Burnett Oil Company (BOC) Virbroseis Test 4-24-2015

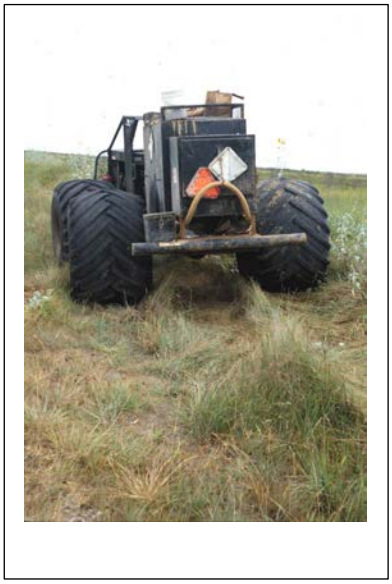
Background

In consideration of the exploration technique proposed for use by BOC in Big Cypress, it is relevant to note that most vibroseis seismic surveys conducted in the state have taken place on road shoulders and occasionally for short distances on trails or dirt roads that connect to asphalt roads. The project proposed by BOC is unique for it is the only vibroseis survey identified exclusively for off-road ever attempted in the state.

From an economic point of view, an applicant's motivation for selection of vibroseis equipment would be lower operation costs, particularly since the level of environmental monitoring is less than would be required when an explosives survey technique is selected. An explosives survey would also contain added costs for the purchase of explosives, permits, licenses, explosives storage, explosive distribution usually by helicopter, and overall safety issues.

From a technical point of view, vibroseis data acquisition is superior to explosives due to the inherent flexibility of the exploration technique where variations in signal amplitude and frequency can be fine-tuned to precise specifications needed under area field conditions.
To fully characterize the proposal, a comparison of more typical exploration operations may be helpful. The most commonly used alternative in Big Cypress has been shot hole drilling.

Several types of seismic shot hole drilling operations have occurred within Big Cypress but the technique that proved to be most efficient in all instances was drilling with the largest and heaviest equipment the geophysical contractor had in their inventory. If BOC selected shot hole drilling over vibroseis, impacts would occur from the act of drilling the seismic shot holes in addition to driving the equipment overland. Similar surface impacts would occur if larger more capable drilling equipment were used to replace vibroseis equipment within an essentially road/trail-less area of the Preserve.



Ardco water buggy and drilling rig (in background) in heavy cover left and right water buggy fitted with Terra Tires

Since the propose survey is being sought to identify subtle variations in subsurface formations that are approximately two miles deep, data quality is extremely important. High quality seismic data could someday lead to drilling operations, but this data would also be used for precision pad placement that should reduce the number of surface locations needed to explore potential subsurface structures.

Based upon the Plan of Operations (Plan) submitted to the NPS, it appears BOC is doing what most companies have done in the past - select equipment for their project they are most familiar with that they regard as highly efficient in delivering quality data. Under ideal conditions vibroseis test equipment selected by BOC is more frequently used by companies operating in open, sparsely treed, or treeless terrain where surface conditions provide limitless opportunity to exploit the full potential of this equipment. However, it may not be practical for the seismic exploration company working exclusively off-road , to rely solely on the success of a single type of seismic exploration equipment in the habitats that will be experienced within the project area.

It is the opinion of the observers of the test, and internal reviewers of the Plan, that high density cypress forests and similar natural barriers within the project area would prohibit exclusive use of the large viborseis equipment. While it would be reasonable to assume that following their vibroseis test BOC would respond by amending their intentions to use the equipment proposed, they have indeed indicated they intend to go forward with their original Plan.

Test Observations

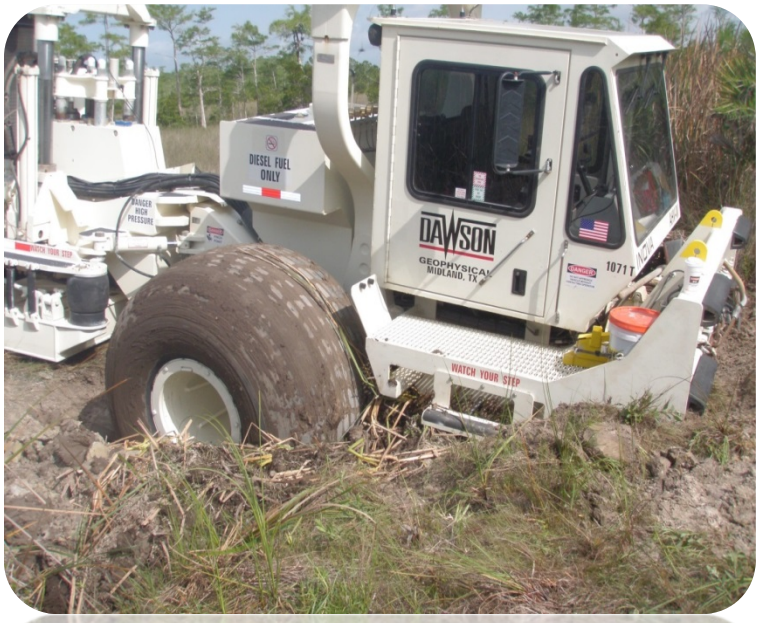
Overall the diesel powered vibroseis buggy that was tested can be used effectively as an energy source to acquire data from areas that they can reach while closely following resource protection criteria established by the NPS. However, smaller more maneuverable equipment may be needed to access source points where vegetation density exceeds test equipment capabilities, and where the proposed vehicles simply will not fit, or cannot negotiate the landscape without becoming stuck.

