

**EXHIBIT “D”**



# E. J. DENNIS & ASSOCIATES INC.

*Consultant in the Care of Trees*

6826 Apona St.

Diamondhead, MS 39525

(228) 586-0033



**SUBJECT: Damage to Trees in Diamondhead, MS, Caused by Hurricane Katrina**

1. I, E.J. Dennis, am a resident of Diamondhead, MS.
2. On August 29, 2005, I was in Mobile, AL, during Hurricane Katrina. Early on the morning of August 30, 2005, I returned to Diamondhead, arriving by about 9:30 AM. While driving between Mobile and Diamondhead, on I-10 going West, I observed damage caused by Hurricane Katrina, the extent of such damage increasing measurably as I got closer to Diamondhead.
3. After arriving at Diamondhead I made an extensive tour of the area, including walking for a couple of miles through the South Side of Diamondhead. On that day, and since that time, I made numerous arboreal observations in the area of the South Side of Diamondhead, and which I interpret as follows.

The following observations pertain to the entire area of the South Side of Diamondhead.

- a. Observation: Many medium and large sized trees, especially pine trees, were broken off towards the tops of the trees, usually above the obvious high water mark. Some trees were broken off at levels that appeared to be below the obvious high water mark.

Conclusion: All of the trees I observed were broken by the force of high winds against the tree limbs and trunks. High winds exert varying, turbulent forces against both tree trunks and tree limbs. Winds usually are gusty, and can strike trees from varying directions, causing the trees to twist, and damaging cell tissue. Such twisting motion can result in failure of the trunk. For each specific tree, the point of breakage was at the weak point in the trunk, which can vary from tree to tree, and which can be a function of trunk and limb dimensions (girth of trunk and limbs, length and density of limbs), tree type (e.g. pine vs. oak), previous tree damage (e.g. from disease or fire), etc. In contrast to the destructive force of wind, it is well precedented that water flowing against tree trunks, which tends to be a steady force, usually will not break even a medium sized tree trunk.

- b. Observation: Some trees were felled at the base, showing exposed short, chopped, broken roots. I did not find even a single felled tree with exposed, long roots.

Conclusion: All of trees I observed fell as a result of root failure, not of soil failure. The short, chopped, broken roots indicate that the forces exerted on the trees was too strong for the roots, that the roots simply broke off and, without root support, the trees fell. The trees did not fall as a result of soil failure, i.e. they did not fall because water softened the ground. Such soil failure would result in felled trees having root balls consisting of long, unbroken roots. The absence of felled trees with long, unbroken roots indicates that soil failure, i.e. soil softened by water, was not a significant factor.

- c. Observation: Many trees were downed completely, having fallen in different directions. In some areas, almost every single tree had fallen, in haphazard directions. In other areas, the percentage of trees felled was lower.

Conclusion: The fact that the trees I observed had fallen in different directions indicated that the forces impinging on the trees had come from different directions. However, trees had been felled to all points of the compass. The logical explanation is that most of the trees had been felled by turbulent winds, coming from different directions. The fact that in some areas the percentage of tree felling was especially noticeably higher is consistent with local tornado-like winds.

- d. Observation: Some trees, still standing or felled, were obviously badly twisted.

Conclusion: In my forty (40) years of inspecting trees I have never seen any tree twisted by water surge. Flowing water exerts a constant pressure on trees, most often limited to forces exerted on tree trunks. But twisting originates at the tops of trees. Such twisting usually is caused by gusting and shifting winds, which can cause trees to repeatedly twist in one direction, then the other, until branches break off or the trunk deteriorates. I believe that the twisted trees I observed likely were destroyed by strong tornado-like winds, with a significant cyclonic component.



- e. Observation: Many trees were scarred, with bark stripped off of the trees, usually on one side. The scarring usually was high on the trees, but no higher than what has been established as the high water mark, i.e. the surge level. Many such trees still had debris (e.g. clothes) stuck in the branches at or below the level of scarring.

Conclusion: Scarring of the trees I observed was caused by floating debris, e.g. construction materials, furniture, and such, hitting the trees and thus knocking bark off of the trees. The scarring was mostly on one side, the side facing incoming water. The lack of scarring above the surge level indicates that scarring was a water-assisted event, not the result of wind.

