Dr. Aram JK Calhoun Pre-Filed Testimony

February 28, 2019

**(Supplemental Evidence –
Unredacted Version Not In Existing Record)**

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

and

STATE OF MAINE
LAND USE PLANNING COMMISSION

IN THE MATTER OF

CENTRAL MAINE POWER COMPANY Application for Site Location of Development Act permit and Natural Resources Protection Act permit for the New England Clean Energy Connect ("NECEC") L-27625-26- A-N L-27625-TB-B-N L-27625-2C-C-N L-27625-VP-D-N L-27625-IW-E-N SITE LAW CERTIFICATION SLC-9	PRE-FILED TESTIMONY OF DR. Aram JK CALHOUN ON BEHALF OF INTERVENOR GROUP 4 (APPALACHIAN MOUNTAIN CLUB, NATURAL RESOURCES COUNCIL OF MAINE AND TROUT UNLIMITED) February 28, 2019

Please state your name and address.

Dr. Aram JK Calhoun, 31 Haynes Brook Lane, Amherst, ME 04605

Please describe your professional background and relevant expertise for your testimony.

I am a Professor of Wetland Ecology in the Department of Wildlife, Fisheries, and Conservation Biology at the University of Maine (UME). I have been at UME since 1999 and have focused my research on issues related to forested wetlands and vernal pool ecology, policy, and conservation. Our research has been funded by three consecutive National Science Foundation grants in excess of 6 million dollars (a tribute to the quality of the research questions for grants with less than 2% funding rates).

My lab has conducted research on vernal pools for roughly two decades and we have published extensively on this topic in peer-reviewed journals (over 60 papers on vernal pool ecosystems), book chapters, a book for practitioners, *Science and conservation of vernal pools in northeastern North America* (2008; Calhoun and deMaynadier [eds]), along with a series of technical manuals for practitioners---

1. Morgan DE, Calhoun AJK.2012. Maine Municipal Guide to Mapping and Conserving Vernal Pools (University of Maine, Orono, ME).
2. Calhoun AJK, deMaynadier PG. 2004. Forestry Habitat Management Guidelines for Vernal Pool Wildlife in Maine (Wildlife Conservation Society, Rye, NY).
3. Calhoun AJK (1999;2003) Maine Citizen's Guide to Locating and Documenting Vernal Pools (Maine Audubon Society, Falmouth, ME).

4.Calhoun AJK, Klemens MW. 2002. Best Development Practices for Pool-Breeding Amphibians in Commercial and Residential Developments (Wildlife Conservation Society, Rye, NY)

I have been active in vernal pool policy since 1998 when I was the Maine Audubon scientist representative on the Vernal Pool Working Group convened by the State Planning Office to address management of small wetlands, largely focused on vernal pools (see Jansujwicz and Calhoun 2010 for a summary). In 2006, incorporating 10 years of work and advice from this group, Maine adopted a definition for identifying Significant Vernal Pools (SVPs; Significant Wildlife Habitat Rules, Chapter 335, Section 9) based on the abundance and presence of vernal pool indicator species – fairy shrimp, wood frogs, and blue-spotted (*Ambystoma laterale*) and spotted salamanders (*A. maculatum*) – or use by a state-listed threatened or endangered species for a critical portion of its life history. Criteria for egg mass thresholds for SVPs were derived from data collected on vernal pools through a statewide vernal pool inventory we conducted in 1997 and 1998 through a citizen science program (see Calhoun et al. 2003 for details on this program.) The egg mass thresholds for each of the pool-breeding amphibians represent a legislative compromise more than a science-based assessment of ecological significance (in fact, the thresholds capture less than 25% of vernal pools in the State database) (Calhoun et al. 2014). A Significant Vernal Pool includes the adjacent terrestrial habitat within a 250-foot radius around the pool from the high-water mark. New regulatory protections became effective on September 1, 2007.

Since then, I have been active in providing guidance based on research on pools to the Maine Legislature's Committee on Environment and Natural Resources.

Most recently, I convened a 25-person multi-agency stakeholder group to develop an alternative mitigation tool for conservation of vernal pools using a landscape-scale approach that encourages development in town's growth areas while incentivizing conservation from private landowners in the rural areas. This tool (the Maine Vernal Pool Special Area Management Plan (ME VP SAMP)) was adopted by the United States Army Corps of Engineers in 2017 and is currently an option for any eligible Maine municipality. This tool is described in Levesque, Calhoun, and Hertz 2019.

