

## Summary of Newspaper Articles

Daily Spectrum "Earthquake Extra" – St. George, UT (last date searched 09/02/1992)

Headline: [Earthquake Registers 5.9](#)

Date: 09/02/1992

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Headline: [Quake Rattles Communities](#)

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**Deseret News – Salt Lake City, UT (last date searched 09/11/1992)**

Headline: [Moderate Quake Causes Damage In Southern Utah](#)  
Date: 09/02/1992  
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Headline: [Jolt Crumples Home, Hinders Pair's Escape](#)  
Date: 09/03/1992  
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Headline: [Aftershocks Could Rattle Quake Area, Expert Says](#)  
Date: 09/03/1992  
[Info Categories:](#) E

Headline: [Southwest Utah Picks Up Pieces After Earthquake](#)  
Date: 09/04/1992  
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Headline: [Springdale Keeps An Eye On Landslide](#)  
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Headline: [Quakes Bump Theater Off Agenda](#)  
Date: 09/04/1992  
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Headline: [Town Rejects Building Permit For Zion Theater](#)  
Date: 09/09/1992  
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Headline: [Aftershock Is Shocking In Timing And Mildness](#)  
Date: 09/11/1992  
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**Salt Lake Tribune – Salt Lake City, UT (last date searched 09/11/1992)**

Headline: [Quake Jars S. Utah, Triggers Massive Slide](#)  
Date: 09/03/1992  
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Headline: [Couple Unhurt But Homeless After 4 Days In \\$300,000 House](#)  
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Headline: [Damage Could Exceed \\$2 Billion If 5.9 Quake Hit Wasatch Front](#)  
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Headline: [Neighbors Pitch In To Help Victims Of S. Utah Slide](#)  
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[Info Categories:](#) A, B, G, I

Headline: [Tragedy Could Have Been Much Worse Had It Been Daylight, Park Experts Say](#)  
Date: 09/04/1992  
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Headline: [Home Measures Could Enhance Safety When Next Major Quake Strikes Utah](#)  
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Headline: [Springdale Pledges To Be Ready For Next Quake](#)  
Date: 09/05/1992  
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Headline: [Quake Doesn't Shake Crowds' Plans To Visit Utah Parks Over Holiday](#)  
Date: 09/07/1992  
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Headline: [Landslide, Lack Of Aftershocks Make St. George Quake A Puzzle](#)  
Date: 09/10/1992  
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Headline: [Trench Shows Quakes May Be Frequent Along S.L. Fault Section](#)  
Date: 09/10/1992  
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Headline: [8 Days After Biggie, 2.7 Aftershock Hits Southern Utah](#)  
Date: 09/11/1992  
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## Information Categories

### **A -- Aid:**

provide medical services, shelter, donations, loans, advice, encouragement, implement safety measures

### **B -- Building Damage:**

structure itself plus windows and chimneys (typically damage visible from outside the building)

### **E -- Earthquake Description:**

where, when, duration, direction, sound, motion, number and timing of aftershocks

### **G -- Geologic Effects:**

changes at the Earth's surface, fault scarps, rockfalls, landslides, ground cracks, ground subsidence, sand boils, water spouts; effects on springs, lakes, wells

### **H -- Humor:**

### **I -- Impact:**

changes in daily routine; rumors; influx of reporters, politicians, cost in dollars

### **L -- Lifelines:**

effects on transportation: roads, bridges, railroads, airports

effects on communications: telephone, telegraph

effects on power, gas, water, and sewer lines

effects on dams

### **N -- Nonstructural Effects:**

effects on plaster, furnishings (typically damage or rearrangement of furnishings visible inside a building)

### **P -- People:**

effects on and responses to, during and after; deaths, injuries, near misses

### **R -- Recovery:**

clean up, rebuild

### **S -- Scientific:**

explanation of the day

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## EARTHQUAKE REGISTERS 5.9

By Scott Summerill

ST. GEORGE--Police and emergency crews responded in full force to the early morning earthquake that rocked Southern Utah today.

Most of the quake focused its destructive energy near Springdale at the mouth of Zion National Park. Washington County Sheriff Sgt. Rymal Hinton reports county road crews, civil defense personnel and police converged on the tiny city of Springdale, where State Route 9, the main access road to the town, is closed and at least one hillside is slowly creeping into the valley.

Utah Highway Patrol reports the hillside east of Flannigan's Inn in Springdale is moving three to four feet per hour. Two houses built on the hill have already sustained major damage and are expected to be completely lost as the slide continues toward the river bed.

Road crews armed with heavy earth-moving equipment are standing by to clean up the slide.

Officials say the slow moving slide has taken out some power and water lines, but residents have been evacuated from the area. No serious injuries have been reported. SR-9 is closed to through traffic due to rock slides between Rockville and Springdale. Only local traffic and emergency crews are being allowed into the area.

Hinton said sheriff deputies on the midnight shift stayed on when their relief came on duty to handle emergency calls in the county, which he says have been primarily minor damage reports.

St. George police say the heaviest hit area of that city was in the Green Valley area, where minor structural damage has been reported. Officers say no additional police have been called for duty and no injuries have been reported.

Officials in the Washington County Jail say prisoners in that facility responded to the unexpected wake-up call with a clamor of excitement, but no damage or injuries were reported.

Jeanne Fredrickson of Ivins said she heard several loud booms before the rumbling starting.

"At first I thought a gas leak had exploded," she said. "There were these loud pops that sounded like explosions, then the whole house started to shake. We got a good scare." In Mesquite, Nev., police say they felt the quake but report no serious damage or injuries. One employee at the Peppermill Hotel and Casino said she felt her chair move, but things stayed calm and it was business as usual.

With exception of SR-9 near Springdale, highway patrol and police in Utah, Arizona and Nevada report all major highways are open and traffic is moving normally.

Officials report no fires although there have been downed power lines and minor breaks in water lines.

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## QUAKE RATTLES COMMUNITIES

By Lynette Olsen

HURRICANE--Residents here say they received a wake up call early today that shook windows, knocked over bookcases and dumped groceries into aisles at a local food market.

One residence received extensive damage when an earthquake rocked about 4:26 a.m. today, but no injuries have been reported in Hurricane, LaVerkin, Kanab and Glendale. The southside of a century-old, two-story house belonging to Hurricane resident Leah Heap bowed from shockwaves registering 5.9 on the Richter scale.

"Every wall in the house is cracked," said Kathyryn Greenwood, Heap's daughter. "We're just sick. This is one of the most historic houses in Hurricane."

"There were a few places where rocks slid off hills, but that's about all we've heard about," said Hurricane employee Joyce Maughan. "We haven't had any reports of damage to waterlines, streets or sidewalks."

Hurricane City Councilman LeGrande Imlay was working the early shift at Lins Market when cans and bottles began to tumble from the shelves.

"It was scary as heck," he said. "There wasn't anything I could do but stand there and watch the aisles fill up."

Store manager Greg Gibson said he arrived just minutes after the shakedown.

"The aisles were pretty much loaded with products: juices, pickles and dish soap were splattered on the floor," he said.

Extra crews were called in to help with the cleanup and the store opened as usual at 8 a.m. Gibson said beside the fair amount of damage in product loss, the store got off easy.

"We don't think there's any structural damage," he said.

Filing cabinets and spilled bookcases block the door to LaVerkin City Offices today when employees arrived for work.

City Administrator Del Ruesch said residents from all parts of LaVerkin have reported muddy tap water. At press time city crews were assessing the situation. Ruesch said it was still unknown if the quake shook sediment loose in pipes or if a water main had broke. LaVerkin residents should not drink the water if it appears dirty, Ruesch said. Residents are being told by city officials to flush out their water lines with an outside tap.

The temblor woke up Glendale resident Karren Nemrow from a sound sleep.

"It really wiggled the house hard and it felt like it lasted forever," she said. "I couldn't get back to sleep afterward. It really shook me up."

Nemrow said she felt gentle shaking before the big one.

University of Utah Seismologist Jim Pechmann said the Glendale resident likely felt some foreshocks.

In an earthquake Pechmann said the primary wave or P-wave travels from the epicenter at a rate of about 1 second for every five miles. Within seconds of the P-wave, the secondary wave or S-wave hits. It travels at a slower pace but delivers stronger movement.

Southern Utahns should expect to feel some aftershocks, Pechmann said. He expects some activity through the weekend, although its possible aftershocks could come weeks or months from now.

Kanab County Sheriff's Office said residents there felt the earthquake, but no damage had been reported.

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## ZION PARK STRUCK HARD BY QUAKE

By Debbie Dangerfield

ST. GEORGE--At 4:26 a.m. today, an earthquake roared through Zion National Park. It was, according to geologist Al Warneke, "the largest quake in Southern Utah in the past 10 years."

Warneke, stationed at the park, reported extensive damage to the area, including gaping holes in the ground "as big as the ones in Anchorage, Alaska," created from the 1964 earthquake.

"The whole side of the mountain is falling off," he said, referring to Kinesava mountain, located both inside the park and in Springdale.

City and park personnel, who walked up the mountain on foot, evacuated three families this morning. No injuries were reported but their houses were totally destroyed.

"There are parts of the road that have been separated by 30 feet," said Warneke. "There are literally thousands of cracks--some a few inches wide, some 20 feet wide. They are 100 feet long or more and you can't see the bottom.

"From the road to the top of the hill, where the road started pulling away, is approximately a quarter of a mile or more. The width of the unstable area is, at least, also a quarter of a mile," he said.

Warneke reports everything from dust to boulders, some four feet big, falling off the hill into the road.

"I have been all the way up to the top where the houses are. The houses are still moving, slipping into the holes. The whole side of the mountain, particularly the lower part is unstable and could slide into and across the road.

"Across from the Cliffrose Hotel, there are boulders filling the road. They are still falling off. The power line pole near the side of the road on the hill is leaning toward the road at about a 45 degree angle, ready to fall into the road.

At this time, automobiles are not being allowed into the south entrance of the park, just outside the southgate in Springdale. Warneke said the mountain could remain unstable indefinitely.

