

Lessons Used and Lessons Learned –

2008 Wells, Nevada Earthquake

Craig M. dePolo

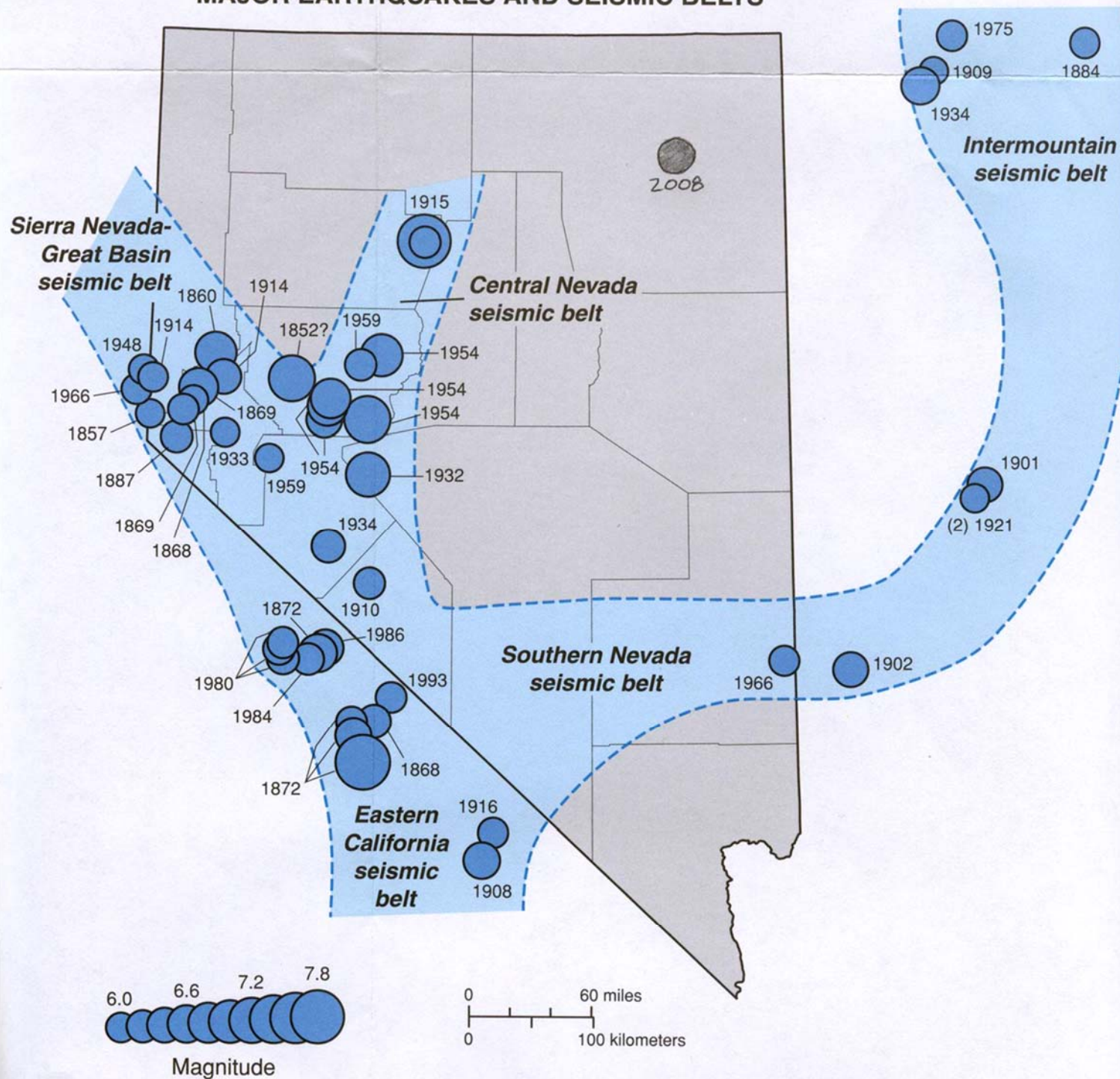
Nevada Bureau of Mines and Geology

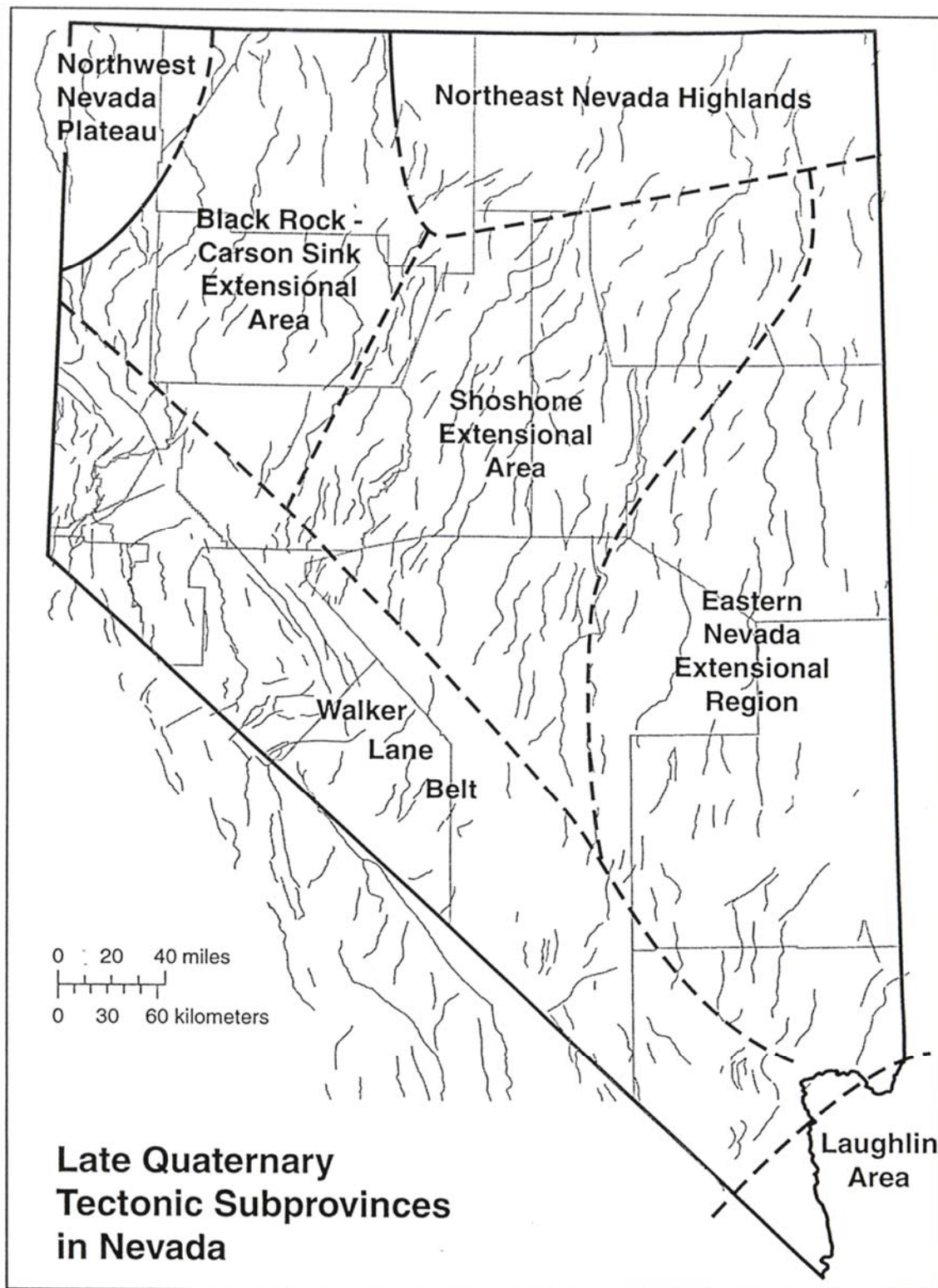


Magnitude 6 Wells Earthquake

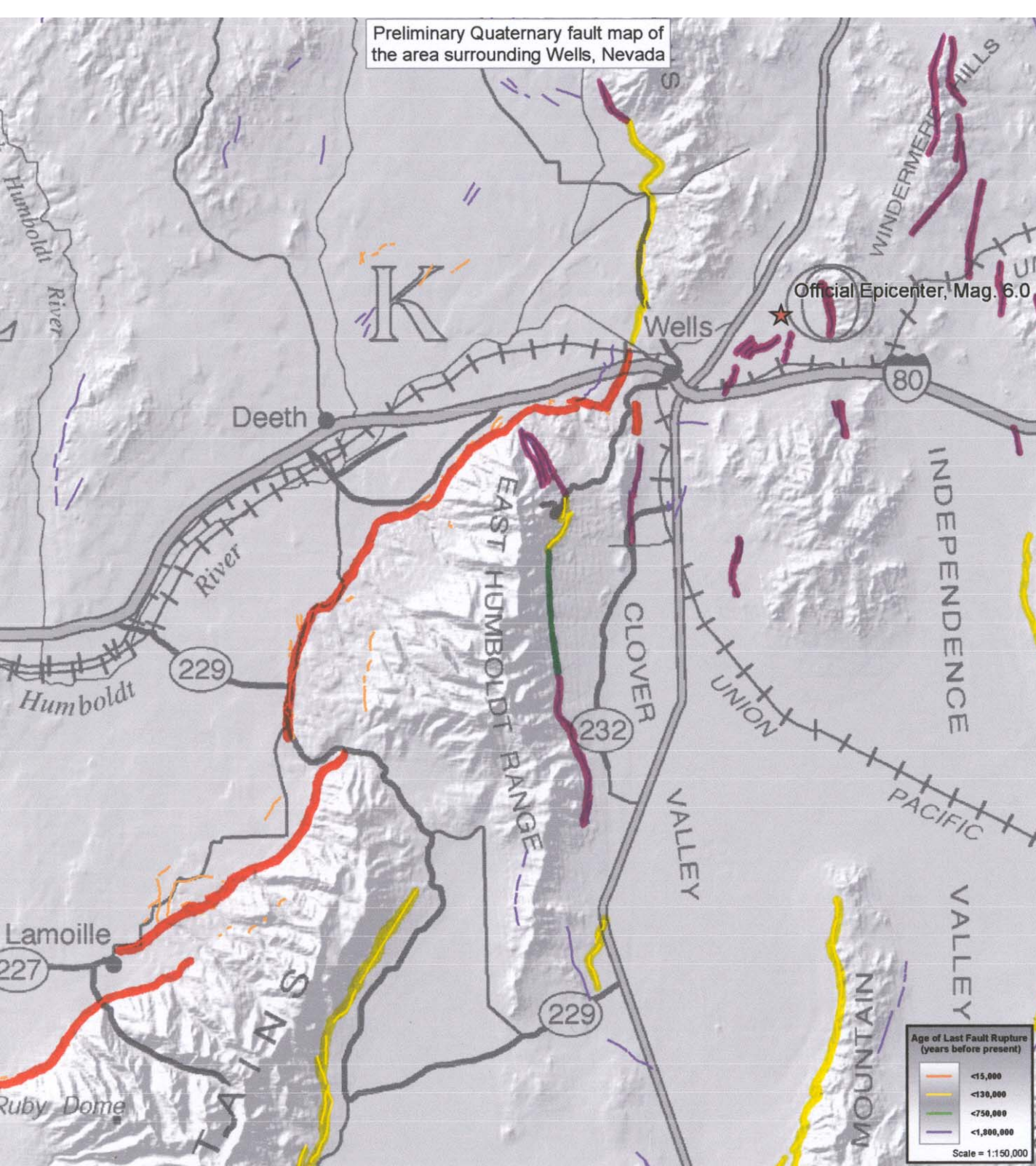
- Relatively low earthquake hazard part of the state,
- Normal fault; northeast orientation and dips to the southeast,
- Background earthquake – could occur anywhere.

MAJOR EARTHQUAKES AND SEISMIC BELTS