Please describe your duties and responsibilities in your current position.

I am currently a professor in the Department of Wildlife, Fisheries, and Conservation Biology at the University of Maine. For short of two decades, I taught two upper-level lab courses for undergraduate and graduate students: *Wetland Ecology and Conservation* and *Wetland Mapping and Delineation.* I currently conduct research on implementing conservation tools at the local level to conserve vernal pools at landscape scales and conduct research on transdisciplinary approaches to solving complex conservation issues. I work with eight colleagues to train 25 graduate fellows in sustainability science in a research and teaching initiative funded by the National Science Foundation.

Please describe the system of regulation the State of Maine uses to protect vernal pools and your role in developing it.

I was active in helping to craft the definition of SVPs through my work with the Vernal Pool Working Group described above and have further worked on vernal pool mitigation strategies through my work leading the development of the ME VP SAMP.

In 1996, the State of Maine amended the Natural Resources Protection Act (NRPA) to include regulation of vernal pools. In 2005, the NRPA was amended again directing the Maine Department of Inland Fisheries and Wildlife (MDIFW) to adopt rules defining 'significant vernal pool habitat' as Significant Wildlife Habitat (38 M.R.S.A. §480-BB). In 2006, MDIFWamended Chapter 10 Significant Wildlife Habitat to add language defining 'Significant Vernal Pools" (SVPs) based on hydroperiod and presence of indicator species and number of egg masses. MDIFW oversees Significant Wildlife Habitat in Maine, including SVPs. They manage data on vernal pools and maintain a GIS database of SVPs reported to them through permitting activities.

Please describe what a vernal pool is, how they function, and why they are ecologically important

Vernal pools in the northeastern United States are ephemeral or temporarily inundated wetlands that are best known for providing critical breeding habitat to amphibian and invertebrate species adapted to life in fishless, temporary waters (Calhoun and deMaynadier 2008). The pools also provide resting or foraging habitat to a suite of other species including mammals, birds, reptiles, and other amphibians (Eakin et al. 2019). In Maine, amphibian indicator species include wood frogs (*Lithobates sylvaticus*), spotted and blue-spotted salamanders (*Ambystoma* spp.), and fairy shrimp (Anostraca- one of four orders of crustaceans; genus *Eubranchipus*). Vernal pool habitats are important resting and foraging habitat for spotted turtles (*Clemmys guttata*), Blanding's turtles (*Emydoidea blandingii*) (Joyal et al. 2001; Beaudry et al. 2009), ribbon snakes (*Thamnophis sauritus* (all Maine Endangered Species Act listed reptiles), and a number of state-listed invertebrates.

An intact vernal pool habitat includes, and is dependent on, the amphibian breeding pool (and other wetlands) as well as the non-breeding terrestrial habitat for amphibian summer refugia and hibernation (Semlitsch 2002; Baldwin et al. 2006; Groff et al. 2015, 2016). Scientists speak of vernal pool landscapes, or *poolscapes,* when considering scales of conservation that will encompass the many functions of these small, discrete wetlands (Calhoun et al. 2014; 2017). Pool-breeding amphibians are present in breeding pools for, at most, a few weeks in the spring; adults and juveniles spend the majority of their lives in the adjacent forests and often use other pools during migration to and from summer, fall, and hibernation habitats in the forest. Because of this, unfragmented connections and the quality of habitats that link breeding and post-breeding elements are key to population vitality. Destruction of individual pools or clearing of connecting forested habitats for the purpose of utility rights-of-way (ROW) may fragment poolscapes and have a negative impact on populations of pool-breeding amphibians. Many species of birds, reptiles, and mammals depend on the pool-breeding amphibians for food in the early spring when other food sources are still in short supply.

