RULES AND DIRECTIVES BRANCH USNRC

2008 APR 16 PM 1:33

Garry L. Morgan
130 Rome St.
Scottsboro, Al., 35769

RECEIVED

2/21/08
73FR 9604
21

Nuclear Regulatory Commission
Chief, Rules and Directive Branch
Division of Administrative Services, Office of Administrative Services
Washington, DC 20555-0001

Reference: Docket #'s: 52-014 and 52-015

Subject: April 3, 2008, Citizen Comment of Garry L. Morgan to Scoping Session, Environmental Impact Statement Bellefonte Nuclear Plant Units 3 and 4 *COL Application, Environmental Report Omission*

Dear Honorable Members of the Nuclear Regulatory Commission:

Upon reviewing TVA's COL Application for the Bellefonte Nuclear Plant Units 3 and 4, I have discovered what appears to be omissions in the Environmental Report. The omissions involve local geology and hydrology of the area. The omissions concern Chapter 2, Part 3, section 1 as it applies to Hydrogeology of the COL Application. Specifically, the application in the Environmental Impact statement fails to consider the effects of drought and seismic activity on the "Karst Terrain," sinkhole terrain, of the Bellefonte Site. The Bellefonte Site is a known and identified sink hole area. The area is susceptible to sink holes as demonstrated by Inclosure #1, USGS, 1977 Sink Hole Map of Jackson County, Inclosure 2-1 thru 2-7 describes the Karst Terrain, sinkhole process. This process may result in complete ground collapse. In the case of a Nuclear Reactor, this is an unacceptable consequence.

Sink Hole formation reported in TVA's Environmental Report page 2.3-27. The report states, "During dry periods (July and August 2006), a groundwater depression was observed adjacent to Town Creek to the northwest of Unit 3. This represents a depletion of the epikarst aquifer and slow drainage into the lower bedrock zone. During these times of low groundwater levels, some reversal of groundwater flow is apparent from Town Creek inland towards the depression, and some surface water recharge into the bedrock aquifer may result; however, the effect appears localized to the areas along Town Creek, and no influence on the groundwater beneath the area of installation for units 3 and 4 was observed. As precipitation events occur with greater frequency in September and the following fall and winter months, the epikarst refills and groundwater reestablishes the normal drainage pattern to Town Creek." This statement assumes ground water will

SONSI Review Complete
Template=ADM-013

E-RIDS=ADM-03
Add=M. Hood (mah2)

recharge the epikarst aquifer. What is the result if there is not a recharge of the epikarst aquifer as a result of drought, which is currently ongoing? The result may be ground collapse as demonstrated in Inclosures 2.The TVA does not address this issue in their Environmental Report.

TVA's Environmental Report, Part 3, Hydrogeology, fails to consider historical maps of the area which clearly reflect sinkhole formation on and near the plant site, Inclosures 3-1 thru 4. The word Bellefonte means "beautiful spring.." The Environmental Report on page 2.3-24 states, "No springs were observed in the vicinity of BLN with the exception of small, seasonal and wet weather seeps with no measurable flow." On Inclosure 3-1 the historical "Bellefonte Spring" may be seen about 100 yards west southwest of the Hansbrough Cemetery and outlined in blue on inclosure.3-1 and 3-3, less than 1 mile from the plant site.

On page 2.3-23, Regional Hydrogeology, the Environmental Report states the aquifer systems of the area reflect a flow which "yields 10-50 gallons per minute, gpm, of water. Inclosure 4, 1989 Geological Survey of Alabama, Groundwater Availability Map of Jackson County reflects yields of 50-500 gpm.

In the COL Application, Part 3, Environmental Report there is no mention of seismic activity and its effects on the "Karst Terrain." Immediately east of the Nuclear Plant is a ridge called River Ridge. River Ridge is a minor fault area. Inclosure 5-1 and 5-2 describes seismic activity in Alabama. If you will notice on the map at Inclosure 5-2 there are several minor earthquakes that have been historically recorded. Earthquake effects on the Karst Terrain have not been discussed in the Environmental Report.

