

JK

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545



memorandum

TO: Distribution
Charles Nylander
FROM: Charles Nylander, ESH-18
SYMBOL: ESH-18/WQ&H:99-0066
SUBJECT: **QUARTERLY MEETING NOTES - FEBRUARY 9, 1999**

DATE: March 1, 1999
MAIL STOP/TELEPHONE: K497/5-4681

Attached are the minutes from the February 9, 1999 Groundwater Integration Team (GIT), New Mexico Environment Department (NMED) Quarterly Meeting held at Los Alamos National Laboratory (Laboratory). A number of major issues were discussed at the GIT/NMED meeting. These issues, as well as the items requiring decision-making, are summarized as follows:

- The drilling status of well R-25 was discussed, including recent analytical results from groundwater samples. The issue of whether R-25 would need to be drilled to a depth beyond 1940 feet was discussed. Since R-25 is nearing the total depth of construction i.e. 1940 feet with the 9 5/8 inch casing, the Laboratory requested that NMED be prepared to correspond expeditiously in the near future regarding a letter of concurrence on well completion plans. All parties acknowledged that such concurrence would be of necessity based on numerous technical considerations, including analytical results from the lower-most sampling zones. The Laboratory will share all available analytical data (screening, preliminary, and validated) with NMED in an effort to finalize completion plans.
- The issue of defining maximum contaminant levels (MCLs) was discussed. The Laboratory voiced a desire to establish MCLs with NMED with respect to groundwater contaminants.
- The issue of which regional well downgradient from R-25 to start this Fall was discussed. The Laboratory is reviewing the technical rationale to support either R-18, R-19 or R-27. The Laboratory asked that NMED also give some thought to their recommendation regarding the accelerated start of one of the three wells.
- NMED is concerned that intermediate perched groundwater zones are not receiving adequate attention in the Laboratory's groundwater characterization program. The issue relates to the timing of intermediate well installation, and their use in characterizing and monitoring contaminants discovered during the drilling of the regional wells. LANL has recently aligned the LA/Pueblo ER RFI Workplan to the Hydrogeologic Workplan regarding the use of intermediate perched groundwater wells. This on-going issue will be discussed further during the GIT/NMED Annual Meeting in March, and also will be addressed in the ER Roadmaps.

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- The drilling activities for FY-99 were discussed and scheduled as follows:
 - Finish R-25
 - Complete R-9 as a single completion monitoring well
 - Complete R-15
 - Start drilling R-31
 - Start drilling one of the following: R-18, R-19 or R-27
- The Laboratory and NMED will conduct the Annual Meeting on March 29, 1999.
- The Laboratory discussed the fact that two separate proposals have been submitted, one to Laboratory Senior Management and the other to DOE/LAAO to request additional FY-99 funding to accelerate modeling/data management activities, regional well construction, and perform hydrologic tests on water supply well PM-4.
- The Laboratory requested NMED comments on the draft Annual Report in a timely manner so as to include them in the final report publication prior to the Annual Meeting on March 29, 1999.

Please review these minutes for accuracy. If you identify any changes that should be made, please submit them to Charlie Nylander.

CN/mm

Attachments: a/s

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Joseph Vozella, DOE/LAAO, w/att., MS A316
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Rick Warren, EES-1, w/att., MS D462
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Bruce Robinson, EES-5, w/att., MS F665
Robert Gilkeson, EES-13, w/att., MS H865
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Introduction

Charlie Nylander described the agenda:

- R-25-drilling and well completion;
- TA-16 future activities;
- Intermediate depth wells;
- FY99 drilling activities
- Other business.