Population dynamics of pool breeding amphibians are best described in terms of metapopulations, or loosely connected populations that maintain genetic health through limited exchanges driven by dispersing juveniles. One basic concept of metapopulation dynamics is that if a local breeding population in a given pool experiences a die-off event (disease, changes in hydrology), a nearby population can "rescue" this population with a recolonization event. In order for metapopulation dynamics to be maintained, an array of pools with forest matrix connections must be maintained. Juvenile frogs and salamanders are the key dispersal agents maintaining these connections as a subset colonizes new breeding pools, thereby maintaining the genetic integrity of pool-breeding populations. Their dispersal distances are often measured in miles (Rittenhouse and Semlitsch 2007; Homola et al. in review). These pool-breeding amphibians need intact forested habitat as far as 1,500 ft (~500 m) from the breeding pool to support a significant portion of the adult population and much longer distances for juvenile dispersal (Semlitsch 2000, 2002; Scott et al. 2013). The negative effects of habitat fragmentation, and more specifically, urbanization, on vernal pool breeding amphibians are well- documented (Semlitsch 2000, Regosin et al. 2009a).

In addition to being prime breeding habitat for a limited number of amphibian and invertebrate specialists, recent research reflected in a vast body of peer-reviewed literature has underscored the broader ecosystem functions that go far beyond the critical biodiversity functions alluded to above. For example, pool-breeding amphibians export nutrients and energy from pools to the surrounding forest (Gibbons et al., 2006; Capps et al. 2014). Vernal pools in the northeastern US have been recognized by scientists as critical ecological units which, much like keystone species (but at an ecosystem scale), are disproportionately more important in their role within entire landscapes than would be assumed by their small size (similar to bat caves and large old trees as small features with big importance to ecosystem functions) (see Hunter et al. 2017; Calhoun et al. 2017).

In summary, vernal pools exchange nutrients, energy, and organisms with other elements in hydrological and habitat networks, contributing to landscape functions, such as nutrient and sediment retention, energy exchange, and biodiversity support (Capps et al. 2014; Cohen et al. 2016; Marton et al. 2015; Creed et al. 2016) and provide food and shelter resources to other wildlife (e.g., Hunter 2008, Mitchell et al. 2008). Fragmentation of these networks weakens these ecological functions at multiple scales.

Please state the ways that transmission corridors harm vernal pools.

The effect of powerlines and the clearing of powerline ROWs on wildlife has largely focused on birds (D'Amico et al. 2019) with more limited work addressing mammals (Sánchez-Zapata J.A. et al. 2018; Richardson et al. 2018) and terrestrial salamanders (Brannon et al. 2014). To my knowledge, there are no peer-reviewed journal articles published on the effects of powerline ROWs on pool-breeding amphibians or vernal pool ecosystem functions. Studies by private entities in the grey literature are often limited by time (often to one or two years) and are based on pool assessments of egg mass counts (a poor metric for population vitality) as opposed to amphibian recruitment or fitness. For this reason, I will provide comments on the effects of powerline ROWs on pool-breeding amphibians based on what researchers know about pool-breeding amphibian frog and salamander ecology and movement patterns which are well-documented in the literature. We can also draw from the extensive literature on the impacts of clearcutting on movement patterns.

Note that my comments here are based strictly on potential **ecological outcomes** of impacting vernal pools directly in the ROW and those associated with the ROW that will remain uncut. My concerns are not limited to political and regulatory definitions of vernal pools. I consider the potential impacts of impacting potentially 700 pools or more, directly, or indirectly. It is well documented that current technology for remotely sensing vernal pools commonly miss up to 30 percent of pools, particularly in mixed and evergreen forests (see Dibello et al. 2016) so the number of potentially impacted pools may be conservative.

Of the estimated 700 potential vernal pool features assessed on the ground by the applicant along the 53-mile ROW, the Army Corps of Engineers identifies 242 jurisdictional pools being directly impacted. Federal jurisdictional vernal pools are limited to those where a significant nexus to Waters of the US can be demonstrated.

State jurisdictional pools are limited to those that fall within strict egg mass numbers that were devised to include less than half of all pools but in reality, to date, capture less than 25% of all pools (pers. comm. MDIFW database). Roughly 160 features were determined to be vernal pools per MDEP definition (that fell within or intersected the ROW) and that were formally reviewed by MDIFW for status. Of the 160, 43 were determined by MDIFW/MDEP to be SVPs and 9 were potential vernal pools.

The jurisdictional definitions of vernal pools are strictly legislative and regulatory definitions that draw from scientific literature but are largely crafted from political realities (e.g., the 250 ft zone of consultation for state SVPS was chosen as a number familiar to the public from shoreland zoning; it is not an ecologically significant number relevant to pool-breeding amphibians).