There have not been any aftershocks at this time

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## FACTS ON EARTHQUAKE

- **Magnitude:** 5.9 on the Richter scale according to the University of Utah Seismograph Stations. The Richter scale provides information on the magnitude or inherent strength of the earthquake.
- **Time:** 4:26 a.m. Mountain daylight-saving time.
- **Epicenter:** Five miles southeast of St. George.
- **Origin of quake:** The epicenter was about one-fourth of a mile west of where the Washington Fault hits the surface. Data indicate the quake was on the Washington Fault, which runs through Washington City, but that cannot be absolutely determined since faults curve below the surface.
- **Notable earthquakes:** A 1902 earthquake in Pine Valley north of St. George was estimated at 6.0 on the Richter scale. Another 6.0 temblor was recorded in March 1975 in the Pocatello Valley on the Idaho border. The San Francisco earthquake of 1906, later recorded at 8.3 on the Richter scale, was responsible for 700 people who died in the fire and subsequent fire. On July 28, 1976, the Hopeh province in northern China recorded an earthquake that reached a magnitude of 8.3; a government document later reported more than 650,000 people were killed and nearly 780,000 injured.

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## EARTHQUAKE ADVICE

Have on hand for any emergency . . .

- **Flashlights with spare batteries.** Also a portable radio with spare batteries.
- **First aid kit and instructional handbook.** Have members of your family take basic first aid and CPR courses.
- **Fire extinguishers.** Some extinguishers are made for certain types of fires-- electrical, grease or gas. Class "ABC" extinguishers can be used safely on most fires.
- **Food, cooking utensils and non-electric can opener.** Have a sufficient supply of canned or dehydrated foods, powdered milk and canned juices for at least 72 hours. Dried cereals, fruits and nonsalted nuts are a good source of nutrition. Include some food items that do not require water for preparation.
- **Alternative source for cooking.** In case gas or electricity is interrupted, you will have to use other means for cooking. Have appropriate fuel and tools to use an outdoor stove or barbecue. When cooking outdoors, ensure you are away from possible gas leaks. Store matches in waterproof, airtight container. Check from time to time to ensure they are still good.

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## AREA UTILITIES REPORT LITTLE DAMAGE

By Loren Webb

ST GEORGE--No reports of damage were reported by utilities in Washington County except in the Springdale-Zion National Park area following an early morning earthquake that measured 5.9 on the Richter scale.

Utah Power & Light Area Manager Scott Rasmussen in Cedar City, who had difficulty getting through to *The Daily Spectrum* on the telephone lines at 9:30 a.m. because all the circuits were busy, said "the only thing we know about is that we do have an outage at Springdale but we don't know what it is because we have not been able to get in there because the roads have been blocked off by the Utah Department of Transportation.

"I'm sure it (the power failure) was caused by the quake but we have not been able to get up there to see what it is," he said.

By 10 a.m., Rasmussen reported UP&L crews had reached Springdale, and said one house was leaning about 45 degrees. He said a UP&L pole had slid down the hill and put enough slack in the line "that our lines are on the ground. We have no idea how long power will be out because rocks are still rolling down the hill."

He said the incident occurred in the Black Rock Subdivision near Flanagan's Restaurant. Rasmussen said he did not know what time the power failure occurred.

City Water and Power Department Engineer Phil Solomon said their department checked all of their facilities and found no problems with either water or power.

He said the only place they hadn't heard reports on was at Gunlock Reservoir. He said city staff had asked Rod and Jay Leavitt of the Lower Gunlock Corp. to check the dam for any damage left by the earthquake which struck around 4:28 a.m.

Solomon said they were still trying to investigate major structures, including water tanks and they seem to be intact.

No power failures were reported, said Solomon.

Ron Thompson, Washington County Water Conservancy District manager, said crews went out to Quail Creek Reservoir immediately following the earthquake and conducted a preliminary check of the entire water system.

The system check was completed about 6 a.m. "and all the structures are fine and there is no damage that we have discovered, although we will continue an extensive monitoring program for the next two to three days," said Thompson.

Thompson added there was no new cracking or indication of any problem at the Quail Creek dam site. He said the dam was designed to handle quakes much larger than this one.

He said the district is sending someone to Kolob Reservoir to check for any signs of damage there.

St. George Airport Manager Jack Jeppson said city officials conducted a thorough investigation of the airport and airport facilities and found no obvious damage. He said they checked the runway and various terminal and hangar buildings and found no damage.

However, he said rockfalls were reported on Red Cliffs Drive and Don Lee Drive.

Jeppson, who is also a city building inspector, said they had not received reports of any major damage to any residential homes, except he said Police Chief Jon Pollei had reported a broken water heater at his residence.

He said the quake loosened plaster in the historic Arts Center in the stairwell area. Minor cracks were also evident in the west area, but it is not structurally unsound.

"As far as the airport, we rode it (the earthquake) out real well," he said.

Dave Chapman, Southern Utah manager of U.S. West, said a transmitter site at Little Creek near Apple Valley did go out, but it automatically switched to a spare line and there was no problem to customers other than high usage.

"We don't know the extent of the damage and we are sending a man up to the site to determine the extent," he said.

Kirk Bradley, regional wastewater manager of the Regional Wastewater Treatment Facility, said crews were also at the plant shortly after the earthquake "and there appears to be no damage to the Water Reclamation Facility.

He said there were no reports of damage to any wastewater trunk lines.

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## EARTHQUAKES RARE IN SOUTHERN UTAH

By Gary G. Roe

Residents in Southern Utah are conditioned to hearing of quakes in California and elsewhere. The populated area of northern Utah sits astride a major fault line along the Wasatch Front, stretching from Gunnison to Malad, Idaho. But, documented earthquakes in the southern part of the state are sparse.

Documented reports from the early history of the area are found in personal diaries and newspaper accounts. Once the use of seismic equipment was implemented, however, precise and specific records became available.

Since 1850 approximately 150 earthquakes have been recorded registering at least 4.0 on the Richter scale.

The two largest earthquakes in the Utah region occurred Nov. 13, 1901, near Richfield. On Oct. 5, 1934, a quake hit Hansel Valley at the north end of Great Salt Lake. Both tremors registered in excess of 6.5.

Kanab was near the site of two notable quakes: one on Dec. 5, 1887, registering 5.5 and another July 21, 1959, registering slightly above 5.5.

Pine Valley's quake of Nov. 17, 1902, tipped the scale at 6. Elsinore suffered back to back temblors Sept. 29 and Oct. 1, 1921.

In November 1971, the area around Cedar City experienced what is termed an "earthquake swarm" near the Hurricane fault zone. The swarm began the first week of November and hit its peak Nov. 10, being felt by residents throughout Cedar and Parowan valleys.

Most recently, within the last two years, several small tremors have been registered with epicenters in the mountainous areas between Cedar City and Beaver, and Beaver and Nephi. No injuries or damages were reported.

Most earthquake activity in Utah has been experienced in the northern part of the state.

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## **BUSINESS AS USUAL FOR LOCAL SCHOOLS**

ST. GEORGE--A few roof tiles fell, one classroom wall cracked, but class went on as usual today throughout Washington County.

This morning's earthquake caused only minimal damage to some of the older buildings, "About what you see in some of the houses," said district Superintendent Steven Peterson. One classroom in the Woodward Elementary Annex building was closed. Classes were moved to elsewhere in the building.

Peterson and a building inspector examined schools in the St. George area. The greatest damage was reported in the Springdale area, but the school was undamaged there, as well.

Peterson said the damage at Woodward appeared to entail only plaster cracks. Woodward Principal Don Powell said, "We were about 15 minutes late starting school because we checked out all the classrooms before we let the kids in.

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## TEMPLE AND TABERNACLE SUSTAIN MINOR DAMAGE

By Carolyn Wardle  
Religion Editor

ST. GEORGE--The St. George Temple and Tabernacle sustained only superficial damage from the earthquake that shook the area early today.

Rod Park, superintendent with McCullough Engineering and supervisor of the Tabernacle restoration, said the "old massive buildings withstand earthquakes real well; they crack but they don't break."

The west side of the Tabernacle received most of the damage. Plaster on the cornice was broken off and the joint between the ceiling and roof cracked.

"Structurally, the building is fine," said Park, "but cosmetically there is a lot of damage. There are cracks everywhere."

Many of the cracks are in areas where the restoration painting has been completed.

Plaster will have to be remolded and walls repainted. Completion of the restoration will be delayed by several months.

"The earthquake has caused a real hindrance," said Park. "It sets us back to square one--even worse than square one."

President Robert Winston of the St. George Temple Presidency said there are only moderate cracks in some walls of the temple. A few windows in the tower were also cracked.

A structural engineer from Salt Lake City will be coming to inspect the building.

Winston said they are happy there was so little damage. He said officials took the necessary safety precautions before allowing patrons to enter the building.

Winston joked that the earthquake was a wake-up call from the Lord for temple workers, because they had been late opening the temple Tuesday morning.

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## QUAKE RATTLES GROCERY STORES, LOCAL BUSINESSES

By Julie Lindquist Applegate

ST. GEORGE--"I was in the front of the store facing into the aisles when everything began to shake and tumble off the shelves. I thought a small plane had come down on the store and we were going to die," said Smith's Food King employee Mindy Grummel in the wake of this morning's earthquake.

Smith's was hit the hardest by the earthquake, which measured 5.9 on the Richter scale. At Smith's, a suspended ceiling apparently amplified the effect of the earthquake, causing light fixtures and ceiling tiles to come crashing down. The store also had merchandise shaken off the shelves, and was forced to close temporarily.

According to manager Harvey Woodyatt, the store sustained no structural damage except that related to the suspended ceiling.

"I estimate the damage will total about \$15,000 \$20,000. The costs will add up with all the manpower it will take to clean up the broken glass and spilled items in the aisles, not to mention the electrical damage. I can't open like this. It's unsafe with all these fallen light fixtures," Woodyatt said.

However, by 10 a.m., city building inspector Dick Simkins had proclaimed the building safe, most of the debris was cleaned up and the store was re opened to the public.

Dixie Regional Medial Center reported minor damage to the building's brick facade, but no structural damage and no injuries occurred. However, that did not prevent alarm at the hospital.

"The higher you go, the more patients complained of rocking. Nobody has slept since the earthquake at 4:30 a.m., said assistant administrator Kent Tarbot. "One patient even asked to be discharged."

