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Notice of Public Workshop on a Potential Rulemaking for Safe Disposal of Unique Waste Streams Including Significant Quantities of Depleted Uranium

Comment On: NRC-2009-0257-0001
Public Workshop: Potential Rulemaking for Safe Disposal of Unique Waste Streams Including Significant Quantities of Depleted Uranium

Document: NRC-2009-0257-DRAFT-0005
Comment on FR Doc # N/A

Submitter Information

Name: phillip barr
Organization: private citizen

General Comment

i dont think the andrews county texas nuclear waste dump should be used for disposal of any kind of nuclear or hazardous waste.
because of the earthquake history and sinkhole history the area has. and its over the aquifer as well

All information below has been placed in public domain

Attachments

NRC-2009-0257-DRAFT-0005.1: Comment on FR Doc # N/A
NRC-2009-0257-DRAFT-0005.2: Comment on FR Doc # N/A

SUNSI Review Complete
Template = ADM-013

E-RIDS = ADM-03
Add: C. Grassman (cjg2)
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----- Original Message -----
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Sent: Thursday, August 20, 2009 6:18 PM
Subject: consolidated comment on storage safety at andrews county Texas waste site nb1

Its my belief that the geology at the Andrews county TX waste site area is not stable enough for a nuclear/pcb/Mercury storage site.
1. I submit these news reports on the sinkhole activity in the area..
Sinkholes north and south of the nuclear waste site at Andrews county Texas and the waste site area itself has an earthquake history that's on record.
2. Earthquake study 12a,12b, 12w-a on record.

The state of Texas and federal government's safety analysis on the andrews county dump is hypothetical at best because :
The State of Texas and the Nrc, EPA and Doe can not guarantee there will not be another earthquake at the Andrews county Texas waste site which would endanger the aquifer which is under the site as determined by the epa:
==========
News quote "But David Barry, spokesperson for the Environmental Protection Agency for Region 6 says, "Yes, the facility does sit above the Ogallala aquifer. It sits on the southern end of the aquifer."
==========
The state of Texas, EPA,NRC,DOE also cannot guarantee that in an area with sinkholes, one would not form under the waste site.
High winds and sandstorms blowing toxic particles offsite and over Eunice and Hobbs. There is no way to prevent this and at no time has any government agency demonstrated to the public how to do so.

I believe for the Federal Government and the State of Texas to open up a waste dump for anything toxic at the andrews county nuclear waste site with this sinkhole and earthquake history is highly irresponsible and a disaster waiting to happen.

Phillip Barr
Lea county, New Mexico

Yoakum county north of the site
http://www.newswest9.com/Global/story.asp?S=10811930

Giant Sinkhole Opens Near Denver City

Posted: July 29, 2009 11:43 AM MDT

DENVER CITY - Investigators from the Texas Railroad Commission spent Tuesday trying to figure out why land at a Denver City oil company caved-in.

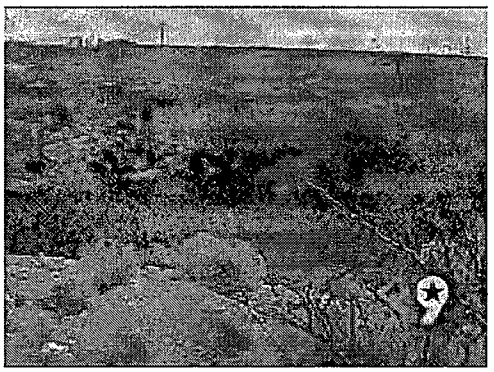
The sinkhole appeared just on the edge of Denver City on the Oxy site. Officials tell us no one was hurt and no water or power lines were damaged.

The hole drops 50 feet and is 60 feet around.

Winkler county south of the site

http://www.kwes.com/Global/story.asp?S=7936458
or www.kwes.com/Global/story.asp?S=7936458

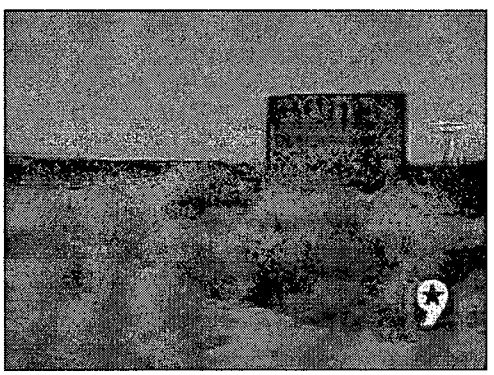
Wink Sink Study Needs Funding



by Victor Lopez
NewsWest 9

WINKLER CO.-Local oil and gas producer, John Bell believes, "We need to be cautious about where it is and the understanding on how much area it could affect."

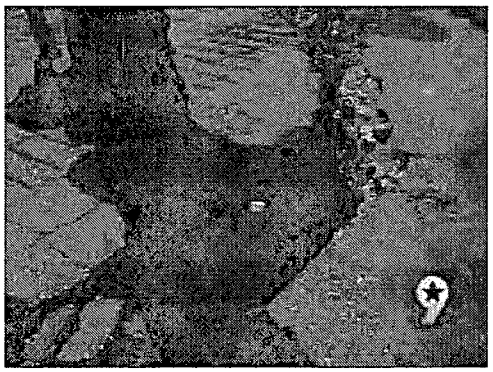
Whether you call it, the Kermit Crater or the Wink Sink, residents say it's all the same place.



It measures approximately 300 feet across. Now, it appears to be multiplying. And the newest member of the family is getting bigger.

According to Bell, "There is a new sink hole that is six or seven times larger than this one, that has occurred in the last three years."

The area around what is being called "Wink Sink 2", is still very unstable. And it's the size of a 15 acre lake.



Random cracks in and around the sink holes are creating concern for safety and well being in Winkler County.

That's why John Bell is asking for support for "The Wink Sink Study", or as he calls it, a large scale science project, "Right now, anything we're doing is personal theories. We have to come up with some science. This is just a big science project to help us understand, how do we deal with it, and what do we to avoid somebody having a catastrophe that we don't see, and get somebody hurt or killed."

Phase one of the study calls for about $730 thousand dollars in funding, 200 thousand of which has already been raised. Leaving a balance of about 1/2 a million dollars left to collect.

Dr. Bob Trentham, Director of CEED, at UTPB, tells NewsWest 9, The money will help provide some pretty high tech study tools, "We are going to be using several state of the art techniques, various types of radar and arial photos."

Since the new cracks and sags are popping up pretty much all over, the images these study tools will provide, will be invaluable.

Trentham says, "We need to know where these are going to potentially develop in the future so that we can help both the oil companies and the public service people to know where the areas with lowest risks and the highest risks are."

The growing threat of these cracks not only affects Winkler County, but other parts of the Permian Basin and even New Mexico.

Bell added, "This thing is large enough in scope, it extends past Monahans on down towards Imperial. We know that this is going to get bigger than we are. There is one at Jal, between Jal and Eunice, New Mexico."

Thus increasing the urgency of the study.

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Subject: consolidated comment on storage safety at andrews county Texas waste site nb1
Date: Thu, 20 Aug 2009 18:18:50 -0600
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Seal-Send-Time: Thu, 20 Aug 2009 18:18:50 -0600

EARTHQUAKE SEISMOLOGY

EARTHQUAKES

Chapter 12 of, *State of Texas Hazards Analysis*, by the Governor's Division of Emergency Management, Department of Public Safety, Austin, Texas, 1998.

Introduction: Earthquakes in Texas

An earthquake is a motion or trembling that occurs when there is a sudden breaking or shifting of rock material beneath the earth's surface. This breaking or shifting produces elastic waves which travel at the speed of sound in rock. These waves may be felt or produce damage far away from the epicenter-the point on the earth's surface above where the breaking or shifting actually occurred.

For Texans, three essential facts about earthquakes are important to remember. First, earthquakes do occur in Texas (see Figure 12A). Within the twentieth century there have been more than 100 earthquakes large enough to be felt; their epicenters occur in 40 of Texas's 257 counties. Four of these earthquakes have had magnitudes between 5 and 6, making them large enough to be felt over a wide area and produce significant damage near their epicenters.

Second, in four regions within Texas there have been historical earthquakes which indicate potential earthquake hazard (Figure 12B). Two regions, near El Paso and in the Panhandle, should expect earthquakes with magnitudes of about 5.5-6.0 to occur every 50-100 years, and even larger earthquakes are possible. In northeastern Texas the greatest hazard is from very large earthquakes (magnitude 7 or above) which might occur outside of Texas, particularly in Oklahoma or Missouri-Tennessee. In south-central Texas the hazard is generally low, but residents should be aware that small earthquakes can occur there, including some which are triggered by oil or gas production. Elsewhere in Texas, earthquakes are exceedingly

are. However, the hazard level is not zero anywhere in Texas; small earthquakes are possible almost anywhere, and all regions face possible ill effects from very large, distant earthquakes

Third, while Texas does face some earthquake hazard, this hazard is very small in comparison to that in many other states, including California, Missouri, Montana, South Carolina, and Washington (Figure 12C). In most parts of Texas earthquake hazard is also small compared to the hazard attributable from other natural phenomena, such as hurricanes, tornadoes, and floods. Thus there is no need for Texas to enact sweeping changes in construction practices, or take other drastic measures to mitigate earthquake hazard.

However, Texans need to begin learning about earthquakes. Over the past 70 years Texas has changed from a sparsely populated state with an economy dominated by agriculture to an economically diverse state with various large, technical manufacturing industries centered in a few densely populated urban regions. For reasons of safety, economy, and (in some cases) law, Texans need to consider earthquake hazard when designing or siting various structures which are essential for providing medical or emergency management services, which house sensitive manufacturing processes, or which store hazardous wastes.