Therefore, the proposed CMP project will likely impact hundreds more functioning pools than the regulatory or legislative definitions alone would indicate. The project will have both direct and indirect effects on pools, as described below. It will also harm the ecological webs of pool and post-breeding habitats through fragmentation of forests associated with the pools.

Direct impacts to vernal pools

Pools impacted with fill or compacted by equipment will suffer direct degradation. Pools will also be directly impacted by forest removal. Vernal pools naturally occur in forested habitats and provide specialized breeding habitat for forest specialists adapted to detrital-based (leaf and organic matter) food webs. The environment is cool, shaded by trees, and sub-optimal breeding habitat for other aquatic breeders (invertebrate and amphibian) more suited to permanent waters in systems driven by primary production (production by photosynthetic plants and algae). The ephemeral hydrology, shaded habitat, and less productive environment allow specialists, such as pool breeding wood frogs and salamanders, to thrive as competitors are reduced by the harsh conditions. The construction of CMPs proposed powerline would degrade pools by turning them into unshaded wetlands driven by primary production (open, sunny conditions). This leads to warmer pools and serves as an attractant to bull frogs and green frogs. This is problematic because:

a. Bull frogs and green frogs are very efficient egg and larval predators (Vasconcelos and Calhoun 2006).

b. Bull frogs can transmit Bd (the chytrid fungus) directly to wood frogs (Greenspan, Calhoun, Longcore and Levy 2012) which may be problematic if populations increase significantly. This is not currently an issue in Maine.

c. Viruses that result in amphibian die-offs are more likely to occur in warmer waters (Gahl and Calhoun 2010).

d. Hydroperiod is likely to be dynamic. In the first years, pools may be deeper owing to the clearcutting; this may invite more marsh pioneers to colonize the pools (e.g., cattail or sedges, phragmites) which will ultimately dry the pool (see Vasconcelos and Calhoun 2010). This will alter floral and faunal species composition and abundance and will no longer favor forest specialists.

e. Egg mass presence in degraded pools should not be assumed to prove lack of impact. Many open pools serve as ecological sinks---that is, eggs are present from pool breeders but many of these eggs will never mature to adults because of the poor habitat (i.e., in poor, unshaded habitats, predators may eat the eggs and larvae, the eggs and larvae may dry out, or disease may kill the eggs and larvae).

In conclusion, the proposed project will harm many individual pools, even those that are not filled. Even unfilled pools may cease to function as true vernal pools due to lack of shade, changes in species composition, increased predation, and disease.

Indirect impacts on vernal pools in the uncut portion of the ROW.

Pools adjacent (within 30 m) to the cut would receive more light and desiccation and would suffer from edge effects of increased exposure to green and bull frogs and mammal and reptilian predators attracted to edges and more open habitats (see Eakin, Hunter, and Calhoun 2019 for differences in pool visitation by predators in open vs. wooded pools in suburban contexts).

Impacts on emigration routes and staging areas (fragmentation)

Our recent research on amphibian movement patterns and habitat choice for movements illustrates that the quality of the migratory routes influence amphibian behavior and hence success. Agricultural landscapes (i.e., row crops, pastures, hay fields), clear cuts, and fragmentation from development can all serve as partial barriers to movements of amphibians (Guerry and Hunter 2002; Cline and Hunter 2014; Groff, Calhoun, and Loftin 2017, Hoffmann, Hunter, Calhoun and Bogart 2018). Population viability and vitality requires functional connectivity in fragmented landscapes.

Maine adult pool-breeding amphibians have been documented traveling from breeding pools to post-breeding habitat up to 2,000 ft for salamanders and 3,000 ft for wood frogs; median distances (half more, half less) are measured in hundreds of feet. They seek shade, cover from light and predators, and moisture during these migrations (Baldwin et al. 2006; Groff et al. 2017; Scott et al. 2013, Hoffmann, Hunter, Calhoun and Bogart 2018). Patrick et al. 2008 showed that adult abundance and habitat use differed among species, with wood frogs, spotted salamanders (*Ambystoma maculatum*), and eastern red-backed salamanders (*Plethodon cinereus*) preferring uncut and partial-cut habitat, and adult green frogs (*Rana clamitans*) and American bullfrogs (*Rana catesbeiana*) being more tolerant of clearcutting. Spotted salamander numbers also showed decline with partial canopy removal and higher numbers in uncleared habitat with higher levels of coarse woody debris.