Preliminary Quaternary fault map of the area surrounding Wells, Nevada



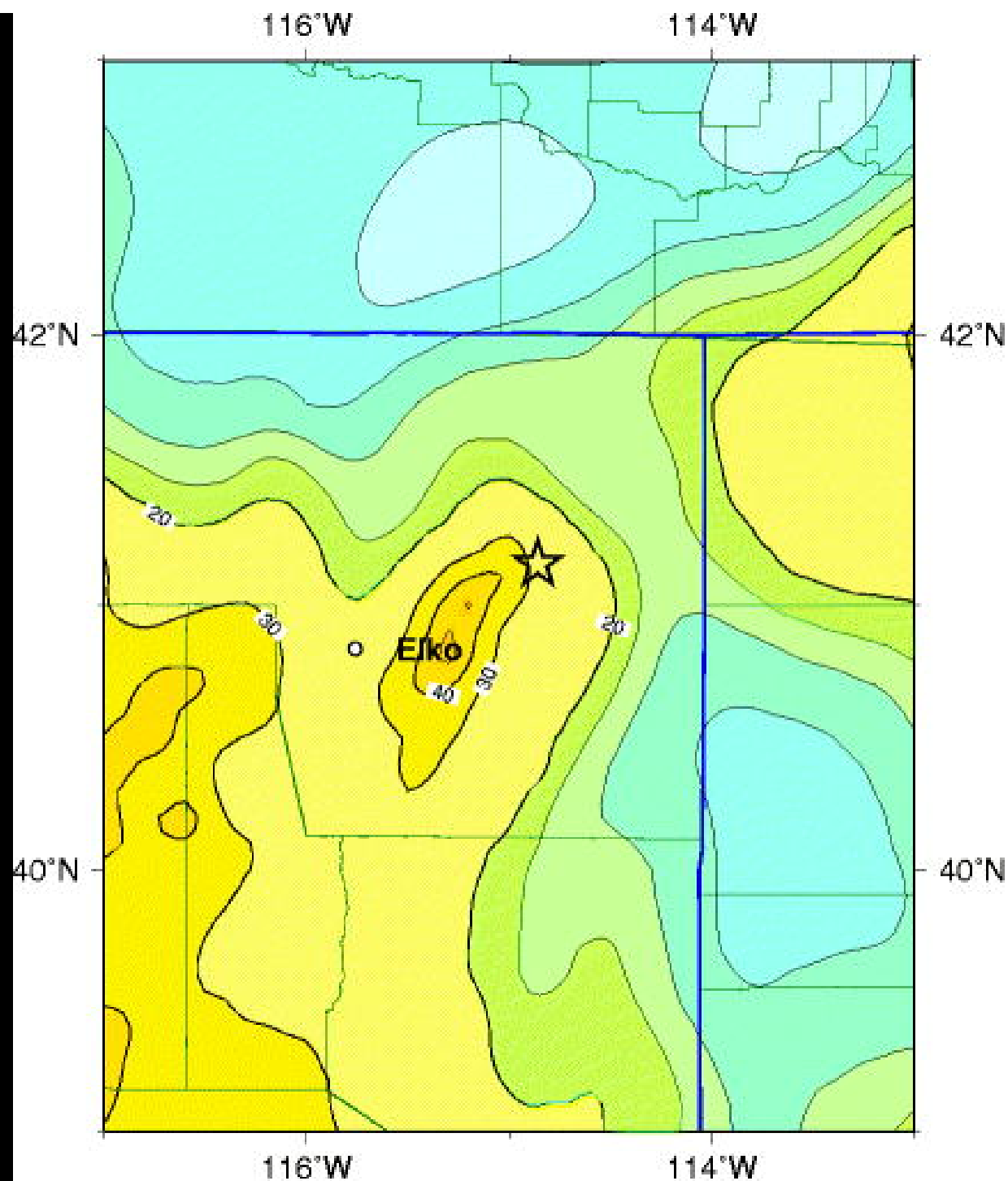
Quaternary Faults in the Wells Region

Orange < 15,000 y

Yellow < 130,000 y

Green < 750,000 y

Purple < 1.8 million y



Peak Acceleration (%g) with 2% Probability of Exceedance in 50 Years
site: NEHRP B-C boundary
National Seismic Hazard Mapping Project



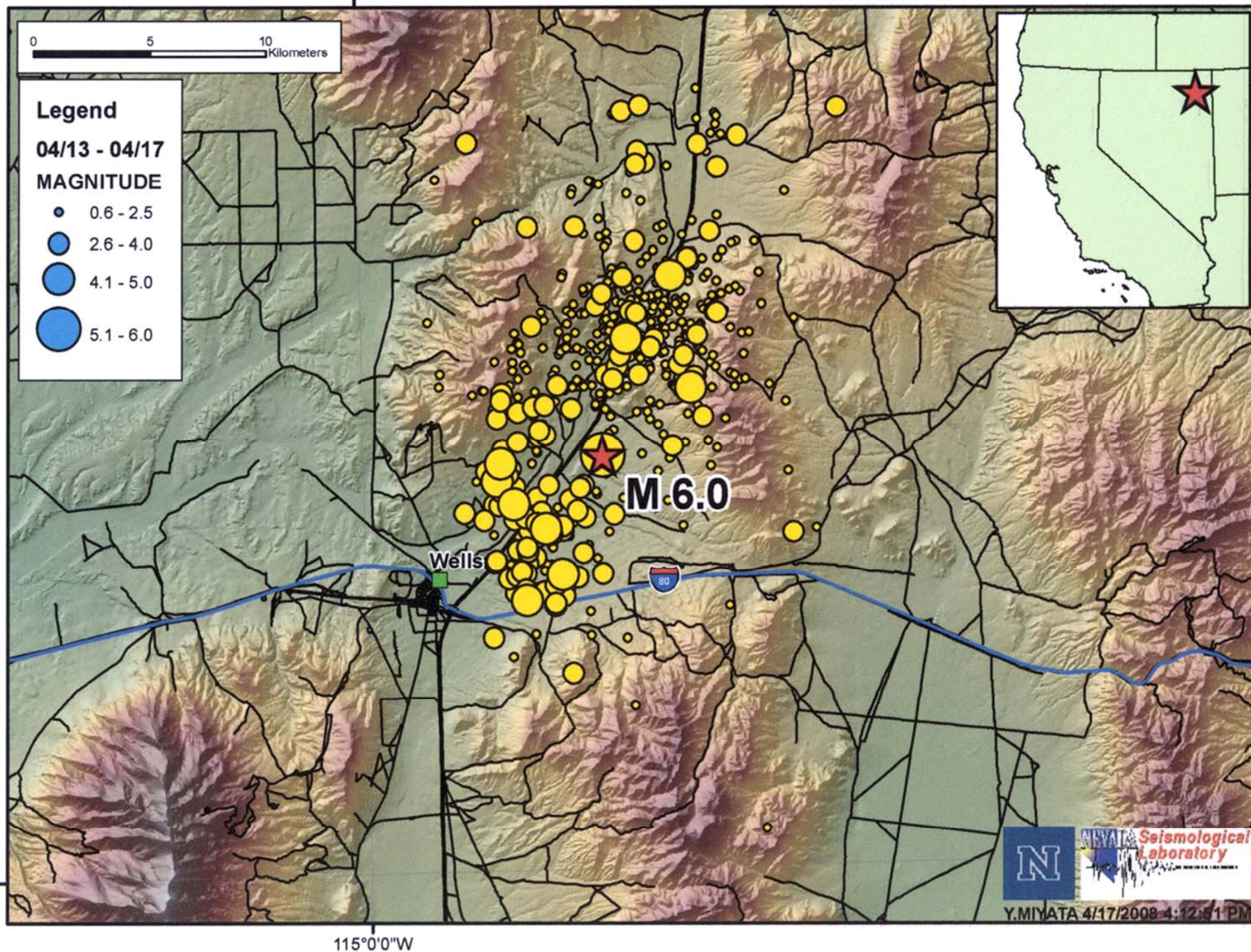
**Wells,
Nevada**



Image © 2008 DigitalGlobe
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Wells: All Reviewed Aftershocks