Don Lyman of Jones Paint and Glass said initially, his company did not have any increased requests for glass replacement. However, by 10:30 a.m., Lyman estimated he would have three to four times his normal business this week, and was making plans to work on Saturday to wrap things up by the Labor Day weekend.

"Mostly the damage has been to buildings with old, wooden window frames. The newer window designs can take more of a shock," Lyman said. He said a lot of calls were from individuals, but that he has also received calls to replace windows at Ancestor Square, Seven Wives Inn, and Green Gate Village, all of which are refurbished pioneer structures. Lois and Gerald Smith, caretakers of Your Inn bed and breakfast in Toquerville, experienced a close encounter with boulder tumbling off a nearby hillside.

"We just felt this terrible jerk and a clanking sound. My husband rushed outside and saw that the top of his Blazer had been sheared off and the back of the car smashed," said Lois Smith. A boulder, three feet in diameter, rolled over the Blazer, crushed a bicycle, and pushed in a four to five foot section of the Inn's rear wall. The boulder destroyed a solar heating system, but total damages are unknown at this time.

Area department stores escaped serious damage in the quake, with Wal-Mart reporting about \$500 in broken merchandise, and Kmart about \$300.

Harmons grocery store reported almost no damage, while Albertsons apparently suffered little, but were unwilling to comment.

Other area businesses escaped mostly unscathed, although Newby Buick, located next to Smiths at the corner of Bluff Street and St. George Boulevard, had some minor problems.

"We had some pictures fall, and some shelves fall onto a computer," said Curt Benware.

The condition of the computer is still unknown.

Also, a crack in a vertical concrete beam was discovered after the quake. City inspectors have OK'd the building, but the damage could have been more serious.

"If that quake had lasted just a few seconds longer, we might have had a cave-in," said Benware.

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## TEMBLORS RATTLE CEDAR CITY; NO MAJOR DAMAGE REPORTED

CEDAR CITY--Iron County residents had flashbacks of a series of early summer temblors early today when an earthquake centered south of St. George shook their homes.

"I sat up in bed, then waited for more to come, like they did a couple of months ago," one person said, referring to a series of earthquakes that struck the area on June 28.

Iron County Sheriff Ira Schoppmann said he expected to find some damage from the quake, but patrols through Parowan and Brian Head, up Cedar Canyon, and to Kanarraville revealed no major damage.

"I believe we were pretty lucky here. So far there's no damage that we're aware of and nothing's been reported. It just shook us all up pretty good," Schoppmann said.

The only damage reported to *The Daily Spectrum* office in Cedar City was a set of cracks in a local driveway. Boyd Redington, of 619 Sunset Drive, said his newly laid driveway had several small cracks this morning.

"We put the driveway in this summer and we used cement with fibers and rebar so it wouldn't crack, but the darn thing cracked anyway. We found three cracks that weren't there last night--one of them is about 20-feet long," he said.

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## WAS THAT AN EARTHQUAKE?

By Nicole A. Bonham

RICHFIELD--"At 4:26 a.m., I was in taking a bath," Richfield Mayor Jay Andersen said of the time an earthquake measuring 5.9 on the Richter scale rocked Southern Utah this morning. "I might have just thought it was a wave in the water."

Reports of power poles flexing and roofs shaking in more southern counties came as a shock to many Central Utah residents.

"There was an earthquake here?" The question, posed by Richfield Police Department dispatcher Pat Johnson, was typical as word of the quake spread.

The temblor was news to employees at Royal's Market in Loa who only knew of the earthquake from media reports.

"There's three of us here and we didn't feel too much," employee Coleen Bagley said. However, a truck driver unloading merchandise at the general store told a different story. The driver had been traveling through Sigurd at 4:26 a.m. and reported "his truck just about came out from under him," Bagley said.

In Richfield, the night-shift employee at Maverik Country Store, one of only a handful of operations in Richfield that remain open 24-hours, said she didn't feel a thing.

Dispatcher Kim Bredsguard of the Sevier County Sheriff's Department said the night dispatcher had felt only minor rumbling, but had gotten additional news from his son who lives in St. George.

"He just knew something was going on," Bredsguard said. He said there were no local reports of damage in the Sevier Valley.

On an early morning show, local radio announcer Jason Barber asked for calls from those who felt the quake. He received a dozen reports from throughout Sevier County and Millard County.

Discussion of areas hardest hit by the earthquake has prompted many local residents to question how such a disaster would be handled if experienced locally.

"I don't even know where to go for information," dispatcher Johnson said.

In Central Utah, such emergency management has been a recent topic of concern in both Wayne and Sevier counties. In August, the Richfield City Council formally adopted its priority list of emergency management authorities on a city level. If experienced on a county level, any disaster would be handled by emergency management directors Jim Porter in Sevier County and Vickie Taft in Wayne County.

However, in Central Utah the early morning quake was not an opportunity to put local emergency management plans to the test.

Reports were few, with most residents learning of the temblor through the media.

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## RESIDENTS OF SPRINGDALE LEND A HELPING HAND Community Rallies To Aid Fellow Residents

By Sandi Graff

SPRINGDALE--Residents of a town lately noted for controversy, closed ranks to help those left homeless Wednesday by the earthquake.

Two families lost their homes as thousands of tons of earth slid off the mountain in northeast Springdale, destroying three houses and blocking S.R. 9 between Springdale and Zion National Park. About six families were evacuated from the Stone Mountain Condos just south of the landslide Wednesday morning, and proprietors and guests were asked to leave three businesses still in the path of the slide Wednesday night.

"This thing is a long way from over," said Washington County Sheriff Glenwood Humphries. Nonetheless residents, while subdued, were universally grateful.

"It could have been so much worse. Not to take away from the families who lost homes, but it mostly just shook things off people's shelves," said fire district volunteer Shirley Ballard. Ballard and other volunteers traversed the devastated area to recover personal items from the crumbled homes Wednesday. Another recovery venture was planned for this morning.

St. George, which was nearer the epicenter, felt a few seconds of quiet rocking during the 4:36 a.m. quake. Springdale and Rockville area residents say the quake began with a resounding boom, which "I'm convinced was the side of that mountain breaking off," said assistant town clerk Sue Fraley.

After the quake, the canyon echoed first with the reverberation of falling rocks, then with a sickening cracking as the hillside began to slide, said Fraley.

"It was like milk poured over a giant bowl of Rice Krispies and you could hear snap, crackle, pop all day long," she said.

Movement of the land appeared to have all but stopped Wednesday evening. Humphries said geologists warned that rain or aftershocks could bring more dirt down. A mild aftershock Wednesday afternoon appeared to have negligible effect, but Humphries added "I just hope the aftershocks hurry up so we can be done with it."

Part of "Slide Mountain," as some call it, moved about 30 feet east, cutting off power to north Springdale and the park; power was restored to Springdale about 4:30 Wednesday while Utah Power and Light crews labored into the night to restore electricity to Zion National Park.

87-year-old Rudy Lueck and his wife Eula, 80, say they escaped their home just before the living room fell apart, thanks to quick action by the Rockville Springdale Fire District.

EMT Pam VanderWerff, a resident of the condos adjacent to the slide, recognized the danger and phoned the Luecks just after the quake. VanderWerff and three other fire district members then climbed the shifting mountain and helped the couple down.

"If you stopped you could feel the ground moving under your feet," said Eula Lueck. Fire Marshal Al Bench said the chasms opened up even as they walked.

An ambulance was waiting at the bottom of the hill for Rudy Lueck, a heart patient who's had a heart attack and bypass surgery. Also waiting were friends who "called before we got (the Luecks) off the hill to say they had a room ready for them," said Ballard.

The Luecks said they hadn't yet absorbed the fact that their home of 25 years is lost, but Mrs. Lueck said "That's just material stuff anyway." Virtually everyone in town called or visited her Wednesday, offering help and support, she said.

Echoing that sentiment was Georgie Meinert, who just moved into her home last week. Their son Mark Austin built and had lived in the home, but this summer Mrs. Meinert and her husband Jerry spent thousands finishing it this summer. They'd just moved the last of their possessions in on Monday.

The Meinerts had lived in California and weren't intimidated by the quake, but Mrs. Meinert said her husband Jerry sensed something wrong and insisted they leave shortly after the temblor.

Mrs. Meinert, who was wearing a leg brace due to a recent ailment, hobbled the mile down to the road with her husband. The ground shifted under them, she said, and "the town was still asleep when we got down. No one knew yet what was happening."

Their \$300,000 house isn't insured against such tragedy, she said, but "It doesn't even matter, we still have each other. I can't help but think of the people who are really homeless, really poor," said Mrs. Meinert. The Meinerts are staying at a motel in Springdale.

The third home on the hill was a summer residence. Owners James and Judythe Roberts are in California.

The families evacuated from the condos moved in with friends and into motels, and will return home once power, sewer and water are restored to the condos.

Utah Department of Transportation officials said they will make no move to clear off the road until the dirt is stable. In other words, Springdale is essentially cut off from Zion during one of the busiest business weekends of the year.

Business owners said they haven't had cancellations yet, but fear some vacationers will cancel plans.

"This weekend obviously is a loss for us," said Ruth Hall of the Cliffrose Lodge. The Cliffrose is just across the road from the slide, and was still without power late Wednesday afternoon.

Ballard, one of the owners of the Driftwood Lodge, said she had hopes visitors will still come, since there is no danger in Springdale. Also, the park is still accessible by foot or mountain bike. Nonetheless, all was too quiet in Springdale for a Labor Day week. A slow weekend "will certainly hurt, but no one's going to go under because of it. It has been a good year," she said.

**[Daily Spectrum; September 2, 1992]**

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## **MODERATE QUAKE CAUSES DAMAGE IN SOUTHERN UTAH**

### **Jolt Destroys 3 Springdale Homes, Triggers Slides. No Serious Injuries Reported**

By Joseph Bauman

A moderate earthquake rocked southwestern Utah early Wednesday, demolishing a three-home subdivision, breaking waterlines, knocking out electrical power and causing rock slides that blocked the southern entrance road to Zion National Park.

The University of Utah seismograph station estimated the quake at 5.9 on the Richter scale, but the U.S. Geological Survey's National Earthquake Information Center in Golden, Colo., put it at 5.5.

