

## Ghosts Don't Complain About Blasting

(Current owners of their buildings are likely to complain though.....)

by Wes Bender

Back in the late '80s and early '90s, I was involved in resolving blasting complaints at the sites of three different ghost towns. All of these ghost towns got their start because of mining, but fears of the impacts of new mining (or the potential for new mining) was what brought about complaints and concerns.

Don't get me wrong. I like ghost towns and I'm all for preserving them. I've been fishing the lakes and streams on the east side of the Sierras since I was about 9 or 10 years old and I've read about and visited many ghost towns both in that area and throughout the west.

The first issue came up in the ghost town of Shakespeare, just south of Lordsburg, New Mexico. A new mining operation had started just south of the site of Shakespeare and the owners of the ghost town were concerned that blasting could be causing the adobe walls in some of the buildings to be crumbling. The mine operator was leasing a seismograph from me at the time and he called and asked if I would come down and help resolve the complaints.

I packed up my equipment and drove to Shakespeare to monitor one of the blasts. I asked that the mine operator load a fairly large blast so that we could get a better idea of what the town was experiencing. People sometimes suspect that such monitored blasts might be smaller than normal and I didn't want any complaints regarding the process. On the day of the blast, the wind was howling across the desert. While I also wanted to record the airblast from the shot, any air overpressures would have been totally masked by the wind gusts. Sand was blowing everywhere and stung my face whenever I ventured out from behind one of the buildings. I set the trigger level low enough to capture the blast and obtained a good record of the vibration. It was fairly obvious that the intensity of the vibration of the blast was not causing any damage. It was also pretty obvious that some of the buildings were losing a fair amount of adobe to the sandblasting that they regularly got from the wind. Boards on the wooden buildings were also being eroded. I expressed this to the owner of the ghost town and she agreed that the blowing sand was a problem. After going back to the office and sending the mining company my report, I heard nothing more about potential damage to Shakespeare from their blasting. Some time later the mining company discontinued their efforts at the site as it proved unprofitable to mine.

Shakespeare is located just off I-10 near the town of Lordsburg, NM and is worth a visit if you are traveling through that area.

The second ghost town where I was called to help investigate damage potential from blasting was Rhyolite, Nevada. Located about five miles west of Beatty, most of the buildings in Rhyolite were either gone, going away, or at least were in a badly decaying state. One building, the Bottle House, had been built in about 1906 out of numerous whiskey and beer bottles, those being more plentiful and considerably less expensive than bricks or boards at the time of its construction. Nothing had been done recently to repair or reinforce the structure and a portion of it had collapsed.

Adjacent to the site of Rhyolite, a mining company had opened the Bullfrog Mine, an open pit operation. There were people in the area who were opposed to the new mining operation and were using the sad state of the Bottle House as an excuse to try to stop it. They were enlisting the aid of various agencies in their fight. A park ranger from Death Valley National Monument even made the claim that blasting was the cause of damage to the Bottle House. In his words (from the Sacramento Bee, 1/20/91), "From what we hear, a blast caused the damage. It's a shame because there aren't many historic buildings left in Rhyolite, and there aren't many bottle houses left in the west. They blast every single day and it's bound to take a toll." It was true that the mining company had been blasting almost daily since about August of 1988, but blasts were from two thousand to three thousand feet or more from the Bottle House. I'm not sure about that particular individual's experience or qualifications in the area of blasting or blast effects, but his comments were certainly suspect.

On January 18, 1991, I recorded the vibration from one of the Bullfrog Mine blasts. The seismograph was located immediately adjacent to the Bottle House, 3,275 feet from the nearest point in the blast. The mine detonated a little over 76,000 lbs in the blast, with the largest charge weight per delay being 6,311 lbs. Vibration recorded at the Bottle House was 0.073 in/sec (longitudinal), 0.034 in/sec (vertical) and 0.068 in/sec (transverse). The vibration frequencies were in the range of 4 to 9 Hz. The vibration intensities were far below those that could cause damage to structures, even as fragile as those in Rhyolite. My report included the comment that other forces such as wind and weather, and possibly even ground motion from nuclear tests at the Mercury Test Site could be putting the Bottle House at greater risk than blasting at the mine.

Several months later, on April 4, 1991, a large nuclear test was to be conducted at the Mercury Test Site and the mine suggested I come down and see if I could capture its ground motion and compare it with their blasts. I drove down to Beatty and, to make sure I captured the event, set up three instruments adjacent to the Bottle House. To one of them I attached a 10X amplifier in case the ground motion was too low to reach the lowest trigger level available of 0.02 in/sec. I had to adjust that unit's trigger level to 0.07 in/sec (0.007 in/sec, with amplification) because the instrument kept false triggering from our footsteps as we moved away from it with it set at 0.02 (actual 0.002 in/sec).

Another instrument was set to record automatically as long as the vibration intensity remained above 0.02 in/sec. The third instrument was set up normally, with a trigger level of 0.02 in/sec and a recording duration of 12 seconds.

