

**Primrose, Annette**

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**From:** Carl Spreng [cspreng@smtpgate.dphe.state.co.us]  
**Sent:** Monday, June 26, 2000 3:53 PM  
**To:** annette.primrose@rfets.gov  
**Cc:** rehder.timothy@epa.gov; kleeman.gary@epamail.epa.gov; norma.castaneda@rfets.gov; Elizabeth Pottorff; Rich Horstmann; SUSAN Chaki; STEVE Gunderson; Steve Tarlton  
**Subject:** SPP Construction Closeout Report

Annette:

I am sorry not to have responded sooner to your message about approval of the SPP Construction Closeout Report. We appreciate the recent changes and updates to that report and your continuing reports on the water levels and contaminant levels at the treatment system.

CDPHE cannot, at this time, approve the Closeout Report. The latest changes reconfigure it as a Construction Closeout Report, but since construction is an integral part of the current problems with the system, it cannot be approved. I think it would be useful and appropriate to document the information contained in the report by including it in this year's HRR Annual Update.

As I mentioned at meetings at the Site last week, the temporary modifications that were approved by the WQCC were to allow time for remedial projects to be implemented and to stabilize. The Site now needs to demonstrate that the temporary modifications are being met (which they apparently are) and to present modeled projections that the underlying standard will be met when the temporary modifications expire.

Please contact me to discuss this further.

Carl



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Response to the EPA letter on the Solar Ponds Plume Closeout Report  
Dated March 27, 2000

Following are the response to comments recently received from EPA on the Solar Ponds Plume Closeout Report, FY 1999.

- A closeout report cannot be written until after the system has been demonstrated effective, with several months worth of data from which conclusions regarding the effectiveness of the collection trench and system can be reached.

Response: The closeout report was intended to report on completion of installation of the system described in the Solar Ponds Decision Document. Therefore, the name of the report has been changed to "Construction Closeout Report" and text has been added to state that this report documents completion of construction. The effectiveness of the system will continue to be reported in the Quarterly Report for the Rocky Flats Groundwater Plume Treatment Systems along with a discussion of treatment issues and proposed resolution of these issues. If treatment issues require a modification of the Decision Document, then a revised Closeout Report will be issued after the change is completed.

- The change in location for the treatment cell necessitates that the water level in the collection trench rises to an elevation of 5885 in order to flow into the treatment cell. Some amount of groundwater might be preferentially underflowing the trench and this amount of water could be detrimental to hillside slope stability.

Response: The requirement for water to be held in the collection trench increases the potential for groundwater to be lost into the formation. However, it is too early to determine the cause of the water loss. As previously discussed, the Solar Ponds Plume system is dramatically changing the hydrogeology of this area. Sufficient time is required to monitor and evaluate the system. However, a geotechnical evaluation was performed for the treatment cell area prior to cell construction and slope stability issues are not expected. This report was provided to both EPA and CDPHE at the April 12, 2000 meeting.

- EPA suggests meeting with CDPHE and DOE to discuss an improved and acceptable closeout report.

Response: A meeting was held on April 12, 2000 and the discussion was used to revise the closeout report.

Response to the CDPHE letter on the Solar Ponds Plume Closeout Report  
Dated March 27, 2000

Comments were received from Colorado Department of Public Health and Environment for the Solar Ponds Plume Project Closeout Report. The issues raised were discussed at a meeting with EPA and CDPHE on April 12, 2000 and the following comment responses are in part based on discussions at this meeting.

Comment: CDPHE does not concur that the objectives of the Solar Ponds Plume Decision Document were met by the completion of this project.

Response: The closeout report was intended to report on completion of installation of the system described in the Solar Ponds Decision Document. Therefore, the name of the report has been changed to "Construction Closeout Report" and text has been added to state that this report documents completion of construction.

The effectiveness of the system in obtaining the Decision Document objectives will continue to be reported in the Quarterly Report for the Rocky Flats Groundwater Plume Treatment Systems. If treatment issues require a modification of the Decision Document, then a revised Construction Closeout Report will be issued after the change is completed. The exit strategy will be included in the Interim ROD or similar document.