Summary: The TVA's COL Application, Chapter 2, Part 3 as it relates to the Hydrogeology of the Nuclear Plant site is not complete. The application does not discuss or consider the effects of drought and/or seismic activity on the Karst Terrain, sinkhole terrain, of the area which the proposed Nuclear Plant will be built. This terrain area displays physical characteristics which are unsuitable for a Nuclear Power Plant as it creates an unacceptable level of risk not discussed in the application. On this basis I am requesting TVA's COL Application be denied for the Bellefonte site.

Regards,

Garry L. Morgan

Garry L. Morgan

5 Inclosures as stated with index

INCLOSURE INDEX

1. Jackson County Sink Hole Map, USGS, 1977, University of Alabama Historical Maps
http://alabamamaps.ua.edu/historicalmaps/counties/jackson/jackson.html

2-1 thru 2-7. State of Alabama Geologic Hazards Program, Sinkholes
http://www.gsa.al.us/gsa/geologichazards/sinkholes/sinks2.html

3-1 thru 3-4. Maps,3-1 and 3-3: Hollywood 1970 Historical Topography, 7.5 min
http://alabamamaps.ua.edu/historicalmaps/counties/jackson/jackson.html ;
3-2 Google aerial photo of Bellefonte Site; 3-4 TVA COL Application, Environmental Report Figure1.1-4 Topography and Site Plan

4. 1989 Jackson County Ground Water Availability Map
http://alabamamaps.ua.edu/historicalmaps/counties/jackson/jackson.html

5-1 thru 5-2 State of Alabama Geologic Hazards Program, Earthquake article and 5-2 earthquake incident map.
http://www.gsa.state.al.us/gsa/geologicalhazards/earthquakes/equinal.html

grey area indicates sink hole zones

X + black areas indicate known sink holes as of 1977

sink hole map Jackson Co. AL.

USGS-1977

Incl #1

geological **hazards** program

EARTHQUAKES | LANDSLIDES | SINKHOLES & SUBSIDENCE | RADON

SINKHOLES & SUBSIDENCE

Sinkholes and Subsidence in Alabama

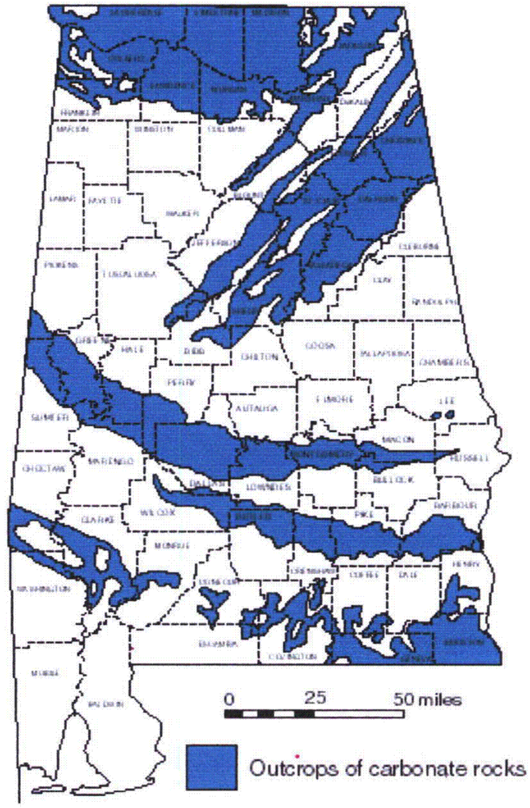
Back to Main Page

USGS Sinkholes

Large parts of Alabama are underlain by carbonate rocks, such as limestone and dolomite, which are susceptible to solution in our humid southern climate. Movement of ground water along joints and fractures in these soluble rocks results in solution of the rocks and the development of cavities or openings in the rock. A prerequisite for subsidence is the presence of underground openings in rocks or unconsolidated materials. Cavities may form naturally or they may be manmade. The most significant cavities in terms of subsidence in Alabama are solution cavities in carbonate rock terrains, although there are known instances of sinkholes forming over abandoned mines.

Areas in Alabama underlain by carbonate rocks and characterized by the presence of subsurface cavities, sinkholes, and underground drainage are called "karst terrains." It is these karst areas that are most susceptible to sinkhole development and subsidence.

Inclosure 2-1



Distribution of Limestone Outcrops in Alabama

MECHANISMS OF SUBSIDENCE

In Alabama, most sinkholes are caused by a loss of support, roof collapse, and/or raveling.

