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Sunset Advisory Commission
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Subject: **Comments for the Texas Sunset Advisory Commission on P.G Licensure –**
Strong support for maintaining the Texas Board of Professional Geologists.
I have only seen vast improvements in the profession since 2001.
The intention of the law has been well satisfied.

I am David M. Petefish, P.G. 1560 and 6791, a geologist with a rather unique perspective of approximately 45 years of experience. 5% in research, 22% in private business, and 71% in federal projects. I have previously been licensed in Wyoming and Virginia and am currently licensed in Texas (Geology and Geophysics). Eighteen years as the State Geologist (Texas) for the Natural Resource Conservation Service – United States Department of Agriculture. B.S. 73, SMU, M.S. 75, SMU, 16 plus hours graduate groundwater at Wright State.

Approximately 60% of my career has been in an unlicensed arena, where geologists and soil mechanics engineers have been caught falsifying documents and investigations. Other times, the investigations have been minimal so as not to even be useful, although meeting the contract specifications. On bringing some of the evidence to the U.S. Authorities, they have stated it is not worth their time to prosecute. I have seen the same charlatan appear in at least four contracts in states where I have worked. He finally moved to other states to practice his craft. He almost bankrupted a respected company in Central Texas. As companies became aware of his tactics, they would lock him out of his office and the NRCS-USDA would have to wait on others to finish his reports ...for what they were worth.

For the most part, the engineers and soil mechanic engineers described below are individuals with 10 to 40 plus years of experience. This clearly indicates the necessity of having a licensed geologist as an integral part of the project team. As these engineers retire, they normally move on to much more lucrative jobs based on their extensive experience. As for myself, I have been able to replace my retirement income several times over through personal investments using my geologic background.

My interaction with my licensed, engineering peers has been great. We may have had rather heated and lengthy discussions on a few projects, but have always parted friends with renewed respect for all. You can't get mad at a person stating highly technical facts and looking at detailed evidence. I have helped to defend my USDA, State Engineer's license on various occasions. One major problem was where a dentist had given a dozer operator a blank check to stack dirt after hours. The extra fill would have placed ponded water over an unplugged oil well and exceeded State of Texas fill heights. Problems arose when the extra, poorly compacted fill started sliding downstream, the dentist wanted free repairs, and the dentist complained to the State.

While working for the Feds and at other times, landowners have felt my presence was a chance to get free geologic information in return for what I needed from them or just as a courtesy from me. This public interaction is greatly appreciated. I have consulted unofficially on water wells, erosion problems,

livestock and personal health problems, etc. I still appreciate the old grave digger's interaction at Brownwood on our seepage problems and the location of the old channel.

My interactions with the State Boards has not only included engineering, but also the Texas Well Driller's Board. I explained to one lady as to how to pursue her claim with the Board from the evidence she had. She resolved her claim to her satisfaction. My stipulation was that she could not use my name or involve the NRCS-USDA, since that could devolve into a regulation contest between the State and Feds.

Worked with the State and U.S. Fish and Wildlife and Archaeology on sites involving their regulations. When dealing with factual evidence and designs, everyone gets a say in the project. They also appreciate licensed geologists, which give geological perspective to their projects and problems.

Current and ongoing activity affecting health, safety and welfare of the public: (first two could be and may yet be pursued through the State Boards.)

Problems with hushing - Hydraulic Mining, Flash Flooding 13 to 14' depths, and Debris flows with up to 2 ton slabs moving with 2 year storms on Sloan Creek, Collin County, Texas. Comments on the SRT Fourth Lane Widening (North Texas Tollway Authority and Texas Department of Transportation), David Petefish, P.G. 1560, 7/19/17, 146 pp. (One of downstream landowners.) U.S. EPA, U.S. Corps, U.S. NPS, and town of Fairview and Huitt Zollars hydrology contractor have been contacted. Hydraulic mining was basically outlawed in the U.S. in the 1890's.

North Texas Municipal Water District installation of a 72" pipeline over collapsible/highly compressible, Trinity River Terrace Deposits. Have given them and their employees a warning about the radioactive materials they have encountered for their own protection. Causing the alarm on a microsiemen meter to be triggered. (One of landowners.)

Working on providing highly erodible land evidence to the Collin County Appraisal District for agricultural land determination.

Notified new, neighboring landowner in East Texas about their water well producing from a radioactive layer. My two aunts, mom, and other neighbors have all died from cancer using the suspect water source. (Petrified wood from the aquifer caused the alarm on a microsiemen meter to be triggered with minor associated alpha radiation.)