The primary reason for replacing the pre-existing collection and treatment system was to develop a more cost-effective and long term solution for the Solar Ponds Plume. The objectives of the SPP remediation included the following:

1. Protect North Walnut Creek by reducing the mass loading of nitrate to surface water and ensure that surface water standards are met in the Creek.
2. Design and install a passive system to intercept and treat the contaminated groundwater of the SPP to remove nitrate.
3. Design and construct the reactive barrier system in a manner which minimizes the generation of low-level mixed waste and/or hazardous waste and protects the habitat of Preble's Meadow Jumping Mouse, which was added to the Threatened Species List on May 18, 1998.
4. Design the reactive barrier system to allow easy access for operations and maintenance and reactive media replacement or removal.
5. Evaluate effectiveness of reactive barrier system in removing nitrate.
6. Evaluate long-term effectiveness of the treatment system once it has been in operation for several years.

Comment: The first objective, to reduce the mass loading of nitrate to North Walnut Creek has not been obtained. Nitrate levels are currently increasing at surface water monitoring locations.

Response: As above, the objective was to "Protect North Walnut Creek by reducing the mass loading of nitrate to surface water and ensure that surface water standards are met in the Creek." The mass loading was to be reduced by intercepting more of the bedrock groundwater that was believed to underflow the pre-existing Interceptor Trench System (ITS). To accomplish this, the intercept system was placed 10 feet into the weathered bedrock. During construction, it was noted that most of the eastern collection trench was dry except around the ITS laterals, indicating that there was little underflow of the pre-existing ITS.

The remainder of the objective refers to meeting the nitrate surface water standard of 100 mg/l through 2009, and a nitrate standard of 10mg/l after that. Nitrate concentrations in surface water are being frequently monitored with maximum concentrations of 39 mg/l at

GS13 in North Walnut Creek and 20 mg/l in Pond A-3. Since the CDPHE comments were provided, concentrations appear to have peaked and dropped at both locations.

Comment: The second objective to design and install a passive system to intercept and treat the contaminated groundwater of the SPP to remove nitrate has not been met for several reasons. First and most obvious, no water has yet been treated. Second, the design as modified was not evaluated to ensure that most groundwater in the plume would be intercepted. The design modification presented no evaluation that the increased head required to drive the treatment system could be met, and there was no consideration given to the effects of increase head on underflow of the system. The other modification of the project, shortening the panels on the top end has not been evaluated in relation to the raising of the required head to drive the treatment system.

Response: The intent of the Closeout Report was to document installation of the system and the report was changed to reflect this. During the last week of March 2000, CDPHE and EPA were both notified that sufficient groundwater had been collected and was now being treated. This was after the Closeout Report was issued and after comments were received.

Preble's Mouse habitat restrictions were incorporated into the design in a way so as to reduce impacts. The treatment cell was not only relocated uphill, but it was placed substantially deeper into the ground (approximately 28 – 30 feet) to reduce as much as possible the amount of water that was required to build up within the collection trench. Further deepening of the treatment cell was precluded because the size of the excavation was already intruding into the Preble's Mouse habitat buffer area. Permission was received from US Fish and Wildlife Service for this limited intrusion into the habitat.

The design modifications were analyzed to determine the impact on groundwater collection, and the modifications were not expected to reduce the amount of water intercepted. The system as built is 250 feet longer than what was stated in the Decision Document. This information was omitted from the Closeout Report, but was added to the revised document and was previously discussed with CDPHE and EPA. Most of the water in the Solar Ponds plume was known to be collected by the pre-existing ITS system and this was confirmed during system construction. During construction of most of the collection trench, water was only found near or at the ITS lines, with the intervening bedrock exceptionally dry. The collection trench was of sufficient depth to intercept the pre-existing ITS lines as well as approximately 10 feet of weathered bedrock. The amount of water collected is as designed.

The requirement to hold water in the collection trench was evaluated. While the ideal situation was to locate the treatment cell at a sufficiently lower elevation for water to passively flow from the collection trench to the treatment cell without having to build up, as at the Mound and East Trenches Project, Preble's Mouse habitat issues made this impossible. Because the bedrock at the collection trench was high in clay, it was believed that the trench would hold water. Some leakage was expected, but not to the extent seen. However, the ITS has been fairly effectively dewatering the hillside for 20 to 30 years. This unusually dry formation has not been encountered before, and the effects were not anticipated.