For pool-breeding amphibians, juvenile dispersal from their natal pools to different breeding pools maintains population connectivity (Homola et al. in review). We know that forested areas are the best facilitator of juvenile dispersal (Cline and Hunter 2014; Hoffmann et al. unpubl. data., Homola et al. in review). In the only peer-reviewed study addressing power line behavior of wood frog juveniles in a controlled experiment, deMaynadier and Hunter (1999) showed that juvenile wood frogs showed an emigration preference for closed-canopy habitat immediately upon metamorphosis, with the highest sampling rates occurring in microhabitats characterized by dense foliage in both the understory and canopy layers. Their results suggest populations of pool-breeding amphibians in vernal pools will likely decline due to fragmentation from power lines.

If the proposed ROW is clear-cut and allowed to grow to shrubby vegetation, there is a good chance that the area will first be colonized by thick graminoids (herbaceous plants with grass-like characteristics), pioneer vines such as raspberries, and a variety of woody plants more indicative of disturbed sites than natural shrub swamps. Travel for juvenile amphibians can be difficult in tall or thick grass-like vegetation (Cline and Hunter (2014). Popescu et al. (2012) observed forest specialists declined in abundance in partial and clear-cuts beginning 2–3 years post-disturbance. There was a shift in relative abundance towards habitat generalist species, most notably green frog juveniles. In summary, shrubby habitat is a vague goal for what will replace the disturbed land created for the ROW. Shrubby habitat that has an understory of thick graminoids may be difficult for dispersing amphibians to pass through on their way to forested habitat.

<u>Please describe your knowledge of the project area and the importance of protecting its vernal pools.</u>

Much of the new 53-mile section of the project is working forest. It is multiple ownerships so there is no way to tell what parts of it will be logged and when. It also passes through public lands, some of which are quite valuable, such as the Cold Stream Public Reserved Land. Most of the area is typical northern Maine working forest. This is relevant because the extensive literature on forestry practices and pool breeding amphibians shows that working forest is a more benign land use than developed or cleared areas (Calhoun and deMaynadier 2004; Patrick et al. 2008). Vernal pools with intact forested adjacent habitat, or where a significant portion of the pool edge is left in contiguous forest connecting to other habitat elements, may still function. Pool breeding amphibians prefer uncut or partially cut forests and suffer the most in clear-cuts or other extreme openings.

I have not worked in the area where the pools are being impacted but the importance of conserving vernal pool landscapes transcends geography. Post-breeding habitats, for example, for wood frogs, vary by geographic context from forested wetlands (Baldwin et al 2006a, b), to upland cool deciduous, montane forests (Rittenhouse and Semlitsch 2007, 2009ab) to refugia on and around erratic boulders in montane settings (Groff et al. 2017). But all vital populations of amphibians rely on intact forested landscapes where connections between breeding pools, dispersal routes, and post-breeding habitats are strong. Degrading or removing this forest cover and access to remaining forests across deforested areas will have an impact on amphibian vitality.

In conclusion, the effects of a clear-cut ROW through existing vernal pools, adjacent vernal pools, and travel routes to and from breeding pools will result in impacts ranging from devastation for some individual vernal pools to greatly compromised habitat for others. The literature is clear that some amphibians will make their way through inhospitable cover but that many will avoid the journey or perish along the way. There are many factors affecting the resiliency of pool-breeding amphibians in the face of land conversion and many are undocumented or only explained by complex interactions of other environmental factors. What we do know is that populations along the corridor will be compromised, some lost, and some severely degraded. We know that significant numbers of animals will be directly impacted through operations. We know that we should avoid all such impacts when feasible. We know that climate change related warming and altered precipitation patterns stress amphibian populations already. The proposed ROW will be a significant further stressor.

Please state your opinion of CMP's proposed compensation for vernal pool impacts.

A small subset of the 700 potential pools identified on the ROW are included in the compensation calculations. Of these, roughly 160 features are determined to be vernal pools per MDEP's definition (that fell within or intersected the ROW) and that were formally reviewed by MDIFW for status. Of the 160, 43 were determined by MDIFW/MDEP to be SVPs and 9 were potential vernal pools (PVPs). In reviewing the data sheet for state pool designation, I have concerns about 23 of the pools which are stated to be non-significant or only potentially significant. In many cases, there are calls limited by the state requirement of determining if pools are naturalized or not and for egg mass number cut offs that are not ecologically rigorous.