A few case examples from past years. These only represent a few of the cases on which I have worked. In numerous cases, I have not given the exact locations and names to protect private or Federal individuals. Some cases represent security issues and are not discussed, although much more serious in nature involving possibly thousands of people...yes, in Texas.

Groundwater Hydrology. Geologist was asked about the human kill ratio assessment below the Salado Creek Flood Control Site 10. He said it should be zero. Verbally reprimanded by engineers for exploring and keeping sinkhole open for recharge in the upstream borrow area. Geologist supported by San Antonio River Authority. In 1998, the 100 year flood event never went over the auxiliary spillway and

did not risk lives on Jones-Maltzberger Road just below the site. Engineers later realized their error in trying to plug the sink. Old Design Engineer was overjoyed about results not causing harm to locals.

Channel erosion. On several grade stabilization structures near Childress, the engineers had been talked into slotted flumes for outlet flows. Geologist informed the engineers that the channels were a poorly graded, fine grained sand with no binder and the new design would most likely not work. After the channels started eroding rapidly, approximately $200,000 dollars was needed to repair the channels and protect the outlet structures.

Coastal erosion. A coastal blowout of over a square mile in area near Brownsville was investigated for remediation from brine to at least brackish water. The engineers felt by constructing a channel for floodwater to the site they could lessen the dust storms and improve wildlife habitat. When the Geologist asked about a disturbance in the southern end of the brine filled blowout, it was replied that it was only the remains of a water well that had been flooded out. On running fluid resistivity and taking water samples, the well turned out to be a 1943 gas well that had blown out and never been plugged. The well was continually producing brine. With the Geologist doing a water budget, it was found that there would never be enough fresh water to dilute the brine with the blowout being up to 7 feet below sea level. Geologists worked with the engineers on cutting a channel to the Laguna Madre to at least raise the water quality to sea water. Hopefully, they have plugged the well by now.

Collapsible/highly compressible soils. In the Rio Grande Valley, the engineers were quite concerned that cracking in and around our flood control dams was due to settlement caused by oilfield activity. On viewing the air photos, the Geologist could tell that the cracks were in relation to the weight of the dams and collapsible/highly compressible soils. (Throw an iron bar on a china plate and you will get the same pattern of fractures.) From geochemistry, solution and dissolution of gypsum was a contributing factor to cracking and sliding of materials.

Collapsible/highly compressible soils. Red Deer Flood Control Site 14 northeast of Amarillo was investigated with collapsible and highly compressible materials being found in the foundation. Engineers were at a loss as to the reason cracking with settlement of up to ½ foot were observed in the dam. Normal procedure was to take out approximately 14' and recompact for the foundation materials. Geologist/Geophysicist ran natural gamma and single point resistivity logs with the recognition of three separate layers of collapsible and highly compressible soils to a depth of 45 feet. Since the site already had a chimney and foundation drain, the plan was to closely monitor the site into the future.

Collapsible/highly compressible soils. Martinez Creek Flood Control Site 4 southeast of San Antonio. Soil Mechanics Engineer felt that a longitudinal crack along the downstream crown was due to a slope failure. Geologist had to explain that the collapsible material had been removed by the core trench and the material downstream of the dam had not been removed during construction with later collapse. Bad news given to the engineer was that the upstream portion of the dam had yet to collapse.

Drainage. On a large municipal site in central Oklahoma, Geologist noted a very permeable sand layer in the right abutment, while working on as-builts. He brought the seepage to the attention of the engineers with the reply that they already had enough drainage available. A few months later, the Geologist had a worried call about the seepage in the right abutment that the geologist had missed. On showing the engineers the photos of the layer from the as-built, the meeting was over quickly with from what the Geologist remembered being a $50,000 fix.

Fractured Material - Teton Dam Failure in 1976. On the failure of Teton Dam in Idaho with the deaths of 11 people, the Geologist could only shake his head in disbelief after seeing the air photographs of the site. There were numerous linear fracture intersections in the right abutment. Years later, he found out that there was air flow moving in and out of the fractures during construction. The young female, Bureau of Reclamation geologist on site had tried to warn the engineers of the brittle, low plastic, clayey silt being used in the construction to no avail.