The test of the vibroseis buggy was scheduled for 8:30 a.m. on 4/24/15 at a site agreed upon by the NPS and applicant's equipment operators. The plan was to simulate the proposed exploratory technique in the actual environment that the proposed exploration is proposed to take place. To document any environmental impacts, an NPS swamp buggy was to follow the vibroseis buggy and record progress by video and still photography.

Upon arrival at the site at the scheduled time, Preserve staff were informed that the vibroseis buggy had already begun its test run and had become stuck. The Preserve observers headed for the vehicle in an NPS swamp buggy, following the route the vibroseis buggy took until the observers came upon it stuck in a ditch that it had attempted to cross. While the NPS and applicants observers were there, attempts were made to pull the vehicle out with a 4x4 truck, but

to no avail. The equipment crew decided to call for heavy equipment from a nearby oil and gas production site to come pull the vehicle out. Since it would be later in the day before the vehicle could be freed, some of the observers returned to the trail head while the remaining observers remained behind to continue observing the test once the viborseis vehicle was pulled from the ditch.

Several hours passed before the vibroseis buggy was freed with the help of a tractor equipped with a back hoe and bucket provided by Whitten Equipment Company. Burnett representatives and their seismic exploration contractor (Dawson Geophysical) explained that under normal circumstances an accompanying vibroseis buggy would have pulled the buggy free. Once freed the buggy was capable of negotiating open and sparsely wooded habitat with little to no difficulty. However, the selected route was primarily along existing trails. Time expended on buggy retrieval reduced overall time available to test the equipment in some of the more challenging habitat that was scouted for testing. During testing Dawson Geophysical buggy operator stopped at various intervals and demonstrated full vibration sweeps.



The consensus from the observe group however is that:

1. The vehicle can negotiate turns up to a point, despite its articulation. At the trail head entrance gate, there was damage to a cypress tree and some rutting where the vehicle apparently could not make the turn as tightly as required and had to veer off the road.

2. There was damage to some cypress knees in the route the vehicle took, but it wasn't clear if this was caused by the Vibroseis or a UTV that had scouted the route prior to the test.
3. The grassy vegetation where the Vibroseis passed was mashed down, as were some tree saplings. This is to be expected, and the plants will likely recover in a few months. There was some rutting of the soil, but not significant, given the tire width and soil conditions.
4. The area where the vehicle was mired was significantly impacted from the vehicle and the attempts to free it.
5. In areas where the vibrator plate had been lowered to the ground and vibrated there was no appreciable effect on the ground.
6. The operator proceeding with the test run without the NPS present raises doubts as to their openness and ability to follow agreed-upon procedures.
7. This test was the operator's opportunity to prove their contention that the Vibroseis could operate in the BICY environment efficiently and without significant environmental impacts. The operator had plenty of time to plan to ensure that the test would be successful, and yet at the location where it became mired down, was clearly a failure.
8. The test only involved an extremely minute portion of the entire 110-square-mile proposed exploratory area. Extrapolating the impacts observed to multiple vehicles in a much larger area, suggests that the potential wetland impacts could be significant.
9. One purpose for this test was to inform what the unknown impacts for this new technology may be in the wetland environment. When the environmental impacts of an action are unknown, an EIS is usually required. If the test had shown that the impacts were not significant, and EA would be justified. Since the extrapolated impacts could be significant, an EIS may be warranted.
10. The operator's draft EA concluded there would be no impacts to wetlands or wilderness. The test clearly refutes this.
11. The operator's attempt to cross a cattail-choked ditch reveals their unfamiliarity with the wetland environment at BICY
12. The operator did not have a contingency plan for rescuing the viborseis vehicle in the event it became disabled, one had to be developed after the vehicle became stuck.
13. The diesel powered vibroseis buggy exhaust and noise appeared to be acceptable
14. The applicants representatives did not appear to have actually looked at or flown over the proposed survey area to determine if the machines could access it – they just presumed that their machines would work in the landscape.