R-25 Drilling and Well Completion

David Broxton said that since R-25 press release, drilling has continued. In December there was a proposal for completion with six sampling ports. That proposal was based on the assumption that there would be negative sample results for HE at depth. However, since that time, LANL has continued to collect water samples every 100 feet. The next sample had HE. Charlie and David have talked with LANL management about sharing preliminary data with NMED. Both Burick and Canepa agree to sharing the preliminary data. They were willing to do this because there has been no inappropriate use of preliminary data in the past. As drilling continues there is a field screening for HE every 20-ft. The correlation between positive field screen for HE and fixed Lab results is good, although the field screen is only good for presence/absence, not concentration measurement. The sample from 1702 ft had field screening hits for HE. LANL will collect sample at 1707 ft. for contract laboratory analysis. The stratigraphic unit is still the Puye Formation (~ 850 ft. in this borehole). The base of Puye is expected at 1725 ft, based on the geologic model. Although the control is limited in this part of the Lab, the contacts have been good so far.

Pat Longmire described the HE analytical results. RDX has the highest concentration, although RDX, HMX, TNT, and their degradation products are all present. It appears that deeper samples have more degradation products. Although we don't know the source terms, Pat said this makes sense that deeper water has had more time for degradation to occur. As shown on an overhead, at 1407 feet the RDX was at 59 ppb and at 1507 feet the RDX was at 4.4 ppb. The "0" for the depths greater than 1507 feet are space holders for samples that have not been collected yet, they are not sample results. The sample from 1607 was collected last week and Pat hopes to have the data back by the end of this week.

John Young asked what the concentration of metals is doing at depth? Pat Longmire responded that metals are not an issue because their concentrations are so low. The samples are turbid, so LANL is getting both filtered and non-filtered for analysis. The metal concentrations are much less than has been measured at the surface in springs.

Chris Hanlon-Meyer asked if the analytical lab has had emulsion problems? Pat Longmire responded that the lab has only had problems with tank samples, which results in surrogate recovery problem. Chris Hanlon-Meyer said that the lab had emulsion problems with NMED samples, also a problem with surrogate recovery. Pat Longmire

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responded that with an emulsion problem they have to add nitrobenzene and that biases the results towards low side. Chris Hanlon-Meyer asked if the drilling fluid has been a problem? Pat Longmire said that the Lab has not had that problem because they have not collected samples where there was drilling fluid. Bob Gilkeson added that drilling fluid is a problem only with water collected from the storage tanks. Chris Hanlon-Meyer asked if the borehole is purged before sampling? Bob Gilkeson responded yes, the borehole is always purged to get a fresh sample. Michael Dale said that the split sample from 1407 ft was sent to 2 labs: Berringer and Paragon. The Berringer result was two times higher than the LANL result and the Paragon was lower. Bob Gilkeson asked if the sample was unfiltered? If the sample was from a high clay zone it might cause emulsion. Was the sample diluted? The two times higher result could be a dilution problem. Michael Dale said that the 1507-foot sample was 4.9 ppb, just like LANL's result. David Broxton asked about the analytical results on the other split samples? Michael Dale said that they verified the non-detect at 1287, and all the rest were close enough. Bob Gilkeson pointed out that since sampling is done while drilling, the samples were somewhat compromised and are not the same as if they had been collected from a well. Pat Longmire will look at our results for 1407 and check on whether they were diluted. John Young asked if the tables with HE and metals data could be provided to them? Pat Longmire committed to providing tables with both validated and preliminary data.

Charlie Nylander said that R-25 will be sampled at 1707 feet and then LANL will drill toward 1800 feet and sample again. LANL wants to complete well at 1800 ft, and hoping for no HE at bottom of well. Bob Gilkeson said that field screening at 20-ft. interval will continue while drilling. The drilling process brings water up from bottom of hole, and so the exact depth that the water came from is very certain. Charlie Nylander said that the current thinking for completing R-25 is with 9 sampling ports. This is an increase over the 6 zones that were proposed in December. Now LANL is planning 3 additional zones: 1600 ft, 1700 ft, and 1800 ft. Lanl is in the process of soliciting Westbay quotes for the 3 additional zones. When LANL has the preliminary results, LANL will sit down with NMED and agree on actual sampling port locations.

