic stance towards hydrofracking. Extreme-case formulations can work to bolster modeling, but models can be challenged in various ways, such as by minimization or reformulation. The Commissioner challenges the boom-and-bust model, not by citing other studies or models, but by reformulating or re-describing the cycle in less threatening terms.

Much of the discourse literature on hydrofracking uses the notion of ‘frames,’ i.e. ‘competing frames’ or ‘frame contests’ (Metze 2014; Molinatti and Simonneau 2015; Williams et al. 2015; Matz and Renfrew 2015; Metze and Dodge 2016). While framing has been a useful metaphor in environmental and media studies, it has become somewhat over-used and has lost some of its descriptive power. Our discursive analysis methodology allows us to more specifically capture how competing accounts on hydrofracking are interactively accomplished through the communicative practices of extreme-case formulations or reformulations in making knowledge claims about modeling. Our discursive analysis describes how participants account for how they know – by modeling along with extreme-case formulations or by reformulations.

Turning to Urlich Beck’s second question, ‘To whom have evidence and ‘proof’ to be submitted?’ the answer is far less clear. The DEC is the lead agency in this environmental review but the Governor is seen as politically responsible since the DEC is an agency under the executive branch of NYS government. This intergovernmental hearing provides a context for the DEC to garner support for their new draft of the SGEIS. Today instead of top-down, deficit-model decision-making, achieving some sort of consensus via horizontal decision-making is preferable (Bora and Hausendorf 2006; Molinatti and Simonneau 2015). Through their revised draft of the SGEIS the DEC wants to get stakeholders on board, such as Assembly leaders, the Department of Public Health, or members of the scientific community. Horizontal decision-making serves to legitimate such controversial decisions (Boholm 2009; Smith and Ferguson 2013). Politically the DEC needs other agencies, stakeholders, or experts to approve their draft SGEIS (Douglas 1992; Bora and Hausendorf 2006). The DEC needs to legitimate their decision by reaching some sort of consensus. Risk can be understood in sociopolitical terms—in how consensus on a project is achieved, or not (Douglas 1992).

The number of concerns raised during this intergovernmental hearing makes achieving consensus unlikely at this point. Not only do Assembly members report contrary expert opinions, but the DEC does not appear to have convincing answers to certain questions. Especially damaging is the criticism of the DEC’s bias (excerpt 4). The DEC’s insistence that their regulations based on their modeling will prevent the problems from hydrofracking does not seem reassuring to Assembly members or to the audience. The needed confidence or trust in the DEC’s SGEIS appears wobbly in light of the concerns raised (Krimsky and Plough 1988; Buttny 2015). Once the public debate becomes polarized, a hearing
of this sort is not the place for a serious weighing of the scientific or technical evidence (Mazur 1981; Ozawa 1996; Hilgartner 2000). Scientific deliberation gives way to advocacy, and strong feelings and emotion become displayed in the dialog. Politics and values inevitably become part of the equation.

The conflicting positions in intergovernmental hearings have been said to reflect the larger public debate (Boynton 1991). In our case this is only partially true. No doubt the DEC and Assembly members have been hearing from various stakeholders, the public, and from the gas industry. But, overall, this hearing does not seem as polarized as the public debate. While the DEC officially adopts a neutral position on permitting hydrofracking, in this hearing they are clearly advocating that hydrofracking can be done safely given their precautions.

This intergovernmental hearing went on for over three hours. In hindsight these sometimes heated exchanges of challenge–response, concerns–mitigations, while messy and unresolved, played themselves out in important ways in the deliberative process on hydrofracking. After this hearing and after receiving numerous written comments on this draft SGEIS, the DEC sought out more input from the Department of Health (DOH) and independent public health experts. Some two years later, the DOH’s report on the mounting evidence of health impacts led to a statewide ban on hydrofracking (Revkin 2014; NYSDEC 2015). This intergovernmental hearing appears to have been a pivotal moment where the DEC was unable to garner enough support to politically legitimate permitting hydrofracking. New York is the only state with sizable natural gas deposits to ban hydrofracking.

Notes
1. SGEIS stands for Supplemental Generic Environmental Impact Statement. ‘Supplemental’ since New York already had regulations on the more traditional gas and oil drilling, but not on this uncoventional technology of horizontal, high-volume hydraulic fracturing.
2. The Assembly is part of the legislative branch of the NYS government.

Disclosure statement
No potential conflict of interest was reported by the author.

References

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Appendix 1

[ ] Marks overlapping utterances
= Marks when there is no interval between adjacent utterances
(3.5) Indicates pauses or gaps within or between utterances. Timed to tenths of a second
( ) A short untimed pause or gap within or between utterances
: One or more colons mark the extension of a sound or syllable it follows. The more colons, the longer the sound stretch
? Marks a rising intonation
- Marks an halting abrupt cutoff
↑ Marks a rising shift in intonation
↓ Marks a falling shift in intonation
word Underlining marks a word or passage said with emphasis
°word° Degree signs mark a passage that is said more quietly than surrounding talk
>word< Chevrons marks a passage delivered at a quicker pace than surrounding talk
<word> Inverted chevrons marks a passage delivered at a slower pace than surrounding talk
§word§ Words or a passage uttered in a staccato voice
hhh Audible outbreaths including laughter
XXX Applause
() Empty parentheses indicate inability to hear what is said
((word)) Scenic details or description of the context