

**From:** [Mike Griffin](#)  
**To:** [Saxton, John](#)  
**Cc:** [Ralph Knode](#); [Royal Pond](#); [Ben Schiffer](#); [Beth Kelly \(bkelly@wwcengineering.com\)](#)  
**Subject:** [External\_Sender] RE: Supple Information Request for 11.3B license amendment  
**Date:** Wednesday, April 05, 2017 10:36:50 AM

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Hi John:

Please see Strata's responses below for the supplemental information that you requested for License Condition 11.3(B):

- 1. Please provide Strata's rationale and justification for the proposed revised narrative in the license application that the standard 400-foot distance is 400 feet +/- 5 percent.***

**Response:**

Strata believes that some minor allowance must be made for distances for monitor well spacing due to several factors including those that were the basis for the amendment request for License Condition 11.3(B). This includes the necessity to avoid physical features such as power lines, pipelines, roads, historical sites, and topographic features. Drill sites are routinely shifted in the field to conform to existing physical features and to allow the safe setup of the drill rig.

In addition to avoidance of physical features in the field, there are inaccuracies that are inherent in determining monitor well locations. For instance, the GPS equipment that Strata uses to survey well locations has an accuracy to below one meter horizontally. While this is an acceptable level of accuracy for determining well location, it correlates to 0.75% at a 400 foot spacing distance. "Drift" encountered during well drilling and completion can result in the well completion zone being horizontally displaced from the surface drill location. Strata typically experiences approximately an average of 7 feet of drift (1.75% of 400 feet) for wells completed in the ore zone but drift above this percentage could be acceptable.

Finally, in addition to inaccuracies inherent in well installation, the response time for detecting increases in excursion parameters at 420 feet versus 400 feet fall within the excursion monitoring frequency in SUA-1601 (i.e., semimonthly). The following table shows the delay that would be expected in detection of excursion parameters at a 400 foot well versus a 420 foot well:

Parameter	Day UCL detected at 400 ft.	Day UCL detected at 420 ft.	Δ Days
EC	189	203	14

Alkalinity	43	51	8
Chloride	167	182	15

The table, which is based on NRC modeling results, shows that it would take between 8 and 15 days longer for the UCL to be detected at 420 ft. than at 400 ft. Based on these results, any excursion would be detected during the excursion monitoring period described in LC 11.5, which requires monitoring twice monthly and at least 10 days apart.

**2. Please provide an example Upper Control Limit (UCL) calculation using your proposed procedures.**

**Response:**

To support Strata’s commitment to calculate UCLs for wells exceeding the 400 feet +/- 5 percent spacing from the nearest production unit the following outlines the procedures Strata will use. The procedures use the UCLs established for the perimeter monitor wells in the wellfield data packages and NRCs Phast model output. The same procedures will be used for each UCL parameter (electrical conductivity (EC), alkalinity, and chloride).

**Step 1:** Using the UCLs and NRCs Phast model output, the day a UCL would be detected in a perimeter well at 400 feet was calculated for each parameter. For example, the MU2 EC UCL is 3,985 µmhos/cm, which at 400 feet would fall between day 146 and 219 (Phast model output day 365 was equal to day 0, Phast model output day 438 was day 73, etc.). Table 1 shows the Phast output EC concentrations for those days and the calculated linear equation. Using the linear equation, the UCL would be measured at a perimeter well on day 189.

Table 1. EC Concentrations at Various Distances and Days

Day	EC (µmhos/cm) at 400 feet	EC (µmhos/cm) at 440 feet	EC (µmhos/cm) at 500 feet
146	3,590	3,310	2,890
219	4,260	4,000	3,610
Linear Equation	$y = 9.1781x + 2,250$	$y = 9.4521x + 1,930$	$y = 9.863x + 1,450$

**Step 2:** The next step was to calculate UCL parameter concentrations between 400 and 500 feet using the Phast model output and linear interpolation. For example, Table 1 shows the EC concentrations for days 146 and 219 at both 400 and 500 feet. Using the linear equations for each, the EC concentrations at 440 feet for days 146 and 219 were interpolated.

**Step 3:** The time in days calculated in step 1 can then be used to calculate an updated UCL at any distance between 400 and 500 feet. For example, one perimeter monitor well is 440 feet from the nearest production unit. Using the linear equation and day 189 (step 1), the UCL for

EC at 440 feet would be set at 3,716  $\mu$ mhos/cm. This would be equal to the MU2 average EC concentration plus 4.3 standard deviations.

**Step 4:** Follow the same procedures for alkalinity and chloride for all wells spaced at distances greater than 400 feet +/- 5 percent.

**Step 5:** Using the above procedures, perimeter wells spaced at distances greater than 400 feet +/- 5 percent would be calculated and used in the monthly excursion monitoring program and provided to NRC and WDEQ-LQD in future quarterly reports in accordance with LC 11.1(A). For new mine units, the UCLs for perimeter wells exceeding the 400 feet +/- 5 percent spacing from the nearest production unit would be calculated similarly (i.e., could use mine unit specific fate and transport model) and documented in future wellfield data packages.

Please let me know if you have any questions.

Mike

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**From:** Saxton, John [<mailto:John.Saxton@nrc.gov>]  
**Sent:** Monday, April 03, 2017 11:59 AM  
**To:** Mike Griffin  
**Subject:** Supple Information Request for 11.3B license amendment

Mike,

Thank you for your recent submittal responding to the proposed draft license conditions for the license amendment request to modify license condition 11.3 A & B (see ML17089A275 and ML17079A289). In order to complete its review of the supplemental information, the NRC needs the following additional supporting information:

- Please provide Strata's rationale and justification for the proposed revised narrative in the license application that the standard 400-foot distance is 400 feet +/- 5 percent.
- Please provide an example Upper Control Limit (UCL) calculation using your proposed procedures.

### **Bases**

In a PM-to-PM call to clarify the proposed license conditions, the NRC staff indicated that the limitation of a distance for the perimeter well from the production area to 400 feet from the 500 feet requested was due to the delay in timing for a detection of an excursion because of the poor baseline water quality at the Ross facility and referred to staff's calculations (see ML17069A034). Strata expressed an approach to address staff's issue with timing by reducing the UCL levels.

In that PM-PM call, Strata expressed concern about wells that may have been installed to meet the 400-foot criterion but, due to logistical issues, may slightly exceed 400 feet. The NRC staff's review only compared the 400-foot scenario with the 500-foot scenario. In order for staff to evaluate whether a 5-percent tolerance is justifiable, Strata needs to provide NRC with additional supporting information.

Finally, the proposed procedures in Strata's response documents the principles for Strata's approach but does not provide any evaluation on implementation of that approach. The NRC staff needs to evaluate that the approach results in a timely detection of an excursion. At a minimum, Strata needs to provide an example calculation.