David Broxton asked what does the state think about pursuit of vertical extent? The situation is that this continued drilling is holding up other wells. LANL will be running out of the 9-in casing at 1940 feet, so should we focus more resources on this well or look to down gradient wells? John Young said that depends on what the HE is doing. If it pops up to 60 ppb, keep going. If it is near detection limits; then could stop. Bob Enz asked what the spot testing results have been below 1600 feet? Pat Longmire said that they have been dropping off. David Broxton added that the correlation is pretty bad, the spot tests are really only good for presence or absence.

Chris Hanlon-Meyer asked if the piezometric head has changed? Bob Gilkeson said that the 11-3/4 inch casing is set in at 1175 ft. The static water level in this upper zone was at 711 ft and it dropped gradually as drilled through it, down to 1175 ft. After sealing at 1175 ft, drilled into dry rock then drilled back into saturation with static water level at 1172 ft. As drilling through this, the water level has dropped to 1280 ft. This drop in water level indicates a recharge area. There is enough 9-in casing to get to 1940-ft level.

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That is about as deep as can get with this system. The next size down is 7 5/8 inch. However, cannot construct a 5-inch well in that size casing. Westbay can (for future wells) modify the packing system to construct a 4-in well inside a 7-in casing. But for this well, have already received the casing and can't change for this well. David Broxton asked if there is 6-in casing left? Bob Gilkeson said that there is, but not much more than the 9-inch. David Broxton asked if it would be cheaper to supplement existing system? Bob Gilkeson responded that if you use the 6-in system, it will lose a lot of the power of the downhole hammer. The 7-5/8-in provides enough space that the hammer can still work and can drill much faster. This is a 200-300% improvement in drill speed versus the IR T-4 drilling rig.

Dave Broxton asked how deep is deep enough? What level of HE is ok to stop at? Do we keep drilling until we can't go any further? Chris Hanlon-Meyer said since there is a downward gradient, the HE is going down. Michael Dale said that must stop at 1940 for well construction, but could go further in exploratory mode. Bob Gilkeson said can not drill further without buying the 7-5/8-in casing. Joe Vozella said that is because you can't build a well in the 6-in casing. But Westbay can be installed down 3000-4000 ft, so you could drill much deeper. David Larssen responded that those are open borehole Westbay completions without outer casing. Joe Vozella said if you stopped sampling and just drilled open hole you could go deeper. The risk is that the hole will collapse, but you would still have the 1940 ft cased. Steve Rae said the result of collapse is that the drill string could be lost. Bob Gilkeson said that it would be "Mission Impossible" to drill open hole and construct the Westbay well inside in the open borehole below 1940 feet.

Michael Dale asked if the Tschicoma a good candidate for open hole drilling? David Broxton responded that it would probably be like basalts at R-9 and R-12: the fractured parts fall apart, but the massive portions would produce clean holes. However, it is unknown if Tschicoma will even be there. It was anticipated to occur much higher in the section, and LANL has not encountered it yet. The chances of hitting it are getting smaller with depth. The next stratigraphic unit is the Santa Fe and LANL is uncertain what it will look like. John Young asked what the character of the Puye is at this location? David Broxton responded that it is massive conglomerate. There have been two tephras; one was 1 ft thick and came up like sand; the other was 10 ft thick, not same sand problem. There have been variations in amount of clay. Bob Gilkeson pointed out that at the 1175 ft depth the Puye was clayey. David Broxton added that given proximity to fault system, the character of the Puye is not a surprise.