The quake struck at 4.26 a.m. It was centered about five miles southeast of St. George, said Sue Nava, senior staff seismologist at the university seismograph station.

No serious injuries were reported.

All three homes of the Balanced Rock subdivision near Springdale, close to the Park's entrance, were destroyed. "One is sliding down the hill and the other two, they're buckled," said Springdale City Manager Paul Millett.

Mr. and Mrs. Rudy Lueck were trapped in their home in the Balanced Rock subdivision when the house was damaged, Millett said. Two emergency medical technicians from the Springdale ambulance service "broke them out and started walking them downhill," he said.

"The elderly man (Lueck) had a little heart trouble this morning, but he's stabilized and he's OK at a friend's house this morning."

A big boom woke Millett, and his home was "rocking and rolling." Although the ground shook for less than a minute, it seemed like a long time, he said. "There was an awful lot of dust in the air this morning."

The mountain started sliding about 6 a.m., he said. "Rocks were rolling and moving, fissures were opening up, and the earth was coming down. It's still going on. It's still moving," he said, six hours after the quake.

Also evacuated from the Balanced Rock subdivision was the Mark Minert family. The third home was unoccupied. Minert's home started sliding, he said.

The temblor broke a water main that fed the subdivision and communities close to the mountain's base, and workers rerouted water to continue service. Electrical power to much of Springdale was knocked out.

"Aftershocks are to be expected. Typically, they're 1.2 magnitude units less than the main shock," said Nava. "They'll probably start within hours of the main shock and continue for several months."

"There is a mountain east of Flannigan Inn, near the Zion Park entrance, that is falling," said Denise Springer, officer manager for the Washington County Sheriff's Department, St. George.

"We have officers on the scene and the road, ready to clear the damage when it does fall. There are a couple of homes on that mountain that are coming down with it. There's nothing they can do to stop it."

In addition, power lines on the mountain may go down.

"We have no reports of serious personal injury at all in the county as yet," Springer said. John Neighbor, Washington County undersheriff, said crews have been clearing rocks from highways. "They've blocked off roads," he said. "We've got officers out providing traffic control."

"We thought an airplane hit our house," said Sonja Sweeton, who with her husband owns the Eagle's Nest Indian Store in Springdale.

"It startled us out of our sleep. We have a log home with a lot of rafters inside, and they were all banging onto each other.... We just dove under the bed and listened to things falling out of the cupboard and breaking. We were scared to death."

Kachina dolls, pottery, pictures and dishes were broken at the home and store, "and our groceries fell off our shelves," she said.

The sharp jolt was felt as far away as Richfield, Kanab and Salina, said William J. Alder, meteorologist in charge of the National Weather Service's Salt Lake forecast center.

Weather watchers called him from around the region to report the quake.

"It woke us up right away, and it looked like the whole roof was moving back and forth, and the fence out in the yard was moving back and forth," said Donna Tedd, St. George.

Violent shaking continued for about 10 seconds, she said. "We've had tremors down here before but I knew right away this was a full-fledged earthquake."

Dust stirred up by the quake filled Hurricane Valley, said Grant Twitchell, who lives in Hurricane. "It just about threw me out of bed. It was pretty strong," he said.

"I was about half awake, and it was just like we were riding a roller coaster (with) the waves. The house tilted."

While driving on the I-15 freeway toward Cedar City at about 7 a.m. near the Kolob Canyons section of Zion National Park, "I saw this little cloud forming, and I thought, "Well, there's no way a cloud should form at that elevation. It was about halfway up the cliffs.

"It was a rock fall."

Twitchell attempted to drive into Zion, but that part of the park was closed.

"State Road 9 just outside of the park boundary is blocked within a quarter-mile of the park entrance," said Denny Davies, chief of interpretation and the public information officer for Zion National Park.

"A major slide of several hundred cubic yards of material has rolled down and essentially blocked State Road 9. At 8 o'clock this morning there were still rocks falling, so it's very unstable. That rockslide has disrupted the power supply," Davies said.

The park was closed to incoming traffic, and visitors at Zion Lodge within the park were asked to leave.

The manager of Zion Lodge contacted Davies by radio and told him several rocks damaged the lodge's roof. "They were saying as a result of the earthquake there was a crack that appeared in the ceiling inside the lodge," he added.

The roof of the restroom at Zion Narrows was destroyed also, Davies was told. The park had no reports of injuries.

Ben Moffett, National Park Service spokesman in Denver, said only one telephone line into the park was still working.

"I thought maybe it was a rock fall or something," said Mildred Jensen, Rockville, which is about three miles west of Springdale. "We were sound asleep, and I jumped right on top of my husband."

It was a big, hard jolt, she said, but their home apparently was not damaged.

"This thing shook and rattled and rolled," said Judy Lee, contacted at the Best Western Driftwood Lodge, Springdale. "There has been some damage here in Springdale. There's a rock slide between Springdale and the park entrance that they're working on."

Dust hung in the air in Springdale, she said.

"I grew up in southern California. I felt them before. I knew what was happening. But it isn't any fun to have it happen to you at 4:30 in the morning."

Lynette Goodwin of New Harmony, Washington County, said she heard that a waterline broke in that town.

Myrna Fraley, who works at the post office in Springdale, said, "There are some houses alongside the hill that have been damaged. You can't get to them. They're back up in the hills."

"In the Springdale area there's power out and a lot of problems up there," said Alan Merritt, dispatcher at the St. George power plant.

"Here in St. George, we had a lot of stuff in the streets. Had to get heavy equipment out to get rocks and debris out of the streets in town." Most of the material was cleared by mid-morning, he said.

St. George Police Chief Kelly Larson said the city didn't suffer much damage. There were reports of "some structural damage, plaster off the walls, stuff like that," he said.

Nava said she wasn't certain whether the quake struck a known fault. The closest seismograph is in Cedar City, far enough away to prevent pinpointing the epicenter accurately enough to know if it was on a fault.

"There are quite a few" active faults in the area, she said. "The nearest is the Washington Fault."

The U. seismograph station planned to send a team to the earthquake region Wednesday. **[Deseret News; September 2, 1992]**

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## JOLT CRUMPLES HOME, HINDERS PAIR'S ESCAPE

By Dennis Romboy

SPRINGDALE--Jerry and Georgie Meinerts' Ford Tempo sits abandoned on a dirt road just below their crumpled house on a hillside near the entrance to Zion National Park. A 2-foot-wide gap in the earth runs directly beneath the car. Cracks of various widths scar the ground both in front of and behind it. The road resembles a series of stairs going neither up nor down.

"That's our getaway car, but we didn't get away," said Jerry Meinert, 74, from a Springdale motel room. The Meinerts began moving into the home last Thursday. Some of their belongings are still packed.

An earthquake early Wednesday morning triggered a landslide that crumbled part of the hill above Zion Park Boulevard like a dry piece of cake. Three homes were destroyed, leaving four elderly people homeless. The third house was unoccupied during the temblor. No one was injured.

The Meinerts were trying to flee by car as the foothills slowly detached from the mountain above. Dirt and rocks covered U-9 in one spot, preventing access to the park's south entrance. The entrance remained closed Thursday.

"We encountered cracks that we could not cross. We got out of the car and walked down," Jerry Meinert said. It was pitch dark.

The mile-long hike wasn't easy on the fractured road, especially for 68-year-old Georgie Meinert, who injured her left knee a week ago. Wearing a soft brace that immobilized her leg, Georgie Meinert gingerly picked her way over fissures and crevices.

In some locations, the ground was too steep for her to walk down.

"I just got on my fanny and slid down," she said.

Although all of Springdale was awakened by the 4:26 a.m. temblor, there was little, if any, damage in town. When the Meinerts reached the main street, not a soul was stirring.

"The whole damn town was sound asleep," Georgie Meinert said.

The couple walked to a nearby bed and breakfast inn where friends took them in.

"Gradually the town woke up and realized that a disaster had occurred," Jerry Meinert said.

In Springdale, the damage was confined to the Balanced Rock subdivision. It's called Balanced Rock because of the large rock that appears to teeter on another rock just above the James Roberts home. Although the house, which was unoccupied during the earthquake, looks like a Twinkie that was torn in half to exposed the filling, the rock remains intact.

"(The rock) was making noise when I went past it," said Al Bench, Springdale fire marshal. Bench guided Rudy Lueck, 88, and his wife, Eulah, 80, from the subdivision using a flashlight. The road was more passable at 5 a.m. than it was at 5 p.m. The shaking earth loosened the ground, causing it to slowly slide all day.

"You could literally watch the whole mountain moving. It was intense for hours," Bench said. The hill was crumbling even while Bench was on it making sure the Luecks got down safely.

"The road was opening and the road was moving and I was moving--fast," he said.

The area was recently subdivided, and "For Sale" signs dotted the hillside. Property values literally fell through the floor.

"A lot of dreams went down the hill here," said J. R. Madson, whose daughter owns some of the building lots.

The Meinerts have lost everything for now.

"Our big problem at this point is the road is torn up. It will require extensive repair before we can really go up there and salvage anything," Jerry Meinert said.

That could be days because of the unstable ground.

"We're just waiting for the aftershock. It's going to be awesome," said Washington County sheriff's Sgt. Rymal Hinton. "Another aftershock will just finish this off up here."

A small hill laced with cracks is poised to slide into a condominium building.

Motel managers in Springdale reported numerous cancellations as the word of the earthquake spread. Labor Day weekend is traditionally one of the busiest for the town and park.

**[Deseret News; September 3, 1992]**

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## AFTERSHOCKS COULD RATTLE QUAKE AREA, EXPERT SAYS

By Joseph Bauman

Residents of the St. George region have a 30 percent chance of experiencing an aftershock of 5.0 on the Richter scale or larger in the next few weeks, according to the senior staff seismologist at the University of Utah seismograph station.

Sue Nava made that prediction Wednesday afternoon, while the staff at the seismograph station waited for the aftershock.

Aftershocks can hit the region for several months following an earthquake. "The probability of having one or more aftershocks at the magnitude 5.0 or larger is 20 percent during the first day," she said.