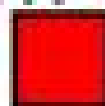
115°0'0"W



41° 12'

41° 00'

Wells, NV



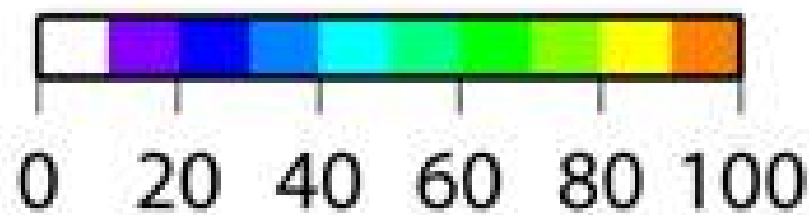
10 km

244° 48'

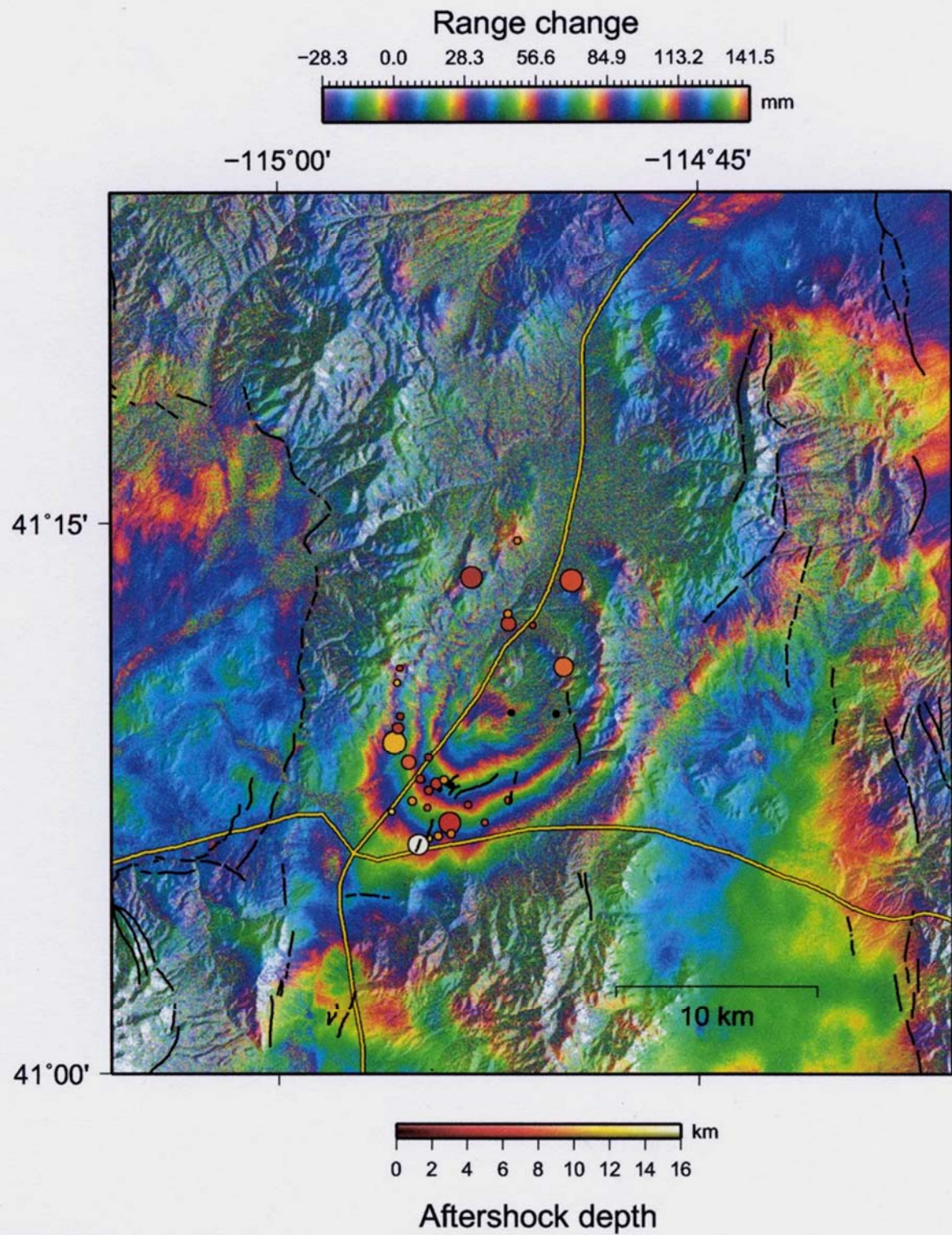
245° 00'

245° 12'

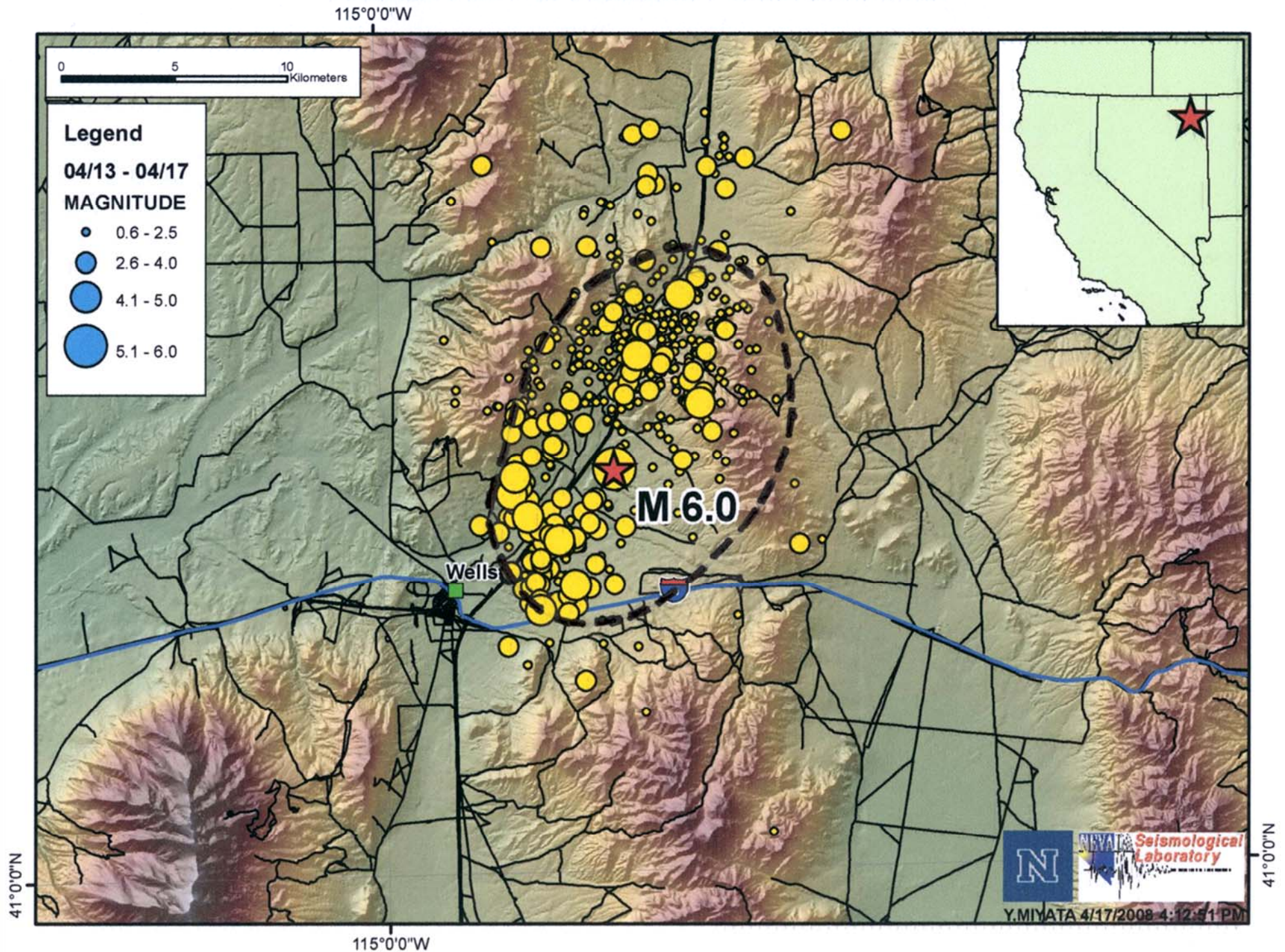
245° 24'