David Rogers said that it is not good practice to drill deeper than can complete a well. In that situation you are not sure exactly what depth the samples are coming from. Michael Dale said that monitoring at depth is important. The problem is that the Westbay well will fit inside the 7" casing, but the packers won't? Bob Gilkeson said that is right because to construct a well, everything must be tripped down at the same time. Joe Vozella confirmed that Westbay can design a packer system that will fit in the 7-in casing, so this is not a technical problem. David Larssen said that the packer system for a well that can be constructed in the 7-in casing already exists, but the larger packer has

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already been purchased. Joe Vozella said that if the smaller packers are purchased for R-25, then the larger packers could be used in another well. Steve Rae pointed out that the 7-in casing has not been ordered. David Larssen pointed out that R-25 completion would then have to wait for the new packers. Joe Vozella said that we don't want to have to come back to this location. If we stop at 1940 ft, and that turns out to be not ok, we don't want to have to come back and go through the same 1940 ft to complete a 1960 foot well next to it. John Young said that they have to defer until NMED can talk about it amongst ourselves. Need to see the data. Joe Vozella said lets just assume that at 1940 ft, there is no detection of HE, but we have seen this lens type thing before and there is no guarantee that there is no HE deeper -- what will you say? David Rogers said that is not all of the possible scenarios, we could install the well and never find HE in the lower 400 ft again. Pat Longmire said the higher concentrations of HE are in zones that go from wet to dry. If saturation persists, then HE should continue to drop off. Joe Vozella said it may not be necessary to go to zero because there are other wells planned for this area. Don't want to drill right next to R-25. This is also applicable to future wells. Bob Gilkeson said we do need a decision soon for cost efficiency. Won't have the option of parking R-25. We can leave the drill casing there and complete R-9. But we will need this for R-15.

Charlie Nylander said that while still drilling and waiting for results; we need NMED to give some thought to how much more drilling would be required if RDX is still present at 1940 ft. We need to have a NMED concurrence letter for well completion and some input on the regulatory limit of concern for constituents. Chris Hanlon-Meyer asked if the extent position paper could be applied to this situation? Kim Hill responded that the position paper applies to soil, which is such different conditions that it would not be applicable. Chris Hanlon-Meyer asked what the purpose of the well will be -- a monitoring well? David Broxton responded that these wells are characterization, however, it is likely that this will be a monitoring well. Chris Hanlon-Meyer pointed out that with a downward gradient, it is possible that there will be HE at the bottom of the well in 5 years, therefore it is important to go deeper to monitor the plume. Charlie Nylander said that based on the behavior of the contaminants, such as degradation and spreading, it may not be important to monitor any deeper. Dave Broxton added that this is a single spot and it is not likely to be "the worst" spot.

Charlie Nylander said that the EEG recommendation was to negotiate ACL/MCL to know where to stop. Alice Barr said that the ACL negotiation is more appropriate after the hydrologic characteristics are better known. Charlie Nylander asked if there is an MCL for RDX? Kim Hill responded that there is no MCL from Safe Drinking Water Act. Alice Barr added that there is an appendix table with concentration limits based on MCLs for certain contaminants that exists, and you can use background for those that do not appear in the table.

Steve Bolivar said that the question is still: if there is no detect at 1940 feet, do we need to go further? Kim Hill responded that no one wants to construct wells that won't help us. Bob Gilkeson said that a RCRA compliant well can be constructed inside the 7-5/8-inch casing system (with purchase of materials). David Broxton said we have to come to

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grips with points of compliance. The ER project will have groundwater aggregates, but to move forward we need to have those points – are they designated as the closest water supply well or aggregate boundaries?

TA-16 Future Activities

Charlie Nylander said that based on discussions at the last meeting, the GIT is willing to move up R-27 or R-18 and drill this Fall (after spotted owl clearance). R-19 is another candidate. All 3 wells are down gradient from R-25. Need to discuss further at the Annual Meeting. ER is doing accelerated clean up at 260 outfall. John Young said that ties into coordinating with on-going CMS; we want to make sure it is coordinated and not duplicative. Charlie Nylander responded that the GIT feels this is well coordinated with the 260 outfall. But there are other sites at TA-16 that are possible sources. David Broxton said that investigations of the pond site will be accelerated. Brent Newman pointed out that the 260 meetings always discuss R-25. The alluvial aquifer investigations will complement our understanding of R-25. David Broxton said we will be combining the technical meetings. John Young said that the question of coordinating the 260 work was brought up in a discussion with Pat Longmire wherein Pat was unaware of some alluvial data that had been collected. John Young said that it is also important that the modelers are involved. Pat Longmire agreed and said that the new proposal for modeling is focused on that.