That didn't happen, but it's even more likely that a shock will hit in the next few weeks. The U. was studying one possible shake that hit Thursday morning. A rumble of 5.0 could cause damage.

The seismograph station boasts a wall of slowly revolving steel drums, where earth movements are shown; wall maps pinpointing seismograph stations; charts; reference books and computer links.

The station is on the seventh floor of the U's William Browning Building--which seems a strange place to study ground movement. But Nava explained that the seismometer that senses the earth trembling is in the basement and that the office is a kind of nerve center for a network of 80 stations scattered throughout Utah.

"We have a seismometer down there that measures the ground motion. It amplifies the signal 2,800 times so we can see it, basically," she said.

Nava showed a chart that recorded Wednesday's quake, which the station estimated at 5.9 on the Richter scale. The chart shows a flat line until some small movements, then the pen jiggled wildly for more than a minute before tapering off.

The network of 80 remote seismograph stations also records earth movements. These unattended instruments send data to the Browning building by radio, microwave, and telephone.

The U.S. Geological Survey estimated Wednesday's temblor at 5.5, but Nava defends the U's higher figure. The USGS calculation was made by the National Earthquake Information Center based in Boulder, Colo.

"Our stations are closer, and we feel our magnitude will be more accurate," she said.

People felt Wednesday's quake in far-flung locations, Nava said, "west to Las Vegas, south to Flagstaff, east to the Escalante-Boulder area, north to Richfield."

The university dispatched two crews, of two persons each, to southwestern Utah on Wednesday. "Their purpose is to put out portable seismometers to help us locate the depth" of any aftershock, she said.

An earthquake can be centered anywhere from half a mile to four miles beneath the surface. Knowing the depth is important in pinpointing which fault was involved, because the faults angle down unpredictably.

"A shallow earthquake will cause more local damage" than a deeper movement of the same intensity.

Knowing much about Wednesday's quake is difficult "because we have inadequate seismograph stations in southern Utah." The nearest permanent station to the epicenter is in Cedar City, 55 miles to the north.

**[Deseret News; September 3, 1992]**

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## **SOUTHWEST UTAH PICKS UP PIECES AFTER EARTHQUAKE**

### **Springdale Now Has Power, But 1 Entrance To Zion Park Remains Closed**

By Joseph Bauman

Southwestern Utah was returning to normal Thursday, recovering from the earthquake that rattled the region Wednesday morning.

Electrical power was restored to Springdale early Thursday, nearly 24 hours after the quake that demolished three homes in the town's Balanced Rock subdivision and tumbled rocks onto the south entrance to Zion National Park.

The park, closed Wednesday, was reopened. But as of Thursday morning, the southern route, U-9, remained closed.

Minor damage was reported throughout southern Utah from the quake, variously estimated at 5.5 and 5.9 on the Richter scale, which hit at 4:26 a.m. It was centered about five-miles southeast of St. George.

In stores throughout the area merchandise was thrown about during the earth movement. But no serious injuries were reported.

Springdale was the hardest hit because of rockslides.

"The only restriction we have is the road closure at the south entrance. Other than that, all park facilities are open and operating," said Zion Superintendent Don Flavey on Thursday. Electrical power was restored to Springdale at 2 a.m. Thursday, said a Utah Power employee. Power returned to the park about the same time.

"We did check all the infrastructure yesterday. The trails are all safe, the water systems are all fine," Flavey said.

The eastern entrance is open. However, Flavey did not know when the debris would be cleared from U-9.

"There's quite a bit. The whole hillside just moved onto the roadway, and it covered up about three-fourths of the road itself," he said. Utah Department of Transportation engineers were trying to figure out a detour into the park, since the southern entrance handles about two-thirds of the visitors.

"On a typical summer day we have over 2,000 cars coming into the south entrance." The Kolob section of the park remains open to traffic.

Zion Lodge, closed on Wednesday because of the power outage, is open again. Although a couple of rocks hit the lodge's roof, it sustained no damage. A rock penetrated the roof of the rest room at the Zion Narrows trail at the end of the main canyon road but did no other damage.

On Thursday morning, the University of Utah Seismograph station was studying readings that indicated a tiny aftershock may have rocked the region of Wednesday's quake. The magnitude was 2.8 on the Richter scale, not large enough to be felt by residents.

**[Deseret News; September 4, 1992]**

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## SPRINGDALE KEEPS AN EYE ON LANDSLIDE

By Joseph Bauman

Residents of Springdale, Washington County, were praying Friday morning that no rain would fall from the overcast sky--in fact, hoping no rain will fall for several weeks--following Wednesday's earthquake.

A huge, unstable hillside slipped during the quake, destroying the three luxury homes of Springdale's Balanced Rock subdivision. Without much prompting, it could move again.

The landslide is about two-thirds of a mile long and a fifth of a mile wide, with its easternmost edge reaching U-9, the entrance road to Zion National Park.

Springdale held an emergency town meeting Thursday night to discuss the situation.

"We were told by a geologist at our meeting last night that if it rains--because there's clay underneath--that the hill would just start sliding again," Paul Millett, Springdale's city manager, said Friday.

"The hillside is to the edge of the road and covering part of the highway," he said. "The geologist said in a worst-case scenario, it could move right down to the river. If it rains, it's possible. Or if we had an aftershock, a tremor."

The condominiums, restaurants and motel have been evacuated. People continue to live in a couple of the residences," he said, "but they're on the alert as well."

Meanwhile, local contractors used a Caterpillar tractor to cut a four-wheel-drive road to two of the homes destroyed in the quake, and the town has organized teams of volunteers to help pack belongings onto trucks and move them out. A road was to be cleared to the third wrecked house soon.

The houses' walls are ruptured and the roofs caved in. They could collapse, particularly if a strong aftershock hits or the hillside lurches again.

The trucks are directed by volunteers using radios, who could warn quickly of any movement. If the slide starts to shift, the orders are for everyone to immediately jump in the trucks and leave.

Zion is back to normal, with the reopening of the entrance road Thursday afternoon.

If the quake had happened during the busy daylight hours, when thousands of people drive into the park on this south entrance road, deaths might have occurred. Some of the rocks that crashed down "were as big as washing machines, and there could have been severe damage," said Denny Davies, the public information officer at Zion.

However, for the most part, within the park "we're frankly surprised there wasn't a great deal more rockfall than there was," he said.

More rocks are bound to come down, and fissures that are visible in the soil will cause movement.

**[Deseret News; September 4, 1992]**

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## QUAKES BUMP THEATER OFF AGENDA

Associated Press

SPRINGDALE, Washington County--The town council postponed a decision Thursday night on a controversial large-screen theater and instead talked about earthquakes. The council had held a work meeting earlier in the week to discuss plans for the theater complex, but the next morning a 5.9 earthquake rumbled through the area at the entrance to Zion National Park.

The council will call a special meeting on the matter next Tuesday.

The proposed theater has sharply divided the town of 275 people for nearly two years.

World Odyssey, a California-based entertainment company, wants to build a large-screen theater, parking lot and retail shops.

**[Deseret News; September 4, 1992]**

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## **TOWN REJECTS BUILDING PERMIT FOR ZION THEATER**

### **Recent Earthquake Causes Concern. Council To Take Up Giant-Screen Issue Again**

Associated Press

SPRINGDALE, Washington County--The town council on a tie vote rejected a building permit for a controversial giant-screen theater, but it will take up the issue again next month.

Some members of the council said Tuesday night that they wanted more information in light of last week's earthquake before deciding whether to allow the IMAX-type World Odyssey Theater to be built at the mouth of Zion National Park.

Assistant town clerk Sue Fraley said the town engineer suggested further geotechnical review be made.

Al Warneke, a retired park employee and geologist living in Springdale, said the hill that began sliding after the magnitude 5.9 earthquake Sept. 2, destroying three luxury homes, was very unstable and could threaten the theater.

He said the town could be subject to liability if it approved a building permit now.

Doug Memmott, a partner in the developing company, Zion Theater Partners, did not consider it a serious threat but said, "It's always a possibility and ... your having discussed it and made us aware that we build at our own risk alleviates the town for liability."

Memmott said the proposed theater would be earthquake proof and that previous studies have been adequate.

However, he was instructed to provide geological studies and approval of the health department and fire and water agencies for the Oct. 1 meeting.

Earlier, the motion to approve the building and excavation permits for the theater was made by Mayor Bob Ralston, a strong supporter of the project, and seconded by council member Bert Chamberlin.

Council members Stephen Roth and Marcel Rodriguez voted against the motion, and council member Mavis Madsen declined to vote.

Rodriguez is opposed to the project. Roth and Madsen indicated they wanted more information.

The screen would be 55 feet high and 70 feet wide. Developers plan to show a movie about the park's natural splendors.

The theater would be in the corner of an 11-acre plot up against the park boundary.

The National Parks and Conservation Association, the Southern Utah Wilderness Alliance and the Wilderness Society lost a court challenge to the plans. They contend the theater would detract from the park's natural beauty.

Proponents see the project as a potential economic windfall.

**[Deseret News; September 9, 1992]**

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## **AFTERSHOCK IS SHOCKING IN TIMING AND MILDNESS**

### **2.7 rumble Is Nothing Compared To Several That Should Have Occurred**

By Joseph Bauman

An aftershock large enough for some residents to feel made the earth quiver Thursday morning near St. George. But it was far smaller than the 5.9 jolt that started the landslide that ruined three homes in Springdale, Washington County, on Sept. 2.

"There was an aftershock of magnitude 2.7," Sue Nava, senior staff seismologist at the University of Utah seismograph station, said Friday. It hit at 12:42 a.m.

The Hurricane and Washington faults, which run through southwestern St. George, have long concerned scientists because each is believed capable of generating a whopper of 6.5 magnitude, according to the Utah Geological Survey. That would be many times larger than the Sept. 2 shake.

The Hurricane Fault extends from Cedar City to the Grand Canyon and is thought to be one of the most active faults in southern Utah.

A handful of smaller jolts, barely strong enough to make the seismograph pens wiggle, also were recorded in the week and a half since the quake.

Dozens of aftershocks of 3.0 or greater magnitude on the Richter scale would ordinarily have shaken the region by now. Strangely, they haven't and earth scientists don't know what this means.

