

# UNC Charlotte rebuttal to WBTV report

Emails reveal Duke edited scientific reports on coal ash, coordinated with advisory board chair

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CHARLOTTE, NC (WBTV) -

Emails and documents obtained by WBTV show senior officials at Duke Energy edited reports prepared by at least one professor hired by the company to prepare independent scientific reports related to the impact of coal ash ponds on groundwater.

Duke Energy and Dr. Langley discussed potential edits at length before Dr. Langley accepted them for inclusion in the single report cited in this article. These edits added context to the problem statement and did not alter the final model results or conclusions.

The documents also show a second professor, Dr. John Daniels of the University of North Carolina Charlotte, advised Duke Energy staff while chairing an independent advisory board Duke was required to charter as a condition of its probation stemming from a guilty plea in a criminal case in US District Court.

The advisory board is chartered to advise Duke Energy staff. That is its purpose. None of the board members is employed by Duke Energy. NAMAB and its governing contract were developed in compliance with University policies and protections, with careful review to ensure independence, objectivity and no conflicts of interest.

WBTV requested emails and documents from two professors at UNC Charlotte - Daniels and Dr. Bill Langley - who were paid by Duke Energy to investigate scientific questions related to the company's coal ash ponds.

During the interview with WBTV, also recorded by UNC Charlotte, both professors told the reporter that neither of them was paid by Duke Energy. Dr. Daniels does not receive personal compensation for his work as chair of NAMAB. His university salary remains the same regardless of his work with the advisory board.

Both Dr. Langley and Dr. Daniels were contracted through the university, in compliance with conflict of interest criteria.

Dr. Langley's research was funded by HDR (through the university) for the report cited in this article. Other work cited in this article was funded by HDR and Synterra.

As a result, the university provided thousands of pages of emails and documents detailing years of the professors' work on behalf of the company.

All of these emails confirm that the work was completed with integrity.

Environmental attorneys who reviewed the documents obtained by WBTV said the correspondence shows Daniels and Langley preparing scientific reports at the direction of Duke company officials.

The “environmental attorneys” are attorneys actively leading litigation against Duke Energy. That is, by definition, a conflict of interest for this report.

The scientific reports prepared by Dr. Langley were self-directed.

The thousands of emails, draft reports and other documents obtained by WBTV cast doubt on the company’s claims that Langley and Daniels performed independent scientific work.

The scientific reports prepared by Dr. Langley were his independent work.

Dr. Daniels provided independent advice to Duke Energy through the National Ash Management Advisory Board (NAMAB).

The claim by WBTV/SELC is that one cannot be independent if they are interacting with Duke Energy. In truth, a scientist cannot perform the work competently (advisory board or modeling/research) unless one interacts with the sponsor to obtain relevant information (e.g., information about their sites).

### **Duke hires professors to help guide research, answer regulatory questions**

Duke Energy first contracted with UNCC in February 2013 to help model groundwater flow and determine the cause of high levels of several elements in the water at the Riverbend Steam Station in Mt. Holly, NC.

A proposal for that first project shows the research would be led by Daniels with Langley as a co-researcher. The two would work through UNCC’s Environmental Assistance Office, which had a mission to “research, design and promote sustainable engineering and management practices to serve government entities, regional small business, and to offer students the opportunity to gain real-world experience in solving pollution problems.”

Documents provided by UNCC in response to WBTV’s records request show that first contract was for \$9,750.

Over the next three years, UNCC would execute six more contracts with Duke or a contractor working for Duke.

Later contracts included sorption evaluation and groundwater modeling for ash basin closure at at least two coal ash facilities, groundwater modeling for corrective action plans and review of modeling for other work performed by a Duke contractor.

In total, the contracts show UNCC was paid \$1,071,257 between February 2013 and August 2016.

**Documents:** [Click here to read the contracts provided by UNCC](#)

A majority of the scientific research work was led by Langley, with help from a team of post-doctoral and graduate students.

In October 2014, Daniels took the helm of a board formed by Duke that was supposed to independently review research and advise the company on issues related to coal ash. The \$1.071 million figure paid to UNCC does not include compensation for Daniels' work chairing the advisory board.

Daniels does not receive compensation for his work chairing the advisory board. The university receives funds to hire other personnel to fulfill his teaching and administrative responsibilities while he is performing this service to the community. Daniels' service with the advisory board has no impact on his salary.