Charlie Nylander asked if the NMED had any preference for R-27, R-18, or R-19. Kim Hill expressed a concern that the NMED did not have adequate time to confer and provide well-thought-out feedback to LANL. Charlie Nylander said that there is some time before the Fall when that well would be drilled so there will be future opportunities to discuss it. Dave Broxton said that these Quarterly Meetings are a way to introduce issues that we are thinking about, but there is no expectation of instant answers. Karen Agogino suggested that the minutes from the meetings be distributed with the questions that NMED input is requested on. John Young said that has been done with the action items in the draft notes. Michael Dale asked if the GIT will be developing a list of pros and cons associated with moving up R-29, R-18 or R-19. Charlie Nylander said that the GIT will be doing that and hopes that the NMED will also. John Young said that this is an important issue that could be discussed at another meeting.

Intermediate Depth Wells

John Young said that based on the letter recently received about changes to LA/Pueblo Canyon, it appears that a switch is proposed to characterizing intermediate zones while drilling. HRMB does not believe that intermediate zones can be characterized with one sample. R-9 shows importance of intermediate zones and can't just ignore them. We think that the intermediate wells will be useful for placing the regional wells. Bob Enz asked if the wells are for characterization or for contaminant chasing? Don't understand the difference between intermediate and regional wells if this is for characterization. John Young said that the difference is in whether they can be monitoring wells. Michael

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Dale said there is a need to be able to repeat sampling. Chris Hanlon-Meyer added that intermediate wells are also important for siting regional wells.

David Broxton responded that the regional wells in the letter are sited in the same place as the intermediate wells in the LA/Pueblo Work Plan. In the case of R-9, if we had stopped at the first water-bearing zone we wouldn't know what was there. John Young pointed out that is counter to the argument in Mortandad Canyon. Pat Longmire said the intermediate wells in Mortandad Canyon are for plume chasing. David Broxton added that there is so much more information in Mortandad Canyon; we know there is a tritium plume and not many other places have that amount of data. In LA/Pueblo Canyon, our knowledge of where these intermediate zones are is limited. For example, in PM-1, we knew there was an intermediate zone and we found it in R-12, but much thicker than expected. Another example is that we had no idea there would be 6 saturated zones in R-9. Once you have the deep wells and have some ideas of where zones are and water is going, then you can place additional monitoring wells at the appropriate spots. There is no imminent danger to people because no one is drinking that water. Are they important, of course, but there is no scientific way to place those intermediate wells now. The Lab boundary might be an obvious place for a intermediate zone monitoring well and we could probably put in monitoring wells there now. The letter was intended to bring the LA/Pueblo Work Plan up to date with what we are doing under the Hydrogeologic Workplan. There is no fundamental change in the LA/Pueblo Canyon purpose.

Michael Dale said that in LA/Pueblo, you already know where intermediate water is and where to put intermediate wells. David Broxton said we discuss that often, but can't agree. The approach we are using is getting much better information. Something has to be done down the road; we can't accomplish all of the activities in the program at the same time. Michael Dale said the LA/Pueblo Work Plan proposed investigations of shallow to intermediate groundwater. David Broxton pointed out that we have integrated the ER program with the Hydrogeologic Workplan. Michael Dale said that the Canyons have suffered. For LA/Pueblo Canyon Michael said just get in and do work plan, then get out. Do the other Canyons a different way, since they did not have pre-existing work plans. David Broxton said the Hydrogeologic Workplan scheduled the wells for the greater good. If we have to do this on a canyon by canyon basis, then we have to go back and re-do the workplan.

