STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER
DISTRICT VI - SANTA FE

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April 11, 2022

Los Alamos National Laboratory
Attn: Christian Maupin, Agent
600 6th Street
Los Alamos, NM 87544

Re: Timeline of Events and Concurrence of Procedural Changes

Greetings:

The Office of the State Engineer (OSE) received your letter, *Response to New Mexico Office of the State Engineer for Approval of Amended Well Plugging Procedure and Conditions of approval for the Revised Well Plugging Plan of Operations for RG-98114,* (the letter) dated March 8, 2022. In response to the letter and attached timeline of events, provided by EM-LA and N3B Los Alamos (LANL/N3B), the OSE is providing additional clarification to Procedural Requirement changes, and additional requirements, as follows:

Procedure Requirement #1: "A complete well video log shall be run from ground surface to total depth of the well."

> Description of Change per LANL/N3B: It was agreed that the video camera does not need to be run below the casing into the open formation
>
> **OSE Clarification #1:** The video camera does not need to fully exit the casing to view the formation below through the side scan. This will be required to not only confirm formation is exposed but also to confirm exact depth of casing termination/formation exposure.

Enclosure
Cc: file

OSE Clarification #2: Side scan (360 degrees) is required on the video camera and required to be functional.
OSE Clarification #3: Depth counter (displayed on the well video) is required for the video log. Depth counter must be fully operational and displayed in the video during the entire video log.

Clarification per LANL/N3B: NMOSE stated that any changes required to the procedure requirements will be made real time as much as possible based upon downhole video.
OSE Response: The OSE concurs with the LANL/N3B clarification. However, there shall be no deviation from OSE Clarification #1 through #3 above.

Procedure Requirement #3 and #6: steps require that perforation of well casing be performed.

Description of Change per LANL/N3B: NMOSE requires that a description of the equipment to be used for perforations and how it will be used be provided to NMOSE before performing perforations.
OSE Clarification: The information required by the OSE above for perforating equipment and procedure, shall be required to be submitted to the OSE at the same time as the LANL/N3B proposed decommissioning schedule, required later in this document.

Clarification per LANL/N3B: NMOSE stated perforations do not need to occur in wire wrap screens.
OSE Response: The OSE concurs with this statement.

Procedure Requirement #7: The tremie shall be placed as close to the top of the lower sealed interval as possible. Neat Type I/II cement grout containing no more than 6 gallons of fresh water per 94-pound sack of Portland cement shall be pumped from the total depth to surface in one continuous lift. The cement shall be placed in one continuous lift and the tremie pipe shall not be pulled above the top of the cementing column, at any time, during placement. No additives shall be permitted for this cement plug.

Description of Change per LANL/N3B: It was agreed upon that neat cement type I/II shall be used below the cement packer. Bentonite grout/cement with less than 6% bentonite may be used to fill the casing areas with perforations in the continuous pour from the top of the cement packer. Neat cement type I/II shall be used in the last setting of cement at the surface. NMOSE agreed that the tremie may be left in place following the continuous pour.
OSE Clarification #1: The use of up to 6% pure bentonite powder ("90 barrel yield") as an additive in cement is allowed under NMOSE/AWWA guidelines. Neither granular bentonite nor extended yield bentonite shall be mixed with cement.

When supplementing a cement slurry with bentonite powder as requested, water demand for the mix increases at a rate of 0.65 gallons of water for each 1% increment of bentonite bdwc (by dry weight cement) above fundamental water demand of 5.2 gallons water per 94-lb. sack of cement. A 5% bentonite/cement slurry may therefore contain up to 8.5 gallons of water <u>total</u> per 94-lb. sack of cement / approximate 5-lb. bentonite increment, provided appropriate mixing order is maintained. The bentonite shall be properly hydrated

separately with its required increment of water, prior to being added into the cement mixture. If water is otherwise added to the combination of dry ingredients or the dry bentonite blended into wet cement, the hardness and alkalinity imparted to the mix water by the cement will restrict the ability of the bentonite powder to yield as expected, resulting in excess free water in the slurry and enhanced cement shrinkage upon curing.
OSE Clarification #2: Bentonite shall be properly mixed and hydrated prior to being introduced into the cement. Dry bentonite powder may not be mixed into cement slurry.
OSE Clarification #3: The remaining tremie shall contain no fresh water upon completion of cement installation to surface. No tail water shall be pumped by the cementing contractor to displace cement (through their surface equipment) thereby leaving the remaining tremie, full of fresh water.

