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Punete Power Project (15-AFC-01): Wishtoyo Foundation Comments on the Revised Preliminary Staff Assessment (for Tuesday, September 27, 2016 Status Conference)

Additional submitted attachment is included below.

September 26, 2016

VIA e-Comment

Mr. Robert Oglesby
Executive Director
1516 Ninth Street
Sacramento, CA 95814

RE: Punete Power Project (15-AFC-01): Wishtoyo Foundation Comments on the Revised Preliminary Staff Assessment (for Tuesday, September 27, 2016 Status Conference)

Dear Mr. Oglesby:

On behalf of the Wishtoyo Foundation ("Wishtoyo"), we submit the following comments for the Tuesday, September 26, 2016 California Energy Commission Committee Status Conference for the Puente Power Project ("P3" or "Project") on the Revised Preliminary Staff Assessment.

Wishtoyo is a non-profit organization in Ventura County with over 700 members composed of Chumash Native Americans, Ventura County residents, and Los Angeles County residents. Wishtoyo's mission is to preserve, protect, and restore Chumash culture, the culture of all Ventura County's diverse communities, and the environment. Wishtoyo also shares traditional Chumash beliefs, cultural practices, songs, dances, stories, and value with the public to instill environmental awareness and responsibility for sustaining the health of our land, air, and water for the benefit of future generations.

We are writing to express our concern regarding the Cultural Resources section of the Revised Preliminary Staff Assessment.

Consultation

While the Project has consulted with some of the Chumash tribes, the Project has not consulted with all of the Chumash tribes, groups, bands, and clans whose cultural resources will be impacted. Meaningful tribal consultation with all Chumash groups will ensure meaningful tribal consultation and will identify the Project's impacts to Chumash historical and cultural resources. Wishtoyo requests the Project consult with the remaining Chumash tribes, groups, bands, and clans with current and historical affiliations to the project area to ensure meaningful consultation.

Analysis of Cultural Resources

The Revised Preliminary Staff Assessment states "there is a moderate probability of encountering buried prehistoric resources" during the construction of P3. (Revised Preliminary Staff Assessment, 4.4-18). The ethnographic methods applied involved four steps; (1) formulating preliminary guiding questions, (2) informally and/or formally discussing with people who have a cultural relationship

or affiliation to the area, (3) conducting an archival "search, retrieve, and assess" process, and (4) conducting field visit(s) to help ethnographer triangulate between what people currently say with written documentation and what is perceived to be in the project area. (Revised Preliminary Staff Assessment, 4.4-20). This analysis does not represent the best available technology and frequently implemented practices in assessing cultural resources.

Wishtoyo requests that specially trained forensic canines[1] in combination with ground penetrating radar are utilized to identify the location of all Native American burials within the project area. The use of specially trained canine forensics alone, or in combination with ground penetrating radar, represents the best available technology and most reliable means for the identification of Native American burials, and thus should be used to identify potential impacts to Native American cultural / historic resources and to mitigate those impacts to a less than significant effect. Please see attached for more details on trained forensic canines.

Only with the best available technology and frequently implemented practices can the Project ensure cultural resources are protected. Further, under the California Environmental Quality Act ("CEQA") and California law, when cultural resources are identified, the preferred mitigation measure is avoidance and preservation in place. (CEQA Guidelines section 15126.4). If cultural resources are not identified until after construction has begun, avoidance and preservation in place mitigation measures will likely not be successful or utilized. Wishtoyo requests that best available technology and frequently implemented practices are used to determine no cultural resources will be impacted by P3.

Biological Impact as Cultural Resource Impact

The environmental impact of P3 poses a threat to Chumash peoples' connection to air, soil, water, ocean, and viewscapes. The Chumash are a maritime culture and have a significant connection to the coastline and marine animals living in our oceans. The environment in connection to the coastline is a natural cultural resource for the Chumash people. Air and water pollution associated with the project, like excessive nitrogen deposition, will harm both terrestrial and aquatic habitats, which can have a vast impact on animals and plants important to the Chumash people, culture, and lifestyle. Wishtoyo requests the Project research further the environmental impacts associated with air and water pollution and its effects on the natural cultural resources for the Chumash people.