Comment: Objectives 5 and 6 can not be met until the treatment system is operational.

Response: As stated above, the title and text of the Closeout Report was changed to reflect that this report documents completion of system construction as described in the Solar Ponds Decision Document. Treatment effectiveness of the system is being reported in the Quarterly Report for the Rocky Flats Groundwater Plume Treatment Systems.

Comment: There is no diagram that shows the relationship of the treatment cell to the colluvial and bedrock lithologies or to the potentiometric surface in the area. What information was this system designed from? The vertical as built drawings should also be included in this report.

Response: The Decision Document summarizes the information on colluvial and bedrock lithologies and the potentiometric surface used to design the system. The as-built drawings of the trench profile have been added to the Closeout Report as an appendix. The bedrock contact is also annotated on these drawings.

Comment: Changes made to the design were presented in the final decision document, but the 12 foot head requirement and its consequences were not disclosed until the January 2000 meeting. Detailed design documents appear not to have been completed for this project, or if completed, not presented to either regulator.

Response: In the future, the Site will make sure that the ramifications of design changes are better communicated. The impacts to the design due to the Preble's Mouse Habitat were discussed prior to start of construction as noted above. EPA and CDPHE representatives toured the construction site on August 18, 1999, where the location of the treatment cell was noted and the requirement for water to build up within the trench to allow flow into the treatment cell was discussed. Detailed engineering drawings were completed for this project. A complete set of the final design drawings were provided to CDPHE at their request at the January 2000 meeting. In addition, two of the design drawings were handed out to all meeting participants. Full sets of design drawings were provided to EPA and CDPHE at the April 12, 2000 meeting for both the Solar Ponds Plume and East Trenches Plume systems as a result of this comment.

Comment: Evidence exists that water is underflowing the system at an estimated ½ gpm at the discharge gallery, this adds up to 720 gallons per day. Using existing low flow measurements for this segment of North Walnut Creek and the current loading from the discharge gallery provided in your letter the resulting calculated instream nitrate concentration is 99 mg/l. Given the prior treatment system resulted in instream observations below 10 mg/l, the efficacy of this treatment has not been demonstrated.

Response: The record for the past 8 years shows that the minimum mean daily flow rate at SW093 (just upstream of the discharge gallery) is 0.8 GPM (for the month of August). Combine this flow with the 0.5 GPM from the gallery and the reported nitrate concentration of 250 mg/L and the result is about 96 mg/L, close to CDPHE's predicted value. This confirms that the 100 mg/L standard can be met under the worst conditions. At all other times of the year, the water record shows flow levels at least twice the minimum, and as high as 21 times the minimum. Based on the water record, it appears that just as often as the nitrate concentration may approach the stream standard, it will also be less than 5 mg/L. On average, nitrate levels will be well within the allowable levels.

The prior treatment system resulted in nitrate concentrations below 10 mg/l by pumping the collected water to Building 374 for evaporation and not releasing water into North Walnut Creek. Low levels of nitrate in the creek demonstrated that the original interceptor trench system protected the stream from the nitrate plume, but at an extremely high cost. The new stream standard was adopted to allow for a more cost effective treatment system, which the new system provides.

While CDPHE has calculated that North Walnut Creek nitrate levels could get as high as 99 mg/l, even during the recent dry period, performance monitoring at GS13 indicates that the nitrate levels are well below 100 mg/l. The current average is less than 25 mg/l.

Comment: We have serious concerns about the additional head requirement in this system driving underflow of the system, ground water will take the path of least resistance. Evaluation of the underflow of this system needs to be added to the Performance Monitoring of this system. The site should also to set up an evaluation of water coming into the system to help manage the treatment system operation. We have evaluated the monitoring information available in the area

through the Integrated Monitoring Plan (IMP) and Performance Monitoring specified in the Decision Document. A separate memorandum has been sent to your technical staff detailing the information we believe necessary for an analysis of the problems. After an initial evaluation of this data the ground water and surface water groups of the IMP should meet to develop decision rules for the operation of this treatment system. We must be certain this system can meet the underlying standard of 10 mg/l Nitrate.