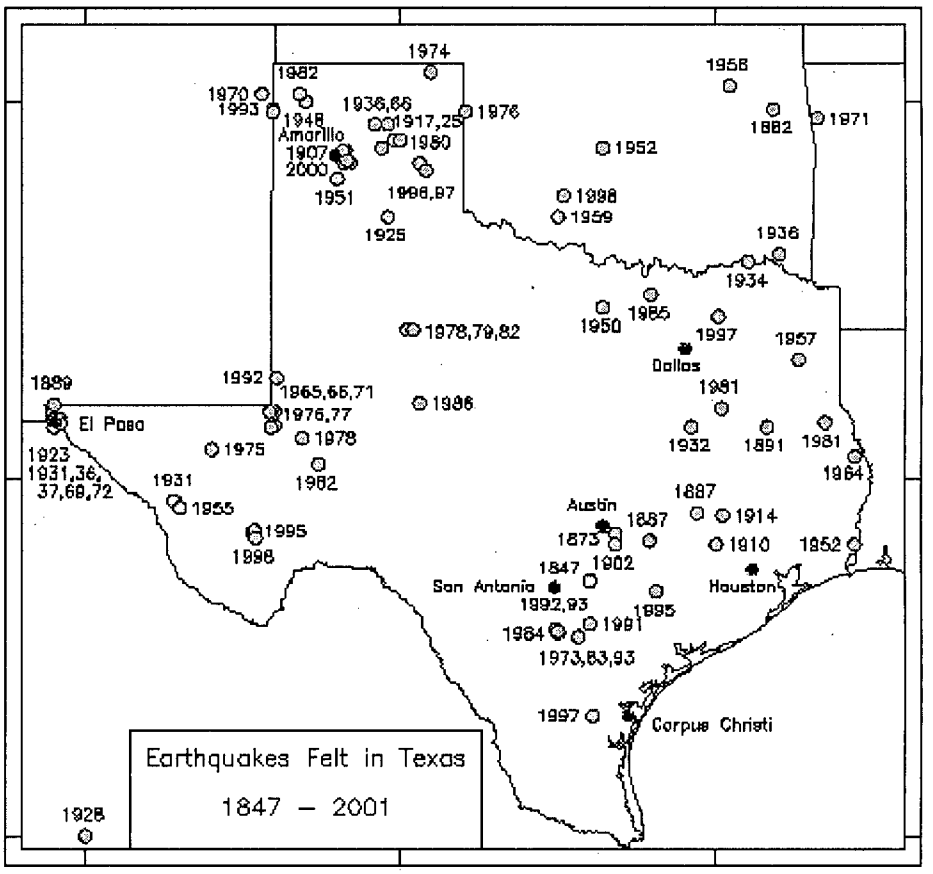


Figure 12A Locations of earthquakes and earthquake sequences that have occurred in Texas, or that were felt by Texas residents. Numbers are the year of occurrence. (See a larger version of this figure.)

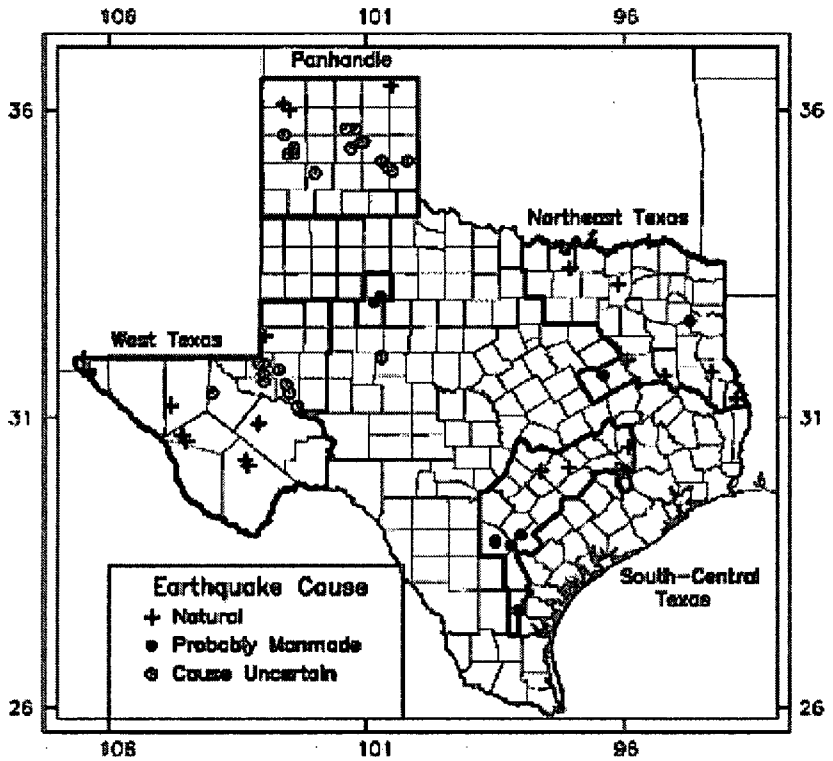


Figure 12B Map indicating probable causes of eartthquakes occurring in Texas. Solid lines show the four regions of Texas where historical earthquake activity indicates there is earthquake hazard. Light lines are county boundaries.

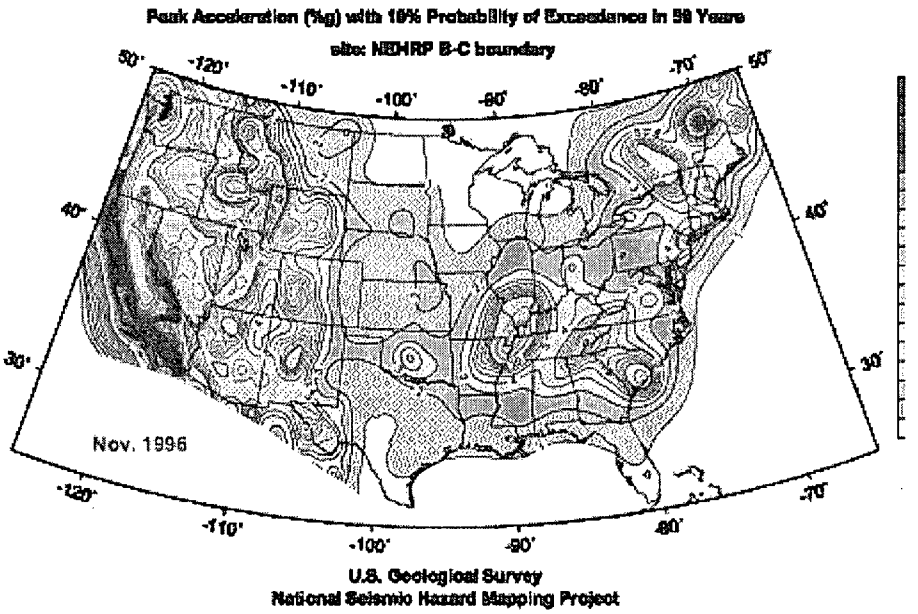


Figure 12C Earthquake hazard map for the continental United States as prepared by the U. S. Geological Survey. In the central and eastern U. S., the regions expecting the highest accelerations all correspond to the sites of known historical earthquakes. These include: Montana, 1959; West Texas, 1931; Oklahoma, 1952; Missouri-Tennessee, 1811-1812; and South Carolina, 1886. In many places such as Texas, the absence of detailed historical information means that earthquake hazard may be higher than indicated in this figure.

Earthquake Magnitude, Intensity, and Damage

The nature and geographical extent of earthquake hazard depends strongly on the quake's size or magnitude. Because earthquakes are rare, people are often confused about how risk depends on magnitude. Imagine that you were about to return from a vacation, and someone told you that animals had infested your property. Naturally, you would ask whether these animal were mice, armadillos, or cattle, because each might cause a different kind and amount of damage. Similarly, if your neighborhood has an earthquake, the kind and amount of damage depends on the earthquake's size. A quake with magnitude 3 may do no more than startle people and rattle dishes within a one-square-mile region. However, a magnitude 7

would be felt by people over the entire state of Texas, and could do significant damage to buildings, bridges, and dams over a considerable region.

Scientists determine an earthquake's magnitude by measuring the amplitude of ground motion as recorded on a seismograph, and then correcting the measurement to account for the effects of distance from the epicenter. The magnitude scale is a power of ten' scale; thus if a magnitude 3.8 caused ground motion of 1/10 inch at a particular location, a 4.8 at the same epicenter would cause ground motion of 1 inch, and a 5.8 would cause ground motion of 10 inches. This means that magnitude 3 and magnitude 7 earthquakes are enormously different with respect to their ground motion and the size of and slip on the faults that produce them.

Scientists use the Modified Mercalli intensity (MMI) to describe how strong the motion is at a particular location. The MMI is a number between one and twelve, expressed as a Roman numeral such as MMI IV or MMI IX so that the number won't be confused with magnitude (see Figures 12D and 12E). While each earthquake has only one magnitude, it has many different intensities, since earthquake damage becomes less severe as one moves away from the epicenter. Usually, most of the damage done by an earthquake occurs in the regions nearest the epicenter which have the highest intensities. While intensity depends strongly on factors such as soil properties, in most cases earthquakes with larger magnitudes have higher maximum intensities (see Figure 12F).