Thank you for your time and consideration in reviewing these comments. Please feel free to contact us with any questions.

[1] Please see Canine Forensics Attachments to this letter for more details about the use of forensic canines and ground penetrating radar. These techniques were used to reliably identify the location of Native American Burials for the KB Homes Development in Santa Cruz and for other development projects. Wishtoyo used forensic canines to detect the presence of Native American ancestral remains/burials for the McGrath State Beach Campground Relocation and Estuary Restoration Feasibility Study.

Sincerely,

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Wishtoyo

Articles Discussing How Forensic Dogs can be and have been successfully used to identify and locate Native American human remains (last visited October 21, 2011)

1.) http://www.ohlonenation.org/?p=264

By charlene on September 20th, 2011

Forensic Dogs Successful in Identifying Ancient Human Remains for Ohlone

Category: Uncategorized. Tags: burial site, forensic dog, kb homes, ohlone, santa cruz

Native Americans are always concerned when their exists the potential of unearthing human remains during construction projects. During a time when regular protocol would dictate the use of drills and tedious ground penetrating strategies that might harm or destroy findings, two alternatives have been incorporated during a recent project.

This fall the remains of an Ohlone boy were discovered during a KB home building project in Santa Cruz, CA. During negotiation meetings between the home builder, the City of Santa Cruz, CA and the Ohlone all parties agreed to respect and accept the results from two alternative proven methods of ground investigation. The two methods include ground penetrating radar or (GPR) and specially trained forensic dogs.

In this case, Ohlone descendant Chuck Strickland recommended the GPR method. A trained GPR technician came to the building site and scanned surface of the earth to see if additional buried remains could be detected. Unfortunately, due to layers of sediment and rock would not allow proper functioning of this method. While this did meet the Ohlone requirement of a non-invasive method for predicting the likelihood of findings, it would not be a good match for this project.

Next, Gregg Castro, also an Ohlone descendant recommended the use of specially trained dogs from the Institute for Canine Forensics.

The institute has it's headquarters in California, but has provided services nationally and internationally. The institute trains for nine distinct types of area scannings. The match for the Ohlone project would be a team of dogs who could detect historical human remains. Dogs are taught not to disturb a scene by digging or retrieving evidence. Further, the dog can discriminate between human remains and all other non-human items. In this case, the dogs were able to detect the spot of the original finding as well as additional findings that would require great care if the construction project were to continue.

In this project, the Ohlone, the city and the home builder came together to agree upon these alternative scientific methods for land surveying. It is the hope of the Ohlone Elders Circle that these non-invasive methods become part of the regular process to be implemented in order to preserve former village sites.

2.) http://www.santacruzsentinel.com/localnews/ci_18929918

Santa Cruz, developer reach agreement not to build on Ohlone site

By J.M. BROWN
Posted: 09/19/2011 03:37:31 PM PDT

Archeologist and helpers sift through burial site on land where KB Homes is... (DAN COYRO/SENTINEL)

Wishtoyo

SANTA CRUZ - After weeks of negotiations with the city and Native American elders, the developers of a 32-unit housing complex on the Eastside agreed Monday not to build over an Ohlone burial site.

KB Home will set aside a premier, 13,000-square-foot parcel at the top of a knoll, where several remains were discovered this summer, to preserve in perpetuity for Ohlone elders to access for ceremonies. Elders, who believe the spirits of buried people wander if their resting place is disturbed, will be able to use the site for ceremonies in coordination with the site's homeowners association.

"I am ecstatic," said Ann-Marie Sayers, a state-designated Ohlone descendant who negotiated with the city and company to preserve the knoll. "Just the fact that KB Home honored the request of the original people whose land they are building on, it is so long overdue for developers to honor sacred sites. I truly believe they did the right thing."