Because of the independent nature of Daniels' work, he was not supposed to be involved in Langley's research.

The "independent nature of Daniels' work" means Daniels was not employed by Duke Energy. It does not mean Daniels should not have communication with Langley. Daniels and Langley both work for the same university, work on related projects and serve together on student thesis committees. Their communication is entirely appropriate.

Dr. Langley was responsible for his own research, and he was the Principal Investigator of record. Dr. Langley did his own work and yet he was (and remains) welcome to confer with all faculty, including Daniels.

Daniels was involved in verifying and explaining what Langley did, much the same way as verifying and understanding what modelers from Clemson did, or other consultants. This is part of Daniels' responsibility in his role as Chair of the NAMAB.

As an independent researcher, Langley was supposed to lead his scientific inquiries without influence from Duke or Daniels.

Here WBTV/SELC defines “influence” as any communication. As colleagues on other projects, there is no reason for Dr. Langley to be prevented from communicating with Daniels.

Dr. Langley was developing groundwater models and performing laboratory tests. Such work requires interaction with Duke (e.g., provision of data from other consultants for use in the models, soil samples, etc.).

Dr. Langley’s work was reviewed by a separate team (assembled by the Electric Power Research Institute, EPRI). One of the EPRI reviewers was the developer of the model itself, Dr. Chunmiao Zheng from the University of Alabama.

Documents obtained by WBTV show neither professor operated independently in carrying out his work for the company.

### **Daniels touts ‘independent’ advisory board while consulting with Duke**

Daniels did not “consult” with Duke. Daniels provided advice as expected from his role in chairing an independent advisory board.

Daniels, the professor who first led research projects for Duke back in February 2013, has touted his role as chair of the National Ash Management Advisory Board since the board’s creation in October 2014.

Duke first created the board - commonly referred to as NAMAB by Daniels and Duke executives – in October 2014. The company would later be required to maintain the board as a condition of its guilty plea to federal environmental crimes in April 2015.

In addition to Daniels, the board consists of professors and environmental experts from across the country.

Daniels described the board in a letter to Tom Reeder, then the assistant secretary of the North Carolina Department of Environmental Quality, in a letter on April 5, 2016, arguing against a risk classification system for Duke’s coal ash ponds.

“The NAMAB is an independent group of experts chartered through Duke Energy and managed by the University of North Carolina at Charlotte (UNC Charlotte). Board members provide advice to Duke Energy, but they are contracted with and report to UNC Charlotte,” Daniels wrote.

**Document:** [Read the letter John Daniels sent to Tom Reeder](#)

That same letter concluded with a final reaffirmation of the board's independence.

"And we are independent," Daniels wrote.

But emails obtained by WBTV show staff from Duke Energy scheduled meetings, coordinated the distribution of research materials and facilitated the day-to-day operation of the board; a direct contradiction of what Daniels wrote in his April 2016 letter to Reeder.

The board is independent because none of the board members are employed by Duke Energy. The board was created by Duke Energy, is chartered by Duke Energy and advises Duke Energy. For the board to function, Duke Energy must provide materials for the board to review. Duke Energy must also make Duke staff available for meetings. That is how a board works. Members are independent because they don't report to anyone at Duke Energy.

Moreover, emails show, Daniels touted his independence from Duke as chairman of NAMAB while consulting with Duke executives to prepare company responses to regulators at NCDEQ.

This was part of NAMAB's function, to present NAMAB's perspective to both Duke executives and to NCDEQ, as requested by Duke.

A calendar invite sent from John Daniels to employees at Duke Energy and an outside engineering company working as a contractor for Duke, HDR, shows Daniels helped organize and participated in meetings to prepare for a DEQ briefing just a week after sending his letter to Reeder touting his independence.

These meetings are part of NAMAB's function, but the actual calendar invitations in question were not created and sent by Daniels. The reporter is confusing an accepted invitation with a sent invitation.

On April 13, 2016, Daniels sent a calendar invite entitled "Prepare for Briefing on Site Assessments and Modeling" to a group of Duke executives that included Ed Sullivan, a manager for the company's waste and groundwater programs; James Wells, vice president and lead compliance officer for coal combustion products; and Michelle Spak, associate general counsel for Duke, among others.