Because damaging earthquakes are rare in Texas, it is tempting to ignore them. A more responsible approach is to be selective about mitigation efforts, focusing attention on structures or areas where potential hazard is greatest. The argument for earthquake mitigation is analogous to the argument for having seatbelts and airbags in automobiles-although any one driver is unlikely to have an accident in any given day or year, over a person's lifetime there is a significant chance of having a serious accident. Even in West Texas and the Panhandle, at any particular place damaging earthquakes probably occur only once per century, or less. However, with a little prior planning it is possible to ensure that their damage is minimal.

Earthquake felt intensity - the Modified Mercalli Intensity Scale

MMI	What people feel, or what damage occurs.
I	Not felt except by a very few people under special conditions. Detected mostly by instruments.
II.	Felt by a few people, especially those on the upper floors of buildings. Suspended objects may swing.
III.	Felt noticeably indoors. Standing automobiles may rock slightly.
IV.	Felt by many people indoors, by a few outdoors. At night, some people are awakened. Dishes, windows, and doors rattle.
V.	Felt by nearly everyone. Many people are awakened. Some dishes and windows are broken. Unstable objects are overturned.
VI.	Felt by everyone. Many people become frightened and run outdoors. Some heavy furniture is moved. Some plaster falls.
VII.	Most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.
VIII.	Damage is slight in specially designed structures, considerable in ordinary buildings, great in poorly built structures. Heavy furniture is overturned.
IX.	Damage is considerable in specially designed buildings. Buildings shift from their foundations and partly collapse. Underground pipes are broken.
X.	Some well-built wooden structures are destroyed. Most masonry structures are destroyed. The ground is badly cracked. Considerable landslides occur on steep slopes.

XI. Few, if any, masonry structures remain standing. Rails are bent. Broad fissures appear in the ground.

XII. Virtually total destruction. Waves are seen on the ground surface. Objects are thrown into the air.

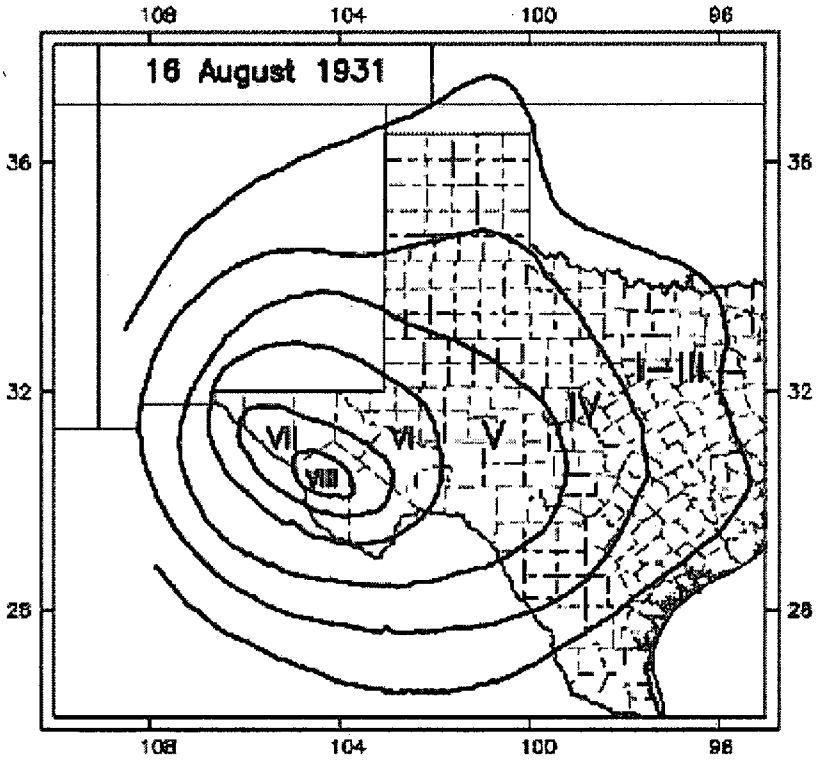


Figure 12D Felt area and Modified Mercalli Intensities experienced by Texans from the magnitude 6.0 Valentine, Texas, earthquake of 16 August, 1931. Dashed lines are county boundaries; small square in south-central Texas indicates region mapped in next figure.

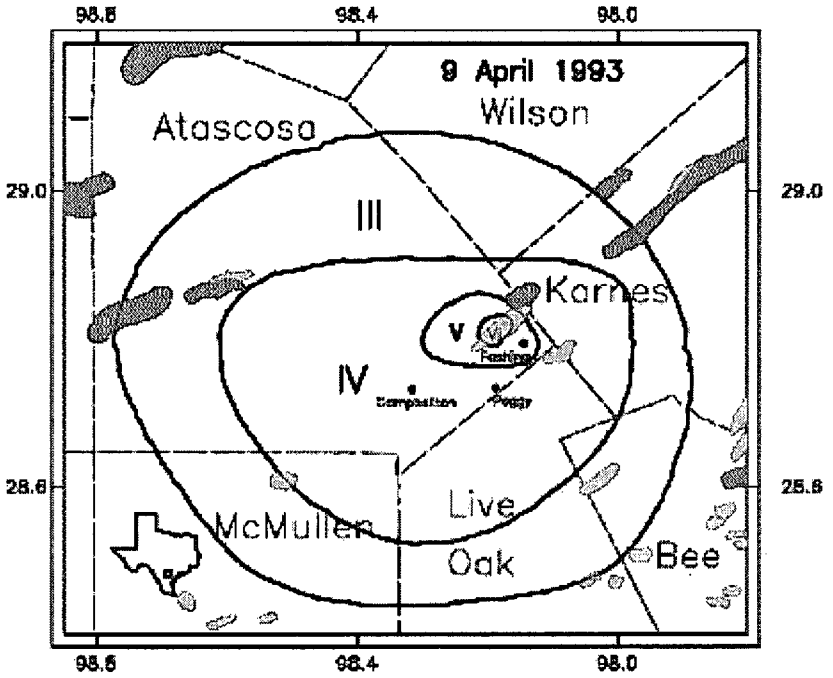


Figure 12E: Felt area and Modified Mercallli Intensities experienced by Texans from the magnitude 4.3 Fashing, Texas, earthquake of 9 April 1993. Dashed lines are county boundaries; shaded regions indicate major oil (dark shading) and gas (light shading) fields. Note how this small earthquake is felt over a much smaller area than the 1931 magnitude 6.0 Valentine earthquake.

Figure 12F

Relationship Between Earthquake Magnitude and Maximum Observed Modified Mercalli Intensity (MMI).

Magnitude	Maximum MMI
3.0	III-IV
3.5	IV-V
4.0	V-VI
4.5	V-VI
5.0	VI
5.5	VI-VII
6.0	VIII

Note that the table values are only approximate, as there is great variation for individual Texas earthquakes.

Approximate Relationship Between Earthquake's Magnitude and the Diameter of and Slip Along the Fault that Produces It.

Magnitude	Fault Diameter	Fault Slip
8	45 miles	20 feet
7	15 miles	7 feet
6	4.5 miles	2 feet
5	1.5 miles	8 inches
4	800 yards	2.5 inches
3	800 feet	1 inch
2	240 feet	.25 inch
1	80 feet	.1 inch

The Cause of Earthquakes

Just as changes in temperature or moisture content can produce cracks in the ground, various ongoing natural processes produce stresses that occasionally cause the underlying rock material to break or shift in an earthquake. Rock material is most likely to break where it is highly stressed or where it has broken before, as along a preexisting fault. Earthquakes are most common along very large, well-developed faults (such as the San Andreas Fault in California) which divide the Earth into huge, country-sized, relatively stable regions, called tectonic plates. The majority of the world's earthquakes, such as most reported in Mexico, California, Alaska, and Japan, occur along plate boundaries.

However, not all earthquakes occur at plate boundaries; in regions like Texas many also occur far away from plate boundary faults. Sometimes these 'plate interior' earthquakes are quite large; for example, in 1811-1812 three earthquakes with magnitude above 8 occurred near the Missouri-Tennessee boundary (see Figure 12G). These quakes were as large as any historic earthquakes that have occurred in California, or anywhere else in the U. S. outside of Alaska. While Texans haven't experienced such large quakes in historic times, smaller quakes do occur naturally along faults in several regions of Texas.

While all earthquakes occur on faults, not all faults have earthquakes. A fault is simply a fracture in rock material accompanied by displacement along the two sides of the fracture. If the displacement occurs slowly enough, no earthquake waves are generated. And, often the displacement may have occurred millions of years ago, so that the fault remains but there is no present earthquake threat. Finally, many faults go undiscovered because they lie far beneath the surface, covered by soil. It is no accident that fault maps show the most faults in regions where bedrock is exposed at the surface (see Figure 12H).

Finally, some human activities are known to cause or trigger earthquakes. These include the injection of fluids into the earth for waste disposal or petroleum production, and the filling of deep lakes or reservoirs. In Texas, there have been earthquakes

associated with oil and gas production at a number of fields. These include the Wortham field in Freestone County, the East Texas and Longview fields in Upshur and Gregg Counties, the Cogdell field in Scurry and Kent Counties, and the Fashing and Lourdanton fields in Atascosa County. None of these quakes have been very damaging or very large; the largest had magnitude 4.7. And, usually petroleum production does not cause earthquakes; in Texas there are more than two thousand oil and gas fields but only about five seem to have generated earthquakes. Nevertheless, wherever there is considerable petroleum production, and especially when there is fluid injection to enhance recovery of to dispose of waste, people should be aware that induced earthquakes are possible.