Sayers, who lives in a Native American community outside Hollister, will join Ohlone elders from other parts of the state in walking the site with company representatives later this week. The elders, who had recommended KB Home fully set aside the parcel containing the knoll, will finalize details of the accord reached after numerous meetings since early August, when the remains of an Ohlone child were discovered.

During an archeological evaluation triggered by the discovery, researchers later recovered remains believed to be teeth and a skull fragment unrelated to the child or each other, officials said. Forensic dogs identified another area on the knoll believed to contain remains, but all sides agreed not to disturb it.

KB Home will establish a permanent cultural easement on land that would have contained a 2,200-square-foot house and driveway, a unit that would have been among the largest and most expensive planned for the community at Market Street and Isbel Drive. The preserved area, where all remains will be buried again, is attached to three acres already set aside to preserve the endangered spineflower.

"We essentially decided to do this out of respect for the elders and folks from the Native American community," said Ray Panek, senior vice president for forward planning at KB Home, who took part in the talks. "It will be just allowed to go to a more natural state. It seems like a good solution."

Panek said he did not have immediate estimates on lost revenue for setting aside the land or the total cost to the company for archeological research. The company agreed to bring in subsurface sonar equipment and forensic dogs at the request of Native American representatives, and two sets of archeologists worked on the site.

The city ordered the company to stop construction work around the knoll after the remains were recovered. Panek said he expected work would resume soon after the elders walk the preservation area.

"KB was generous in what they were willing to do and elders were flexible in understanding what was possible and meaningful," said Vice Mayor Don Lane, who participated in the talks.

Lane said the outcome was "a really nice conclusion," especially amid all of the demonstrations at the site and at City Hall since the first remains were found. "Everyone was a little pessimistic that goodwill wouldn't manifest."

For the past month, demonstrators have been calling for an end to building plans around the knoll. Protesters resumed their demonstrating Monday until they heard from officials outside City Hall that an agreement had been reached.

3.) http://www.k9forensic.org/historical.html (the site has links to many articles about canine forensics detecting Native American Burials)

Historical Grave Detection Group

Group has been formed by several Forensic Evidence
and Historical Human Remains Detection (HHRD) dog teams
under the umbrella of Institute for Canine Forensics

In archaeology, an HHRD trained canine with impeccable manners, slow and methodical search style, properly trained and certified, may be the Remote Sensing Tool of the future. ICF canine trainers are "writing the book" in this field. Certification standards are high insuring that the ICF certified canines are reliable, non-invasive tools to be used in modern archaeology.
tools to be used in modern archaeology.

4.) http://www.pressdemocrat.com/article/20091121/ARTICLES/911219966?p=1&tc=pg

Reclaiming Santa Rosa's century-old graves

By MARY CALLAHAN
THE PRESS DEMOCRAT

Last Modified: Saturday, November 21, 2009 at 5:33 p.m.

The graves are thought to be well over 100 years old, forgotten over time, unclaimed and uncelebrated.

Photo Galleries

- Dogs Search Cemetery

Tiny yellow and red flags newly planted Saturday in several overgrown areas of the Santa Rosa Rural Cemetery began to acknowledge the loved ones who rest there and the history they represent.

But Rhea, Eros, Alice and Osara, four dogs trained to sniff out old bones, were focused firmly on the present as they criss-crossed designated areas of the 17-acre cemetery in search of human remains.

The canine foursome - as well as several others still in training - were brought to Santa Rosa by the Woodside-based Institute for Canine Forensics, which trains and deploys Human Remain Detection Dog teams.

Though some also work in search-and-rescue contexts and seek out human remains from recent tragedies, the Institute is the only such agency in the world focused on detection of historic remains, whether in law enforcement or archaeological contexts, representatives said.

Dogs associated with the Institute have been used, for example, to search for human remains at the home of a Hayward couple charged with kidnapping of Jaycee Dugard, who was snatched off a Lake Tahoe road at age 11 and kept for 18 years.

They've also identified Native American burial sites around the western United States, and served at New York City's Ground Zero and along the trail of the Space Shuttle Columbia, which exploded over Texas.