John Young said that the Hydrogeologic Workplan states that intermediate wells will be in the Canyons Workplans. Dave Broxton responded that it is pretty clear in Hydrogeologic Workplan that intermediate wells will be put in where there are problems. If there is no problem, why would we put in a well? Michael Dale said that somewhere it made sense to put in intermediate wells. David Broxton said that at the time the LA/Pueblo Work Plan was developed it did make sense. When the Hydrogeologic Workplan was developed it made more sense to go to the regional aquifer. R-9 did that and we learned a lot. We are in a much better position to select locations for intermediate wells. We still want to do the same thing: monitor intermediate zones, I just want to know more about where they are before deciding where to monitor. Kim Hill said the

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issue is one of timing. Chris Hanlon-Meyer asked if you would wait until all the wells are done before installing intermediate wells? David Broxton said no, we could make those decisions when we close an area.

Chris Hanlon-Meyer said they are anxious to see the ER roadmap. David Broxton said we are working on that now. Chris Hanlon-Meyer said my biggest fear is that we will get 13 canyons reports in 2006 and the LANL staff has moved on. David Broxton said we would like to have participation from NMED on these roadmaps. Joe Vozella asked if this is a subject for one of our joint meetings? John Young responded that it is because it is bigger than this project.

Proposed FY99 Drilling Activities

Charlie Nylander described the proposed FY99 activities in their sequential order:

- Finish R-25
- Complete R-9 as single completion
- Complete R-15
- R-31
- R-27 or 18 or 19

Charlie Nylander said LANL has to decide to have either 2 rigs or 24-hour drilling schedule to accomplish this much work. John Young asked if this is part of roadmap? Dave Broxton said yes it will be. Charlie Nylander said LANL originally planned to drill 4 wells per year, but LANL needs to have more rigs or a 24 hour drilling schedule to do this. Chris Hanlon-Meyer asked about the completion of R12? Charlie Nylander said that it is budgeted for FY2000. Will be discussing how to complete it over the summer. R-5 was on the agenda. It will be pushed out to 1st quarter of FY2000 because of R-25 and spotted owl surveys. On R-15, the spotted owl surveys will take place between March and May and can not move in until after that area has been cleared.

Other Business

Charlie Nylander said the Annual Meeting will be Monday March 29. The External Evaluation Group (EEG) will participate. The Citizens Advisory Board (CAB) asked for groundwater presentation, which was done last Wednesday. The CAB asked to have a member participate in the Annual Meeting. The GIT also will ask the Accord Pueblos if they wish to participate in the Annual Meeting.

Charlie Nylander said that two proposals have been submitted:

- 1) An internal proposal for money to accelerate the modeling program. Three key divisions have asked for the proposal for LANL indirect monies to speed up activities.
- 2) A proposal to DOE for midyear additional FY99 funding for groundwater activities. First to catch up on ER well that is behind due to funding; data management, modeling and stratified water sampling on PM-4 supply well.

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John Young said that he had question about plume chasing, but assumes it will probably be answered by road mapping.

Pat Longmire reported the status of the background program. Four quarters of background data collected, however, only have enough money for validation of the data. A report will be completed next year.

Charlie Nylander said Annual Report will be finalized by incorporating LANL internal, NMED and EEG comments. John Young said the NMED will provide comments by 15th. Michael Dale said the R-25 data should be provided to the regulators as soon as possible. Joe Vozella said the preliminary data should be transmitted as "draft". Michael Dale asked what feedback is needed for the R-25 completion? Charlie Nylander said that the data will come back in sequential order. If we are down to last 100 ft, we will be sharing every bit of data, so we can make decision about how to complete the well, i.e. install sampling ports, in an expeditious manner.

Steve Rae said this meeting has been helpful to focus on concerns. The format can be changed if necessary, like sending out agenda earlier.

Charlie Nylander asked about the status of the request to land apply the drilling water. John Young said that the request has been approved by the Surface Water Bureau, however, HRMB is holding it up. HRMB would like to have an AP 4.5 as condition of approval.

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