Response: The Site is currently collecting data in addition to that specified in the Decision Document and providing data to EPA and CDPHE on a regular basis. The area hydrogeology was substantially altered by installation of the Solar Ponds Plume system and these additional data are assisting with evaluation of these changing conditions and assisting with decision making.

A response to the separate memorandum to the technical staff is in preparation and these issues were discussed with CDPHE technical staff on March 21, 2000. Site personnel met with EPA and CDPHE on April 14, 2000 to discuss the situation. Two presentations have been made to the Water Working Group and a third presentation is planned for June 13<sup>th</sup> to a Water Working Group technical subcommittee.

Evaluation of the expected system inflow had used water volumes treated from the ITS system. This information was presented at the Water Working Group Meeting on March 21, 2000. However, as requested, additional data are being collected to try and correlate saturated thickness with water flow rates.

The stream standards specified in the Solar Ponds Plume Decision Document are 100 mg/l nitrate and 10 pCi/l total uranium. At this time, new decision rules are not required, but as noted in the Decision Document, decision rules must be evaluated when post-closure conditions are established and will be refined at that time. Surface water quality will continue to be closely monitored and if action levels for surface water quality specified in the Decision Document (ALF) are threatened, then installation of a pump is planned. This action will minimize the amount of water held in the collection trench and maximize the amount of water treated.

Nitrate concentrations, collected at the ITS sump, have been declining since 1992, and are projected to continue to decline because the source of the plume was removed in 1995. These data will be evaluated with the additional plume monitoring data to see if future water quality trends can be predicted.

Comment: Another concern we have is for the stability of the hillside with 12 feet of water backed up behind the barrier wall. We would like to see the analysis that was done to evaluate that concern.

Response: The stability of the hillside was evaluated and documented in TR-000-NA-100, "Geotechnical Design, Water Treatment Cell, Solar Ponds Plume Treatment System, RFETS, Golden Colorado," dated June 1, 1999, prepared by Michael W. West and Associates for Parsons Engineering Science, Inc. Slope stability analysis was performed and long-term stability was predicted under the anticipated saturated conditions. This report was provided to both CDPHE and EPA at the April 12, 2000 meeting.

Comment: Although it seems contradictory to our current concerns of not enough water to run the treatment system the minor modification of shortening the barrier panels should be evaluated for the potential of overflowing the barrier during periods of high recharge. What is the volume discharge of the pipe influent to the treatment cell in relation to the water permeable volume behind the barrier and a major recharge event?

Response: As discussed in the closeout report, shortening the barrier panels was evaluated in regard to groundwater levels. The potential for overflowing the barrier during high flow periods is believed to be virtually non-existent due to the length of collection trench available to store water, as well as the 8 feet of storage capacity remaining above the inlet pipe and below the top of the barrier panels. However, the throughput capacity of the system piping was re-evaluated. The system can accommodate a minimum of 100 to 150 gallons per minute throughput. This volume correlates to the maximum flow volume previously obtained from the ITS system, prior to blocking flow from the uppermost trench. With the storage capacity in the collection trench, the Site is confident that the system will not overflow.

Comment: Issuing a closeout report prior to the system actually functioning seems premature. The agencies have agreed to wait for anticipated spring moisture to test the hydraulics and operating efficiencies of the system. We hope to continue to work with the Site to agree on solutions that will allow the system to operate so stream standards can be met.

Response: As discussed above, the closeout report was intended to document installation of the system described in the Solar Ponds Decision Document. The effectiveness of the system is being reported in the Quarterly Report for the Rocky Flats Groundwater Plume Treatment Systems along with a discussion of treatment issues and proposed resolution of these issues. If treatment issues require a modification of the Decision Document, then a revised Closeout Report will be issued after the change is completed.

The Site is interested in gathering as much information as possible to evaluate the system prior to making a decision. We also would like to continue to work with CDPHE and EPA to resolve issues. However, the stream standards specified in the Decision Document are clearly being met, and that the concentrations are well within the range of the existing decision rules.

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