

## Norman, Yolande

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**From:** Mark Jancin [mjancin@chesterengineers.com]  
**Sent:** Thursday, April 01, 2010 11:24 AM  
**To:** Mark Purcell; earle.dixon@state.nm.us; Norman, Yolande; Eugene Esplain  
**Cc:** Bush, Larry (GE Aviation, US); Blickwedel, Roy (GE, Corporate)  
**Subject:** proposed location pilot injection well Zone 3  
**Attachments:** Figure 1.pdf

This email presents the proposed location of the pilot injection well in the northern part of Zone 3 at the Church Rock tailings site.

Figure 1 shows the estimated effect of water injection at a sustained rate of 1 gallon per minute (gpm) for one year from the proposed pilot injection well, which is designated IW-A in the figure. The estimated effect of this injection is illustrated as a contour map (2-ft interval) of piezometric elevations in Zone 3. The directions of induced hydraulic gradients are indicated by arrows in the figure.

The analytical model used to estimate the effect of injection is the same as that used for, and described in, the following report: N.A. Water Systems, April 25, 2008, Recommendations and Summary of Hydrogeologic Analysis – Evaluation of Groundwater Flow in Zone 3 for the Design of a Pumping System to Intercept and Recover Impacted Groundwater. The model estimates drawdown based on projected pumping rates at extraction wells (and mounding from injection into the simulated injection well). The estimated future influence of that pumping (and injection) was added to a prior, measured state of the piezometric surface in Zone 3. The resulting estimate of the future piezometric surface is shown in Figure 1.

Injection at simulated well IW-A at a rate of 1 gpm is estimated to balance the projected withdrawals from wells NW-1, NW-2, and NW-4. Note that the symbol for pumped wells in Figure 1 implies that all five of the NW-series wells are pumping; in fact, only wells NW-1, NW-2, and NW-4 have been pumping since re-optimization occurred during November 2009.

One effect of this injected water is that it is estimated to slow or arrest further drawdown in the vicinity of the extraction wells. This will have the beneficial effect of extending the functional life of those wells. The geochemical effect of the alkaline water should similarly benefit the extraction wells, by slowing the deleterious influence of seepage impacted groundwater on the hydraulic conductivity of the rock.

UNC intends to install this pilot well as soon as practicable, and then to proceed with the injection (hydraulic) testing. We will provide you with a report on the results of this testing. If the injection rate is satisfactory, then we will amend the injection water with alkalinity as soon as possible. Monitoring of the groundwater levels and chemistry will continue in this area.

**Mark Jancin, P.G.**  
Project Manager

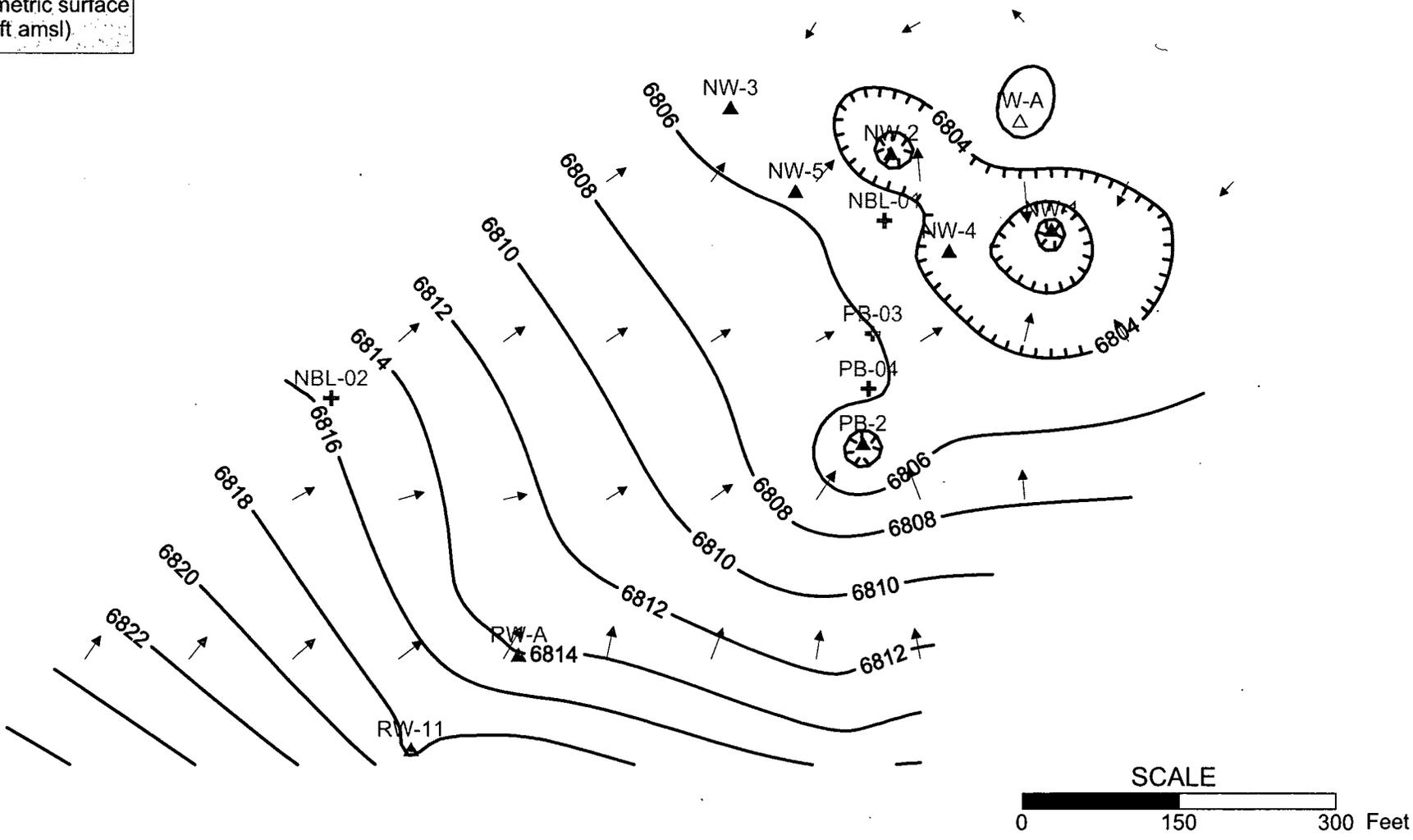
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**LEGEND**

- + monitor well
- ▲ pumped well
- △ injection well
- piezometric surface elev. (ft amsl)

SECTION 36



**FIGURE 1**  
**Estimated piezometric elev. in Zone 3, June 30, 2011.**  
**based on analytical model of projected pumping drawdown,**  
**plus injection at 1 gpm in well IW-A starting June 30, 2010.**