= 1980 Eureka earthquake =

The 1980 Eureka earthquake (also known as the Gorda Basin earthquake) occurred on November 8 at 02 : 27 : 34 local time along the northern coastal area of California in the United States . With a moment magnitude of 7 @.@ 3 and a maximum Mercalli intensity of VII (Very strong) , this strike @-@ slip earthquake was the largest to occur in California in 28 years . Although damage was considered light , several loss estimates equaled or exceeded $ 2 million , and six injuries resulted when two vehicles came down with the partial collapse of a highway overpass on US 101 in Fields Landing . The north coast of California experiences frequent plate boundary earthquakes near the Mendocino Triple Junction and intraplate events also occur within the Gorda Plate .

Due to the regional seismic risk , the nuclear portion of the Humboldt Bay Nuclear Power Plant was shut down in the 1970s . No substantial damage occurred to the two fossil @-@ fuel units that were still operational at the facility . Several types of sensors were installed at the site to capture strong motion data in this seismically @-@ active area , but the majority of records from the event were considered unreliable due to faulty equipment or inadequate maintenance . Only one piece of equipment at the facility provided data by which an estimate of the peak ground acceleration could be made .

= = Tectonic setting = =

Near Cape Mendocino , the Mendocino Triple Junction is an area of active seismicity where three tectonic plates come together . The Mendocino Fracture Zone (also known as the Mendocino Fault east of the Gorda Ridge) is a transform fault that separates the Pacific and Gorda Plates . To the south , the relative motion between the Pacific Plate and North American Plate is accommodated by the San Andreas Fault , and to the north , the Gorda Plate is converging with the North American Plate at the Cascadia Subduction Zone . Earthquakes within the Gorda Plate are the result of north @-@ south compression at the Mendocino Fault .

= = Earthquake = =

The left @-@ lateral strike @-@ slip earthquake was the largest to occur in California since the 1952 Kern County earthquake . The mainshock (which was described as a multiple @-@ rupture , with four subevents in the initial 80 seconds) and its aftershocks occurred on a northeast @-@ trending fault that extended from near the Mendocino Fault to a point northwest of Eureka . Movement along the fault is due to a north @-@ south compressional regime and the resulting intraplate deformation of the Gorda Plate . Previous events in this area were the January 1922 7 @.@ 3 Ms and the January 1923 7 @.@ 2 Ms shocks .

The earthquake occurred offshore (to the northwest of Eureka , about 37 mi (60 km) west of Patrick 's Point) and had a maximum Mercalli intensity of VII (Very strong) . Some people reported intense shaking that lasted for 15 to 30 seconds ; tremors were felt as far south as the San Francisco Bay Area and as far north as Salem , Oregon . In the epicentral area , items were knocked off shelves and furniture was displaced , but damage was considered light (the smaller 5 @.@ 2 ML event that occurred in June 1975 caused more damage) .

= = = Damage = = =

While most of the damage from the Gorda Basin earthquake was considered light , there were some exceptions . Mercalli intensities in the immediate area were judged to be in the range of V (Moderate) to VII . In Eureka , intensity VI (Strong) effects included broken windows and dishes , fallen chimneys , and merchandise that fell from store shelves . Intensity VII effects affected the Fields Landing , King Salmon , Loleta , and Big Lagoon areas , and included surface cracks on the ground , soil liquefaction , small landslides and rockfalls , and numerous slumps along the Eel River . Similar effects occurred along the Old Coast Highway near Trinidad and Moonstone , where the

roadway was reduced to one lane of travel in some areas . Several homes were knocked off their foundations and a highway overpass collapsed in Fields Landing . Seismic wave amplification , poor design , or inadequate construction style may have contributed to losses there .

= = = = Tompkins Hill Road overpass = = = =

The Tompkins Hill Road overpass is situated just south of Fields Landing and was built in the late 1960s . It suffered slight damage during the 1975 earthquake and was due for a retrofit in 1981 . The overpass was constructed with cement abutments on earthen ramps on either end and a series of concrete support columns in the middle . Eight 60 ft (20 m) reinforced concrete spans accommodated northbound and southbound lanes of traffic , with no anchors connecting the spans with each other or to the abutments . At the time of the shock , two of the southbound spans came off their support (a 6 in (15 cm) ledge) and six people were injured when a Volkswagen Beetle and a small pickup truck plummeted off the bridge .

= = = = Humboldt Bay Power Plant = = = =

The Humboldt Bay Power Plant is located about 3 miles (4 @.@ 8 km) north of the collapsed highway overpass and operated fossil @-@ fuel and nuclear units in the 1960s and 1970s . The nuclear unit was cancelled in 1976 because of seismic safety concerns , but the two fossil @-@ fuel units remained in operation . The Nuclear Regulatory Commission performed a post @-@ event survey of the facility 's systems in late 1980 , but inspectors found only minor effects to the plant 's structure , piping , tanks , and other mechanical equipment . It was found that the two units were automatically shut down at the time of the shock for various protective concerns and that there were minor cracks in masonry and concrete , sheared bolts , pipe leaks , and slight movement of water tanks . The deformation of a reinforced masonry wall that resulted in a variable @-@ width gap was the only structural issue .

= = = Strong motion = = =

Pacific Gas and Electric initially reported that peak ground accelerations in the range of .16 ? .4g were recorded on the floor of the refueling building on the plant 's strong motion instruments (accelerometers) . Low voltage from a faulty power supply left the instruments in a condition that was functional , but the records were not considered reliable . Three TERA Technology film recorders were also in use as a backup system , but these instruments also did not produce any usable records , because lack of maintenance had allowed dirt and grit to get inside . Only records from one instrument (an Engdhal peak shock recorder) was believed to be operating correctly and , with a close examination of the energy dispersed at various frequencies , an estimate of .15 ? .25g was given for the event at that location .