They came to Santa Rosa at the invitation of the Rural Cemetery's volunteer Preservation Committee. The organization hoped to determine whether human remains were buried in more than 100 plots recently discovered on maps long tucked away from human eyes and

never marked by gravestones at the cemetery, said Sandy Frary, who, with her husband Jim, is a key organizer for the committe.

Committee members thought it possible the plots had been mapped and never used, and wanted to find out, part of their effort to restore the cemetery fully and document its history in as precise a manner as possible.

The scent of cadavers lingers in the soil and can be sifted and distinguished with a dog's sensitive nose, though it's sometimes hard to pinpoint precisely from where the odor comes, handlers said.

Dogs can even detect remains in ancient sites after centuries f burial.

The gravesites sought Saturday were probably closer to 130 or 140 years old, though there was plenty of doubt they were there in the first place - especially on a rough, sloping area along Franklin Road where 12 flags were left Saturday, indicating multiple bural plots.

Nobody had thought there were burials in those sections of the cemetery, Sandy Frary said, adding, "I'm totally amazed."

Another 10 or so flags were scattered about a meadow and adjacent hillside at the north side of the cemetery, while half a dozen others remained planted along a back road near the top of the acreage.

Volunteers still hope to rake the areas, pull up weed cover and probe around to see what more can be determined, Frary said.

Wishtoyo

ICF Institute for Canine Forensics

A non-profit organization for the advancement of research and education of Forensic Evidence and Human Remains Detection Dog teams

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Using Historical Human Remains Detection Dogs
Practices and Procedures

The Institute for Canine Forensics (ICF) is a 501(c)(3) non-profit corporation established in 1998. ICF is the only group in the world dedicated to training and certifying Historical Human Remains Detection (HHRD) dogs. HHRD dogs have unique and specialized training to teach them to locate historic and prehistoric human remains. We work closely with archaeologists and anthropologists to ensure our training and methods are consistent with current standards of practice. This document describes some basic requirements clients need to know to ensure their project would be enhanced by using HHRD dogs. For more information on the Institute for Canine Forensics, including articles, advisory board, past projects and testimonials you can go to our web page at: www.K9Forensic.org or www.HHRDD.org

This document will address the following subjects:

- General Information About the Dogs
- Search Strategy
- Alert Quality Key
- Dog Working Conditions
- Dog Training and Certification
- Scent Travel
- Percentage of Accessible Terrain
- Reports Provided

General Information About the Dogs

Each handler owns their own dog and is responsible for their dog's training, health, and wellbeing. Along with scent training, the dogs are taught obedience and socialized to other animals and humans. Most of our dogs have flown all over the country and, in some cases, internationally. They fly in-cabin with us under the umbrella of service and working dogs. We use a variety of dogs, but all are working breeds, usually from working lines. Typical breeds we use include Labradors, German Shepherds, Australian Shepherds, Border Collies, Golden Retrievers, as well as some mixed breeds.

Our dogs are trained to perform an alert when they detect the scent of human remains. The alert is either a sit or down at the strongest source of the scent they have located. At times it is not physically possible to alert near the source due to vegetation or other obstacles, so the dog tries to communicate that they have scent but are unable to get to the source. Since the dogs

can only communicate in limited ways, the handler must interpret their actions. We do this by observing the dog's actions and comparing it to past experiences working known graves or human bones. For example, when we observe the dogs with their heads up, sampling the air after we ask them to indicate the location, we interpret this action as the scent being airborne and an exact location cannot be pinpointed. Dogs have varying abilities and scent thresholds.

Search Strategy

Archaeologists use a wide range of multidisciplinary techniques to locate historic and prehistoric sites. Many times they combine techniques such as oral history, historical records, remote sensing like metal detectors and GPR and physical remains to help locate sites. Historical Human Remains Detection dogs are another type of remote sensing. Their unique ability to detect and recognize the scent of human remains makes them a tool that can aid archaeologists as well as a tool to combine with other more traditional techniques. Using scientific methodologies archaeologists can build predictive models to help determine the possibilities for unknown burials in a given location. HHRD dogs can be used to add layers to a predictive model.