Seismic exploration is an ever evolving technology where current program design trends make use of highly efficient geophones and advanced computer technology to acquire and process data. In years since the last seismic survey was conducted in Big Cypress in 1999, monumental leaps in technology have occurred that allow more distant recording of reflected energy waves from fewer source points if high density geophone arrays are configured in the typical 3D fashion. It is appropriate to consider use of the tested equipment resulting in the need for fewer source points to achieve the project goals.

Next Steps

NPS can work with the applicant to identify various habitats in the project area that must be avoided with the tested equipment and areas where the proposed equipment may be able to be used. Following public input from plan review, alternative, such as smaller equipment should be considered in the alternatives to that proposed in the Plan. The applicant will be required to provide specificity in determining how they will reach areas not accessible via vibroseis buggies.

On April 29, 2015, Dawson Geophysical provided a map that identified offset source locations that would serve as secondary vibration points when incapable of reaching selected points.

The following provides a description of the weight and dimensions of Dawson Geophysical vibroseis test buggy and the smaller "mini" vibroseis buggy that could be considered in addition to the test vibroseis buggy for use in the Preserve.

Vibroseis Truck Dimensions

Vibrator Large

Width = 11'6"

Length = 32'10"

Height = 11'4"

GVW = (Gross Vehicle Weight) = 67,100 lbs

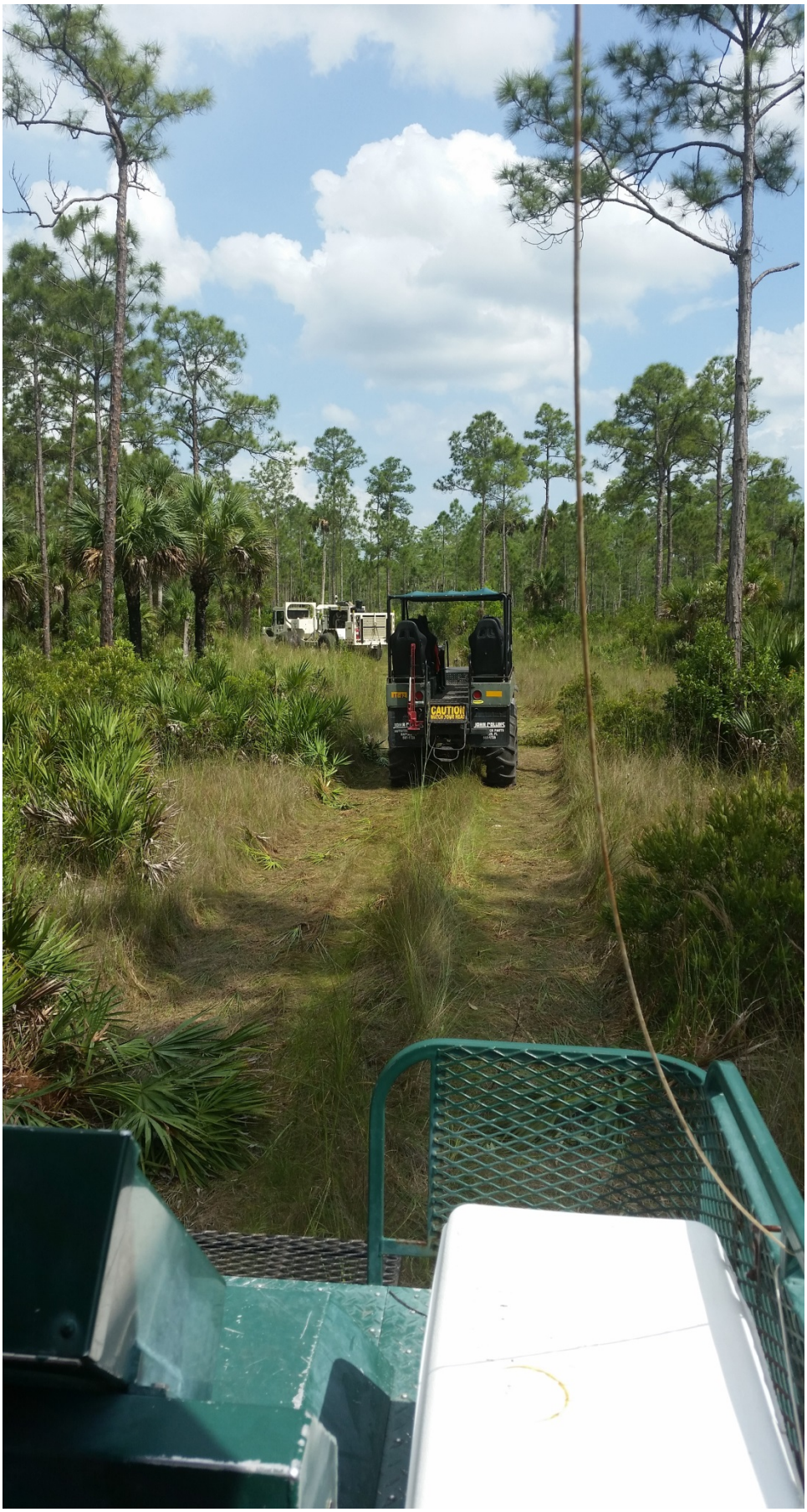
Vibrator (Small/Mini)