Slip(cm)

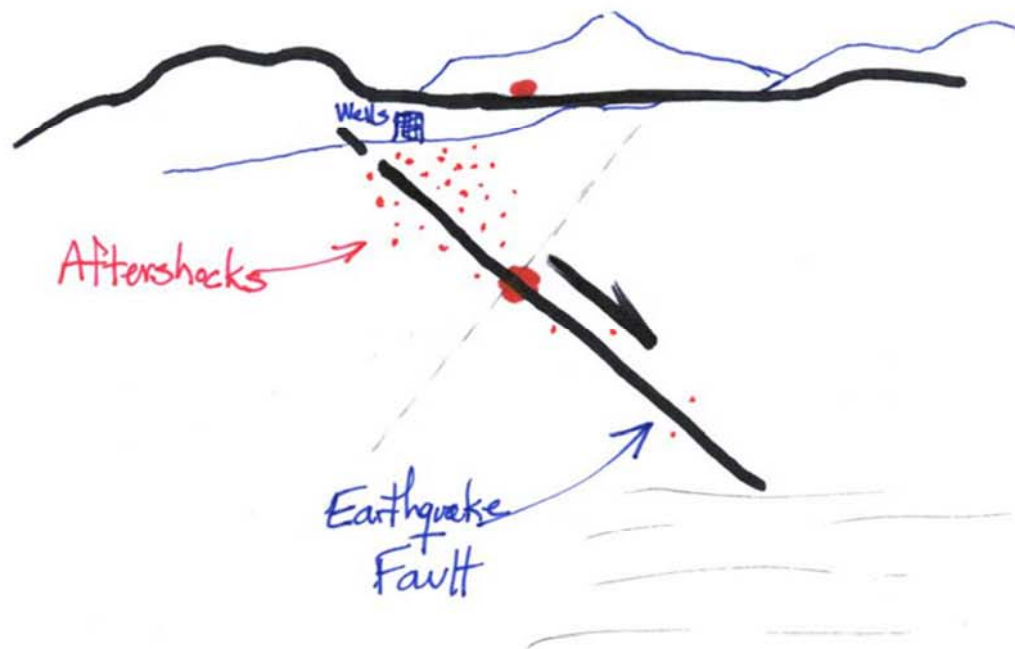


Wells: All Reviewed Aftershocks



NW

SE



dePolo
sketch



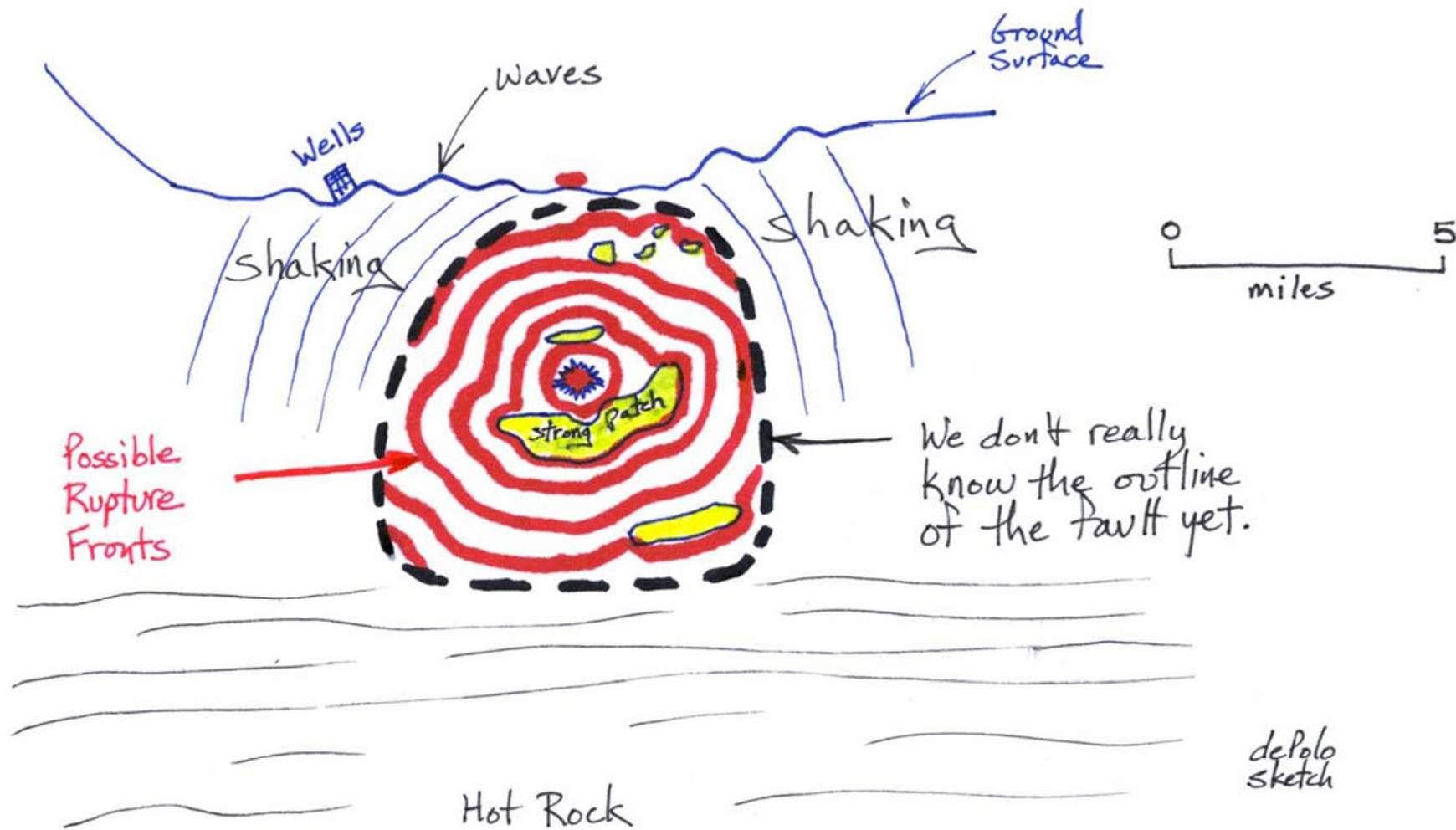
View to the Northeast

Cartoon of
current working
model

SW

View to the Northwest

NE









Nevada Hotel

- Close to more collapse
- Roof fell and rotated slightly
- Large amount of bricks on front sidewalk
- Falling bricks damage adjacent buildings
- All this damage and windows not broken