Each project is unique, as is each search area. An initial strategy is defined based on information given to us by the client during the negotiation phase. This is re-evaluated once we arrive at the search site and may be adjusted to fit current conditions. The terrain, weather and amount of time we have to search the designated areas dictate the search mode we will use.

These search modes are:

- Free: This style of search lets the dog choose the area it wants to search and is not as controlled as a grid search. It can be useful when speed is needed but it is more difficult to keep track of the areas the dog has searched. The benefit of this search mode is if the dog has scent they will gravitate to that location and work it first.
- Hasty: A hasty search entails a quick search that covers a larger area in a faster time. This usually means larger grid spacing and less coverage of a search area.
- Detailed Search: A detailed search will cover a search area with a finer grid. The dog usually stays closer to the handler and works more slowly. This search pattern is designed to find single human burials. A typical grid pattern would be about 3 meters. We will often use this type of search in cemeteries to locate multiple burials. A Detailed Search should cover about 2 acres per hour.
- Fine Grid Search: A fine grid search is used to search for single bones and teeth. It typically uses a grid of about 1 meter and often is searched with a cross-grid to get better coverage and probability of detection. The dog can easily miss these weak scent sources; the miss can be caused by as simple a thing as breathing out when they pass over the scent source. We use multiple passes over the grid pattern to improve the probability that the dog will get the scent on one of the passes. This type of search is used in the dog's certification exam in which they have to find both single old bones and teeth. We do not

use it very often in the field because we are usually not asked to search for individual bones and teeth. A Fine Grid Search covers about ¼ acre per hour. It is tiring on the dog and they usually need a rest break after covering their ¼ acre.

The search location is broken down into multiple, manageable areas. GPS coordinates are taken of the boundaries and handlers are assigned to each area.

Each area is usually searched by at least 2 dogs in order to get the best coverage. When possible, we use different colored flags for each dog and mark each flag with the team's identification, waypoint number, and other important information. Single-flagged alerts are given the same creditability as multiple-flagged alerts.

The dogs work at different times during the day with different weather conditions and for varying lengths of time. Each handler chooses the best search strategy based on the weather conditions, terrain, and their dog. Typical search patterns include searching boundaries followed by gridding in 2 directions. Grid spacing depends on terrain, soil conditions, and what we are looking for. Using multiple dogs to cover an area increases the probability of detection.

Some projects dictate that we use a blind approach where alerts from the dogs are not flagged, only recorded by the initial handler. A second team then works the same area without knowing what the previous team has done. A monitor may observe each team to make sure any areas in question are searched. This strategy is used when more scientific information is desired.

Some projects have time constraints where we need to find potential burials quickly and do not have a need for a blind study. The first team searching the area will flag any alerts and record GPS UTM coordinates.

In past projects, native monitors and/or archeologists have located areas they deem significant due to their knowledge of the terrain, topography, and presence of artifacts or features that were used in historic or prehistoric burial practices. The handler/dogs are given a narrowed down area to search but are not told exactly where these features are. This eliminates the potential to cue or guide the dogs to a specific object or location.

Percent of Accessible Terrain

The percent of accessible terrain is estimated by how much of the search area the dogs can access the surface of the ground. Scent can be trapped in plants above the burial. Brush, thick grasses, downed trees, etc. can make it very difficult for the dogs to cover some areas. Dry grasses like foxtails, needle grass, rip gut, wild rye and wild oats can be very dangerous to the dogs as they propagate by seedpods that have one-way barbs. These seeds can attach to the

animals fur and can lodge in the dog's nose, eyes, ears or skin, sometimes requiring surgical removal.