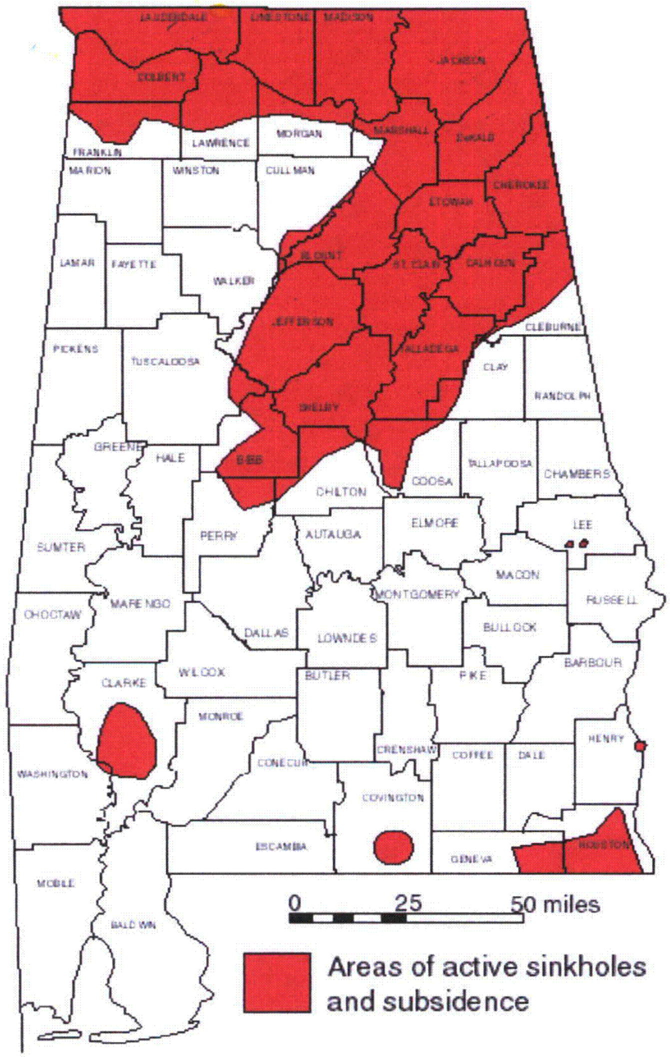
Loss of Support	Ground water provides buoyant support to the roofs of subsurface cavities. Lowering the water table removes this support and may result in the collapse of the roof of the subsurface cavity.
Collapse of Unsupported Openings	The collapse of an unsupported opening results from the enlargement of the opening beyond the ability of the materials above to bridge it.
Raveling	Raveling or piping is the slow erosion of unconsolidated sediments into an underground opening.

Incl 2-2

The sinkhole above formed by raveling in Hale County in 1990. An oil and gas drill rig had reached a depth of 755 feet when the drilling fluid was lost in the hole. In a period of 2 hours unconsolidated sediments overlying the karstic Knox Group carbonates had moved downward into subsurface cavities in the Knox, carrying the drill rig downward with them. The weight of the fluids in the adjacent mudpit facilitated the rapid downward movement of the sediments. Another well was drilled successfully across the road to a total depth of 12,000 feet.

Areas of Active Sinkholes in Alabama

Incl 2-3



TRIGGERING MECHANISM

A change in the local environment affecting the soil mass initiates sinkhole collapses and subsidences. This change is called the "triggering mechanism." Water, either surface or ground water, is generally the most important agent effecting environmental changes that cause subsidence.