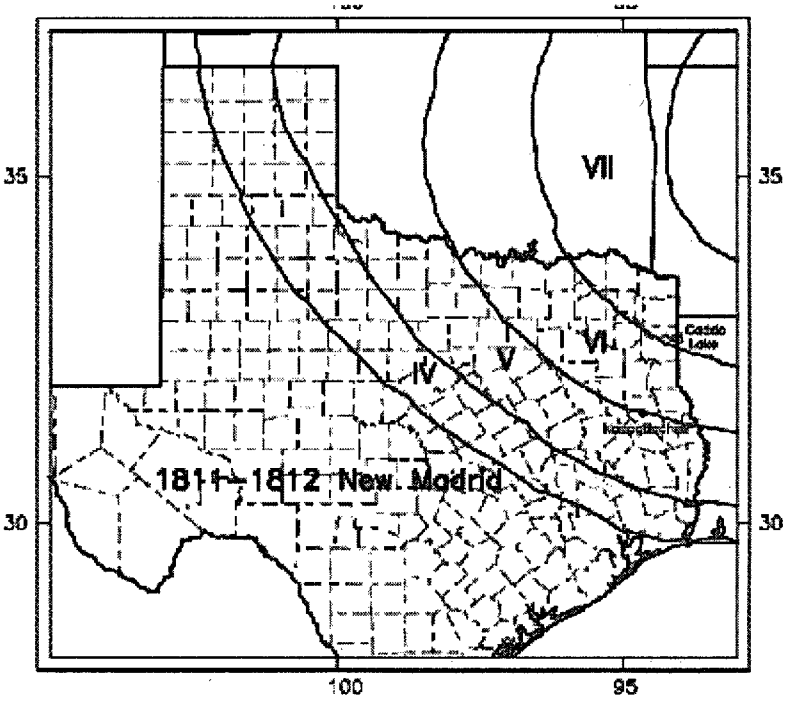


Figure 12G Estimated felt area and Modified Mercalli Intensities for the magnitude 8 Missouri-Tennessee earthquakes of 1811-1812. In much of Texas there is greater earthquake hazard from rare, distant earthquakes such as these than from any quakes with epicenters within Texas.

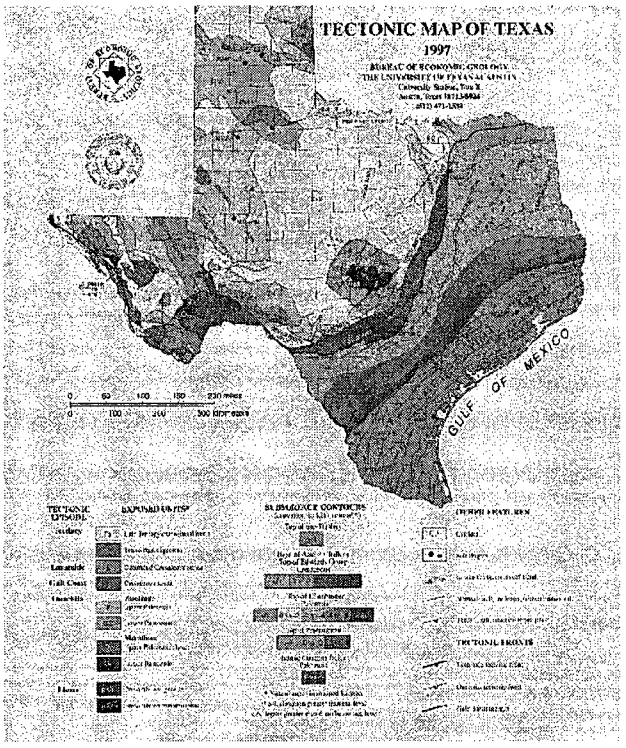


Figure 12H. (Click on image to see full-size version.)

Assessing Earthquake Hazard

In any particular region, the level of earthquake hazard depends on many different factors. These include the size, location, and frequency of earthquakes that may occur, as well as the population density, the topography, and the nature of manmade improvements. In very steep, mountainous areas earthquakes might trigger landslides, for example. And, a nuclear power plant or waste disposal site might pose more potential hazard than a feed lot. For any particular earthquake the expected intensity also depends on the type of construction and the thickness and type of soil.

Nevertheless, for any region the most important factor affecting scientific hazard estimation is the historical record of earthquake activity; regions which have had large earthquakes in the past will probably experience them again. Although hazard estimates also include information about mapped faults, in practice this information isn't very influential since many known faults are not seismically active, and since many damaging earthquakes have occurred on unmapped, unknown faults.

Thus, it is no accident that the regions of highest hazard in United States Geological Survey's (USGS) hazard analysis correspond to the locations of known, large, historical earthquakes. In the central U. S., the USGS assesses the greatest hazard in the Missouri-Tennessee area, where three earthquakes with magnitude of 8 or greater occurred in 1811 and 1812. Unfortunately, the very rarity of large earthquakes makes hazard analysis an inexact science. In the twentieth century, the largest earthquake in the Missouri-Tennessee area only had a magnitude of about 5.5. If quakes like the 1811-1812 events had occurred in Texas a few hundred years ago, would scientists know that such large and damaging earthquakes were possible here? Almost certainly not.

In Texas the regions at greatest risk are in West Texas, where earthquakes of magnitude about 6 occurred in 1931 and 1995, and in the Panhandle, where at least six earthquakes with magnitude above 4 have occurred since 1900. Clearly, such earthquakes will occur again. Unfortunately, what we cannot know is whether larger quakes--like the Missouri-Tennessee quakes of 1811-1812--might possibly occur there. Geologically, some features of the Panhandle are similar to the Missouri-Tennessee area. Fortunately, large continental quakes are extraordinarily rare (occurring less often than once per 500 years in any particular place), so for many Texans there is little reason to make special preparations for them. But, Texans should be aware that they are remotely possible.

Why is there concern about Texas earthquakes, given that historical events have done little damage? One reason is that the frequency of small and large earthquakes are related in a predictable way-a rule of thumb called the Gutenberg-Richter relation states that for every 1000 magnitude 4 earthquakes there will be approximately 100 magnitude 5 events, 10 magnitude 6 event, and one magnitude 7 event. Thus, the occurrence of two earthquakes with magnitude near 6 in the twentieth century suggests that a magnitude 7 may occur every few hundred years or so. Like many other rules of thumb, the predictions of the Gutenberg-Richter relation aren't always correct. For example, transportation experts use rules of thumb to predict the number of auto fatalities during a holiday weekend; these may be incorrect because of the influence of unpredictable factors such as weather, safety campaigns, etc. Similarly, the predictions of the Gutenberg-Richter relation may be incorrect because of factors that scientists don't understand or didn't consider. Yet, the record indicates that magnitude 6 quakes do happen in Texas, and suggests that larger earthquakes are possible. These could be especially serious if they occurred near a major population center.

Finally, there is some risk to Texans from earthquakes that may occur outside of Texas. If the 1811-1812 Missouri-Tennessee earthquakes were to occur today, in the Dallas-Fort Worth area they would probably damage some structures that weren't designed to withstand earthquakes. There is also possible hazard to Texans in the Panhandle from earthquakes which may occur in Oklahoma.

Certain earthquake-related phenomena which affect some parts of the U. S. do not pose a hazard for Texans. These include:

- Liquefaction: For large buildings constructed on certain poorly consolidated soils, strong earthquake tremors can cause the soil to 'liquefy', producing severe damage to large and apparently well-build structures. This is most common for structures built on landfill in lake or ocean regions. In Texas, the regions along the Gulf Coast where this conceivably might occur are not subject to strong earthquake tremors.
- Tsunamis: Tsunamis are tidal waves generated when undersea earthquakes displace the sea surface or when extraordinarily large landslides dump large volumes of material into the ocean. There is no historic record of any such events doing significant damage along the Gulf Coast.
- Volcanoes: Volcanic eruptions may produce ash falls over regions extending hundreds of miles from the eruption site. However, no active or dormant volcanoes occur near Texas, and Mexican volcanoes are too far away to be hazardous to Texans.

Where is the Hazard Greatest?

There is an old saying among seismologists: "Earthquakes don't kill people, buildings kill people." This is because the most serious damage caused by nearby earthquakes often comes when heavy, unreinforced structures collapse. Adobe and unreinforced masonry can be particularly dangerous, even in earthquakes with magnitudes as small as 5 or less. Ordinary wood-frame dwellings are surprisingly earthquake-resistant; in such structures the most serious damage often results from

the collapse of chimneys.

In the twentieth century hundreds of man-made lakes and reservoirs have been constructed in Texas; in some cases these pose a special hazard, particularly if there are population centers downstream. Large very distant earthquakes sometimes have surprising low-frequency effects. Seismic waves from the 1964 Alaskan earthquake, with a magnitude of 9.2, caused sloshing in canals and rivers in Texas which damaged boats and docks. Earthen or earth-filled dams are of special concern since intense shaking or sloshing could cause dam failure.

Monitoring Earthquakes as a Mitigation Strategy

It is important to remember that our knowledge of both past and present seismic activity in Texas is incomplete. Unlike states along the east and west coast, much of Texas is sparsely populated and/or was only settled about a century ago. And, even today Texas has only a few continuously recording seismograph stations (see Figure 12-I). This means that we have a much poorer knowledge of the earthquake hazard in Texas than in most other states. With the population of Texas expanding rapidly, the potential for injury to people and damage to structures increases proportionately. To be effective, attempts to assess potential risk must be based on long-term monitoring of seismic activity, so for accurate assessments we must take steps today to ensure that adequate monitoring is performed.