Dr. Daniels received and accepted a calendar invitation from Ed Sullivan. Examine the document posted on WBTV's website; the "organizer" is Ed Sullivan. Daniels is listed as the "creator" because he accepted the invitation. Daniels did not send the invite.

Months early, in January 2016, Daniels sent a different calendar invitation entitled "DEQ Presentation Review – Lisa Bradley's portion" to a group of Duke employees that included Wells, the

company's lead coal ash compliance officer, and Harry Sideris, who, at the time, served as senior vice president of environmental health and safety at Duke.

This is inaccurate. Daniels did not send a calendar invitation; he accepted one from Richard Baker. Richard Baker was the organizer. The reporter continues to confuse the accepted invitation as one that is being sent.

**Documents:** [Read the calendar invites sent by John Daniels](#)

A month before that, in early December 2015, Daniels created a calendar invite entitled "12/14/15 Prep, Plan Adjustment, Status" sent to Wells, Sideris and others.

This is inaccurate, again: Daniels did not send a calendar invitation; he accepted one from Richard Baker.

Included in the calendar invitation was a message that said "Please juggle schedule to make this call. Late afternoon developments in DEQ."

The statement was written by Richard Baker, not by Daniels.

Daniels defended his participation in meetings with Duke executives by saying he took part in them on behalf of the NAMAB.

"We work with Duke engineers so that everyone is clear on what people think and what that viewpoint is," Daniels said.

Pressed further during an interview with WBTV, Daniels said it was appropriate for him to take part in meetings with Duke executives as they prepared for presentations to DEQ at the same time as he was leading a separate, independent board that would also make a recommendation to DEQ regulators.

"The advisory board advises for Duke," Daniels said. "Of course, we're going to work with Duke and present that activity to DEQ."

**Daniels worked 'behind the scenes' on Langley research**

As more Duke Energy work came to the professors at UNCC, emails show Langley and Daniels discussed how to manage all of the projects.

Dr. Langley managed the projects independently of Dr. Daniels.

In an [email from Langley to Daniels on August 20, 2014](#), Langley forwarded an email discussing a new round of research UNCC would conduct for Duke's contractor, HDR.

"As understatement (sic) to say there is a lot here," Langley wrote. "I feel ok about it though given that Tryambak, Jenberu, and Shubha will be on the team, with you behind the scenes."

Dr. Daniels and Dr. Langley had informal discussions about the work during its course. Dr. Langley maintained independent control.

That email was sent two months before Daniels was announced as chair of the independent ash advisory board.

But, emails and other documents provided by UNCC show, Daniels' new position on the independent advisory board did not stop his involvement in Langley's research.

Daniels discussed his continued involvement approving research conducted by two of Duke's outside contractors in a text conversation with Richard Baker, a Duke engineer, on October 15, 2014.

Daniels had the opportunity to work in two different capacities (NAMAB or modeling) and he asked for Richard Baker's opinion. These opportunities developed at two different times. Daniels had to choose between developing groundwater models, or to step aside and continue to lead the NAMAB. This is a natural progression of events. In the past, Daniels had done work as a modeler. So logically HDR asked if Daniels would serve in that capacity again. But the NAMAB was in its early stages at this time. NAMAB was a new concept and activity, created by Duke. Daniels did not know how long NAMAB would exist, nor the full scale and scope of its activities. The person best able to understand how NAMAB could evolve was Richard Baker.

"Do you see a problem with me sealing the GW models for HDR and synterra?" Daniels asked Baker, referring to whether he should put his PE seal on final reports as engineer of record.

"Any other option?" Baker asked. "Langley does it," Daniels responded.

"If he can do it, I think that would be better," Baker said.

"Will do, agreed. Next question...Should I not be listed at all? Technical reviewer? Responding to (an HDR engineer)," Daniels asked.



“Likely best to not be listed. Let’s discuss,” Baker responded.

This exchange documents the consideration and decision on Daniels’ role. The decision was to step aside completely from performing the modeling, and leave that to Langley. Ultimately, HDR sealed all documents, working with Langley. Duke contracted with EPRI to provide an independent review of these models, separate from NAMAB.

**Document:** [Click here to read the text messages](#)

After that, Daniels texted later to confirm that Langley would be listed as PE of record and that he would be removed completely.