Triggering mechanisms for subsidence include:

1. **Water level decline**

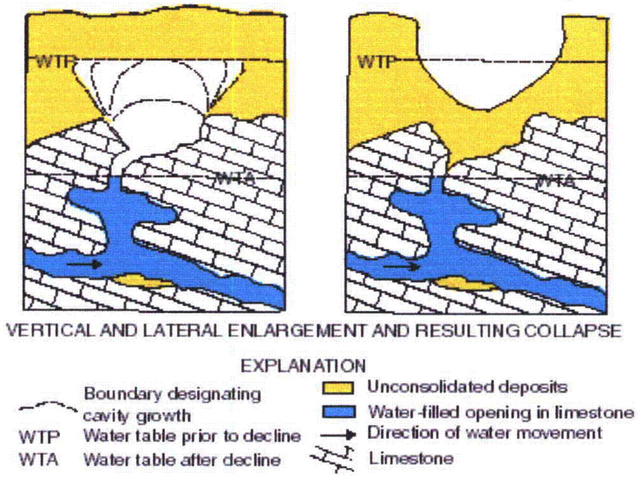
2. **Changes in ground-water flow**

Dud 2-4

3. **Increased loading**

4. Deterioration (relates to abandoned coal mines).

Water-level decline



(Source: Alabama Highway Department)

Lowering water levels is one of the most significant triggering mechanisms for subsidence in a karst terrain. Water-level decline may occur naturally or be induced by man. Factors leading to a decline in water levels include:

1. Pumpage of water from wells,

2. Localized drainage from construction,

3. Dewatering from mining, and

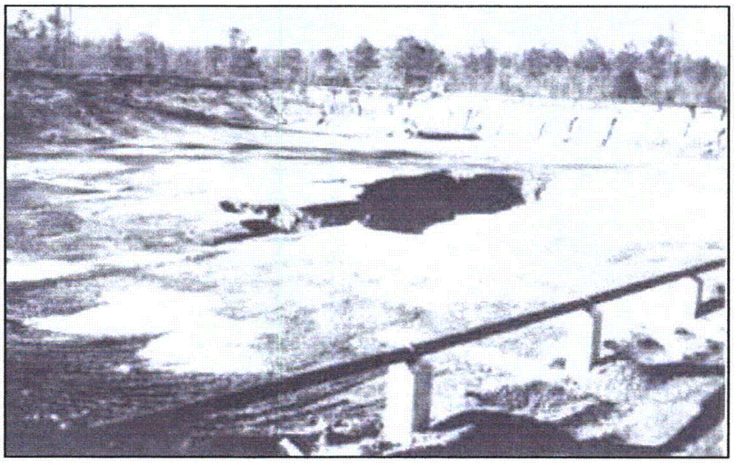
4. Periods of drought.

Changes in ground-water flow

Changes in ground-water movement can initiate subsidence. These changes include an increase in velocity of ground-water movement, an increase in the amplitude or frequency of water-table fluctuations, increased or induced recharge, and induced differences in hydrostatic head between two aquifers or an aquifer and an impoundment.

Incl I-5

Sinkhole caused by rerouting of surface drainage



Sinkhole in bottom of lagoon

Construction of an impoundment provides a source of recharge to water-table aquifers, thus raising the water table beneath the impoundment. This increased head causes water to move downward into underlying openings and may result in downward movement of sediment and failure of the impoundment.

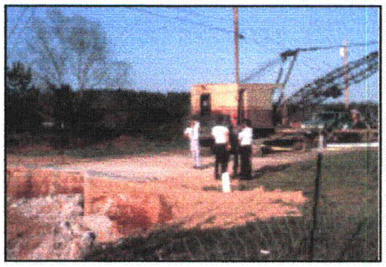
Incl 2-6

Increased Loading

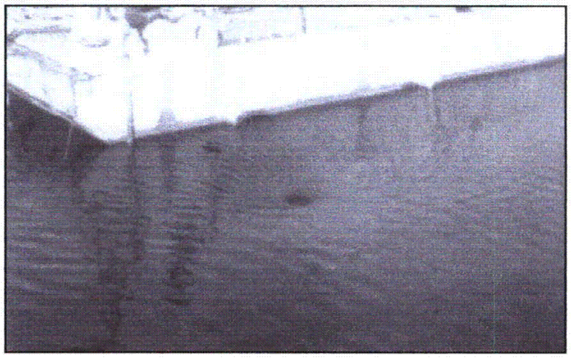
Increased loading on the surface increases stresses in the soil and rock surrounding an underground cavity and may lead to failure. Dynamic load, such as shock and vibration induced by an earthquake, vibrating machinery, and blasting, may induce structural collapse followed by surface settlement or flow in the form of quicksand.

Sinkhole caused by vibration of traffic on highway.