Over the past twenty years, there has been a revolution is the technology to monitor earthquakes. In the past, seismographs recorded on paper or film, and were designed specifically to measure earthquake waves from events of a particular size in a particular, narrow frequency band. The equipment at these 'narrowband' stations had to be selected to be optimum for measuring signals either from small nearby earthquakes (*e.g.*, magnitude 3.5 earthquakes occurring within a few hundred km) or from large distant earthquakes (*e.g.*, a magnitude 7.0 earthquake in Japan). Nowadays, so-called 'broadband' stations record digital information over a broad range of frequencies, and thus obtain information about both nearby and distant earthquakes. These broadband stations are advantageous because the data is useful both for regional hazard analysis as well for research by scientists throughout the world. For a state like Texas, a broadband network is desirable because it is useful for hazard assessment within Texas and for scientific researchers outside of Texas; over the long term this means that part of the support to run the network may come from science organizations outside of Texas.

Presently, Texas has only two modern, broadband seismograph stations, one near Houston, and one in Brewster County in West Texas (see Figure 12I). In addition, there are several narrowband stations in operation near El Paso. To properly monitor Texas earthquakes with magnitude of 3.5 and greater will require about ten additional stations. Currently various organizations within Texas-including university scientists, emergency management personnel, and people concerned with dam safety-have begun to work towards making such a network a reality; however, at present its future is still uncertain.

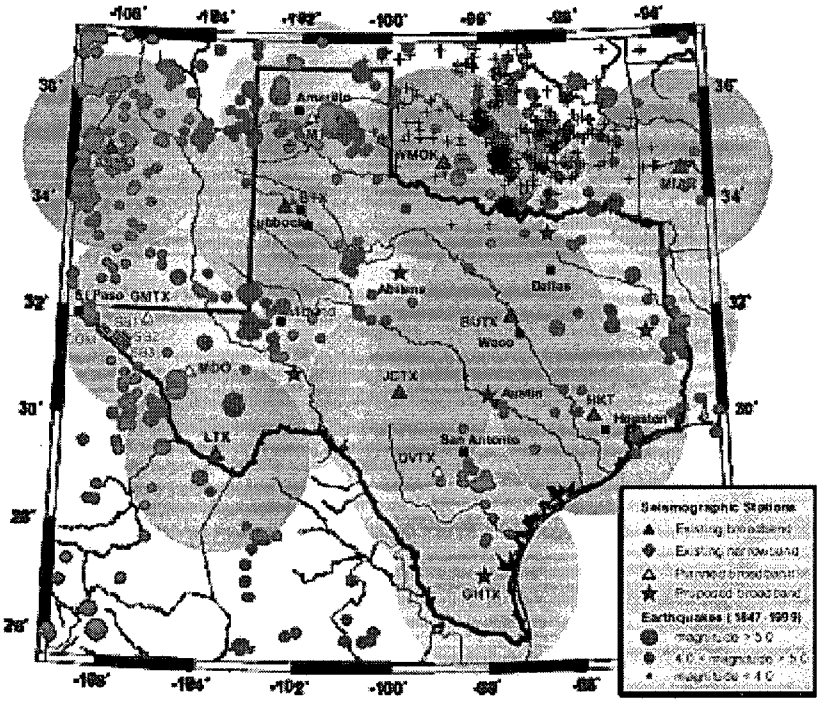


Figure 12I Nominal monitoring capability for magnitude 3.5 events for for existing stations (dark shading and proposed stations (light shading). Click on map to see full-size figure.

Regional Hazard Assessment

West Texas (Largest City - El Paso)

Counties Affected (22): Andrews, Brewster, Crane, Culberson, Dawson, Ector, El Paso, Gaines, Hudspeth, Jeff Davis, Kent, Loving, Martin, Midland, Pecos, Presidio, Reeves, Scurry, Terrell, Upton, Ward, Winkler.

Hazard Level: Within this region several earthquakes with magnitudes 5 to 6 will probably occur each century. Moreover, the historical earthquake record and regional geology suggest that even larger earthquakes are possible, with a probability of perhaps once per 500 years. In most of this region population density is low and earthquakes only pose a significant hazard for poorly built or very sensitive structures. However, an earthquake with magnitude of 5.5 or greater that occurred close to El Paso would cause personal injury and significant economic losses. Also, people who live, work, or plan to build in hilly or mountainous places should be aware that historical earthquakes have produced landslides in various parts of this region.

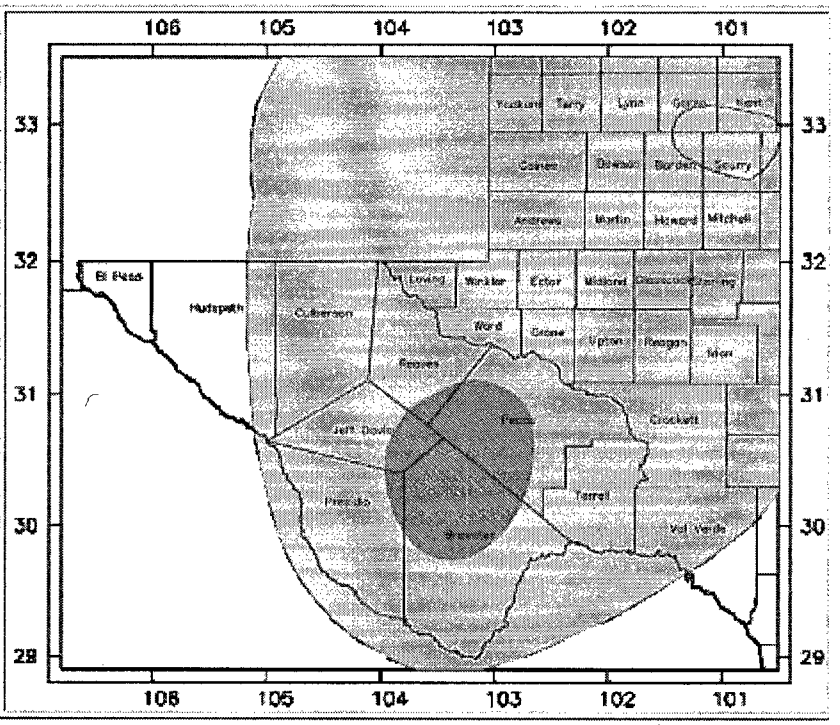
Justification: Historical earthquakes have produced Modified Mercalli Intensities of VI and higher throughout this region.

Significant Historic Earthquakes Affecting West Texas

- There have been three historic earthquakes which have each been felt over all or a significant part of West Texas.
- The first, which occurred on 16 August 1931 and was centered near Valentine, had a magnitude of 6.0. Even though many buildings in Valentine were constructed of adobe and brick and thus damaged severely, few were injured, probably because most people were sleeping outdoors because of the heat.
- The second, which occurred on 2 January 1992 along the Texas-New Mexico border near Andrews and Hobbs, had a magnitude of 4.6 (see Figure 12W-A).
- The third, which occurred on 14 April 1995 near Alpine, had a magnitude of 5.7. Both the 1931 and the 1995 earthquake produced landslides in mountainous areas. The amount of injury and damage from the 1931 and 1995 earthquakes was relatively small, mostly because of the relatively low population density in West Texas.
- In addition, earthquakes with magnitudes between 3 and 4.7 were felt by El Paso residents in 1889, 1923, 1936, 1937, 1969, and 1972. Finally, a magnitude 4.6 earthquake, probably induced by oil production, occurred in Scurry County near Snyder, Texas, in 1978.

Why is there such concern about earthquake hazard in West Texas? The occurrence of two magnitude 6 earthquakes in the twentieth century suggests that a magnitude 7 may occur every few hundred years or so. And, the record indicates that magnitude 6 quakes are likely to happen within the lifetime of ordinary citizens.

Figure 12W-A Areas in West Texas which experienced Modified Mercalli Intensities of IV or V (light gray) and VI (dark gray) during the earthquakes of 16 June 1978 (near Snyder in Scurry County - curved line indicates intensity V region for this quake), 2 January 1992 (near Andrews County - New Mexico border) or 14 April 1995 (near Alpine in Brewster County). Also, almost the entire area shown experienced intensities of VI during the earthquake of 16 August 1931.



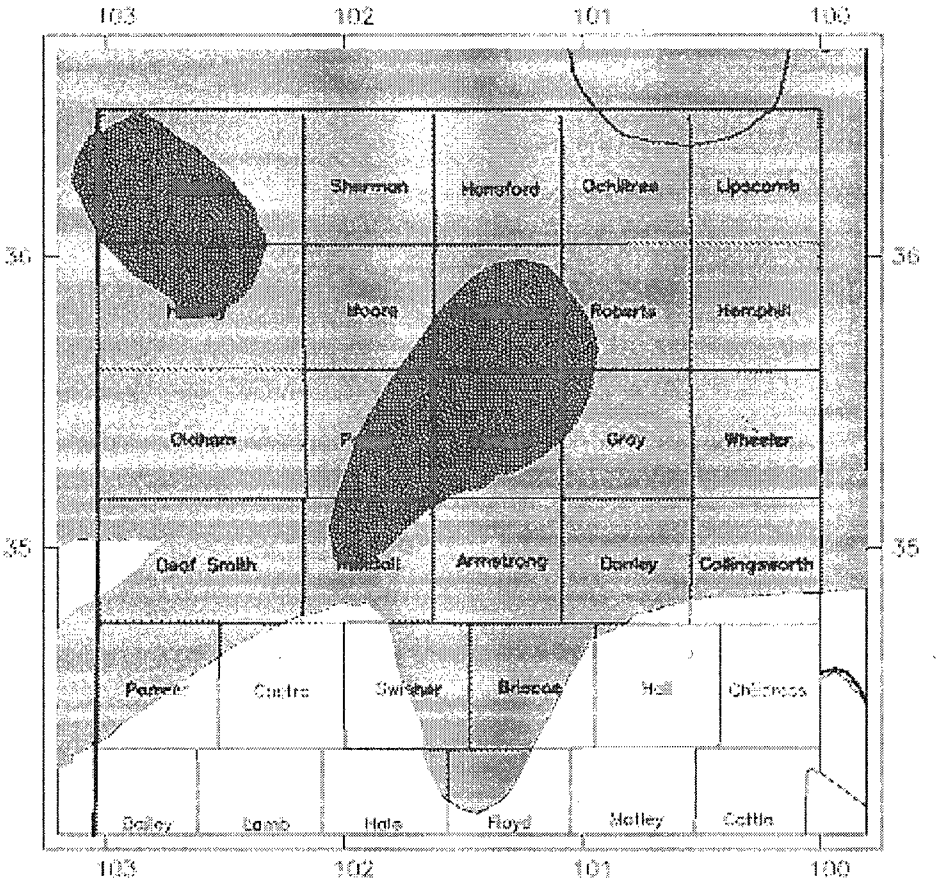


Figure 12P-A Areas in the Panhandle which experienced Modified Mercalli Intensities of V (light gray) and VI (dark gray) during the earthquakes of 1925 and 1936 (near Borger, in Hutchison County), 1948 (near Dalhart, in Dallam County), 1952 (in Oklahoma), or 1974 (near Perryton, in Ochiltree County - curved line indicates intensity V region for this quake).