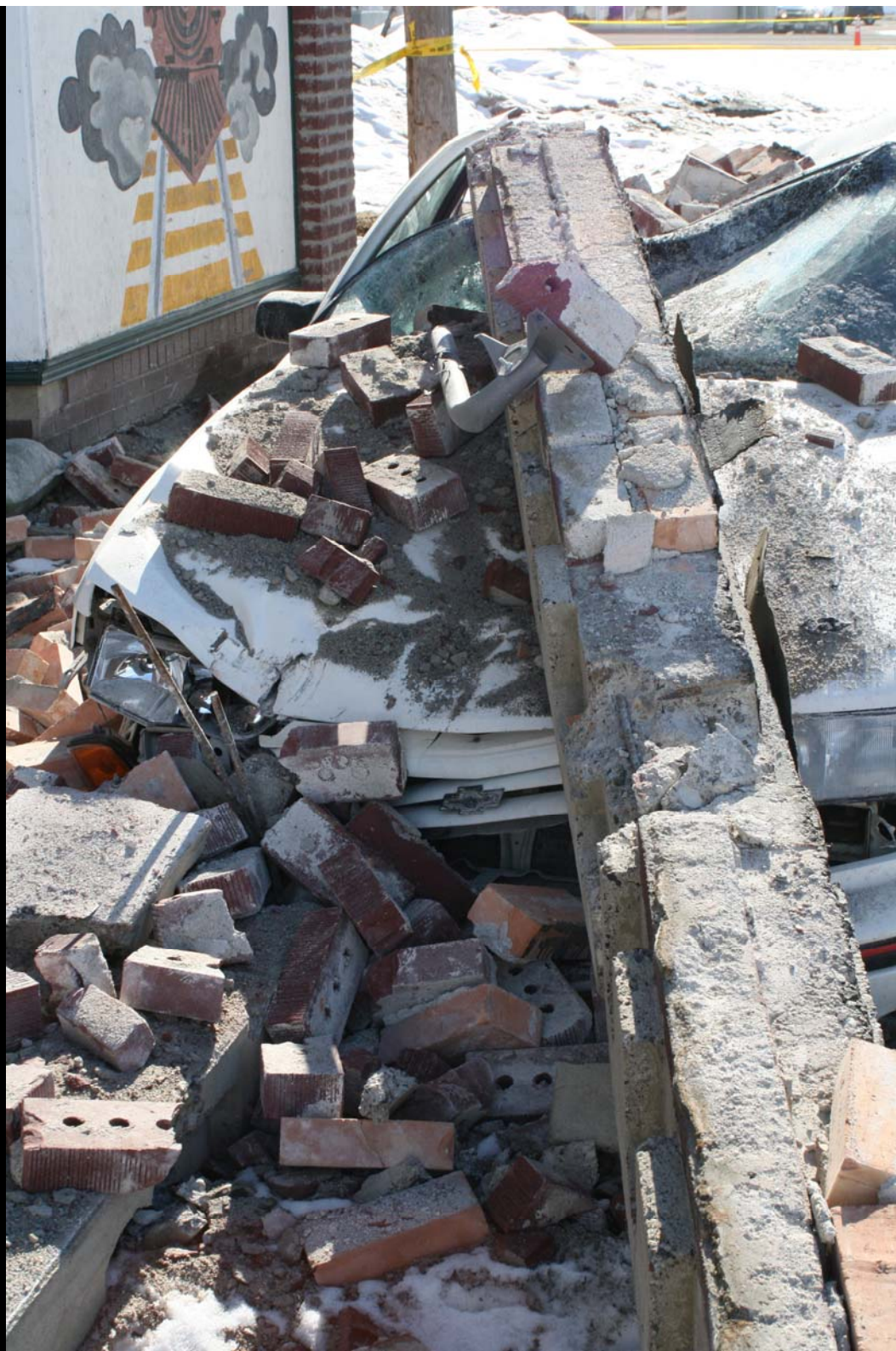












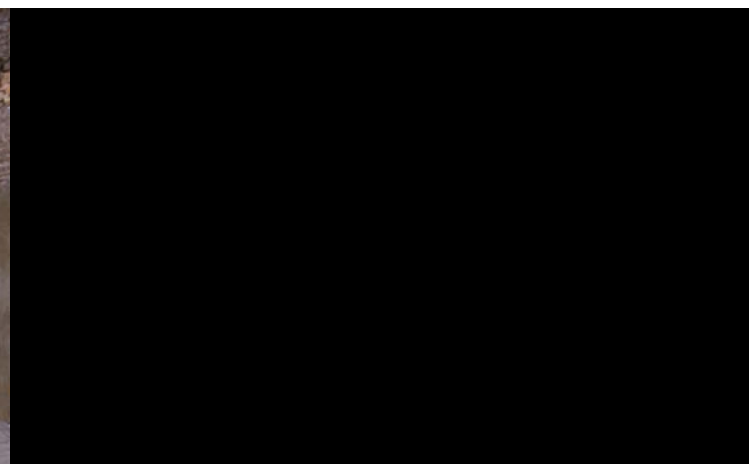










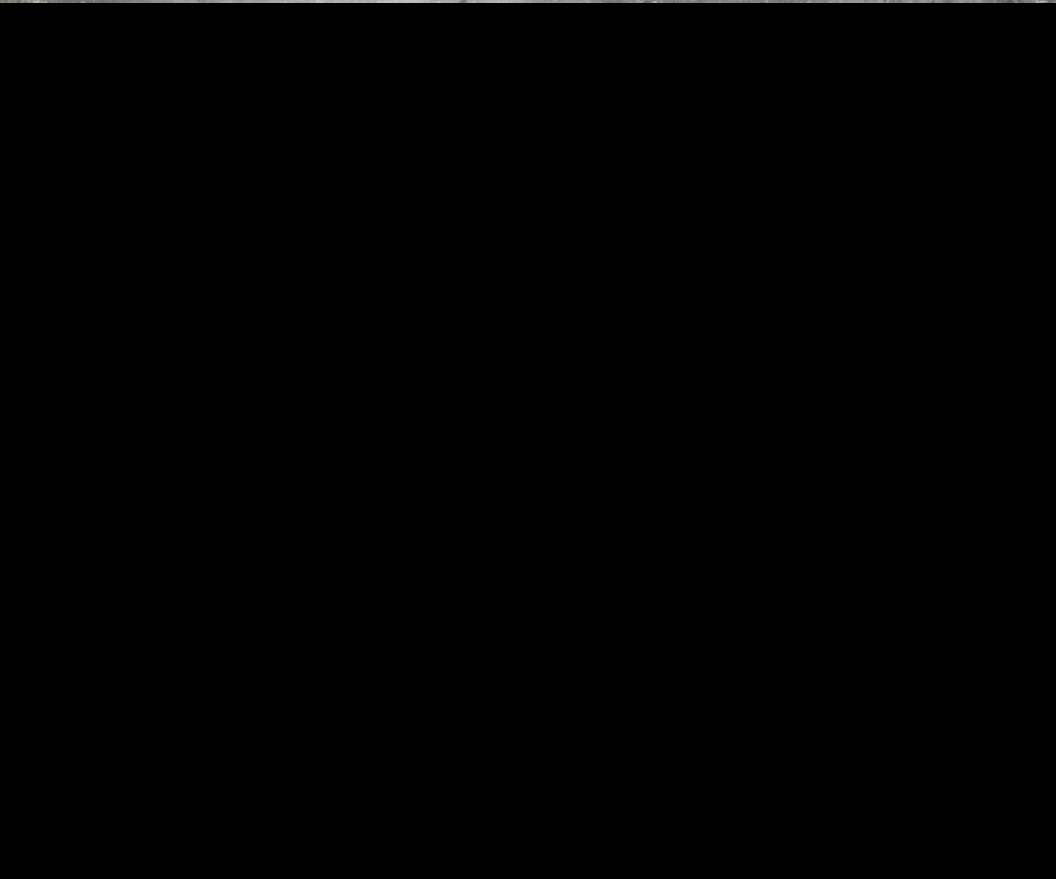












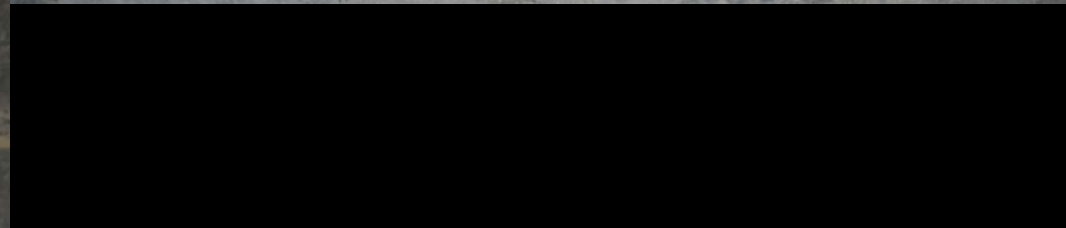
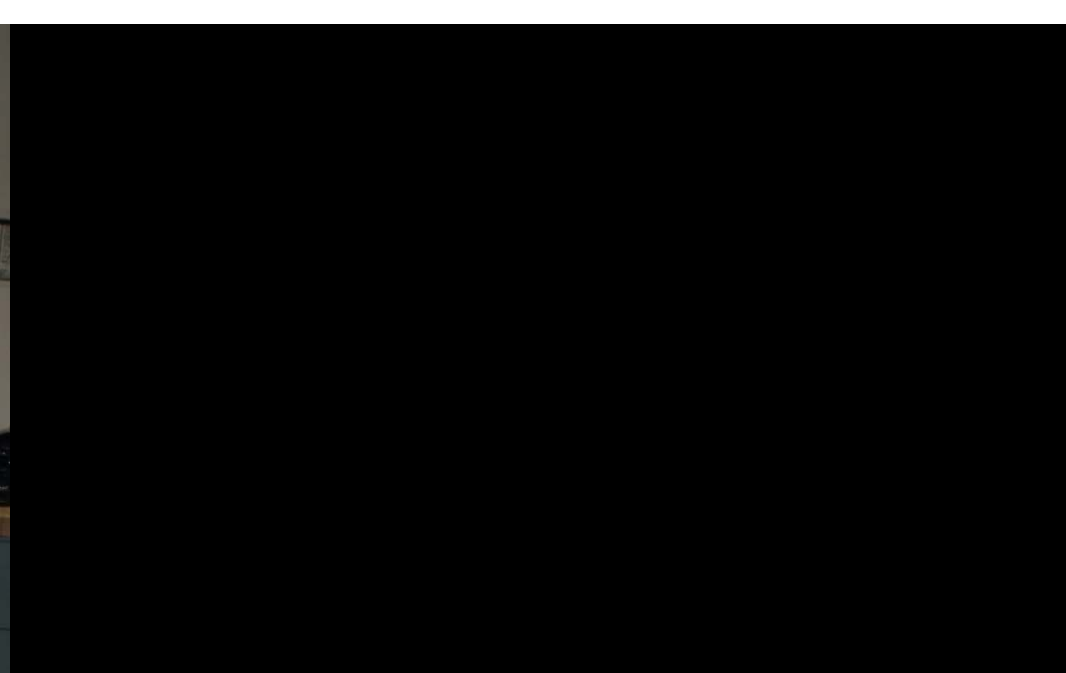