Dense grass above four (4) inches in height can degrade the Probability of Detection (POD) for the dogs. Grass above one (1) foot in height has a significant degradation in POD. The taller grasses, and other groundcover, trap scent in a localized area and the dog must pass directly above that area, with their nose at ground level, in order to catch the scent. It is recommended that tall grass be cut a week before a search. If that isn't possible, a shorter time interval than a week is preferable over searching in tall grass. Ideally it is recommended that the cut grass be removed if it leaves large, thick clumps, which can result in trapping the scent between the clumps and the ground and not allowing it to rise.

It is important to note that there is a difference in the Percent of Accessible Terrain and the amount of area covered by a dog. The area covered is dependent on the terrain, ground and weather conditions, search mode and the amount of time allotted to work an area. The more dogs that are worked in a specific area, the greater the area covered and the higher the Probability of Detection.

Alert Quality

The handlers use 1-3 designation to rate the alerts the dogs give at each location. This is based on experience and the dogs' behavior when they work the burial and perform the trained alert indication.

1. Strongly Committed: The dog immediately identifies and alerts at a specific location.
2. Committed: The dog took time to locate and alert at the strongest source of scent.
3. Scent Pool: The dogs are getting scent but are unable to locate the exact source. Scent pools may be the result of disturbed, scattered or fragmentary remains; or, they may be created by wind and/or moving water. It could be scent remaining in the soil where a burial was located but where physical remains are no longer identifiable.

The alert quality key has been developed over several years by observing the dogs' typical reaction to different kinds of known locations of remains, for example scattered remains from a burial or intact burial at a cemetery. The dog is taught a specific alert / indication when they locate the imprinted scent. They are taught to get as close as they can to the strongest scent. In some cases the strongest scent location may be a crack in the ground or a rodent hole next to the burial.

In the case of scent pools, there may not be a "source" in the area for the dogs to give a definitive alert on; however, their body language will indicate that they are getting diffused scent in the area.

Multiple flags in close proximity do not necessarily mean more than one grave but most likely are because each dog chooses a different location to alert on at a single grave. Each burial may be anywhere between 3ft to over 5ft in length. Multiple flags in close proximity can also mean the burial has been scattered by ground dwelling rodents, roots, or earth moving equipment.

When a body has decomposed in the ground the "grave soil" contains the scent that the dogs recognize as human remains. Alerts on disturbed, "scattered" burials can be grave soil, or actual remains (bones/teeth).

One of the most difficult sources for the dogs to locate by scent is surface bone in a desert environment where it has been bleached and deteriorated due to sun and other elements. Bone or other human remains (scent) are protected when they are buried in soil. Winter conditions make long term exposed bone somewhat easier to locate as the moisture brings out the scent.

Dog Working Conditions

Our dogs are living creatures and subject to weather, especially heat. Cool, moist conditions are best. The best conditions are not always possible due to the season or location of the project. We have adopted some standard working practices to help ensure the dogs are safe and we get the best possible results. Our dogs are athletes and our training program builds their endurance to extend the duration of time they can work. Each project has its unique set of circumstances.

A basic list of guidelines we subscribe to follows:

- The dogs' workday varies from 4 to 6 hours per day, depending on weather and conditions. A workday is not the same as "nose time". Nose time is the amount of time the dog is actively working.
- The dogs can cover anywhere from 2 to 10 acres per workday depending on what they are looking for, the weather, the terrain and the search strategy used.
- Our dogs typically work 3 days on and 1 day off.
- We stop working dogs when the ground temperature reaches 100°F, or the dogs internal body temperature reaches 104°F.
- Weather and ground temperatures play a critical role in the dogs' ability to locate scent. We monitor ground temperatures as this directly affects the availability of scent. Hot weather conditions, especially ground temperatures 85°F and higher appear to decrease the scent available to the dog.
  In general ground temperatures below 85°F work best for locating burials. The higher the ground temperature, the lower the probability of detection. Ideal ground temperatures are between 40°F and 85°F. The most desirable conditions are mist and light rain. Heavy rain is difficult to work in for both the handler and the dog. Standing water or flooded

conditions may make it more difficult to pinpoint a burial as it can block scent or move it around.