This was confirmation that Daniels would be removed completely and would focus on the NAMAB. This was done to keep roles and responsibilities separate and independent. Langley worked with HDR, and HDR ultimately sealed the documents as required.

But in an interview with WBTV, Daniels refused to clarify why, if he had no involvement in the ongoing projects, would he have raised the possibility of being listed as the PE of record on the forthcoming work.

Daniels did not refuse to explain this. The videotape of interview taken by the University confirms the explanation. In 2014 there were at least two different paths that Daniels could have taken, namely (1) perform the groundwater modeling, or (2) chair and manage NAMAB. Text messages and emails from this time reveal the natural evolution and consideration of these options which became available at different points in time. Ultimately, Langley did the groundwater modeling for HDR, and Daniels chaired the NAMAB for Duke. Both activities were contracted through the university.

Daniels’ involvement with Langley’s work continued into 2015.

An email from January 27, 2015 shows Langley forwarded an email from regulators at the North Carolina Department of Environment and Natural Resources - the agency that is now NCDEQ - to Daniels and another person working on the research.

In September 2015, Langley and Daniels forwarded emails to each other as an update on the respective professors’ independent work on coal ash.

Sharing was appropriate and helpful to both Langley and Daniels.

On September 11, 2015, Daniels forwarded an email with review comments from the NAMAB to Langley.

The next day, September 12, 2015, Langley forwarded Daniels feedback from a separate outside review group that had looked at other reports prepared by Langley.

“I wanted you to receive this from me first. I hope we can meet early next week to discuss,” Langley wrote Daniels.”

Dr. Langley provided context to Dr. Daniels of an email that he would eventually receive from another source.

“Yes, lets meet Monday to discuss,” Daniels responded.

Daniels defended his continued work with Langley, acknowledging the two professors talked about their coal ash work for Duke but claiming Langley had autonomous control over his work product.

“We’re working together. We’ve got different projects,” Daniels said. “He did all the models by himself.”

### **Duke makes ‘highly suggested edits’ to Langley report**

Included in the thousands of pages of documents provided to WBTV by UNCC in response to a public records request was evidence that Duke Energy executives re-wrote portions of a scientific report submitted by Langley.

The report in question was prepared by Langley and entitled “Conceptual Groundwater Modeling for Ash Basin Closure H.B. Robinson Steam Station.”

Essentially, Langley was tasked with predicting the impact three different coal ash pond closure options would have on long-term groundwater contamination at the Robinson Steam Station in Darlington, SC.

Emails produced by UNCC show Langley first sent a final copy of the report to executives at Duke on October 16, 2015.

The report was considered to be a draft on this date.

But that didn't stop Duke personnel from making further changes to the documents.

During that one month period (10/16/15 to 11/12/15), Dr. Langley met and had numerous conference calls with Duke and HDR personnel to discuss new site data that had been collected since the existing draft report was prepared. As a professional engineer, Dr. Langley has a professional responsibility to confer with both Duke and HDR. For example, as part of the iterative nature of site investigation, Duke and HDR were continuously acquiring new data (additional well testing) that he needs to consider for his models. The new data were reviewed extensively but did not result in changes to the model or its results.

One batch of changes came early on the morning of November 12, 2015.

"Attached are highly suggested edits (in track changes) to the most recent submittal of the GW Model report," Duke closure engineer Brandon Culberson wrote Langley in an email sent at 7:23 a.m. "Please finalize the report and submit a PDF version of the entire document by 10 am."

A review of the tracked changes in the attached PDF show Duke personnel deleted sentences, added full paragraphs and made changes to both the executive summary and conclusions section of the report.

The tracked changes were a collaborative effort of Duke, HDR, and Dr. Langley developed over the previous month. Dr. Langley had a professional responsibility to consider these proposed edits and he had the final say on their acceptance. These tracked changes added context but did not alter the original model or its results.

**Document:** [Click here to read the email and document with edits suggested by Duke](#)

This report - and the changes by Duke - came six months after environmental watchdogs convinced South Carolina regulators to install additional monitoring wells at the Robinson coal ash facility that found the level of arsenic in the groundwater was significantly higher than previously reported by Duke.

Langley's report was evaluating whether any of the three closure options put forth by Duke - none of which included digging up all of the coal ash - would reduce the long-term groundwater contamination.

