**From:** Norman, Yolande
**Sent:** Thursday, April 08, 2010 2:52 PM
**To:** 'Dixon, Earle, NMENV'; Mark Purcell; Eugene Esplain; Bahar, Dana, NMENV
**Cc:** Guo, Lifeng; Tadesse, Rebecca
**Subject:** RE: proposed location pilot injection well Zone 3

Mark Purcell *et al.*,

The proposed pilot injection well is located in the leading edge of the impacted groundwater, where an array of injection wells is considered as a potential groundwater remedy. This pilot injection will provide UNC with additional field hydraulic information needed for the design of an array of injection wells. The proposed location for this pilot injection well is fine for the stated objectives. NRC will peer review the final design on the injection well array in terms of its objectives, design and effectiveness when the design is completed.

P.S.
Great summary Earle.

Yolande J.C. Norman,
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**From:** Dixon, Earle, NMENV [mailto:Earle.Dixon@state.nm.us]
**Sent:** Tuesday, April 06, 2010 5:37 PM
**To:** Mark Jancin; Mark Purcell; Norman, Yolande; Eugene Esplain; Bahar, Dana, NMENV
**Cc:** Bush, Larry (GE Aviation, US); Blickwedel, Roy (GE, Corporate); Dixon, Earle, NMENV
**Subject:** RE: proposed location pilot injection well Zone 3

**Dear Mark Purcell, Mark Jancin, and Other Interested Parties-Agencies,**

**Mark Jancin, thank you for your information and diagram for the proposed pilot injection well location in the northern part of the Zone 3 unit at the UNC Church Rock NPL site. It is still not clear to me about the design document for this proposed pilot injection well. Now that we have a location for IW-A (the proposed new injection well for the Zone 3 unit), are we still going to receive an official design document before the well is drilled and tested, or after the well is drilled and tested? I thought we said the design document is about 2 months out?**

**Below is some of the chronology of events leading up to today? I have attached a modified map-diagram to help us with spatially referencing the Zone 3 system of**

**wells and the proposed new pilot injection well. I apologize for the details and intensity of this email, but I need a way to track and help us list all the complex components that are related to this injection well proposal.**

**December 17, 2009: Chester Engineers email report: Hydrogeologic Analysis of Recent Zone 3 Injection Testing and Proposal for Enhanced Remediation, United Nuclear Corporation's Church Rock Tailings Site, Gallup, New Mexico, 7 p, 1 table, and 6 figures. This report mentions the SWSFS, Part II, Table 6, Alternative 8 describing a hydraulic barrier of injection wells for containment of seepage impacted water in Zone 3 near the northern boundary of the UNC property. About 1.5 pages describe a proposal to install a pilot injection well and a linear array of injection wells in Zone 3.**

**February 12, 2010: NMED Earle Dixon sends email to EPA Mark Purcell with a list of questions pertaining to the proposal to install a new pilot injection well in Zone 3.**

**March 4, 2010: EPA Mark Purcell forwards list of NMED questions to NRC, NNEPA, UNC-GE, and Chester Engineers regarding the Zone 3 Injection Well Proposal.**

**March 12, 2010: Conference call with EPA, NRC, NNEPA, NMED, UNC-GE, and Chester Engineers to go over and discuss the NMED list of questions. The background issue pertaining to water quality parameters was discussed and the report sent out by NA Water Systems on October 17, 2008 was referenced by UNC-GE/Chester Engineers. It was during this conference call that UNC-GE/Chester Engineers mentions the July 10, 2009 SWSFS Part II report that they sent out to the regulatory agencies and have yet to receive any comments back. EPA expressed a strong need to know where the nose of the seepage impacted water in Zone 3 was located in order to brief upper management about the status of activities close to the northern boundary of the UNC property. UNC-GE responded that it is a very difficult and complex question to answer because the Zone 3 ground water system is dynamic, geochemically variable/unstable, uranium is a poor indicator of plume location, and it is not easy to understand/predict conditions even if more wells were to be installed. Chester said it would take about 2 months to complete a design document for the pilot injection well array.**

**March 19, 2010: Conference call with EPA, NRC, NNEPA, and NMED to discuss the Zone 3 Pilot Injection Well proposal and approval process so UNC-GE can proceed with additional iterative steps to install the well this year. Offsite well issue is decoupled from injection well issue. NRC license amendment not required. ACL application for Zone 1 is still pending. Mark Purcell will be extremely busy with Molycorp ROD in the coming months and he will be out of the office most of July.**

