

June 7, 2019

6/5/2019 Red Oak grass cutters reported a bulge on the back of the dam. They said there is an area that is steeper than it used to be.

GRASS WAS CUT THIS YR ON ~APR 28 & ~MAY 28. CUTTER'S OBSERVATION WAS BASED ON THE MAY CUTTING. UNCLEAR IF CHANGE OCCURRED BETWEEN APR AND MAY CUTTING.

6/5/2019 and 6/6/2019

Rich, Janet, and Clarue went to look at the site, took pictures, but didn't see what the grass cutters would have been referring to. Clarue asked Red Oak to mark the area. Janet sent pictures of the back of the dam and asked our dam engineer to inspect it.

6/7/2019

Red oak made a special trip and marked the section they identified as the bulge. Using orange flags, they outlined an area approximately 500 ft wide and 200 ft tall.

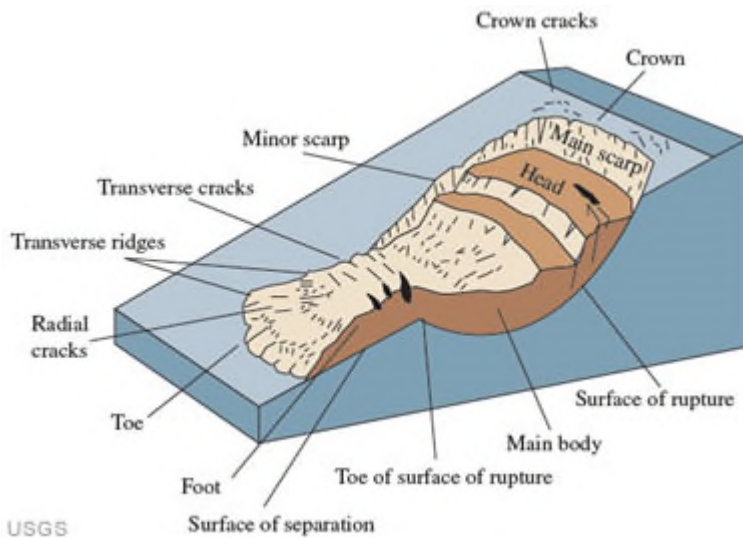
FLAG LINE MARKING LOWER LIMIT OF "BULGE" AREA WAS ON SAME LINE AS WHERE BACK OF DAM HAS ALWAYS CHANGED STEEPNESS. HORIZONTAL RUTS FROM GRASS CUTTING MOWERS COULD BE SEEN.

6/7/2019

Our dam engineer, Jeff Bertel, and another engineer, Stacey B___ came to inspect the dam. They met with Rich, Janet, Clarue, and Marilyn. We examined the area marked with the flags. Rich, Clarue, and the two engineers walked the entire marked area, up and down the back of the dam.

Jeff made several observations:

- This is an extremely large area for a bulge.
BULGE IS PROBABLY NOT A TERM A DAM ENGINEER WOULD USE. I BELIEVE JEFF WAS AFRAID THAT THE DAM WAS IN THE PROCESS OF EXPERIENCING A LANDSLIDE. RAIN WOULD CONTRIBUTE TO THE LIKELYHOOD OF A SLIDE AS WET SOIL IS HEAVIER AND MORE LIKELY TO MOVE. HERE'S AN ILLUSTRATION FROM GEOLOGY.COM/USGS/LANDSLIDES/



- There are no obvious signs of recent movement of earth.

JEFF SAID HE WOULD EXPECT THE SLIDE AREA TO BE STEEPER AT THE TOP AND HAVE MORE MATERIAL AT THE BOTTOM. ALTHOUGH THERE WERE SOME SMALL AREAS OF THE DAM THAT HAD THIS CHARACTERISTIC, IT WAS NOT OBVIOUS ENOUGH TO INDICATE A SLIDE. NOR WAS THERE EVIDENCE THAT A CHANGE HAD OCCURRED RECENTLY. JEFF ASKED IF THERE WAS A RECENT SURVEY OF THE BACK OF THE DAM AS A FRAME OF REFERENCE. JANET HAS SENT JEFF A TOPO SURVEY FROM 2008.

- If there is any movement of the ground at the back of the dam, it is “creeping” rather than sudden shifts.
- The back of the dam should be monitored.
- Monitoring should begin with visible inspection, looking for cracks or fresh earth.
- ~~A couple of~~ TWO spots should be closely watched, ~~there~~ THEY were marked with double flags.
JEFF MARKED TWO AREAS NEAR THE MIDDLE OF THE AREA MARKED BY THE GRASS CUTTER, ONE HIGHER AND ONE LOWER.
- Instruments to measure change in slope of the dam (inclinometers) can be permanently inserted to obtain accurate data. This is an estimated cost of \$10,000.

Jeff will send Clarue a report with his recommendations. He will also model our dam to see if a slide would endanger the integrity of the dam.

Janet Hirsch

Rich Hirsch