Sinkhole caused by induced head from oil and gas well drilling.



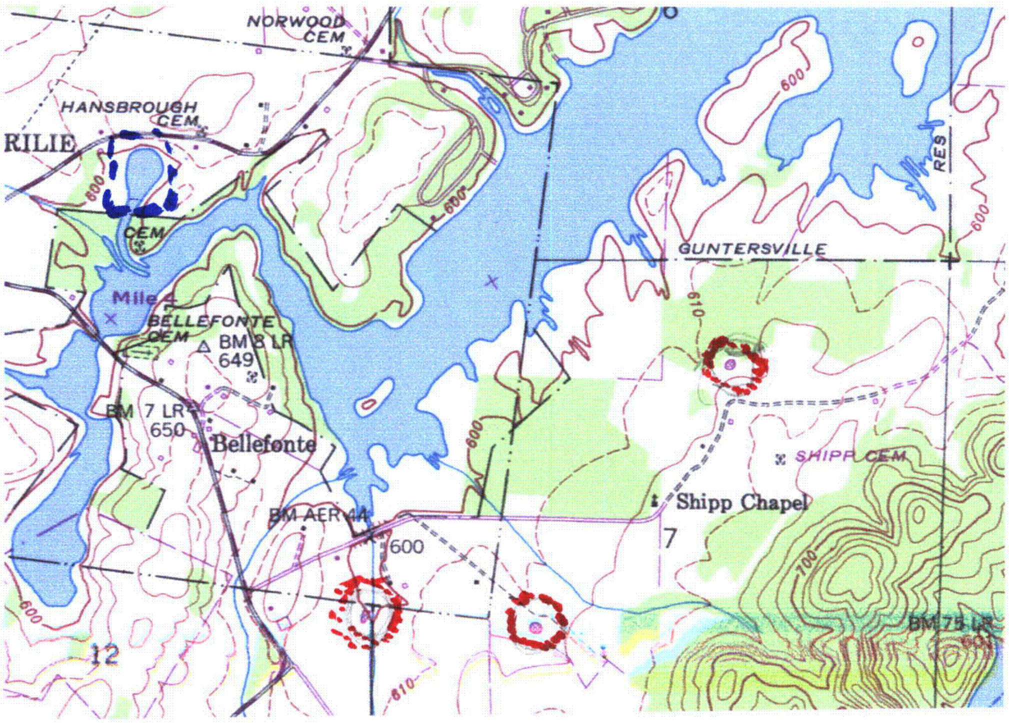
Sinkhole caused by vibration of cars on city street in Birmingham, Alabama.



Whirlpool caused by downward movement of water into sinkhole behind Logan Martin Lake Dam. Leakage results from increased head and loading.

(Source: Jim Redwine)

Incl 2-7



Sinkhole

- Historic Bellefonte Spring

Hollywood, Al 1947, Photorevised 1970
1:24,000 USGS/TVA Topo Map

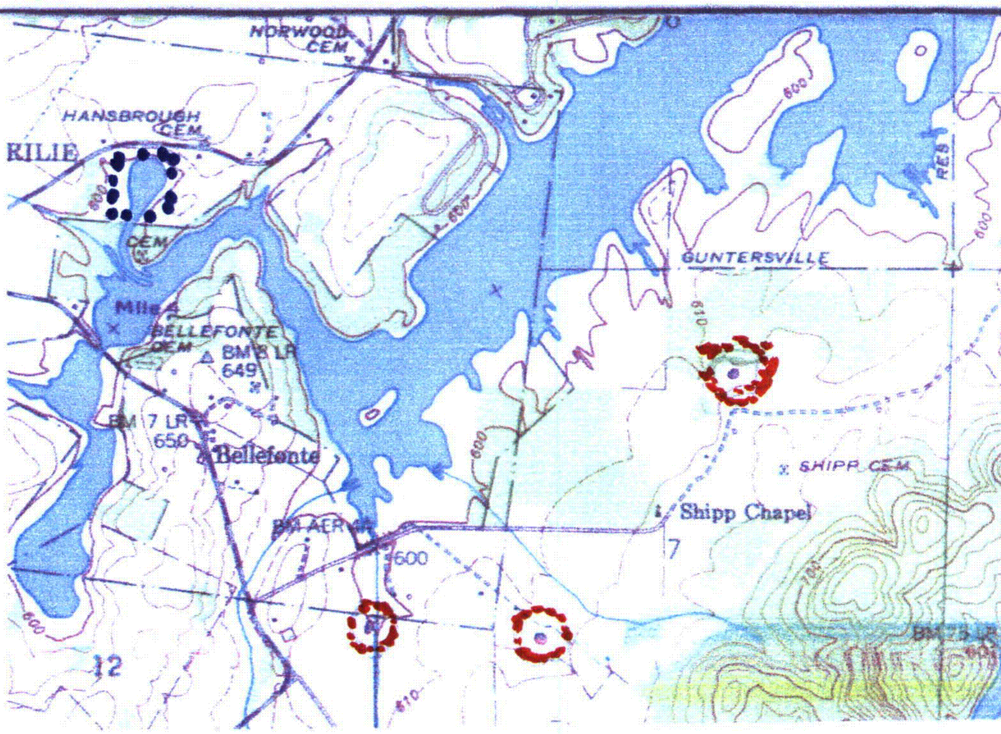
http: alabamamaps. ua. edu/historical/maps/topos/jackson 75min.html