Clarification per LANL/N3B: NMOSE noted that the use of oil and gas methods for pressure cementing and continuous pour above the cement packer would be preferred, such as [the] use of a cement pump similar to that on a Halliburton cement truck.
OSE Response: Condition of Approval #8 states: *"all tools used for cement squeezing shall be approved by the OSE prior to use"*, this includes the equipment used to pump cement. The equipment shall be designed and rated to properly pump cement on the fly and prehydrate bentonite prior to its introduction into cement slurry, otherwise the OSE concurs with this statement.

Condition of Approval 6.ii.: Cement will be allowed to set for no less than 48 hours prior to the commencement of any further plugging activities upon completion of step #1 and step #3 of the approved procedure.

Clarification: The procedure steps should refer to step #2 and Step #4 instead of Step #1 and #3.
OSE Response: The OSE concurs with this statement.

Condition of Approval #18: Per §19.27.4.37 NMAC Rules and Regulations, NMOSE witnessing of the plugging and associated activities **will** be required and shall be facilitated by a NMOSE observed, or an authorized NMOSE agent, onsite by calling the District 6 NMOSE Office at 505-827-6120, at least 72-hours in advance. Witnessing of decommissioning activities by the NMOSE or its authorized agent, shall occur between the hours of 8:00 A.M. and 5:00 P.M., Monday through Friday and shall not occur during any observed holidays. The decommissioning of RG-98113 or any associated activities prior to placing sealant, **shall not occur** without an observer from the NMOSE present.

Description of Change per EM-LA/N3B: LANL/N3B stated that RG-98113 is located within LANL Weapons Facility Operations (WFO) area, to which EM-LA/N3B do not operationally control access. Therefore, the requirements to conduct all work from 8:00-5:00 on weekdays will be difficult because of other activities at the WFO. EM-LA/N3B has had to modify the work schedule so that work typically occurs from 2:00 pm to 2:00 AM Monday-through Sunday. NMOSE stated they are willing to be flexible and are not opposed to working outside of required time periods.

Clarification per LANL/N3B: It was agreed that NMOSE must be provided with at least 72 hours of notification for (a) downhole video (procedure requirement #1), (b) placement of cement plug in the bottom of the hole in the open formation (procedure requirement # 2), (c) cement squeeze formation pressure testing (procedure requirement # 4), (d) squeezing of cement (#4 also), and (e) the last setting of cement at surface (Procedure Requirement #7). NMOSE does not need to be provided a 72-hour notice or be onsite for perforation of well casing (PR#3) and setting the packer (PR#4).
OSE Response: OSE concurs with this statement provided the 72-hour notice is submitted by LANL/N3B in an email to all participating OSE and NMED employees, simultaneously, stating the intended start time and event in which LANL/N3B will require witnessing for.

As requested by LANL/N3B, the OSE is providing a list of employees who may be involved during the witnessing of the decommissioning of RG-98113. **There will be no OSE availability during the Easter, Memorial Day or July 4th weekends so please do not request any witnessing during these times**. There may be times when some of the OSE participants will not be available but someone on this list will make themselves available for the required witnessing. In the event of an extreme emergency and no OSE employee is available to witness, the employees named by NMED/HWB for their own witnessing, may substitute for OSE witnessing. Upon receipt of a LANL/N3B email requesting witnessing, the OSE will respond to the LANL/N3B email with a list of OSE employees to be onsite for witnessing an event. NMED/HWB shall provide their own list of employees as required by them. The OSE will have the following employees participating in the decommissioning of RG-98113:

Christopher Thornburg – christopher.thornburg@state.nm.us
Christopher Angel – christopher.angel@state.nm.us
Lorraine Garcia – Lorraine.garcia@state.nm.us
Joey Maestas – joey.maestas@state.nm.us

The OSE is requiring LANL/N3B to submit an estimated start date for the decommissioning of RG-98113. As mentioned above, the OSE is also requiring that LANL/N3B submit information about the proposed methodology and specific equipment for [jet] perforating, specifically the areas where the casing is overlapped and proposed cement procedures and equipment specific to the pressure grouting.

Thank you for your cooperation. Please contact me with any questions or comments.

Sincerely,

Christopher M. Thornburg
Upper Pecos Basin Lead
Water Rights Division, Santa Fe
(505) 827-6120