"U seismologists are continuing to pay close attention to the St. George earthquake sequence and will continue to research behavior in the Utah region," Nava said.

A report prepared by Walter J. Arabasz, James C. Pechmann and Nava, all of the U. Seismograph Station, said that preliminary data indicate the earthquake originated at a depth of nine miles "and was caused by dominantly normal faulting on a north-south trending fault, possibly a subsurface part of the Hurricane Fault."

The Utah Geological Survey listed two other unusual aspects of the earthquake:

"The Springdale landslide is one of the largest ever recorded to have resulted from an earthquake of this magnitude, according to geologists of the U.S. Geological Survey, and it is farther from the epicenter than landslides typically occur in a magnitude 5.9 earthquake.

"Besides the landslide, the major geologic effects of the earthquake involved only scattered rockfalls near and particularly east of the epicenter and liquefaction along the Virgin River evidenced by small sand boils and ground cracks."

**[Deseret News; September 11, 1992]**

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## **QUAKE JARS S. UTAH, TRIGGERS MASSIVE SLIDE Falling Earth Ruins 3 Homes, Closes Entrance To Zion Park**

By Dawn House and Mike Gorrell

SPRINGDALE--A pre-dawn earthquake Wednesday near St. George released one of the largest landslides in Utah history, destroying three homes and closing a main entrance to Zion National Park.

The foothill of what old-timers call "Slide Mountain" began moving a half hour after the 4:26 a.m. quake, which measured 5.9 on the Richter scale. It was Utah's largest earthquake since a 6.0 earthquake jolted the Utah-Idaho border in March 1975.

Direct earthquake damage was relatively minor--a few cracks in building foundations, items that fell from shelves and some rattled nerves.

But 27 miles east, in Springdale, a community of 275 people, the landslide undermined three homes in Balanced Rock Subdivision--while leaving its namesake intact--and deposited a creeping mass of boulders and debris on state Road 9, the western access into Zion.

None of the homeowners was injured, but Springdale fire officials had to rescue retired park ranger Rudy Lueck, 88, and his wife, Eulah, 80, from their crumbled residence. "We had to kick the door open because it was jammed," said Springdale Fire Marshal Al Bench. Using flashlights to guide them around cracks in the landslide, they worked their way down to the road. "It was just harrowing getting them down there," Mr. Bench said. "The earth was moving, and I could hear boulders falling all around us."

"We're alive, so we like that," Mr. Lueck said, adding that he has relatives coming to help them, "but I don't know what they can do to help because the house is destroyed."

Mr. Lueck said he and his wife still would like to live in Springdale despite the slide. "That probably won't happen again in our lifetime."

The landslide moved all day, raising fears the debris might not be cleared before the busy Labor Day weekend. "Until it stabilizes, we won't be able to get in and determine whether we can cut a detour around it or if it will be out of service for a couple of weeks, or perhaps longer," said Utah Department of Transportation spokesman Kim Morris.

Dale Dockstader's business, the Cliffrose Lodge and Gardens, was directly below the slide but sustained no physical damage. Still, the loss of Labor Day traffic could cost him.

"\$6,000 to \$10,000, something I need like a rock on my foot."

Zion was closed after the slide knocked out power lines to the park and Springdale. Park spokesman Denny Davies said Zion Lodge guests were asked to leave Wednesday, but park officials hope to restore electricity today and resume operations. Power was restored to Springdale late Wednesday.

Karen Collins of Pittsburgh was at Zion Lodge when the slide occurred, but she needed to reach her sister, Laura, who was in Springdale. "I had to take a hundred-mile detour to get two miles," Ms. Collins said.

Park officials also were uncertain what damage the quake might have caused to Zion's back-country. "We will wait until it is seismically calmer before we venture out," Mr. Davies said.

The epicenter was five miles southeast of St. George. Two faults--the Hurricane and Washington--pass through that area, but the University of Utah Seismograph Stations were unable to determine which one was the source because of inadequate seismograph coverage in southwestern Utah, said seismologist Sue Nava.

She said no tremors preceded or followed the quake, but calculated there is a 30% chance of an aftershock of magnitude 5.0 or greater in the next few weeks.

Her agency and the state and federal geological surveys rushed seismologists and geologists to the area Wednesday to set up portable instruments and survey the landslide, which may rewrite scientific understanding of the relationship between the two natural hazards.

"We're excited and perplexed," said Utah Geological Survey Director M. Lee Allison. Earthquakes of that magnitude usually do not produce landslides that large more than nine miles from the epicenter. "This (slide) is three times farther away than that. It screws up all of the known charts to have a slide of this size there."

Southwestern Utah is known to be seismically active. A cluster of earthquakes occurred earlier this summer near Cedar City (a 2.7 quake north of there at 4:39 p.m. Wednesday was not considered an aftershock), and the Sevier Fault has generated a half dozen moderate earthquakes this century. A 1902 earthquake in Pine Valley, north of St. George, was estimated at 6.0 on the Richter scale.

The quake woke up most southern Utah residents, and Ms. Nava said it was felt within an area bounded by Las Vegas, Richfield, Escalante and Flagstaff, Ariz.

"I thought it was going to throw me out of bed," said Hurricane resident Grant Twitchell.

"We were really hanging on there for 5 to 10 seconds. I didn't know if the place was going to hold together."

In St. George, Donna Tedd said, "I could describe it all in one word--terrible. It seemed like it lasted a couple of minutes, but in reality, my son timed it and it was just 11 seconds."

Not far away at Smith's grocery store, the ground motion shook goods from shelves and caused light fixtures and ceiling tiles to crash to the floor. About 20 employees were in the store preparing for the day's business, but no customers were there, said manager Harvey Woodyatt.

"Merchandise was piled pretty deep in every aisle. I had broken pickles, spaghetti sauce, anything in a glass bottle," he said, estimating damage at \$20,000. "I moved down here from Salt Lake and never thought we'd have to deal with it. The first thing I thought was California has probably dropped off the map."

Government officials spent the day sizing up the damage, but they found little.

St. George building inspector Dennis Mertlich said a couple of boulders jarred loose and hit a car, but no one was inside. "The city received a jolt, but the distance (from the epicenter) was so short that the quake didn't have time to magnify."

John Van Staveren, public works director in Washington City, three miles north of the epicenter, said one well quit working, but that was the extent of damage from the quake, which "sounded and felt like a freight train going through."

Hurricane City Manager Clark Fawcett said: "my knees are still shaky." But his fears eased as the day progressed and no real damage was discovered. Some residents complained of dirty tap water, but no leaks were discovered in the city water system.

"I was surprised we weathered it so well," he said. "We're not prepared for that sort of thing."

Day long inspections by utility-company crews also failed to pinpoint any problems--outside of the disrupted electricity to Springdale and Zion Park.

"We were lucky, thank goodness, that we lost no gas lines," said Mountain Fuel spokeswoman Debbie Anderson.

Mr. Morris from the transportation department said a team of structural engineers will begin inspecting bridges today. cursory examinations Wednesday suggested all were safe. "They'll be going over all of them with a fine-toothed comb, just to make sure."  
**[Salt Lake Tribune; September 3, 1992]**

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## **COUPLE UNHURT BUT HOMELESS AFTER 4 DAYS IN \$300,000 HOUSE**

By Dawn House and Pat Mellor

SPRINGDALE--The earthquake itself did not bother Jerry and Georgia Meinert much. It was a rude awakening, coming at 4:26 a.m. But a quick inspection revealed no damage to the house where they had lived for just four days.

Then they went back to bed.

"The house kept creaking and groaning," said Mr. Meinert, 73, a retired FBI agent. The longer they lay there, the more the house seemed to move. They finally decided to get in the car and get out of there.

They did not get far.

A landslide triggered by the tremor had mauled the dirt road leading to Utah Highway 9. Some sections were raised, others dropped. The Meinerts' escape route was cut off when a deep crack opened in front of their silver sedan.

They had no choice but to walk, and that was not easy. Mrs. Meinert, 67, had a cast on her leg after minor surgery. She had to slide part of the way, but she made it.

Their house did not. It settled in a crevice 50 feet lower than where it started the evening.

"Basically, we're homeless," Mr. Meinert said. "We don't know where we'll go or what tomorrow will bring." Added his wife: "The important thing is nobody got hurt."

The Meinerts son, Jerry, who spent the last eight years building the \$300,000 house, discovered Wednesday his full-coverage insurance policy did not include landslides.

"I feel real bad about it, but what can you do," Jerry said.

His one hope is that the slide will deter Springdale from building a large-screen theater at the Zion National Park entrance.

"I've been praying that they stop the development on the theater complex, and if this stops it, I would gladly sacrifice my house."

**[Salt Lake Tribune; September 3, 1992]**

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## **DAMAGE COULD EXCEED \$2 BILLION IF 5.9 QUAKE HIT WASATCH FRONT**

By Mike Gorrell

If a magnitude 5.9 earthquake occurred along the central Wasatch Fault, experts predict "fairly major damage" to Utah's population hub from a variety of natural hazards.

"Bad buildings would fall down. Good buildings wouldn't even know anything happened," said structural engineer Ron Reavely. "But that's a relatively small earthquake. We are going to have a much larger one along the Wasatch Fault, there's not much question about that."

Most earthquake-damage predictions for the Wasatch Fault focus on the effects of the "big one," which is expected to be magnitude 7 to 7.5--more than 10 times stronger than the St. George tremor.

But a study cited by Utah Geological Survey Director M. Lee Allison suggested a 5.5 quake could cause \$1.95 billion damage to buildings alone along the Wasatch Front. "That would be far less energy released than a 5.9 and the estimate doesn't include damage to freeway, utility lines, sewage-treatment facilities," Mr. Allison said.

That study did not predict how many deaths or injuries would occur, but Mr. Allison speculated there would be "numerous injuries and a few deaths" because there always are people who happen to be in the wrong place at the wrong time.

Strong ground motion would be the major source of damage. Rockfalls and landslides also are likely, and a 5.9 quake may trigger liquefaction, the process in which weak soils turn to a quicksand-like material incapable of supporting buildings.

Former Salt Lake County geologist Craig Nelson foresees "newer structures having simple damage like cracks or toppled chimneys, while unreinforced brick buildings will have major damage."