As explained on page 2 of the report, *Conceptual Groundwater Modeling for Ash Basin Closure*, the hybrid model and excavation model are essentially equivalent.

Many of the highly suggested edits made by Duke appear to take out or change language addressing the very issues currently under scrutiny by environmental watchdogs and regulators.

These edits were not made exclusively by Duke, they were a collaborative effort between Dr. Langley and licensed engineers and geologists from Duke and HDR. None of the edits changed Langley's model, model results or model interpretation.

For instance, the highly suggested edits included deleting the following sentence from the first paragraph of the executive summary:

"Residual constituents remaining in the ash basin that can be mobilized will migrate downgradient until they are depleted."

This statement was not removed from the final report and remains on page 14 of the report, Conceptual Groundwater Modeling for Ash Basin Closure.

Dr. Langley made the final decision to retain this statement.

Later in the executive summary, other highly suggested edits included adding several sentences about the level of arsenic in the groundwater below the Robinson ash basin.

*The exact lateral and vertical extent of that critical volume is not possible to determine with the, "data currently available. As noted in the 'Robinson Ash Basin Groundwater Assessment for the MW-7 Area, H.B. Robinson Steam Electric Plant, Darlington County, South Carolina' (HDR, February 26, 2015), arsenic was not detected in the MW-7D, indicating the vertical extent of contamination in the vicinity of MW-7 is delineated and, laterally, arsenic was not detected above the laboratory reporting limit in MW-120S and MW-120D nor the surface water in the discharge canal or Lake Robinson. Further, it is noted that none of the deep wells (including those installed within the boundary of the basin itself) detected arsenic. Based on these data, further refinement of the fate and transport modeling would be prudent following collection of additional sampling data within the basin that could better define the extent of arsenic within the thalweg.*

Dr. Langley fully agreed with this citation and assisted in its writing. The above text does not favor any remediation option (excavation or cap in place).

Later in the draft, Duke employees added language regarding the decision to not model conditions after a complete excavation of the ash basin.

"Complete excavation was not modeled, however, the hybrid cover in place is essentially equivalent to complete excavation as material from the eastern two-thirds of the footprint will be removed which

represents the vast majority of ash below the groundwater table within the basin boundary,” the new language said.

**As explained on page 2 of the report, Conceptual Groundwater Modeling for Ash Basin Closure, the hybrid model and excavation model are essentially equivalent.**

Duke Staff also added an additional bullet point in the report’s ‘Summary and Limitations’ section.

The final report, which included the highly suggested edits from Duke, was produced with a cover page that lists Langley as the sole person who prepared the report.

**The edits were a collaborative effort of Duke, HDR, and Dr. Langley to incorporate new site data. Dr. Langley had a professional responsibility to consider these proposed edits and he had the final say on their acceptance.**

When WBTV asked Langley about his willingness to let Duke staff re-write portions of a report being presented as solely his work product, Langley first said Duke’s changes were merely to help make his writing more concise.

**Collaboration with Duke and HDR made the report more concise and added context. The report authorship is accurately credited to Dr. Langley.**

When a WBTV reporter pointed out that many of the changes made by Duke staff added sentences and underlined points favorable to the company, Langley said he wrote those sentences.

**The statement is inaccurate and false. The changes made were not favorable to the company. They added appropriate context.**

“That all sounds like my language,” Langley said after a WBTV reporter read him portions of the text added by Duke employees.

“I recognize that text that you’re reading and I wrote that,” Langley asserted.

**Dr. Langley did write selected portions of the tracked changes and participated in the development of all of them.**

Even when presented with both a copy of the email from Culberson attaching the highly suggested edits as well as a copy of the report with said edits, Langley refused to acknowledge Duke staff made significant changes to his report.

Dr. Langley acknowledged the contribution of Duke staff and himself to the edits, which were ultimately accepted by him.

“I don’t – I guess I haven’t really seen – I don’t acknowledge that that’s evidence,” Langley said in response to a line of questioning about the email and document with highly suggested edits from Duke.

The tracked changes are not evidence. The tracked changes used by the reporter to question Dr. Langley do not reflect the multiple revisions nor the collaboration between HDR, Duke and UNC Charlotte - Collaboration which was required for responsible conduct of the work. Dr. Langley’s explanation above clarifies this statement.