Mitigation Strategy

- Architects and planners should be informed that damaging earthquakes can affect structures in the Panhandle. Sensitive structures-including dams, towers, very tall buildings, bridges, and highway overpasses-should be constructed with the possibility of earthquakes in mind. Institutions such as hospitals, schools, public meeting places, emergency management organizations, etc. should not be housed in poorly constructed, unreinforced masonry structures.
- Public officials and educators should inform Panhandle residents that earthquakes can and do occur in this region. Citizens should be encouraged to plan for earthquakes; this includes taking steps at home and in the office to mitigate possible injury caused by falling objects such as bookcases or chimneys.
- Citizens should be aware that it is possible that some Panhandle earthquakes are induced by petroleum production.

Table of Texas Panhandle Earthquakes of Magnitude 3 or Greater

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Regional Hazard Assessment

Northeast Texas (Largest Cities - Dallas-Fort Worth)

Counties Affected (41): Anderson, Bowie, Camp, Cass, Cherokee, Collin, Cooke, Dallas, Delta, Denton, Fannin, Franklin, Freestone, Grayson, Gregg, Harrison, Henderson, Hopkins, Hunt, Kaufman, Lamar, Limestone, Marion, Montague, Morris, Nacogdoches, Panola, Rains, Red River, Rockwall, Rusk, Sabine, San Augustine, Shelby, Smith, Tarrant, Titus, Upshur, Van Zandt, Wood, Wise

Hazard Level: This region is at risk from very large, distant earthquakes which might occur in Missouri-Tennessee or Oklahoma; the earthquakes that pose such a hazard are rare, probably occurring only once per 500 years or less. Such distant earthquakes would be most likely to damage large buildings or poorly reinforced masonry structures. Earthquakes with epicenters within this region are rare and small (see **Figure 12N-A**); several earthquakes with magnitudes 3 to 4.5 will probably occur each century. These pose little or no risk unless their epicenters are extremely close to poorly built or very sensitive structures.

Justification: Throughout this region the 1811-1812 Missouri-Tennessee earthquakes, although distant, probably produced

Modified Mercalli Intensities of VI and higher.

Significant Historic Earthquakes Affecting Northeast Texas

Throughout most of this region, the most intense shaking experienced over the past two centuries originated from several earthquakes with magnitude about 8 which occurred in Missouri-Tennessee in 1811-1812, or an earthquake with magnitude 5.6 which occurred in eastern Oklahoma in 1882. Although such distant earthquakes are unlikely to produce severe damage they can cause failure in very large structures, or structures which are designed with absolutely no earthquake-resistant features.

Small earthquakes with epicenters in this region occasionally do occur-some of natural origin and some apparently induced by petroleum production. These include:

- A magnitude 4.0 earthquake with an epicenter near Mexia, probably induced by oil production, that occurred on 9 April 1932.
- A magnitude 4.2 earthquake centered in Lamar County north of Paris that occurred on 12 April 1934.
- A magnitude 3.0 earthquake that occurred in Gregg County near Gladewater on 19 March 1957. This quake may have been induced by petroleum production in the East Texas Field.
- A series of earthquakes in 1964 with magnitudes of 4.0 and higher near Hemphill-Pineland in Sabine County.

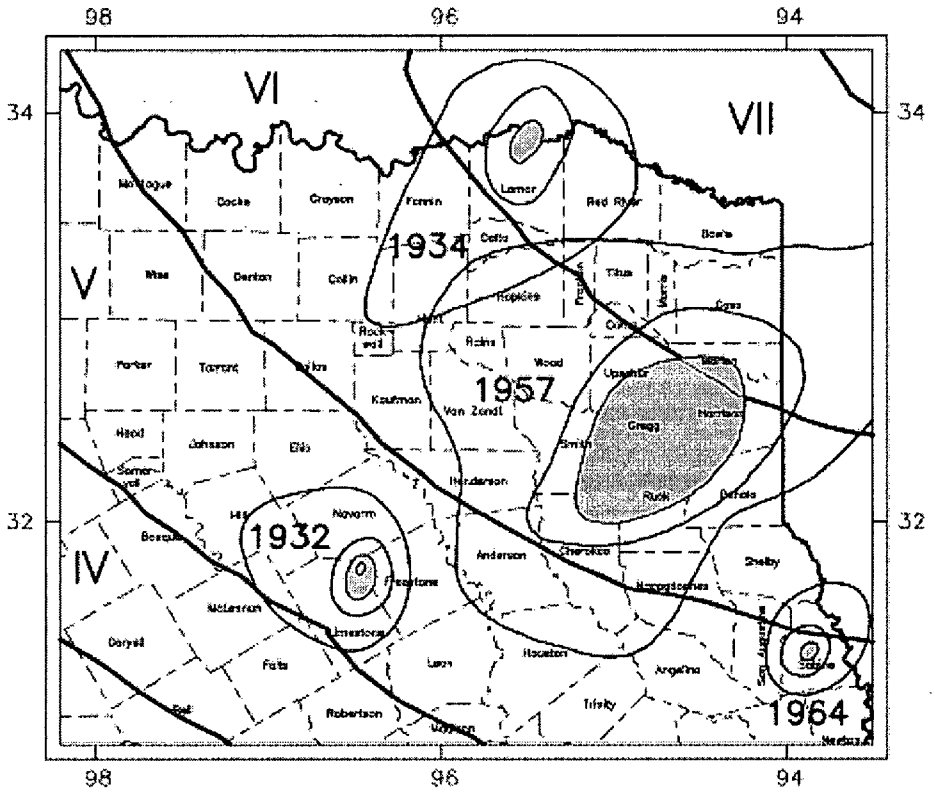

Figure 12N-A: Felt areas of representative historical earthquakes in northeastern Texas. Shaded regions indicate areas of intensity V and above for earthquakes of 1932 (Limestone County), 1934 (northern Lamar County), 1957 (Gregg County), and 1964 (Sabine County). Thick lines indicate estimated boundaries of Modified Mercalli Intensities for the 1811-1812 Missouri-Tennessee earthquakes.

- A magnitude 3.3 earthquake centered near Jacksonville in Cherokee County, which occurred on 6 November 1981.
- A magnitude 3.3 earthquake in Cooke and Denton County near Pilot Point an Valley View; this occurred on 18 September 1985.
- A magnitude 3.4 earthquake centered near Commerce in Hunt County; this occurred on 31 May 1997.

Events of these magnitudes seldom produce damage further than about a few miles from the epicenter.

Mitigation Strategy

- Architects and planners should be informed that distant earthquakes can affect large and sensitive structures in the northeastern Texas. Sensitive structures-including dams, towers, very tall buildings, bridges, and highway overpasses-should be constructed with the possibility of earthquakes in mind.
- Residents should understand that small earthquakes occasionally do occur in this region, including some induced by petroleum production. They should be informed that the principal hazard is from rare, distant, but very large earthquakes occurring outside of Texas.

Regional Hazard Assessment

South-Central Texas (Largest City - San Antonio)

Counties Included (19): Atascosa, Bastrop, Bexar, Brazos, Burleson, Caldwell, Comal, Gaudelupe, Grimes, Hayes, Jim Wells, Karnes, Lavaca, Lee, Live Oak, Travis, Waller, Washington, Wilson

Hazard Level: Earthquakes with epicenters within this region are rare and small; perhaps 10-20 earthquakes with magnitudes between 3 and 4.5 will occur each century. A significant fraction of these earthquakes are induced by human activities, notably petroleum production. These events pose little or no risk unless their foci are extremely close to poorly built or very sensitive structures.

Justification: Many small earthquakes, some of natural origin and others induced by man's activities, have occurred in these counties.

Significant Historic or Induced Earthquakes Affecting This Region

Small earthquakes with epicenters in this region occasionally do occur-some of natural origin and some apparently induced by petroleum production (see **Figure 12S-A**). These include:

- A magnitude 3.9 earthquake centered in Travis County south of Austin which occurred on 9 October 1902. This earthquake is clearly of natural origin.
- A magnitude 4.2 earthquake near Fashing in Atascosa County on 9 April 1993. This earthquake is one of several in this region which may have been induced by petroleum production.
- A magnitude 3.8 earthquake near Alice in Jim Wells County which occurred on 24 March 1997. This earthquake may have been induced by petroleum production.