Mr. Nelson also is concerned about the homes built high in the Wasatch Fault foothills. "The more houses you have high on the hillside, the greater the number of targets you have for rocks."

Davis County emergency services coordinator Roger Anderson suspects a 5.9 quake would cause major traffic problems, possibly knocking U.S. Highway 89 and Interstate 15 out of service. He also fears widespread liquefaction in Davis' west end, parts of which might be inundated by the Great Salt Lake.

Bob Halloran, a planner with Salt Lake County's Emergency Management Office, believes chaos will be more noticeable than damage after a 5.9 quake.

Most problems would arise from the disruption of telephone services, he said. Particularly the 911 emergency system--as lines are jammed with callers.

"Things would have to settle down quite a bit before people could call out for assistance,"

Mr. Halloran said

**[Salt Lake Tribune; September 3, 1992]**

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## NEIGHBORS PITCH IN TO HELP VICTIMS OF S. UTAH SLIDE

By Dawn House and Mike Gorrell

SPRINGDALE--Townsppeople picked their way past 25-foot crevices Thursday to retrieve belongings of three families whose homes were torn apart by a massive landslide at the mouth of Zion National Park.

Rudy Lueck, 88, wonders out loud why Balancing Rock--the subdivision's namesake--survived Wednesday's earthquake while his and two of his neighbors' homes were demolished.

"When I moved here 25 years ago, I thought Balancing Rock would go anytime," said Mr. Lueck, a retired park ranger. "Looks like everything else went but it."

Neither he nor Jerry and Georgie Meinert had earthquake insurance.

"The last quake we had here was in 1952, and that only rattled a few lamps," Mr. Lueck said. "Who would have thought we'd get such a big jolt?"

Throughout the day, volunteers trekked up the treacherous slope at the foot of Three Mary's Mountain to pack out items such as Mr. Lueck's shaving kit, the couple's 50th wedding anniversary photo, American Indian baskets and pottery.

"I don't even know some of the people who are doing this," said his wife, Eulah Lueck, 80. "I've always loved this place, and the people here."

At the Meinerts' home, Springdale Town Councilman Marcel Rodriguez put a jewelry box and clean socks into his backpack. Other volunteers brought medicine, a still-frozen ham and clean underwear.

The Meinerts' \$300,000 split-level home is settling into a 50-foot crevice. Their stranded car sits a few hundred yards away, perched where the couple abandoned it to flee on foot in the early-morning darkness.

"I had a funny feeling the day before the quake struck," said Mr. Meinert, 73, a retired FBI agent. "It was kind of a premonition, a bad one."

At Jim Roberts' home above the slide, volunteers worked to secure possessions of the California owners who were out of town when their concrete-brick home snapped in half.

"This used to be an enclosed hallway, now it's a deck," said Larry McKown as he lifted a painting off a skewed wall beneath clouding skies. Other townspeople formed a book brigade to unload buckling shelves in the home's library.

The living room and kitchen slid downhill away from the bedrooms.

Although the landslide was moving almost imperceptibly Thursday, geologists warned that it is unstable, with an outside chance it could move "catastrophically," said Utah Geological Survey Director M. Lee Allison.

In that unlikely case, he said, the slide could be accelerated "to the point where you would have to run to get out of the way."

The landslide is a half-mile long. It broke off the northeast side of Blacks Canyon, nicknamed Slide Mountain by old-timers in Springdale, leaving a scarp 20-to-30 feet high in numerous places where the ground gave way.

It's a textbook example of a "rotational slump," in which a mass of earth twists and turns as it slides downhill, with the movement forming large crevices. Mr. Allison said geologists were surprised that more water was not pouring out of the slide, considering that some source of lubrication is needed for a movement that large.

While geologists observed the slide from the air and ground, seismologists and geologists set up portable seismographs and searched for other damage caused by the magnitude 5.9 earthquake that occurred at 4:26 a.m. Wednesday, about 5 miles southeast of St. George.

No aftershocks were recorded Thursday, said University of Utah Seismograph Stations seismologist Sue Nava, adding there is a 30% chance of a 5.0 aftershock for several weeks.

Springdale resident John Rook said crashing boulders were so loud Wednesday, he thought aftershocks had hit the town--until he saw gigantic rocks strewn along state Road 9, outside his undamaged home.

Seismologists thought they might have had one aftershock when a tremor, measured at 2.8 on the Richter scale, occurred at 6:41 a.m. Thursday about 30 miles east of Wednesday's epicenter. But it was later judged to be unrelated to the main event, Ms. Nava said.

The absence of aftershocks "is really quite perplexing, but not unknown," said Seismograph Stations director Walter Arabasz. "While it is unusual for an earthquake of this size not to have any aftershocks, we have been intrigued that earthquakes in southwestern Utah and around the Wasatch Fault often don't have aftershocks. "It may be characteristic of moderate earthquakes in these regions," he added. "We're not quite sure what it means."

Washington County officials estimated damage at \$750,000 to public facilities--including roads (other than State Road 9), bridges, schools, water and sewer lines. The county has no intention of asking the state to declare the area a disaster, said emergency services director Dean Cox.

Cracks were located in the walls of Woodward Elementary School and falling rocks damaged several roads, he said, adding "things could have been bad if the earthquake had happened during the day. Those rocks would have caused accidents and injuries."

**[Salt Lake Tribune; September 4, 1992]**

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## **TRAGEDY COULD HAVE BEEN MUCH WORSE HAD IT BEEN DAYLIGHT, PARK EXPERTS SAY**

By Christopher Smith

SPRINGDALE--Venerable Zion National Park survived its 5.9 Richter scale earthquake with little more to show than a hole in an outhouse roof and some rearranged rocks. But National Park Service officials say damage from Wednesday's 4:26 a.m. shake-up could have been much worse if the quake had struck during daylight, when thousands of tourists explore back country trails among sandstone spires.

"We had one rock go through the roof of an unoccupied comfort station up at Temple of Senewava at the end of the main canyon road, then there were rockfalls at Oak Creek Canyon and the Sand Bench Trail," said Park Superintendent Donald Falvey on Thursday. Mr. Falvey toured the 147,000-acre park in southwestern Utah, then said: "But we were very fortunate. The park had minimal damage and there was no one out and about when it hit."

Debris from a landslide that closed the park's south entrance--where an average of 2,400 cars flow into Zion on a typical summer day--was pushed back enough Thursday evening to open state Road 9 to traffic over a temporary bypass. Springdale City and Utah Department of Transportation crews were delayed in reopening the road due to a pair of damaged water pipes.

The quake also delayed scheduled town-council consideration of a building permit for a controversial giant-screen theater at the entrance to the park. The structure would stand 55 feet high and 70 feet wide, along with a 168-space parking lot and 12,000 square feet of retail space.

Environmentalists unsuccessfully sued to prevent the IMAX theater from being built. The landslide occurred a half mile west and across the roadway from the proposed theater site. "A lot of people fighting the theater have been saying, "that's it, this earthquake kills it," said Town Council member Marcel Rodriguez. "Those of us who are against it would like to think it's so, but wishing doesn't make it so. This won't stop it."

Electricity was restored to the park at 2:15 a.m. Thursday, and the east entrance of Zion opened at 7:30 a.m. Campgrounds were nearly deserted Thursday morning, but began filling up with visitors by evening, many of whom entered the park via the east entrance near Mount Carmel.

"Labor Day weekend is usually one of our busiest so we want people to know the park is open, the lodge is open, all facilities are open. Visitors are encouraged to come because we're ready to go," said Mr. Falvey."

Park Service employees spent much of Wednesday inspecting the popular backcountry trails for any damage or danger. A Carlsbad, Calif., couple had perhaps the most harrowing location to experience Wednesday's quake: inside The Narrows, where the Virgin River has carved a 2,000-foot deep chasm into the sandstone of the Markagunt Plateau in the northeast sector of the park.

"They were the only two people in The Narrows and were sleeping in the bottom in pitch black and all the sudden everything started moving, they said," according to Denny Davies, park spokesman.

"It was a frightening experience for those of us with four walls around us, so you can imagine what it must have been like at the bottom of that narrow chasm in total darkness," Mr. Davies said.

**[Salt Lake Tribune; September 4, 1992]**

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## HOME MEASURES COULD ENHANCE SAFETY WHEN NEXT MAJOR QUAKE STRIKES UTAH

The earthquake near Springdale emphasizes the need for earthquake preparedness in Utah.

Though seismologists do not believe that earthquake activity in southern Utah signals a greater likelihood of temblors along the Wasatch Fault, Wednesday's events naturally will cause people in northern Utah and other areas of the state to re-examine their own earthquake readiness.

As part of his report on earthquakes in *The Salt Lake Tribune* March 8, staff writer Mike Gorrell asked experts about what people could do to prepare for "the big one." Their advice bears repeating.

They emphasized that one of the most important safeguards homeowners can take is to secure natural gas water heaters so that they won't topple in a quake. Overturned water heaters can pull away from gas lines, causing gas leaks.

Mountain Fuel, the local natural gas supplier, recommends that water heaters be secured, often by strapping them to adjacent walls. Homeowners may decide to hire a plumber, handyman, a general contractor or Mountain Fuel to perform this service, or they can do it themselves. The utility recommends that do-it-yourselfers stop by a Mountain Fuel office to pick up a copy of "Recommended Installation Methods."

The utility also has prepared a free pamphlet, "Earthquake Preparedness and Control of Natural Gas," that outlines other measures people can take to prepare for an earthquake and deal with its aftermath. In addition, Salt Lake County sells and rents videos on earthquake safety.

Among the measures in the Mountain Fuel pamphlet are simple instructions for turning off gas supplies at the home meter if a customer smells or hears escaping gas following a quake. However, a Mountain Fuel spokesman emphasizes that customers should only turn off the line if they hear or smell leaking gas. Once people turn off their supplies, a Mountain Fuel technician must restore service. If many people turn off their natural gas unnecessarily, that only magnifies the job of restoring service in a wide area, which can be critical in cold weather.

Gas can be turned off at the meter with an adjustable wrench. As a precaution, people should know where their meters are and store a wrench in a specific place where it is readily accessible away from the meter.

People also should know where their main electrical switches are.