The Army Corps of Engineers identifies 242 jurisdictional pools being impacted but identify much lower direct compensation acreage. The disparity between federal and state jurisdictional oversight highlights the policy focus of evaluating pool values and hence compensation requirements. This leaves me with great concerns regarding fair compensation for actual ecological losses.

I believe that CMP's proposed compensation for vernal pool impacts is insufficient for the following reasons:

- The State jurisdictional definition of vernal pools is based on numbers of egg masses of pool breeding amphibians. The thresholds for Significance are the result of a legislative compromise. This limits coverage of ecologically valuable pools. For example, egg mass abundances vary with landscape context (montane vs. lowland for example; single pools vs complexes), with winter and spring conditions effects on breeding adults, and with other factors influencing population dynamics. Hence it is risky assessing pool quality based on egg mass abundances over short time periods (i.e., less than 5 years). Pools in complexes may have relatively low egg mass numbers as a single population disperses eggs over many pools to increase success of metamorphosis (Calhoun et al. 2003).
- Assessments of vernal pools for state Significance for fairy shrimp and state-listed species are problematic in that survey times for these animals often do not overlap with survey times for amphibians.
- The Army Corps of Engineers compensation dollars are based on a square footage estimate of impact times a multiplier based on value. Square footage of impact is not a measure of ecological impact and the ratings of H, M, and L are not based on scientifically defensible science. They are based on the reach of jurisdiction as dictated by the Clean Water Act and adjacency issues and factors related to practical implementation. Given the lack of accountability for ecological impacts and with a very coarse and indefensible rating system, I am extremely concerned that the compensation formulae grossly underestimate potential losses stated. The non-jurisdictional pools are

important elements of the overall poolscape supporting amphibian metapopulations. Fragmentation resulting from these losses is not calculated in the compensation package.

- Vernal pool functions are not limited to a depository for amphibian eggs. Larger ecosystem functions (hydrological, biogeochemical, and as habitat for facultative species) cannot be assessed through egg mass counts. Compensation should factor in loss of poolscapes (pool and connecting habitat) for assessing full environmental impacts.

- I did not see a requirement for a monitoring plan for vegetation recovery. Forty percent credit was given for shrub restoration, but it is not clear what the quality or composition of the understory will be (passable or not to amphibians) after construction of the ROW. With re-entry for maintenance, and with altered pool conditions through destruction or degradation, it is not clear that the pools will be suitable, productive breeding pools where credit should be given for shrub cover or that the revegetation will be hospitable to amphibian dispersal movements.

From an ecological perspective, the losses should be well-compensated, not undercompensated, given the level of uncertainty in actual pool numbers and given the level of uncalculated impacts to all vernal pools in the study area. There is no jurisdictional compensation for the effects of fragmentation and degradation of movement corridors, loss of unaccounted for pools, loss of valuable non-jurisdictional pools, loss of pool clusters, or for the fact that calculations for a given pool loss stop at property lines (this is the only natural resource in Maine that I know of for which a biological zone stops at property lines). This concern is particularly relevant for linear projects such as this.

Please state your expert opinion of whether this project meets the standard of no unreasonable adverse impacts to fisheries and wildlife in the site law and site rules (38 M.R.S. § 480-D(3), 38 M.R.S. § 484(3), and DEP rule Chapter 375 § 15.

This project will cause harm to potentially hundreds of individual pools. Clearing for the powerline will also fragment pool networks causing undue stress to local amphibian populations. The ability of amphibians to move from pool to pool is critical to vernal pool ecological functions. The mitigation only compensates for direct impacts to vernal pools that have regulatory or legal status--- a small subset of the overall impacts to pools. There is no compensation for fragmentation in the form of interruption of migration and dispersal routes, connections among pools, and connections from breeding to post breeding habitats. Therefore, I do not believe that this project meets the no unreasonable adverse impact standard. Its impacts are severe and the applicant's mitigation proposal is inadequate.

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Notarization

I, Aram Calhoun, being first duly sworn, affirm that the above testimony is true and accurate to the best of my knowledge.

Date: February 28, 2019

Aram Calhoun

The above-named Aram Calhoun made affirmation that the above testimony is true and accurate to the best of her knowledge.

Date: February 28, 2019

Catherine B. Johnson, Attorney-at-law