Highly Erodible materials. While working in Nebraska, Geologist discovered that the auxiliary spillway was to be constructed to flow over an esker (fine, poorly graded sand). He then proceeded to drill out the opposite side of the valley, which was highly plastic Nebraskan Till. The engineer was livid that the Geologist had questioned their location for the spillway. As far as the Geologist knows, the location was switched to the Till (considered to be nonerosive.)

Recharge sites. Engineers were afraid to complete the work on Salado Creek Flood Control Site 15R, since they could not prove there would be no contamination to the Edwards Aquifer. Through detailed work with the San Antonio River Authority, the Geologist proved the site would not contaminate the Edwards. The recharge would occur to the Austin Chalk and the hydrologic head on the Edwards would actually be higher that that in the Austin with net flow back to the surface channels and Austin aquifer for wildlife enhancement.

Recharge. Dell City, Texas, Geologist proved that the recharge from the flood control sites would be to a density layered aquifer. The current surface recharge only affected the upper 50' of the aquifer with no hazardous amounts of chemicals or biology present. Engineers were getting ready to give up on the most critical part of the flood control project, since their expertise did not cover this problem.

Riprap. After approximately $400,000 of riprap at Van Horn melted, the Old Design Engineer quizzed the Geologist, if he would have thought it would breakdown. In recognizing the fractured quartzite was cemented with feldspathoids, he said yes. The old engineer with 40 plus years of experience walked away with a sigh. The riprap had evidently been tested to engineering specifications, but not for unstable minerals.

Sediment Use in Construction. Consulted on a number of dams (rehabilitation) for obtaining samples of sediment to prove no harm to the public. One college professor near San Antonio had taken samples to prove there were items like arsenic in the sediment. These discrete samples forced the city to haul all the sediment to a hazardous? Landfill. In taking composite samples of the sediment, the true average concentration of contaminants may be assessed. Most sediment's average concentration of chemicals are below the restricted limits, thus allowing for much more economic rehabilitation of sites and protection of the public. Example of safe use of sediment in Flood Control Dams are Martinez Creek5(A?) near San Antonio and Choctaw 38R at Denison.

Sinkholes. Engineers normally think of water running down the channel and to the Gulf. In at least two cases, mother nature has reversed the flow in the channels much to the despair of the engineers. At these two locations, water has flowed upstream to a sinkhole and then into another fracture pattern. As one VIP said, his wife would have killed him, if he had removed the live oaks and then his duck pond had not held water. Geologist presented a less aggressive approach to detaining water for wildlife.

Slope Failures in Compacted Fill. Geologist made presentation to high level regional and national engineers on slope failures affecting the safety of dams in the Blackland area. Noted the acidic breakdown of the Ozan claystone in place within the dam and reaction with the Austin Chalk. National Soil Mechanics Engineer stated that the slides only occurred to a depth of 6 feet. Geologist said he had evidence to 12 feet and possibly more. Actual slides occurred to a depth of over 20 feet. Safe dam (Pilot Grove Site 28, near McKinney) as a result of the geologist.

Slope Failures in Natural Consolidated Materials. Geologist worked on a deficiency team of engineers to determine the cause of a large hillside failure in the outside cut of an auxiliary spillway near Nacogdoches. The engineers had no clue as to the cause. With the engineers walking to the hillside scarp, Geologist recognized the crushed volcanic ash (bentonite) in the debris at the toe. Ash was not visible in the scarp, with the ash being stratigraphically lower. The ash was the cause of the slide. Later the Geologist used the same information to protect the public on a large municipal site from endangered, oil field storage tanks in the same vicinity.

Slope Failures. Engineers wanted to help the locals out with a large landslide in the Eagle Ford. When the engineers said that there were 2 foot diameter trees going downslope without tilting, the Geologist had to say they were out of their league. They should probably turn it over to the Corps of Engineers. From my estimate, the NRCS-USDA did not have that kind of money.

Slurry Trenches in wet foundations. Choctaw 38R Flood Control Site at Denison on the Woodbine Sand and Grayson Shale. After the engineers were somewhat at a loss as to where to place the core trench/cutoff, the Geologist made the suggestion to the design team to use a bentonite slurry trench. Site was constructed without extensive dewatering and stabilized the water surface for the city park with minimized shore erosion. Worked with the Old Design Engineer for an extensive drain system on the right abutment. Geologist had pointed out to him that the site suffered from rapid piping through the non-cemented sandstone...20' of cavity in less than 20 minutes. Only an experienced geologist would have recognized the piping features exposed on site.