Mitigation Strategy

- Residents of this region should understand that small natural earthquakes occasionally do occur in this region. However, the most numerous earthquakes are small events associated with petroleum production in some, but not all fields. These small earthquakes pose a hazard only in the immediate vicinity of their epicenter; the occurrence of significantly larger earthquakes is unlikely.

Figure 12S-A: Felt areas of representative historical earthquakes in South-Central Texas. Shaded regions indicate areas of intensity IV and above for earthquakes of 1887 (Bastrop County), 1902 (Travis County), 1910 (Waller County), 1993 (Atascosa County), and 1997 (Jim Wells County).

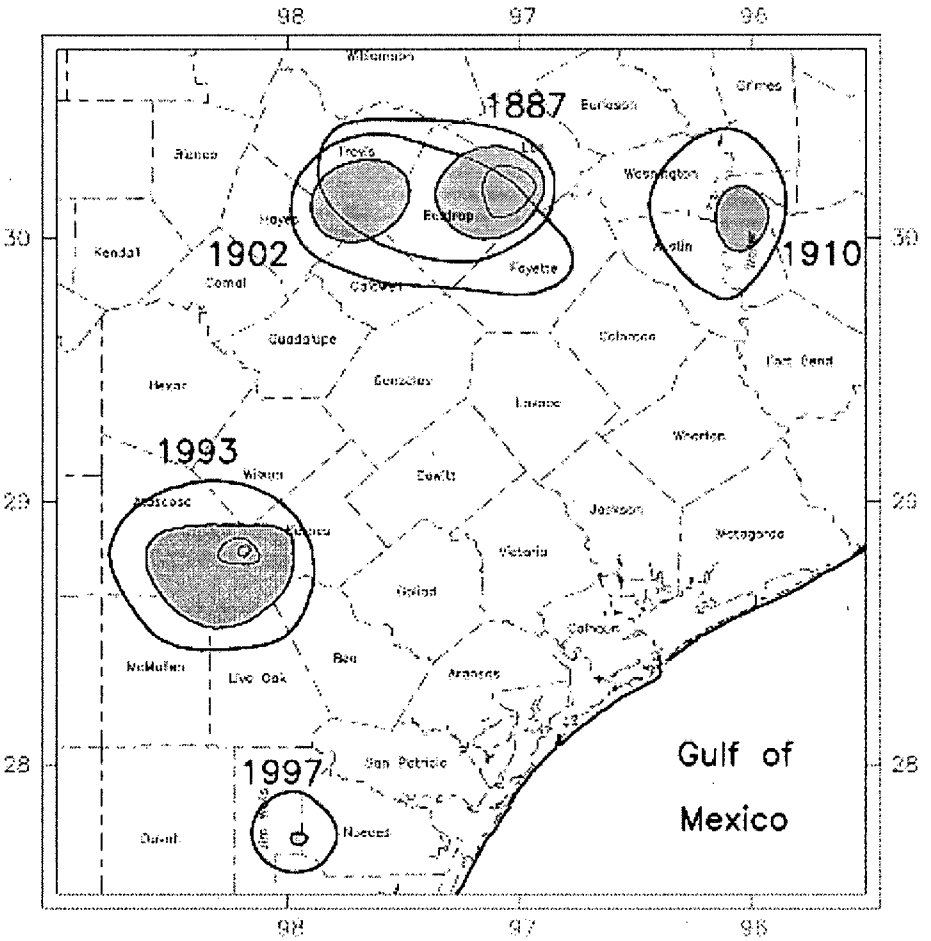

Table of South-Central Texas Earthquakes of Magnitude 3 or Greater

To TOP
To COMPENDIUM OF TEXAS EARTHQUAKES
To EARTHQUAKE SEISMOLOGY

Institute for Geophysics; J.J. Pickle Research Campus, Bldg. 196; 10100 Burnet Road (R2200); Austin TX 78758-4445

Phone: (512) 471-6156; FAX: (512) 471-8844

Last modified: 01 Feb 2002 15:53

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----- Original Message -----
From: pharb2@msn.com
To: president@messages.whitehouse.gov ; jackson.lisa@epa.gov ; Roger Vaughan ; The.Secretary@hq.doe.gov ; radmat@tceq.state.tx.us ; Robert Beleckis ; greg.abbott@oag.state.tx.us ; rick.perry@governor.state.tx.us ; inspector.general@usdoj.gov ; LGloyste@tceq.state.tx.us ; Jackie Hardee ; augurson.shirley@epa.gov
Cc: SJABLONS@tceq.state.tx.us ; Gilrein.Stephen@epamail.epa.gov ; CKuharic@tceq.state.tx.us ; PShaver@tceq.state.tx.us ; SSimmons@tceq.state.tx.us ; GSmith@tceq.state.tx.us ; HWeger@tceq.state.tx.us ; Dateline@nbcuni.com ; Jessica.Farrar@house.state.tx.us ; 60m@cbsnews.com ; David.levenstein@em.doe.gov ; Kelly.Hancock@house.state.tx.us ; Jim.Dunnam@house.state.tx.us
Sent: Thursday, August 20, 2009 7:09 PM
Subject: consolidated comment on storage safety at andrews county Texas waste site nb2

Articles where EPA official says ogallala aquifer is under the Andrews county Texas, Waste site. Since the EPA says the water is under the site, nothing toxic should be stored over the aquifer, with the area of the waste site having a history of sinkholes and earthquakes.

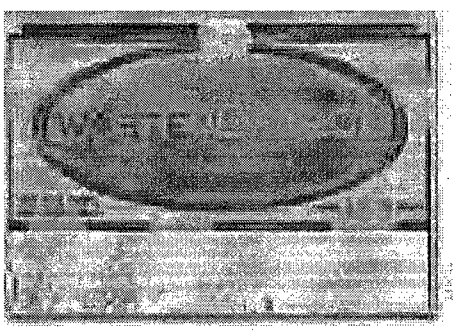
regards
Phillip Barr
nm

ps forwarded to Eunice new mexico to some worried citizens

<<Back

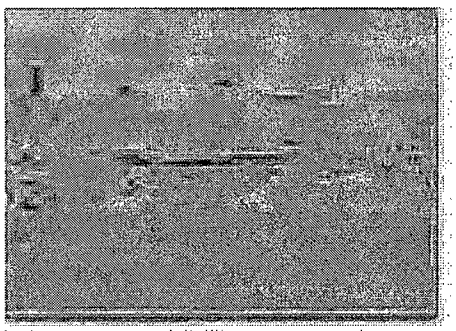
NEWSCHANNEL 11 kcbd.com

4/27/09
NewsChannel 11 Investigates: Toxic Waste Coming to West Texas, Part 1
Posted: April 27, 2009 04:21 PM MDT



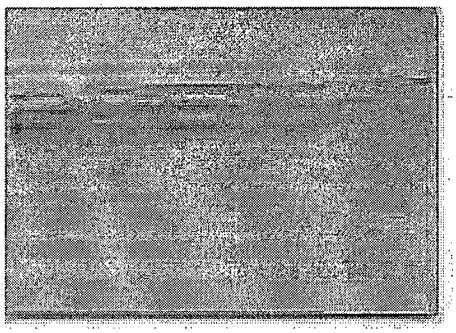
LUBBOCK, TX (KCBD) - It is the biggest clean-up effort in the nation, and contaminants from New York's Hudson River will soon make their way to West Texas to be buried for good. The toxic substance could come through Lubbock by railroad, but the bigger concern is your water supply. NewsChannel 11's Nicole Pesecky is investigating what has become a state-wide controversy.

More than a million pounds of PCB's, or poly chlorinated biphenyls, will be dumped in a landfill in Andrews, Texas. The carcinogen is linked to thyroid disease, learning, memory and

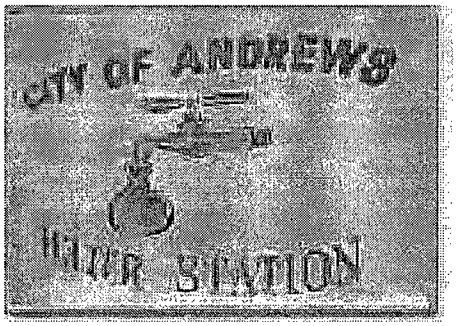


immune system disorders. For the last 30 years, high levels of PCB's were found in fish from the Hudson causing New York to ban their consumption.

It's critical to keep PCB's out of water sources all together, but during our investigation we found out, the landfill in Andrews is sitting on top of the Ogallala aquifer, which is where many West Texas cities get their water including Lubbock.



"It's really a foolish idea to want to ship all these massive amounts of waste 2,000 miles to West Texas," said Dr. Neil Carmen, the clean air director for the Lone Star Chapter of the Sierra Club. Carmen is not the only one who believes these contaminates are going to the wrong place - it is a highly disputed topic.



General Electric is responsible for cleaning up 1.3 million pounds of PCB's from the Hudson after they were dumped back in the 1950's, and GE is forking over $750 million to do it. In the long run, Carmen says Lubbock will be paying the price. "The Ogallala aquifer and other water formations are just a matter of feet away," says Carmen.

Linda Beach, Vice President and G. M. of Waste Control Specialists (WCS) in Andrews, disagrees. She claims there is at least 500 feet between the dump and the aquifer, and that's if there's even a water source there at all. "The aquifer below it is not really the OAG aquifer that everyone is familiar with - it's some water that is too salty to use for irrigation and is not drinkable," Linda explains.