- f. Observation: The morning after Hurricane Katrina I observed that the pine needles on many trees already were brown, shriveling, and dried out. Over the course of the next couple of weeks it was increasingly obvious that most needles on pine trees were dead, and that even trees still standing may not survive.

Conclusion: The dead pine needles I observed indicate destruction by wind, not by water and not by salt water. The fact that damage to the pine needles was obvious within a few hours indicates that destruction was the direct result of being pummeled by high winds. Many of the trees in question are located adjacent to salt water bodies and have grown from seedlings in a high salt environment, e.g. being peppered with salt water spray during frequent storms, which they tolerate. In fact, any damage from salt water, with a salt concentration high enough to destroy cell tissue and chlorophyll, would take quite some time (probably weeks). The salt water first would have to be absorbed through the root system and then conveyed throughout the vascular systems of the trees, a slow process. In contrast, pine needle damage was observed within hours. This is a well precedent phenomenon, which indicates that such damage can be caused by winds of 125 - 135 mph or greater.

- f. Observation: I found 6-8 instances of felled trees that were lying on the floor joists of the first floors of destroyed houses. In each case the trees were broken cleanly. The sides of the breaks were not twisted or broken off. And there was little or no debris trapped under, or tangled in, the portions of the tree trunks and branches that extended into the area of the former house.

Conclusion: The trees I observed fell onto the houses only after the houses were destroyed and the resulting debris gone. I found the trees in the positions they were in when they first fell. The trees did not fall on the



roofs of the houses but, rather, fell only after the roofs, and even upper floors, had gone. If the trees had fallen first on the roofs of the houses, and then subsequently the houses were blown or washed away from under the fallen trees, there would have been a dragging action exerted on the fallen trees, resulting in trunk twisting and side breakage. In fact, the breaks were clean, with no twisting, indicating that they had not been dragged. Moreover, the lack of debris tangled in trunk and branches indicates that the trees fell only after the debris already was gone.

- g. Observation: Two (2) large-diameter pine trees growing on an empty lot located adjacent to 316 Puunani Place, were downed, and had fallen across a small bayou. The bark on both trees was intact, with no sign of scarring.

Conclusion: The lack of bark scarring indicates that the trees were down before water surge arrived, before any debris carried by the surge could strike the trees. Thus, the two (2) trees were felled by the action of strong winds, before the water surge had arrived in the neighborhood.

4. All of my observations, considered together, lead me to conclude, in my opinion, as follows.
- a. Very high, turbulent winds, likely having sustained wind speeds of 125 - 135 mph or greater, pummeled the South Side of Diamondhead, resulting in, for the trees I observed:
- i. Trees felled in all directions by winds shifting in direction;
  - ii. Tops of trees broken off above the high water mark;
  - iii. Trees destroyed by twisting from turbulent, shifting winds;
  - iv. Tree needles killed by the action of very high speed winds; and
  - v. Trees felled onto the first floor joists of houses that already had been destroyed before the trees fell.
- b. Tree scarring, with bark ripped off, was caused by water-borne debris striking the trees.
- c. Many trees that were felled have no sign of bark scarring, indicating that they were felled before water surge arrived.

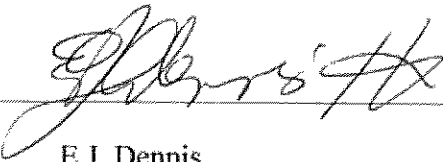


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Qualifications and Experience: I have forty years experience in the tree industry and nineteen years experience as an expert witness in arboriculture. I have been a licensed arborist in the State of Louisiana since 1967 (License Number 0011), am a member of the Louisiana Arborist Association, and a past member of the Louisiana Urban Forestry Council. I am a licensed arborist in the State of Mississippi (License Number LT557), and am a member of the Mississippi Arborist Association. I am Board certified from the American College of Forensic Examiners in Arboriculture (Certification Number 1133), and am a member of the American Society of Consulting Arborists (Certification Number 286).



E.J. Dennis  
6826 Apona Street  
Diamondhead, MS 39525  
TEL: 228-586-0033

Date: 2/25/06



**E. J. DENNIS & ASSOCIATES INC.**

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