- The safety of our dogs always comes first. For example, we do not work deserts at night in the summer due to the presence of rattlesnakes. At some locations we work the dogs on a long line for their safety.
- Each handler has their own personal protection equipment (PPE) including a hard hat, high visibility vest for themselves and a high visibility vest for the dog.

Training and Certification

We start training our dogs as soon as we get them and do not stop until they retire. We meet or exceed best practice standards for similar detection dogs in the industry. Typically, we train detection work 3 days and 1 day of obedience and or drive work per week. Best practice for the industry states that a canine shall complete a minimum of sixteen (16) hours of training per month. Most of our dogs train 40 or more hours a month. We train in all types of weather conditions and terrains, including buildings, urban and wilderness. Although our dogs have no difficulty locating human remains in the stages of decomposition, their training is focused on bones and burials that are no longer in the active stages of decomposing.

Additionally, our dogs are:

- not cross-trained for other scent disciplines
- socialized to many different situations, people and places
- trained to alert as close as possible to the strongest scent available. An alert is either a sit or down at the point of discovery.
- taught to preserve scent sources and are not allowed to dig or mouth potential remains
- routinely train with flags so they learn that flags in their search area are insignificant and do not necessarily relate to an alert by another dog

We track our training sessions in a database that includes nose time, location of trainings, weather, and whether problems were worked blind or known.

To become certified, the dog/handler team must complete pre-certification signoffs of specific criteria and have obtained required search equipment to demonstrate the team is ready for certification. Certification and re-certification tests are set up and run by a team of two pre-approved evaluators, one is from the team and one is an outside evaluator. They have specific criteria they follow when preparing and running a test. The evaluators have a checklist of test scoring criteria that must be met to pass. The certifying team must have an efficacy score between 75% and 100% to pass. Once a team is certified, the team must re-certify every year.

Scent Travel

Human remains scent (vapor) travels away from the decomposing body or skeleton by way of diffusion, or vapor transport. Scent will follow the path of least resistance and can flow by means of water movement, animal or insect activity, and plant or root activity. Burrowing animals, such as rodents, as well as some insects like ants, create channels in the soil that can allow the release of scent to the surface.

Dogs can only detect what is available in the air. Water molecules compete with vapor molecules for binding sites. Water physically displaces odor molecules thus causing human remains scent to appear to be stronger, or pool, at vegetation or moist soil. Humidity is higher in and around photosynthesizing vegetation because it is transpiring. As vegetation transpires, it releases water into the atmosphere and bumps the odor molecules off of whatever they are bound to, making odor in the air more available to a dog's nose.

It is important to note that the dogs do not necessarily alert directly over a burial. Disturbance of the land, be it man-made, rodent and/or insect activity or the natural movement of the earth, including floods or landslides, can spread the scent over the area. The soil in which the body has decomposed retains the human signature that the dogs are trained to recognize and alert on. Disturbed burials will often create larger scent pools, making pinpointing by the dogs more difficult. However, even after years of disturbance and movement, the dogs can still detect, and alert, in reasonably close proximity to a burial.

Bones that have been on the surface for extended periods of time will deteriorate, losing most of their scent, especially in areas with direct sunlight and hot conditions. Environmental conditions that break down scent include sunlight, heat and wind. Intact, undisturbed graves have more scent available than do disturbed graves or bones.

Accuracy

The ICF canine accuracy at finding graves has been measured in only a few unmarked historical cemeteries. In these measurements, the position of the canine alerts is compared to the position of the center of the grave. Results show that the standard deviation of the canine alert position is about 2 meters as compared to geophysical positions taken at the same cemeteries. No excavation was done at any of these graves. These same tests also showed that the dogs cannot accurately discriminate between burials immediately adjacent to each other.

Reports

We produce a final report on each project for the client. The report generally contains the following information:

- UTM coordinates of all dog alerts using a Garmin 60CSx, which has an approximate 3-9 meter range of accuracy
- UTM coordinates for the boundaries of the areas searched
- Alert interpretation, comments and observations
- Weather
- Handlers' Biographies
- Summary of our findings