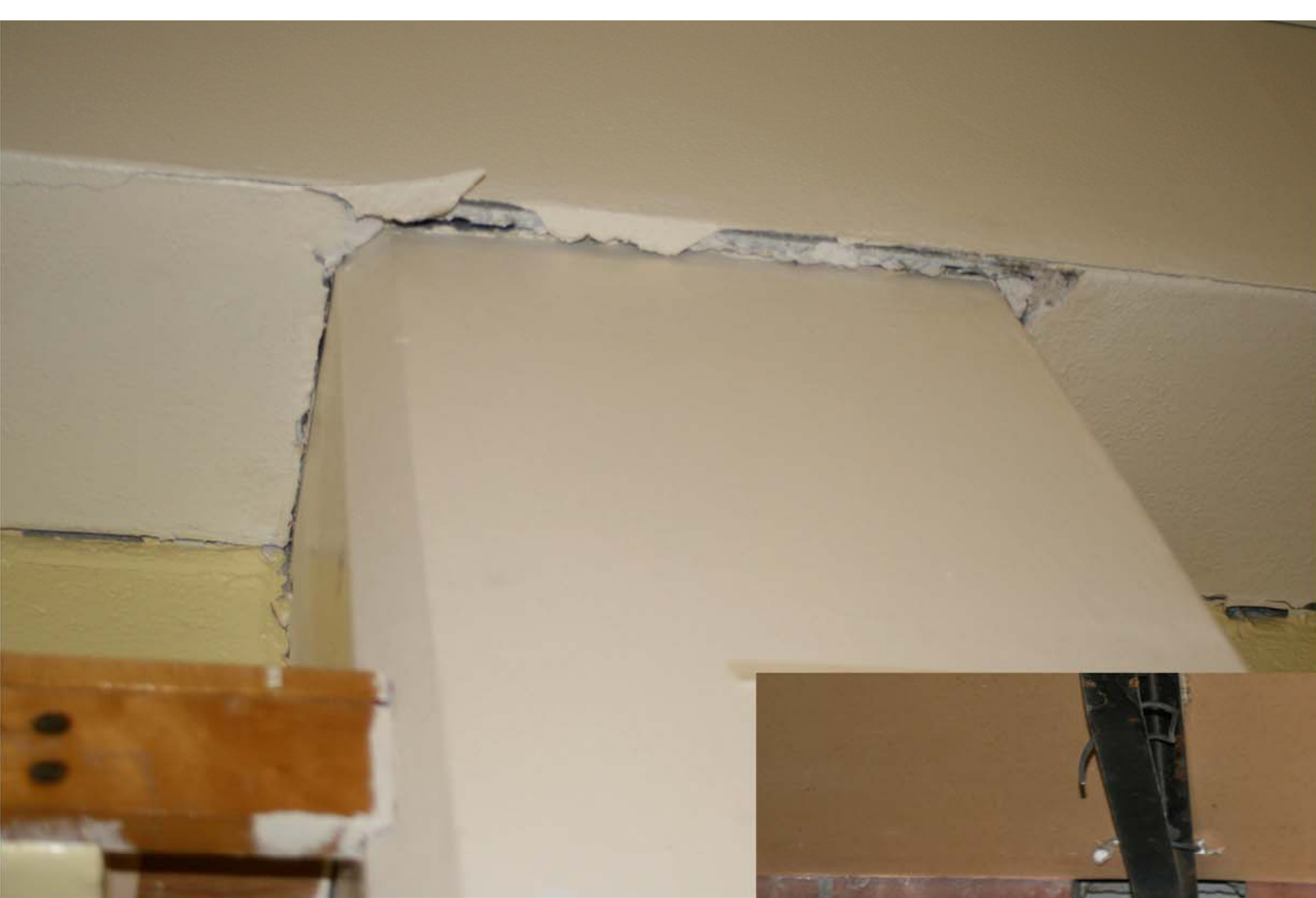
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© 2008 Europa Technologies