Water Quality. When contamination was getting to be a problem around Waco, the engineers were concerned that dairies would be shut down, since they were obviously at fault. A passing Geologist made the comment to the State Engineer to run water samples up above the dairies for water quality. Naturally, the discharges from some small upstream towns proved to be a major part of the problem. More rational individuals prevailed, when the real situation was understood. Geologist was not an official part of the investigation.

Water Quality. With the Mt. Pleasant Chicken Litter Application Project, EPA and engineers wanted to short cut the expenses for the background samples prior to application. Geologist would not allow the project to progress until the background samples were obtained. As the engineers related, they were quite shocked to find e-coli in the disinfected and pumped wells prior to application. Geologist then explained the reason for the bacteria being at that depth from past land clearing, leaving voids and communication paths to the surface.

Water Quality. When engineers develop well testing programs, they naturally assume the well is only producing from one horizon. The Geologist at a later date had to explain the situation, when the 24

hour test left salt crystals on the vegetation by the time the sun rose. Well pumped fresh water at low rates, slightly saline water at moderate rates, and brine from high rates. The well was completed across three horizons. The depth of the well was the dead give-away of what aquifers were pumped.

Water Quality. When the engineers wanted to produce brine from an artesian source to raise shrimp, the Geologist had to inform them that they could not grow native sulfur crystals with the water and contaminate surface water. They had no idea of the corrosion to the well string and the future cost to plug their free water from artesian wells.

If you want more information or more examples, just let me know.

Geology licensing makes the requirement of continuing education a priority.

When I hired on with the U.S. Soil Conservation Service (later NRCS) in Colorado in 1975 and even when I first arrived back in Texas in 1984, many of the engineers and geologists had backgrounds in the Civilian Conservation Corps, Battle of the Bulge, Normandy, North Africa, Patton's Corp, and even Stalingrad. These individuals had proven that they could survive anywhere and were not about to compromise on safety of sites, as far as current knowledge allowed. Normal workloads included basically a job completed every one to two weeks. There was a great deal of communication between the engineers and geologists. Generally, there were regional and national meetings every few years, where ideas were communicated and new methods shared.

Currently, we have a problem in getting the new engineers and geologists trained. Licensing requires that you only work in areas in which you are competent. The engineers and geologists are stuck in one area of the state working on projects, which may last for several weeks. At that rate, it will take quite a few years to become competent over larger areas.

It will take a few years for them to become financially stable to withstand the concern of standing up to other professionals and administrators. Most administrators want to operate professional service contracts as personal service contracts to save money. This was a prime concern for the Federal contracting officers, since personal service contracts meant that the U.S. Government was financially responsible for the contractor's work. Personal service contracts are greatly appreciated by the private sector doing the work. The personal service contracts are illegal in the Texas Professional Rules.

With the NRCS-USDA, a minimum of three years was normally required to get new hires trained into the job. This time frame assumes they are competent in geology before being hired.

With the NRCS-USDA, the State Engineer is greatly appreciative of having the geologists licensed. It removes one item or responsibility from his busy work schedule, for which he has virtually no experience. He realized that there are about 30 specialties in the field of geology, in which few geologists are fully qualified. I have even used my vertebrate paleontology in dating formations and separating Pleistocene deposits from Recent deposits. Knowledge of historical geologic methods has proven very useful. Optical mineralogy and the scanning electon microscope were very useful on Sloan Creek.

Conclusion:

I greatly appreciate being allowed to comment on the Geology Licensing in Texas, since we started lobbying for it back around 1986 and before. **I have only seen vast improvements in the profession since 2001**. Many unqualified individuals have been excluded from the field of professional geology, due to them not being able to pass the ASBOG. Unqualified geologists have not applied for positions in the State dealing with the health, safety, and welfare of the Public. The invisible, unqualified geologists cannot be counted as failures, if they are not hired in the first place. **The intention of the law is well satisfied.** Unqualified geologists can obtain additional education and experience to become participating members of the licensed geologist community.

In relation to the question of old timers Grandfathering and the ASBOG, some of us think it may be getting too easy. Yes, we compare to see how well we would have done on the questions. When you get into the real world, you have to make the decisions and be responsible for them. Often, these are multimillion dollar decisions involving people's lives. As you retire and continue to work as a geologist, you are operating with your own money and future.

One very important goal of licensing is for all of us to sleep well at night by constructing safe projects.

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Self-employed - currently working on my own projects.
Retired Supervisory Geologist: Natural Resource Conservation Service – USDA (Texas), 32 years.