**March 19, 2010: EPA Mark Purcell via email approves UNC-GE request to install the proposed injection pilot well in Zone 3. Email mentions the SWSFS for the Church Rock Site.**

**April 1, 2010: Chester Engineers/Mark Jancin sends out a brief email describing the location for the proposed pilot injection well in Zone 3. Email describes that the methodology used to arrive at the location and injection rate for the well is the same as the method used and described in the April 25, 2008 report for the pumping well array near well NBL-1. This report is entitled, 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, United Nuclear**

**Corporation's Church Rock Tailings Site, Gallup, New Mexico (9 p, 1 table, 13 figures, and 2 p of values used in calculations). This report contains valuable information and figures that are helpful to understanding the proposed new injection well IW-A.**

**Whew! Take a deep breath before reading the rest of this email.**

**Here I try to note and summarize where we have come from on documents related to the pilot injection well. I still don't think I have all the documents and dates up to this point that we need to track/address to have a comprehensive, congruent regulatory approach and management effort at the UNC Site Zone 3 issue (and other units) so please bear with me. Even though NMED may not have completed a final review of all these documents and provided comments on letterhead, we are familiar with them. I am trying to capture what we need to do to clear out the back log and catch up. And what is left to accomplish or anticipated in the rest of this calendar year for the UNC Site.**

**October 17, 2008: NA Water Systems/Chester Engineers revised report on Calculation of Background Statistics with Comparison Values, UNC Church Rock Mill & Tailings Site, Church Rock, New Mexico (9 p text; 2 figures; 9 tables; Appendix A – 15 p; Appendix B – 9 p). UNC-GE/Chester Engineers would like to receive comments on this report (?) to support the anticipated Supplemental Site Wide Feasibility Study (SWSFS) for the UNC Church Rock Site that has been discussed and partially addressed as a product for a future date to support a revision of the Record of Decision (ROD) for the UNC Site. Final review of this document – TBD.**

**December 5, 2008: NA Water Systems/Chester Engineers revised report: Estimated UCL95 Statistics and EPCs in Impacted Groundwater, UNC Church Rock Mill & Tailings Site, Church Rock, New Mexico: 81 p, sent by email only. Final review of this document - TBD.**

**December 29, 2008: NA Water Systems/Chester Engineers report: Alternate Concentration Limits Application, Zone 1 of the Gallup Sandstone, UNC Church Rock Site, Church Rock, New Mexico: CD cover letter 3 p and application report 246 p. Final review of this document – TBD.**

**May 5, 2009: EPA presentation to the Pinedale Chapter of the Navajo Nation regarding an update on the Five Year Review of Remedy for the UNC Church Rock Site. EPA slide no. 21 mentions the SWSFS is, "planned for completion in 2010." Are we on track for completion in 2010 and what are the steps leading up to and required for a completed SWSFS in 2010?**

**July 10, 2009: Chester Engineers report entitled: Revised Submittal Site-Wide Supplemental Feasibility Study Part II, Development and Screening of Remedial Alternatives, United Nuclear Corporation's Church Rock Tailings Site, New Mexico; 46 p; 6 tables; 4 figures; Appendix A (Fig. A.1 – A.3); Appendix B (Tables B.1 – B.6). This is UNC-GE's revised SWSFS for the UNC Site and they would like to receive comments in order to support a revision of the ROD? This document and review was mentioned in the conference call on March 12, 2010. Final review of this document – TBD.**

**As far as I can tell from all the above, the regulatory agencies are to review and comment on the SWSFS Part II report by about June 2010. If I missed something, let me know.**

**Thank you.**

**Earle Dixon**

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**From:** Mark Jancin [mailto:mjancin@chesterengineers.com]
**Sent:** Thursday, April 01, 2010 9:24 AM
**To:** Mark Purcell; Dixon, Earle, NMENV; Yolande Norman; Eugene Esplain
**Cc:** Bush, Larry (GE Aviation, US); Blickwedel, Roy (GE, Corporate)
**Subject:** proposed location pilot injection well Zone 3

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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Sent Date: 4/8/2010 2:52:16 PM
Received Date: 4/8/2010 2:52:00 PM
From: Norman, Yolande

Created By: Yolande.Norman@nrc.gov

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