Other earthquake preparedness tips include:

- Secure tall, heavy furniture that could topple, such as bookcases, china cabinets or wall units. Install latches on kitchen cabinets that will hold doors closed during shaking. Place heavy objects on lower shelves.
- Remove large pictures or mirrors from above beds. Move beds away from chimneys and windows.
- Pack an emergency kit with a 72-hour supply of food and water for each person in the household. It should include three gallons of water per person, plus water purification tablets. Store non-perishable food which can be rotated into the family diet and replenished on a regular basis. Have a 72-hour supply of canned or dehydrated food, powdered milk and canned juices.

Other items should include a can opener, toilet paper, medications, extra eyeglasses, clothing, work gloves, tools (a pipe wrench and adjustable wrench), money, flashlights and portable radio (both with spare batteries), a first-aid kit and fire extinguishers.

- Keep immunizations up to date, learn first aid and conduct family earthquake drills. Even though the natural forces of an earthquake are immense, preparation beforehand can reduce damage and injury.

**[Salt Lake Tribune; September 4, 1992]**

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## **SPRINGDALE PLEDGES TO BE READY FOR NEXT QUAKE Resort Community Not Only Small Town Without Plan**

By Christopher Smith

SPRINGDALE--The day this resort community was rocked by an earthquake, the letter arrived in the mail at city hall. It was an invitation to attend the 1992 Governor's Conference on Emergency Preparedness in Park City.

"It goes without saying that it would be a good idea to have someone from here go to that," says Mayor Robert Ralston.

When disaster struck Wednesday in the form of a quake that registered 5.9 on the Richter scale and crumpled a hillside subdivision and nearly blocked the highway through town, Springdale discovered it had no plan to deal with such an emergency. City staffers didn't know who was responsible for what and no one had been given authority to direct the emergency response.

Fortunately, the community managed to cope without any serious injuries.

"I can't talk about it without getting choked up, but we have the best EMT's in the state. They did an incredible job," says town council member Mavis Madsen. "This town has just pulled together and helped everyone through this."

But when the next disaster hits, some town officials are wondering if their luck will hold out. "Maybe we can fumble our way through this one, but we've got to be prepared better for the next time," Springdale-Rockville Fire Marshal Al Bench said at a post-quake town council meeting this week.

Mike Stever, training manager for the Utah Division of Comprehensive Emergency Management Services, says Springdale is not alone in being caught off guard by a natural disaster.

Many small communities in rural Utah don't consider the possibility of a catastrophe or prefer not to invest limited taxpayer dollars on preparations.

"The problem is, we all have some personal familiarity with fires, paramedics and ambulances, but we don't have earthquakes every day so we don't think about them," says Mr. Stever. "We need to walk a thin line between what I call the Chicken Little Syndrome, where you go overboard, and being responsibly prepared for a disaster. Unfortunately, some people look at emergency services as wasteful. They'd rather fix chuckholes."

For Springdale, the chuckhole created by Wednesday's quake will require much more than the city's lone backhoe to repair. No one is sure what must be done to keep the tons of dirt and rock from steadily slipping toward the canyon bottom and across Highway 9, the town's economic lifeline into Zion National Park.

"That highway is this town's livelihood," says innkeeper Larry McKown, who opened the kitchen of his restaurant to the earthquake victims. "These are small-business people here and we've come to depend on good traffic for Labor Day weekend. If people don't show up, it could really hurt."

Utah Department of Transportation crews had cleared enough of the landslide away Thursday evening to open a detour into the south entrance of Zion, where the park receives 75% of its total traffic.

But officials wonder if the slide caused by the quake will stay put, especially if aftershocks occur or rain showers come.

"The biggest problem is we don't know if it is going to stop moving," says Dean Cox, director of comprehensive emergency management for Washington County.

The city will try to assess damages from the quake and detail the economic impact in order to qualify for disaster-relief assistance. Mayor Ralston expects to make a formal request for aid next week to Washington County, which in turn would appeal to the governor's office.

The city has been contacted by Utah Sens. Jake Garn and Orrin Hatch, who pledged they would help find any needed assistance at the federal level.

**[Salt Lake Tribune; September 5, 1992]**

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## QUAKE DOESN'T SHAKE CROWDS' PLANS TO VISIT UTAH PARKS OVER HOLIDAY

By Mike Gorrell

From the size of the crowd Sunday in Zion National Park, the idea of a park-closing landslide four days earlier seemed remote.

"Things are right back up to where we should have been in the sense of busyness," said Rich Fedorchak, assistant chief park naturalist. "We didn't know for sure how (the slide) was going to affect visitation this Labor Day weekend, but I don't think it affected it at all. Stores are still having a busy weekend."

An earthquake Wednesday near St. George released a landslide in Springdale, partially blocking State Road 9, the park's main access. The slide also knocked out power, closing the park for a day because it was impossible to provide services at the lodge and other facilities.

Electricity was restored and the highway reopened by Thursday evening. "It was a little quiet here Friday," Mr. Fedorchak said, but on Saturday more than 3,600 cars entered Zion. "That is on par with last year, and Sunday was just as busy," he added.

**[Salt Lake Tribune; September 7, 1992]**

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## LANDSLIDE, LACK OF AFTERSHOCKS MAKE ST. GEORGE QUAKE A PUZZLE

By Mike Gorrell

Last week's earthquake near St. George deviates from standard seismic principles enough to intrigue scientists.

First of all, sizable aftershocks still have not occurred since the magnitude 5.9 earthquake shook southwestern Utah on Sept. 2.

Researchers from the universities of Utah and Arizona have determined the quake emanated from nine miles below the ground on either the Hurricane fault or a buried, unknown fault.

"The absence of sizable aftershocks is unusual, based on worldwide experience for a magnitude 5.9 main shock. Dozens of aftershocks of magnitude 3.0 or larger would have been expected by this time," said University of Utah Seismograph Stations seismologist Sue Nava. "The meaning of the unusual aftershock behavior is unclear."

Ms. Nava discounted rumors that the lack of aftershocks suggests a major earthquake is imminent. "Utah seismologists are aware of no seismological evidence that such behavior is a precursor to a large earthquake."

The response of the Earth's surface also has not corresponded with traditional theories.

The landslide that was set loose 30 miles away in Springdale, destroying three homes, was the "largest landslide in the world for an earthquake of that magnitude," said Utah Geological Survey director M. Lee Allison. "Nobody has ever seen a landslide that big (one-half mile long). And we've been surprised by the landslide occurring that far away."

By contrast, he said, the impact near the epicenter was less than expected. "Some boulders fell and there was a little slumping along the Virgin River, and that's it. Damage to buildings was relatively minor."

However, geologists have discovered evidence of liquefaction along the Virgin River's banks between St. George and Washington, the town closest to the epicenter. Liquefaction occurs when ground-shaking changes wet, loose soils into a thick liquid incapable of supporting structures.

Mr. Allison said geologists working their way through tamarisk thickets along the river banks discovered numerous sand boils, some several feet in diameter.

Sand boils are formed much like volcanoes, he said. "During the shaking, the ground liquefies and water spurts to the surface, carrying sand with it like a volcano erupting. The water runs off, but the sand is deposited and forms cones--flat ovals, maybe 3-4 inches high, with circular depressions in the middle."

Mr. Allison was excited about that discovery since the earthquake's size is considered borderline for generating liquefaction.

In Springdale, meanwhile, experts are looking at the possibility the landslide would move again.

**[Salt Lake Tribune; September 10, 1992]**

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## **TRENCH SHOWS QUAKES MAY BE FREQUENT ALONG S.L. FAULT SECTION**

Major earthquakes occur more frequently along the Salt Lake City segment of the Wasatch Fault than previously believed, a new study suggests.

A trench excavated by the Utah Geological Survey (UGS) indicates four quakes of magnitude 7.0 or greater have ruptured the valley's surface in the last 9,000 years. Previous research had pointed to only three major temblors, said UGS deputy director Bill Lund.

"This new information demonstrates the danger to the heavily urbanized Salt Lake Valley from large, surface-rupturing earthquakes is greater than estimated in current hazard assessments," Mr. Lund said.

The additional event identified in the trenching study means the average recurrence of a major earthquake is every 2,400 years (plus or minus 500 years), down from previous estimates of once every 4,000 years (plus or minus 1,000 years).

The segment's last major quake occurred between 1,100 and 1,800 years ago. But the newly discovered quake also shows that major events do not happen on regular intervals, as suspected. "That busts our timing pattern," Mr. Lund added.

The other major earthquakes are believed to have happened 2,400 years ago, between 5,500 and 6,000 years ago, and between 8,000 and 9,000 years ago.

**[Salt Lake Tribune; September 10, 1992]**

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## 8 DAYS AFTER BIGGIE, 2.7 AFTERSHOCK HITS SOUTHERN UTAH

The Associated Press

ST. GEORGE--University of Utah seismologists say a long-awaited aftershock hit southern Utah early Thursday.

At 2.7, it was the first aftershock large enough to be felt since a quake of 5.9 on the Richter Scale occurred in the area Sept. 2.

The aftershock was recorded at 12:42 a.m. A few St. George residents felt the temblor, but there were no reports of damage or injuries.

Jim Pechmann, seismologist at the University of Utah, said officials had been expecting it for days.

Within a couple of days of the first quake, portable transmitters were installed in several locations in southern Utah to pick up ground movement more accurately. Until Thursday, they had picked up only minor aftershocks that measured less than 1 in the three days after the quake.

"I would expect more aftershocks, but so far we've had far less than I've expected," Pechmann said.

The Sept. 2 quake's epicenter was in Washington City, about 30 miles north of St. George, but the most serious damage occurred in Springdale--about 20 miles away where three homes were destroyed.

Zion National Park was closed for a day while debris was cleared from the road and power was restored to the park, but there were no injuries.

Washington county officials said damage from the earthquake would likely total \$750,000.

Pechmann said the last large quake in the area occurred in Pine Valley in 1906. It was followed by an aftershock of 5.0.

The Richter scale is a gauge of energy released by an earthquake and measured by ground motion and recorded on a seismograph. A quake of magnitude 2.0 is usually the smallest quake that can be felt by humans.

**[Salt Lake Tribune; September 11, 1992]**

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