Enclosure 3-1

Historic Sinkholes on 1970 Topo map

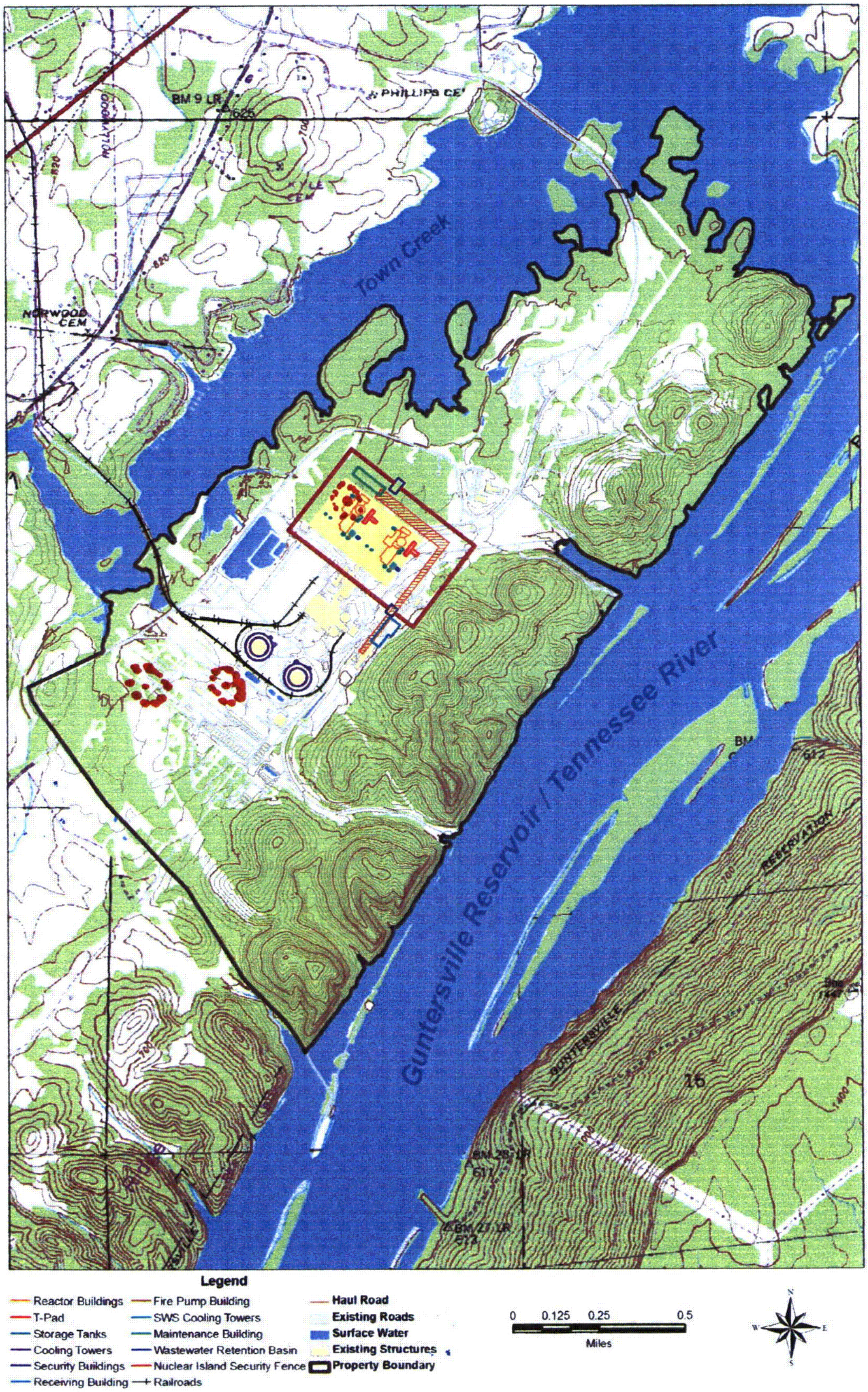
Def 3-2

Google Maps



— Historic Sinkholes_ 1920 map. - Historic Bellefonte Spring

Encl 3-3

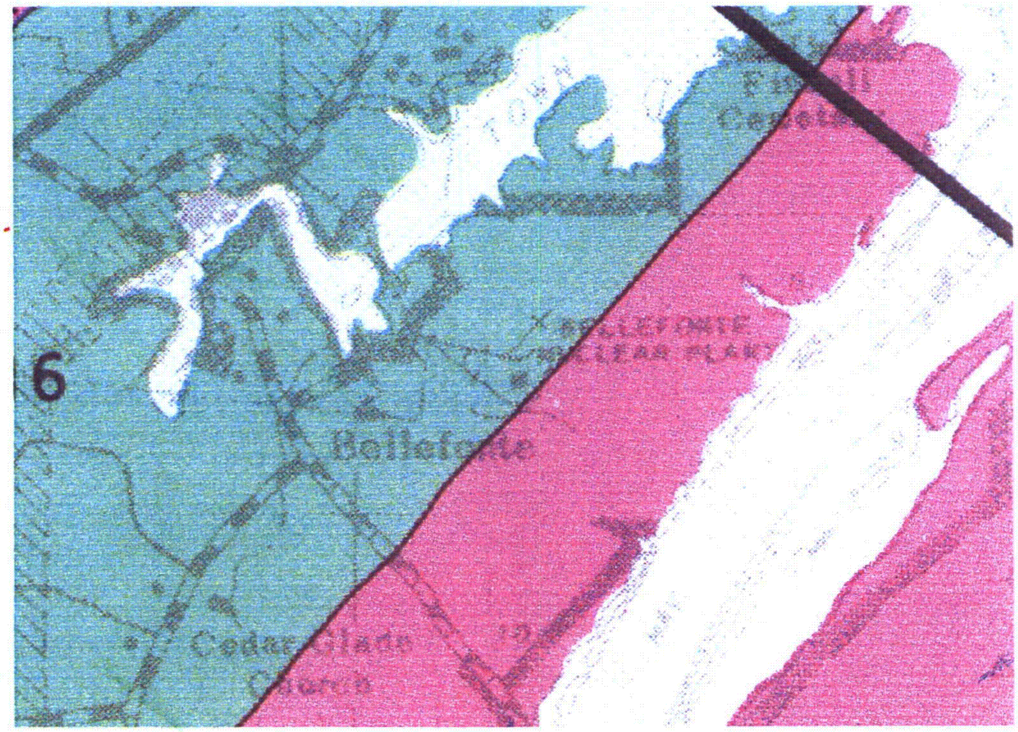


-Historic Sinkholes as identified on 1970 Topomap.

FIGURE 1.1-4
Topography and Site Plan

Encl 3-4

GREEN ~~30~~ up to 500 gpm water bearing limestone & dolomites



GROUND WATER AVAILIBILITY MAP of JACKSON Co AL
1989 Geologic Survey of Alabama.