All three instruments were triggered at 11:00:11, probably indicating an actual detonation time of 11:00:00 at the test site. Particle velocities recorded were 0.078, 0.084 and 0.083 in/sec (longitudinal); 0.044, 0.043 and 0.039 in/sec (vertical) and 0.068, 0.0684 and 0.068 in/sec (transverse). Vibration frequencies were 2 to 3 Hz for all channels on the three instruments. The unit set to record as long as the ground motion exceeded 0.02 in/sec recorded for 16 seconds before vibration dropped below that level. Comparing the resulting ground motion from the nuclear test to the motion recorded from the mine blast, the velocities are similar but the frequency of ground motion is higher for the mine blast. This means displacements from the mine blast were lower and bears out my original thought about the mine blasts possibly being less harsh on the Bottle House than some of the tests at Mercury, although neither generated enough ground motion to cause any damage to the structure. Later, when the mine wanted to open a new haul road, the same predictors of doom now claimed that haul truck vibration would damage the Bottle House. I recorded vibration from truck traffic (both loaded and empty) some 2000 ft away and it revealed that the wind blowing through the creosote bushes near the Bottle House generated more vibration at the House than the truck traffic did at 2000 ft.

Rhyolite is an interesting place to visit, even if most of it has disappeared. Hopefully more effort has now gone into actually preserving this historic site rather than complaining about possible outside adverse impacts.

The third ghost town to which I was called to address issues was Bodie, just north of Mono Lake and southeast of Bridgeport, California. The family that had owned Bodie previously had donated the town to the California Department of Parks and Recreation (hereinafter called the Department) and it was being developed as a state park. Unfortunately, while the family retained ownership of the adjacent lands and intended to either mine them or lease them for mining, they didn't put any stipulations into the gift deed to the state that would protect those rights or keep the state from fighting their efforts. It was the Department's intention to maintain Bodie in its existing "arrested state of decay" and to let visitors experience a REAL ghost town. As a result, the Department was dead set against any mining development near the ghost town. If mining were to take place nearby, they felt it would destroy the ambience that they were seeking.

Initially I was contacted to assist in the preparation of a Draft Environmental Impact Report (DEIR) for a mining operation that was to be conducted on leased land just east of the Bodie town site. My portion of the DEIR pertained solely to blasting and related vibration.

While blasting was not scheduled to take place in the initial exploratory phase of the operation, it would definitely be part of any subsequent mining that might take place on the property. Patented claims existed on Bodie Bluff, immediately to the east of the Bodie State Park boundary and it was anticipated that most of the bluff would probably be mined.

Eventually the exploratory work was allowed to proceed and the mining company started drilling sampling holes on the bluff. When the drills were operating on the side of the bluff facing the state park, they were screened with hay bales to alleviate the visual impact. Meanwhile park rangers and others opposed to the potential mining operation went to great lengths to enlist support from mine opponents.

At some point in the process, a television station in the S F Bay Area jumped into the fray and ran a special report on the potential mining operation at Bodie. It was heavily slanted against the proposed mining operation, depicting a peaceful green meadow, complete with a few deer and surrounded by green trees, with the warning that it would all be destroyed if the mining was allowed to go forward. Normally one expects a documentary to be reasonably accurate in its reporting, however the meadow depicted certainly did not exist anywhere near Bodie. Probably not even on the east side of the Sierras. (One guess was that it was possibly filmed in Marin County, but that was only speculation.) In any case, mine management was quite upset with the documentary and contacted the TV station, demanding that their side be heard too. Eventually the station, to avoid possible legal trouble, acquiesced and agreed to send a reporter and cameraman over to the site of the proposed mine and interview company personnel.

At this juncture, expecting that they would be quizzed extensively by the reporter on various environmental issues, including blast vibration, airblast and cyanide heap leaching, mine management asked me to come over to Bodie for the TV interview. That way I could respond to any questions that the reporter might ask regarding blasting. The mine had also contacted Don Baker, their heap leach consultant, and asked him to be present at the mine for the interview.

On a cold, wintry day I drove over the Sierra, stopped at the Reno airport to pick up Don and we drove down to Bridgeport, where we met with mine management for breakfast. Afterward, we drove out to Bodie and awaited the TV crew. It was bitterly cold and was spitting snow when the reporter and his cameraman finally showed up. He was briefed on who all the personnel were and given a tour of the property. He then proceeded to ask his questions and document the mining company's responses.

We all drove back into Bridgeport for lunch and I sat at a smaller table with the TV cameraman, who was an interesting guy. At some point during lunch, the cameraman chuckled a bit. When I asked him what was so funny, he indicated to me that the reporter had bragged to him on the drive over about how he was going to make the mine people look bad by asking very pointed questions about several issues, including blasting. After he found out that the heap leach consultant and I were there expressly to address these issues, he never even brought them up. The entire process was over later that afternoon, and neither Don nor I had been called upon to address our specialties, marking the only time in my career that I was ever paid to be a Deterrent Consulting Force.....

As is the case with the other two ghost towns (and for that matter, many of the ghost towns that dot the western states), Bodie is a very interesting place to visit. Best to do it on a comfortable spring or fall day though. Winters there can get pretty cold. If you go, take your fly rod along. You aren't very far from some really nice trout streams.