Width = 99"

Length = 238"

Height = 96"

GVW = (Gross Vehicle Weight) = 17,964 lbs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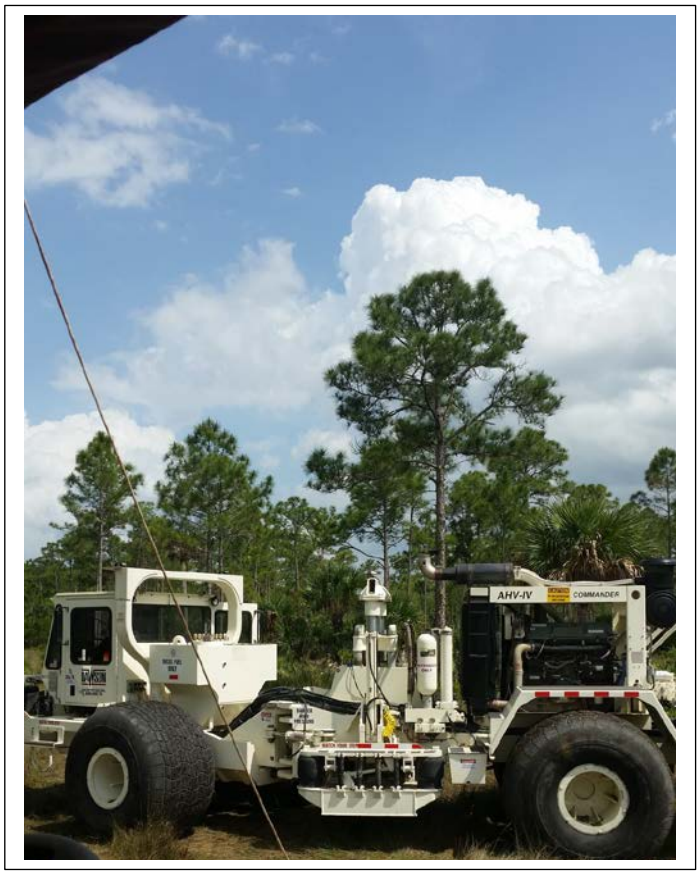
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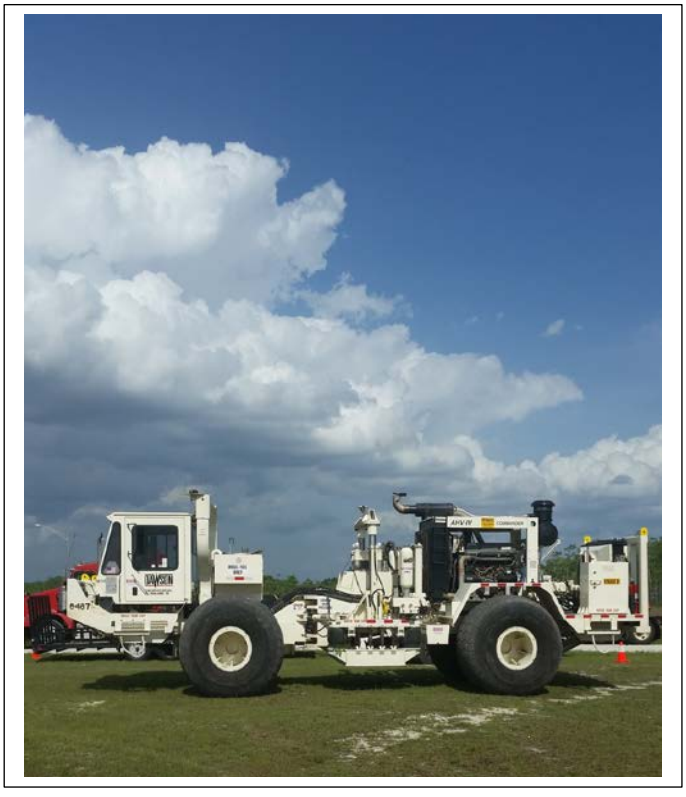
DAWSON