Streaming ||||| 100%



© 2007 Google

Eye alt 7







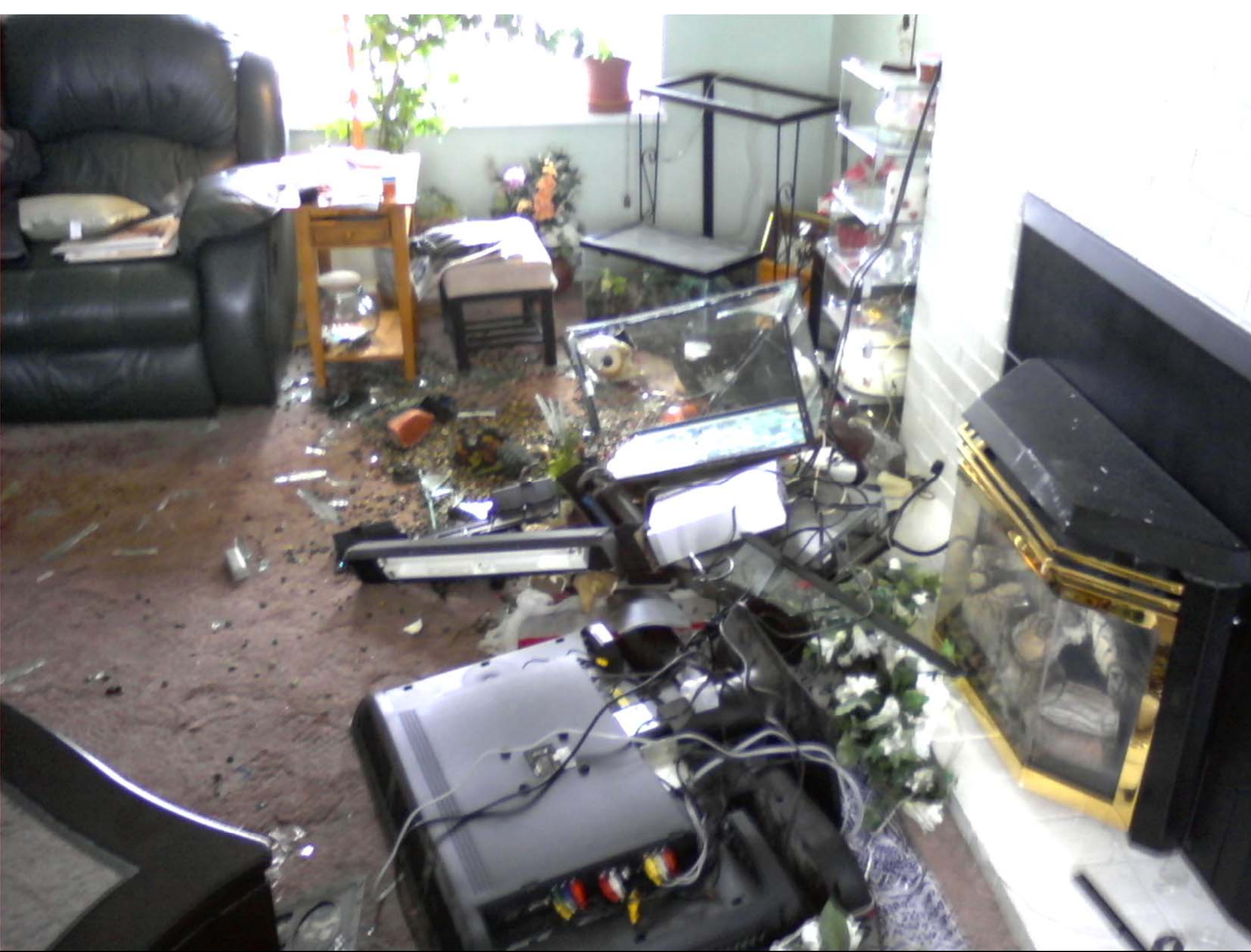


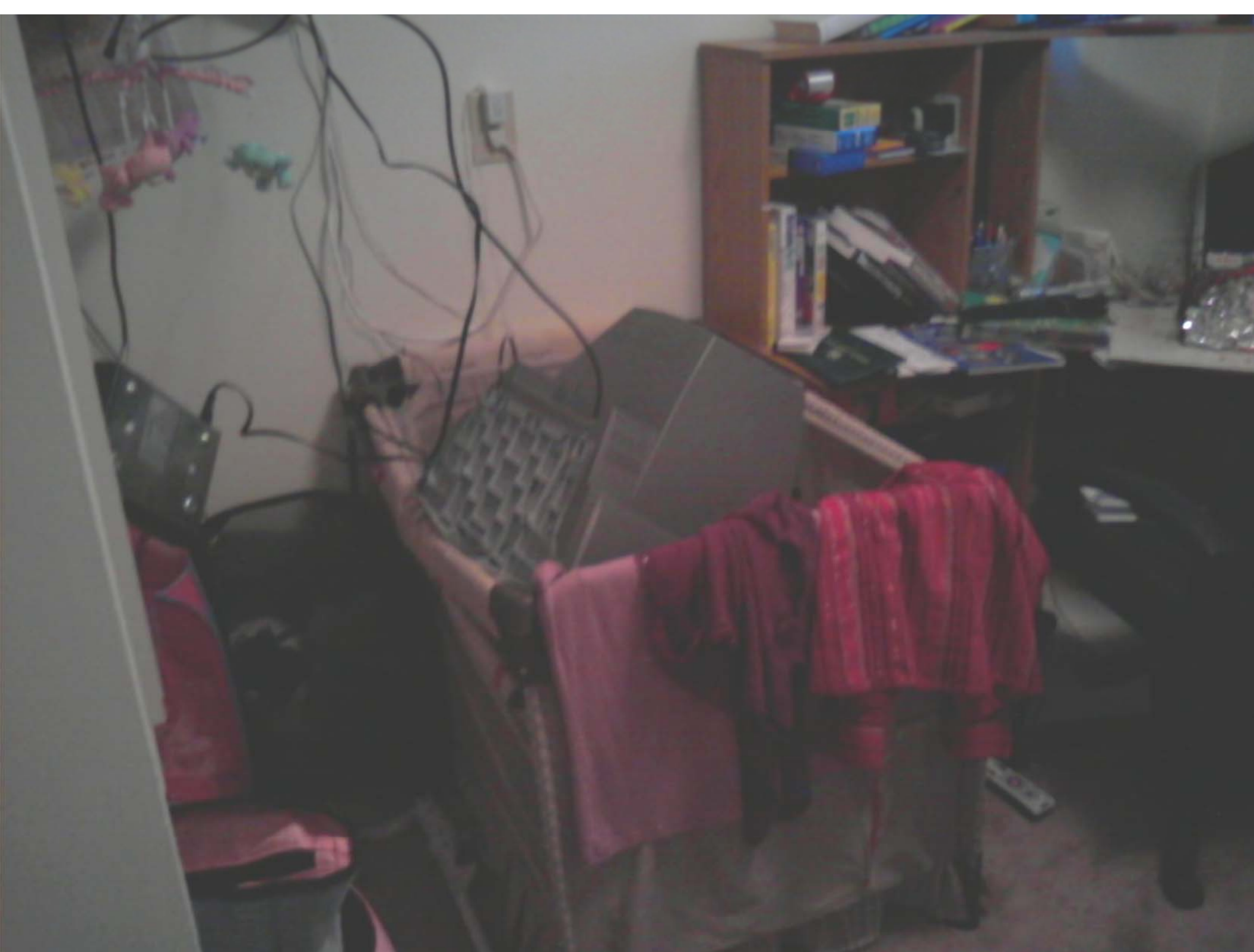




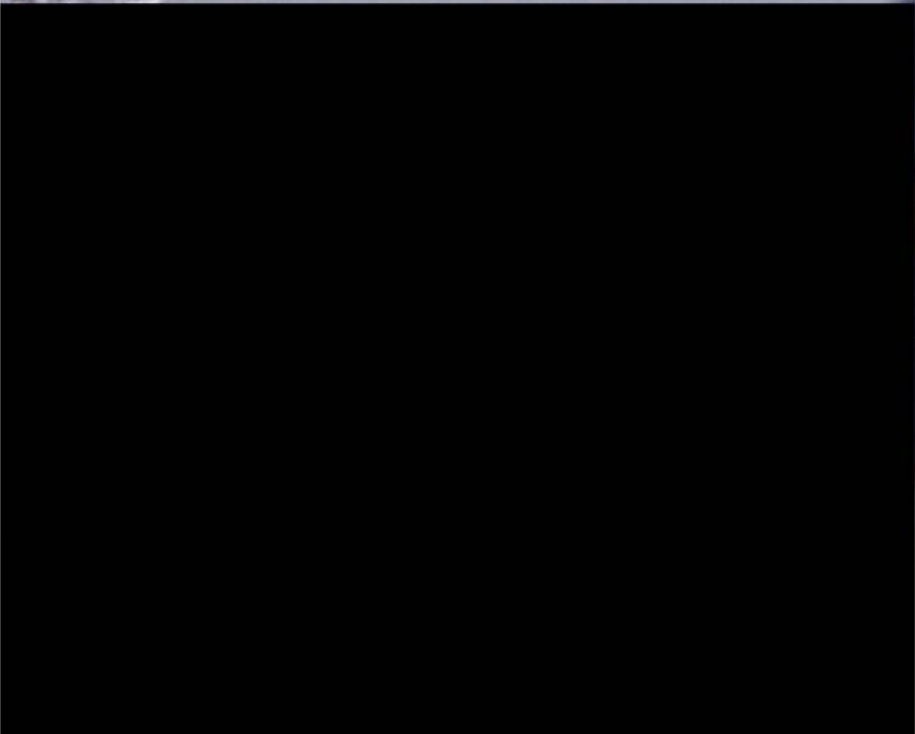


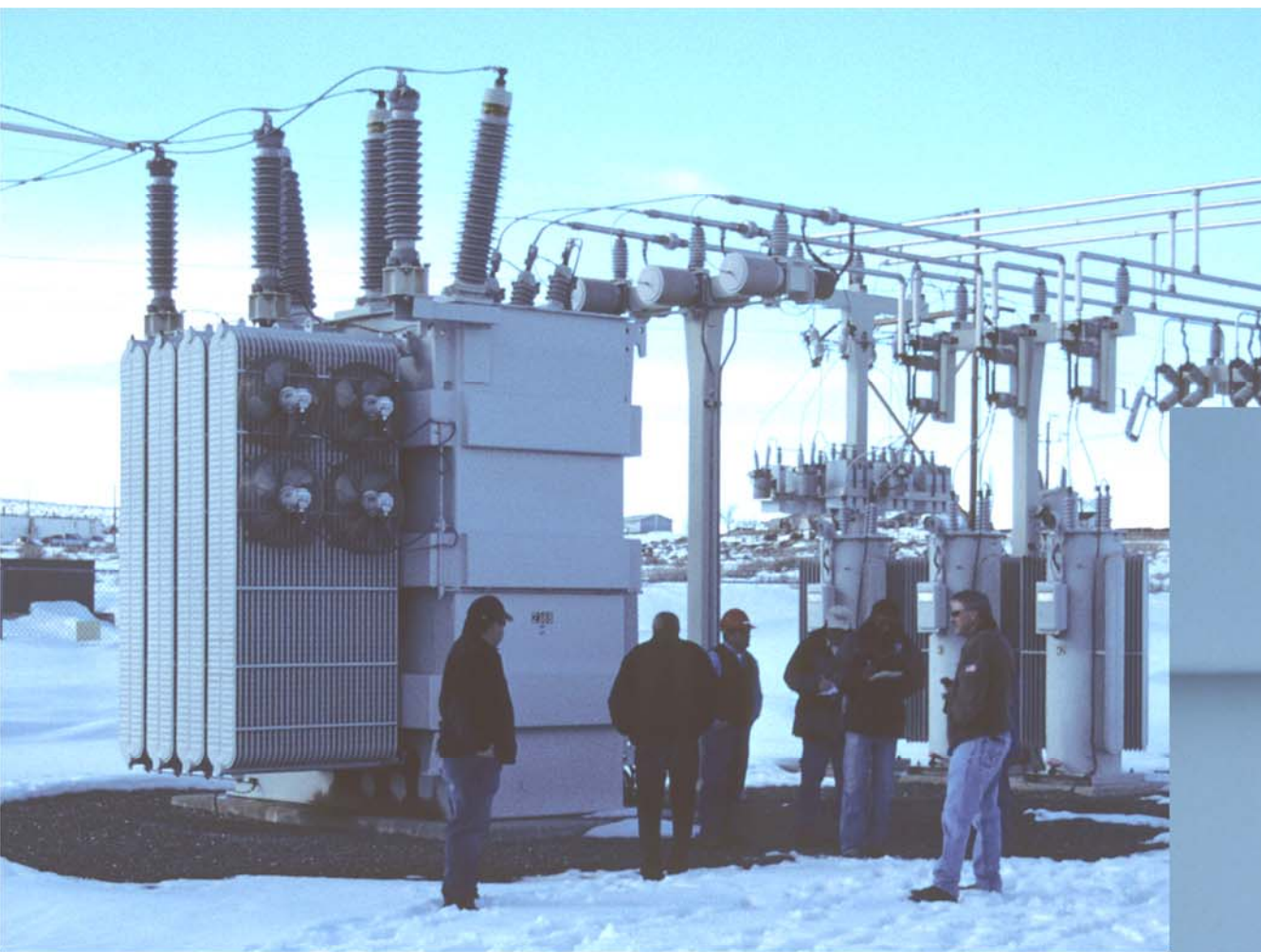


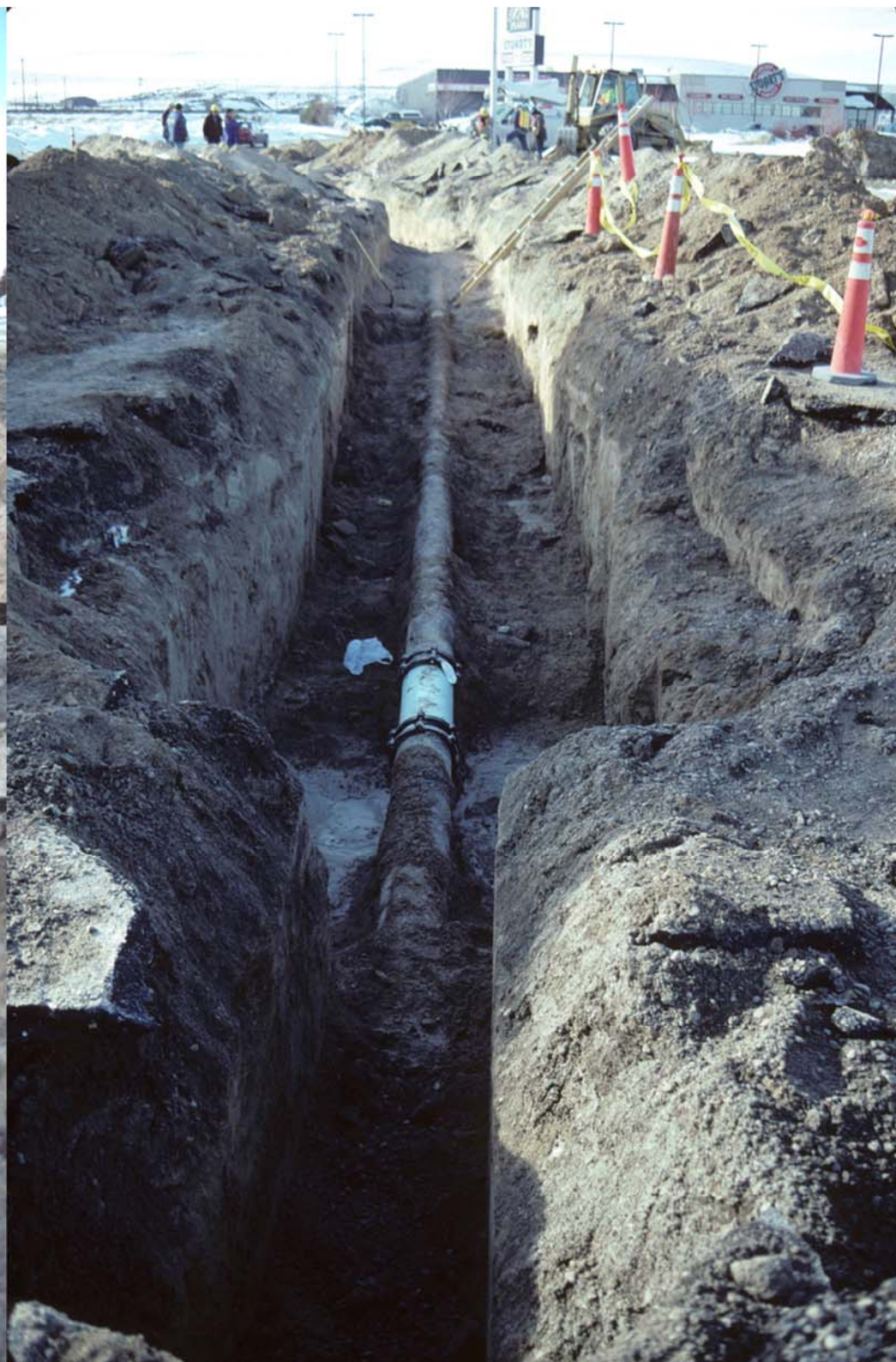














Emergency Response

- Local responders and individuals were on their own for 40 minutes. They handled the event well.
- Professionals and the general public knew what to do.
- People had familiarity and the command structure and response personnel were experienced.
- Communication incompatibilities.

Emergency Response

- 3rd & last EOC center option
- 7 red tagged; 52 yellow tagged; ~400 green tagged
- 60 chimneys damaged or toppled
- Initial safety inspection fire + sheriff deputies
- Inspectors; 8 +/- /day for one month (coupled inspector with structural engineer for team)

Damage to Homes+

- Two (?) homes lost.
- ~ dozen manufactured homes needed to be reset on their foundations.
- Businesses needed to be made safe or cleared for safety (priority; done day 2 if possible).



Early Recovery

- Immediate transition to recovery
- Saturday Fix-Up days
- Statewide donations
- Wells Recovery Rally



WELLS VOLUNTEER FIRE DEPT.





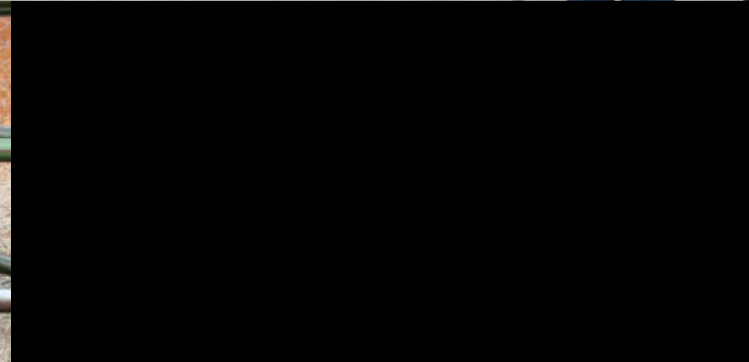
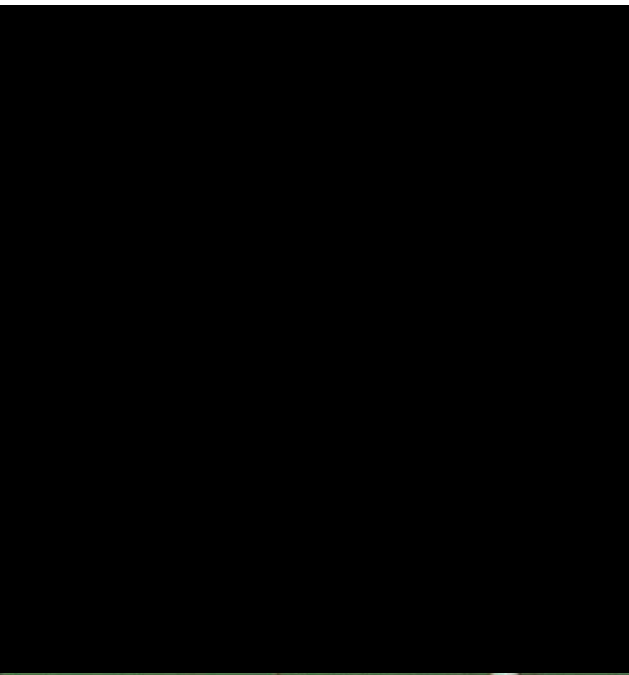
NOW EVERYONE KNOWS WHERE THE HELL WELLS IS !!

**SHAKE
SHAKE
RATTLE
& ROLL**

**I SURVIVED
THE 6.0
EARTHQUAKE..
WELLS, NEVADA
FEBRUARY 21, 2008**



DHM
**Bullshead Bar
Post EarthQuake
2-21-08**







There are many lessons,
but
we have to be careful
how much we generalize
from this event.

What could have been worse?

- Different time of day; damaged blgs. occup.
- 5-10 secs. more shaking, larger eq.
- More rupture directed towards town
- Larger major aftershock Day 1
- People not at home for quick action
- Windows broken
- Power out over night
- Key people not present

Human Spirit/Energy/Ingenuity

- Responders quick to react, well trained