Inclosure H

geologic **hazards** program

EARTHQUAKES LANDSLIDES SINKHOLES & SUBSIDENCE RADON

EARTHQUAKES IN ALABAMA

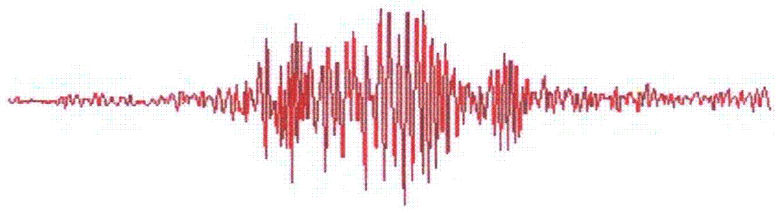
Tell Me About Earthquakes
- Fault
- Plate Tectonics
- Size
- Hazards
- Myths

Earthquakes & Alabama
- Seismic Zones
- Historic Earthquakes
- Recent Earthquakes
- Seismic Station

Earthquake Information
- Earthquake Education
- Earthquake Preparedness
- Earthquake Links

Alabama Joins CUSEC

HISTORIC EARTHQUAKES IN ALABAMA



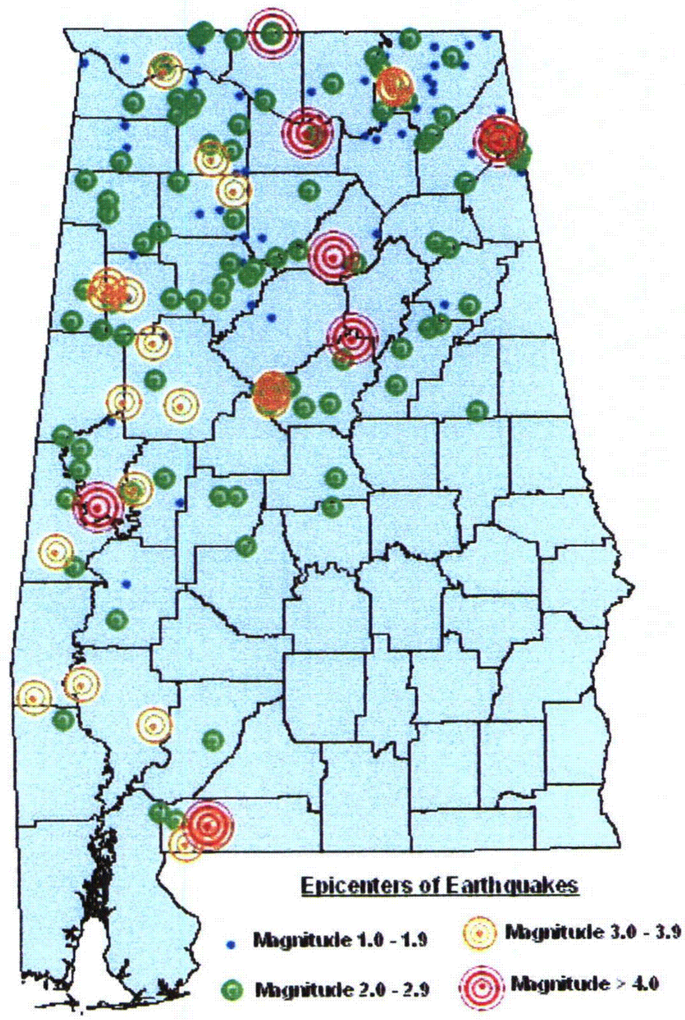
Seismogram of October 24, 1997, Escambia County, Alabama Earthquake

Earthquakes with epicenters in Alabama have been recorded throughout most of the state. Recent seismograph records indicate that earthquakes are more frequent than records indicate, but they are often not strong enough to be felt by people on the land surface. Although an earthquake can occur anywhere at anytime in Alabama, most are likely to do little or no damage.

The largest known earthquake in Alabama happened October 1916 in northern Shelby County. Intensity was VII on the Modified Mercalli Scale, indicating a strong earthquake. The largest instrumentally recorded earthquake had a magnitude of 4.9 on October 24, 1997, in **Escambia** County. Another earthquake of the same magnitude occurred April 29, 2003, near **Fort Payne** in DeKalb County.

The map below shows the epicenters of earthquakes recorded in Alabama since 1886. A table of **Earthquakes in Alabama** provides information on the location and effects of earthquakes in the state.

Enclosure 5-1



Enclosure 5-2