Andrews City Manager Glen Hackler is convinced the aquifer is not under this landfill. "The community of Andrews did independent studies verified that the Ogallala aquifer does not extend into remote western regions of the county," Hackler says. But David Barry, spokesperson for the Environmental Protection Agency for Region 6 says, "Yes, the facility does sit above the Ogallala aquifer. It sits on the southern end of the aquifer."

We checked it out for ourselves, and it does cover part of the Andrews dump. So what are the chances of this toxic substance getting into Lubbock and other West Texas water sources? "In my opinion there's no chance," Beach states.

Waste specialists say the red bed clay is 100 times more resistant than concrete, so the odds of water draining into the aquifer are very slim. Carmen says clay is not leak proof, and it will inevitably become a problem. "It's just a bad idea to leave for future generations to deal with," Carmen says.

Even the citizens of Andrews are skeptical about what the future holds. "It will probably be after my lifetime, but I think it will eventually affect the water if they're not careful," explains one concerned Andrews resident. "If it's gonna bring jobs, great. If they're gonna

hurt our land then they need to find another way to do it," says another.

So why is Andrews so enthusiastic about getting dumped on? "They put a lot into our school system. They put a lot into the community. WCS is good for Andrews," says this Andrews resident.

"I think over time there's going to be tens of millions of dollars of economic impact to benefit our community," says Hackler. He's confident this project won't taint their city or any nearby, "We don't in any way feel like this is a danger to our water supply."

One man who spent four years investigating the WCS site says the danger is definitely there. "All of our time has been wasted. We've all been played for suckers. We've all been pointless impediments to a process that resulted in issuing this license from the first day," he says.

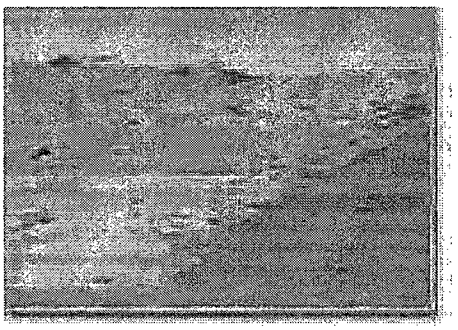
Coming up Tuesday night in Part 2 of our investigation, we will hear from a former employee for the Texas Commission on Environmental Quality. He says, after 16 years, he quit his job after permits were granted to Waste Control Specialists against his recommendation

<<Back

4/28/09

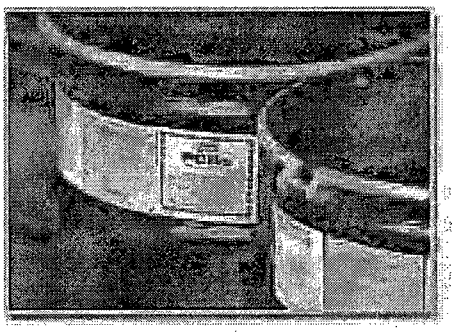
NewsChannel 11 Investigates: Toxic Waste Coming to West Texas, Part 2

Posted: April 28, 2009 07:20 PM MDT



LUBBOCK, TX (KCBD) - NewsChannel 11 told you Monday about a historical cleanup involving General Electric shipping millions of pounds of toxic waste from the Hudson River and burying it in West Texas. Tuesday we hear from a former employee of Texas Commission on Environmental Quality. He claims he quit his job after permits were granted to the landfill against his recommendation.

Glen Lewis says he threw in the towel after TCEQ granted these permits allowing hazardous waste to be buried at the landfill site in Andrews, Texas. He says his reasoning is that those toxic substances will inevitably contaminate the aquifer sitting underneath that dump, which is one way Lubbock gets its water.



Lewis has been with TCEQ for 16 years. He spent nearly four of those years investigating the Waste Control Specialists site in Andrews, Texas for approval of certain toxic wastes. Lewis says, "I resigned my position there, mainly because of decisions made regarding the application submitted by WCS for disposal of low level radioactive waste at a site in Andrews County."

Lewis wasn't the only TCEQ employee who strongly felt the WCS site was the wrong place for these contaminates. "There were two other people who quit specifically because of this," Lewis says.

The permit was just granted to WCS on January 28th, 2009. "All of our time has been wasted. We've all been played for suckers, we've all been pointless impediments to a process that resulted in issuing this license from the first day," Lewis explains.

During Lewis' review with TCEQ, he found that the landfill site is threatened by dump water draining into two water tables. One of those, the Ogallala aquifer which is water Lubbock drinks. "It may be as close as 14 feet from the bottom of the proposed trench. We found that those were unacceptable margins and were not the hundreds of feet of impermeable red bed clay that the applicant originally claimed," Lewis says.

That is what WCS still claims. "At least 500 feet of red bed clay on the bottom of the landfill between the nearest potential aquifer," Linda Beach, the Vice President with WSC says.

So why would TCEQ and the Environmental Protection Agency grant these permits to begin with? Lewis chalks it up to inexperience. Neither organization has ever had to get rid of 1.3 million pounds of toxic waste and transport it to one location. "Nobody has really dealt with this. We can't look into a crystal ball and say that this site is absolutely going to perform satisfactory for 50,000 years," Lewis explains.

Rod Baltzer, president of WCS, says Lewis is wrong - the landfill is not over the Ogallala. "I don't think they've got the latest information, and they don't understand what the facts are," says Baltzer.

Jim Conkwright with the High Plains Underground Water District says he didn't know at first if the aquifer extends under the landfill, but did some checking and says, "It depends on your definition of the aquifer," he continues to say, "Some say it is and some say it isn't."

WCS says according to maps by the Texas Water Development board in 2006, its disposal site does not sit above the Ogallala aquifer. WCS states that after Lewis left the agency, hundreds of additional wells were drilled to determine the subsurface properties at the site. The company has had several consultants analyzing the ground water results. Also, according to the company, as a result of meetings with TCEQ, they agreed to install long term monitoring of the water at the site. Its analysis says the water at the site is puddled and not connected to the aquifer.

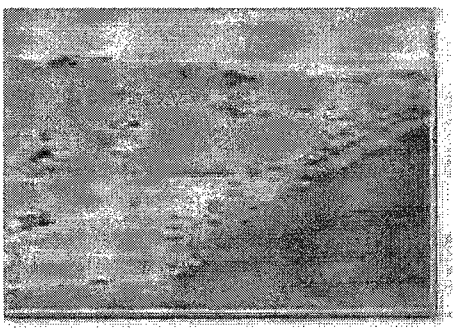
Wednesday night, we'll have more from the president of WCS, and why he says the Ogallala aquifer is not under his site.

NEWSCHANNEL 11 kcbd.com

4/29/09

NewsChannel 11 Investigates: Toxic Waste Coming to West Texas, Part 3

Posted: April 29, 2009 05:48 PM MDT



LUBBOCK, TX (KCBD) - On Monday, we first told you about millions of pounds of toxic waste being taken to the Waste Control Specialists landfill in Andrews, Texas. David Barry, with the Environmental Protection Agency says the Ogallala aquifer is under that dump, but the president of Waste Control Specialists says he can prove otherwise.

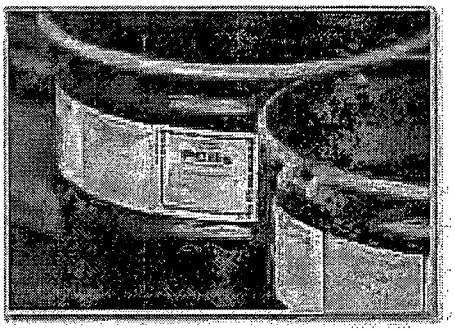
Rod Baltzer is the president of Waste Control Specialists, which is the landfill taking this toxic waste. Baltzer flew in for an interview with NewsChannel 11 after our first story aired. He says the site is not on top of the Ogallala aquifer and he can prove it. "The Ogallala aquifer is not under our site. But just to be safe, the way we design our landfill is to dig into the red bed clays and to ensure that nothing above it would interfere with that wastes," said Baltzer.

Baltzer claims the hundreds of feet of red bed clay isn't the only liner between the ground and these toxic contaminants. "We've then got a three foot clay liner, we've got a geomembrane plastic liner and then we've got a concrete liner," he said.

Baltzer explains that, according to maps by the Texas Water Development Board in 2006, the dump in Andrews does not sit above the Ogallala. He also says Texas Tech University did a study back in the 90's that found the same results. "This site is probably the most studied analyzed and modeled site in the history of the universe," Rod says. So why is this site so controversial?

We spoke with David Barry, the Environmental Protection Agency spokesperson for Region 6, who once again states, "It does appear that the Waste Control Specialist site is above the Ogallala aquifer."

"I would love to be able to talk with EPA and see what they were looking at. I don't know if they were looking at old maps that have changed," Baltzer states in response.



Jim Conkwright with the High Plains Underground Water District did some checking and says, "It depends on your definition of the aquifer. Some say it is and some say it isn't."

Glen Hackler, the city manager of Andrews, says they profit from WCS. "I think over time there's going to be tens of millions of dollars of economic impact to benefit our community," Hackler explains.

So we know the possible economic benefit for Andrews, but it's still unknown how much WCS will profit from this waste. Rod Baltzer says WCS is required to have financial insurance. They're insured for over $8 million.

WCS issued a statement saying, "State and federal governments have determined on 8 separate occasions that the WCS facility does not pose a threat to the drinking water of any person, city or entity in the Permian Basin or the South Plains, including Lubbock."

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To: <president@messages.whitehouse.gov>,
<jackson.lisa@epa.gov>,
"Roger Vaughan" <RVaughan@tceq.state.tx.us>,
<The.Secretary@hq.doe.gov>,
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Subject: consolidated comment on storage safety at andrews county Texas waste site nb2

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