- People took care of emergencies
- People took care of each other
- Leaders led and inspired
- Neighbors near and far came to help
- People put together recovery events

Low probability events matter

- Lower probability part of the State, but location of major earthquake
- Temporary nursery, baby temporarily gone

Low probability events matter

- Society can't focus on low probability events.
- So, it is up to **individuals** and local communities to respond to and recover from earthquake disasters. It is up to individuals to do nonstructural mitigation.
- Society supports individual effort and responds.

Some Conclusions

- Many **prior lessons** used in Wells; **limited the impact** of the earthquake.
- Lessons learned are generally similar to those learned in previous earthquakes and must be tempered by the limited nature of this event.
- **Individuals in Wells and surrounding communities were the largest asset.**

Some Rural Conclusions

- Goldilocks approach to response.
- Early Recovery is important.
- FEMA should consider a rural disaster fund (e.g., \$500,000 max. per. small community if \$1,000,000 damage is done).
- Promote earthquake preparedness and mitigation in rural communities.
- Promote public entity earthquake insurance.
- Promote URM hazard reduction.
- Support rural recovery.

Some Societal Insights

- Pioneer Approach to Coping with, Surviving, Recovering from, and Living with Earthquakes.
- Pioneering Spirit
- Pioneering Courage
- Pioneering Wisdom



On February 21, 2008 a magnitude 6.0 earthquake struck Wells, Nevada...view [press release](#)

Go to [Technical Clearinghouse](#)

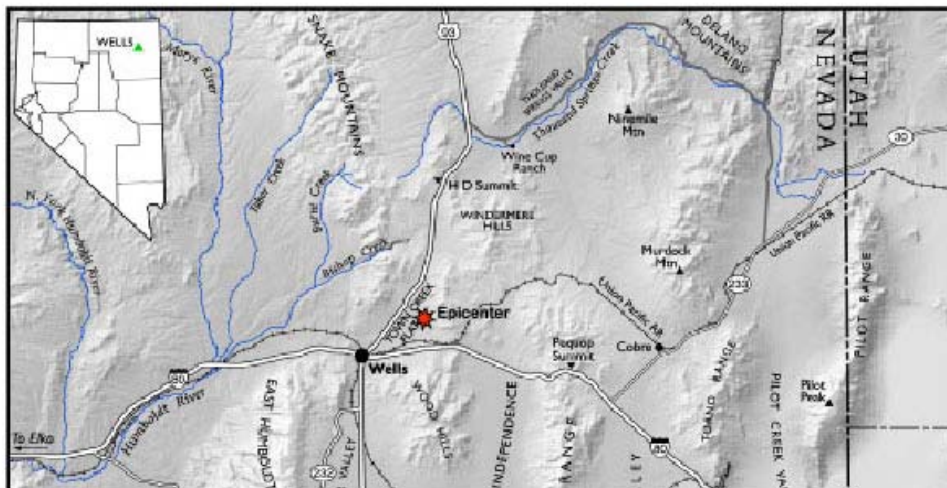
Back to [NBMG home](#)



Tells us your story!

We want to hear your reports and see your photos and videos of the Wells earthquake.

Send your stories, photos or video to: webmaster@nbgm.unr.edu



nbgm.unr.edu

Afterword

- **Pioneering spirit**
- **Modern-day savvy**