### **Coal ash neighbors, attorneys react**

WBTV showed a copy of the email from Culberson with the highly suggested edits to Langley’s report to Deborah Graham and Amy Brown, who both live within a half-mile of Duke coal ash ponds and have been vocal critics of the company in the debate over how Duke should close its coal ash basins.

“Who’s the expert here?” the women asked.

“That’s not independent. That’s being part of the corruption,” Brown and Graham said.

Both women said the documents uncovered by WBTV were troubling since Duke has routinely cited its scientific experts in giving assurances to neighbors near coal ash facilities regarding the impact of coal ash on groundwater.

“We’ve known for a long time that Duke has not been very truthful. You can’t trust them. Trusting Duke is dangerous to our health on so many levels,” they said.

Separately, DJ Gerken, an attorney at the Southern Environmental Law Center - which has active court cases against Duke Energy regarding its coal ash facilities - said the emails and documents uncovered by WBTV confirm a troubling suspicion many already had that Daniels and Langley were working in consultation with Duke.

“Independent scientists? Not so much,” Gerken said. “They’re definitely relying on Duke Energy for funding and doing work Duke Energy has asked them to do.”

Beyond Daniels’ work with Duke while coordinating the advisory board or the changes made to Langley’s report on Robinson groundwater, Gerken said the emails also show coordination between

the scientists and Duke about what models would be used to conduct the scientific research in the first place.

“Duke has hired consultants at private firms and at UNC Charlotte to answer the questions it wants answered. Unfortunately, those questions are self-serving for Duke Energy,” Gerken said.

“When you ask the right question, when you ask whether neighbors are threatened, whether rivers and lakes are threatened, the answer you get if you do good science is absolutely yes,” he said.

A spokeswoman for Duke Energy provided the following statement to WBTV in response to a request for comment:

*These emails and other documents illustrate that the scientific process is being conducted in a robust and appropriate manner. WBTV is misleading viewers and misrepresenting rigorous work that stands up to any objective review and we strongly object to the inaccurate conclusions that are being offered by the station. Science is an iterative process conducted through research, testing, analysis, adjustment, vetting and more among experts, which is illustrated in these documents.*

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In addition to University policies and protections to ensure independence, objectivity and no conflicts of interest, the public is further protected by engineering licensure laws. Drs. Langley and Daniels are both licensed professional engineers. Chapter 89C, Chapter 2 of the NC General Statutes states “In order to safeguard life, health, and property, and to promote the public welfare, the practice of engineering and the practice of land surveying in this State are hereby declared to be subject to regulation in the public interest.” Further, the National Society of Professional Engineers has adopted the Engineer’s Creed which states:

As a Professional Engineer, I dedicate my professional knowledge and skill to the advancement and betterment of human welfare.

I pledge:

To give the utmost of performance;

To participate in none but honest enterprise;

To live and work according to the laws of man and the highest standards of professional conduct;

To place service before profit, the honor and standing of the profession before personal advantage, and the public welfare above all other considerations.

In humility and with need for Divine Guidance, I make this pledge.

Adopted by National Society of Professional Engineers, June 1954

It is for the above noted reasons that, specifically in the case of coal ash, the U.S. Environmental Protection Agency (EPA) considers independent judgment to be a function of licensure, and not employment. As such, licensed engineers at Duke Energy are allowed to certify engineering decisions on behalf of the company and with public trust. By engaging professional engineers at another organization, there is yet another layer of independence. It is entirely appropriate and expected for professional engineers from different organizations (e.g., HDR, UNC Charlotte, Duke Energy) to engage with one another. It would be professional incompetence if these organizations did not collaborate in the sharing of information during the iterative nature of site investigation. Below is a direct quote from current EPA regulation (promulgated during the Obama administration).

“First, that professional engineers, whether independent or employees of a facility, being professionals, will uphold the integrity of their profession and only certify documents that meet the prescribed regulatory requirements; and that the integrity of both the professional engineer and the professional oversight of boards licensing professional engineers are sufficient to prevent any abuses. (For an example see: 67 FR 47084, July 17, 2002.) And second, that in-house professional engineers may be the persons most familiar with the design and operation of the facility and that a restriction on in-house professional certifications might place an undue and unnecessary financial burden on owners or operators of facilities by forcing them to hire an outside engineer.”

Reference: Page 21336, Federal Register, Vol. 80, No. 74, April 17, 2015.