

**From:** [John Ellis](#)  
**To:** [Cates, David](#)  
**Cc:** [Kalman, Kenneth](#); [Downs, Brittany R.](#)  
**Subject:** [External\_Sender] Re: Questions about raffinate disposal  
**Date:** Wednesday, September 09, 2015 5:03:24 PM  
**Attachments:** [SFC responses to questions from David Cates.docx](#)  
[FIGURE A R5.pdf](#)

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David,

Attached are our responses to the questions you had concerning placement of the raffinate material into the SFC disposal cell. I apologize for the length of time I took to get back to you. I was on vacation in the mountains of Montana and Wyoming from August 21st to September 2nd.

John

**From:** [Cates, David](#)  
**Sent:** Monday, August 24, 2015 11:03 AM  
**To:** <mailto:jhellis@sequoyahfuels.com>  
**Cc:** <mailto:Kenneth.Kalman@nrc.gov> ; [Downs, Brittany R.](#)  
**Subject:** Questions about raffinate disposal

Hi John,

I have a few questions about the on-site disposal of raffinate and cell construction:

1. Will you be ready to start placement of the raffinate into the disposal cell in October?
2. Will placement of the raffinate into the cell require a design modification of the cell?
3. Will the supersacks be wrapped with geomembrane?
4. Where will the sacks be placed within the cell? – distance to bottom liner? Distance to top of cover?
5. The cell design has a leachate collection system as well as leak detection, correct?
6. When will the sediments from the clarifier basin that is used to treat contaminated groundwater be placed in the cell?
7. How will contaminated groundwater from the interim measures (e.g., French drain systems) be treated once the clarifiers used for chemical precipitation are closed? – use the cation exchange columns?
8. Will contaminated groundwater continue to be collected and treated after the cell is completed?
9. When will the lagoon used for storage of high nitrate waters for land application be closed?

Sorry this is more than a few questions, but we really need to know some more information about the timing and planning as we move into the next phase of site remediation. The answer to these questions will help us with our decision on on-site disposal of the raffinate. Any information you can add (or direct me to) regarding the disposal cell completion and movement into groundwater phase will be appreciated.

Thanks,  
David

David Cates  
Engineering Manager  
Land Protection Division  
Solid Waste Permitting Section  
Ph: 405-702-5124  
Email: [david.cates@deq.ok.gov](mailto:david.cates@deq.ok.gov)

SFC responses to questions from David Cates – ODEQ

1. Will you be ready to start Placement of the raffinate into the disposal cell in October?

We are prepared to start the raffinate placement process as soon as a concurrence is received. The first step involves enlarging and deepening the area in which we plan to place the material. This involves exhuming waste materials that were placed in the disposal cell earlier and moving this material to another part of the cell. I expect this will take 2 -3 weeks if the weather cooperates.

2. Will placement of the raffinate into the cell require a design modification of the cell?

No. The NRC approved Reclamation Plan included provision for placement of the raffinate in the cell and an assessment demonstrating that the radon emission limit for the cell would be met. The actual location of the raffinate bags within the cell is different than that shown in the Reclamation Plan, however, SFC believes that this change can be made without prior approval of the NRC in accordance with Condition 54 of our NRC license.

3. Will the supersacks be wrapped with geomembrane?

The supersacks will be placed into the cell inside a 60 mil HDPE (high density polyethylene) liner, welded in the same manner as the base liner.

4. Where will the sacks be placed within the cell? Distance to bottom liner? Distance to top of cover?

The sacks will be placed in the north central part of the Phase III portion of the cell. Distance to the bottom HDPE liner will vary from x feet to y feet (the bottom of the Phase III cell base is sloped to the west to assure drainage of leachate to the collection point. The distance from the top of the raffinate bags to the top of the cell cover will be a minimum of 23 feet, which is the thickness analyzed in the Reclamation Plan. The attached drawing (Figure A R5) depicts the approximate location of the raffinate bags, both in plan and elevation views.

5. The cell design has a leachate collection system as well as leak detection, correct?

Correct. Each of the three Phases of the cell has its own systems of for leachate collection and leak detection. The leachate collection systems consist of slotted pipe networks, lying on top of the HDPE Bottom liners, bedded in 18 inches of sand. The leak detection systems consist of slotted pipe networks, lying on top of the three-foot thick clay base liners, bedded in 6 inches of sand, lying immediately below the HDPE bottom liners. The bases of each cell Phase are sloped to drain any liquid by gravity to an exit point through the cell perimeter berm and into a common collection system.

6. When will the sediments from the clarifier basin that is used to treat contaminated groundwater be placed in the cell?

We currently have three sources of uranium impacted water that require collection and treatment in the clarifiers to reduce the uranium concentration prior to discharge. These include the monitoring well MW-10 area groundwater recovery well, the 005 Drainage intercept trench and stormwater from the cell, the South Yellowcake Stormwater Collection Sump, the disposal cell and some of the soil excavation sites that are in the process of being remediated.

We are working on the up-gradient sides of the MW-10 area and the 005 intercept trench to remove contaminated soil and perched groundwater. This should result in removal of the uranium source to these two groundwater recovery systems and allow us to either operate them intermittently or shut them down altogether.

Placement of the raffinate in the cell will allow us to remove the South Yellowcake Pad and the contaminated soil beneath it. Once that is done, the South Yellowcake Stormwater Collection Sump can be removed, eliminating that source.

Once the impacted water sources are eliminated or reduced to small volumes, the last two Clarifier Basins, 2A and 3A, can be taken out of service and remediated. Removal of the sediments will be the first step in the remediation process.

7. How will contaminated groundwater from the interim measures (e.g., French drain systems) be treated once the clarifiers used for chemical precipitation are closed? – use the cation exchange system?

We have a water treatment area that has five tanks, filtration and an ion exchange system. We can use either chemical precipitation or ion exchange to treat the water. Once the volume of water requiring treatment is sufficiently reduced, we can switch to this system.

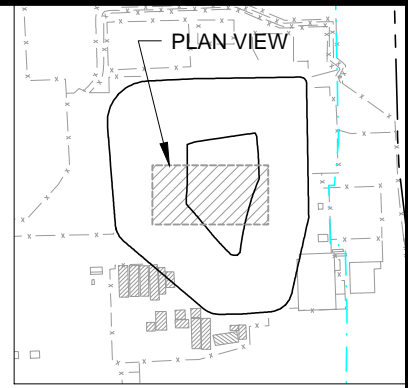
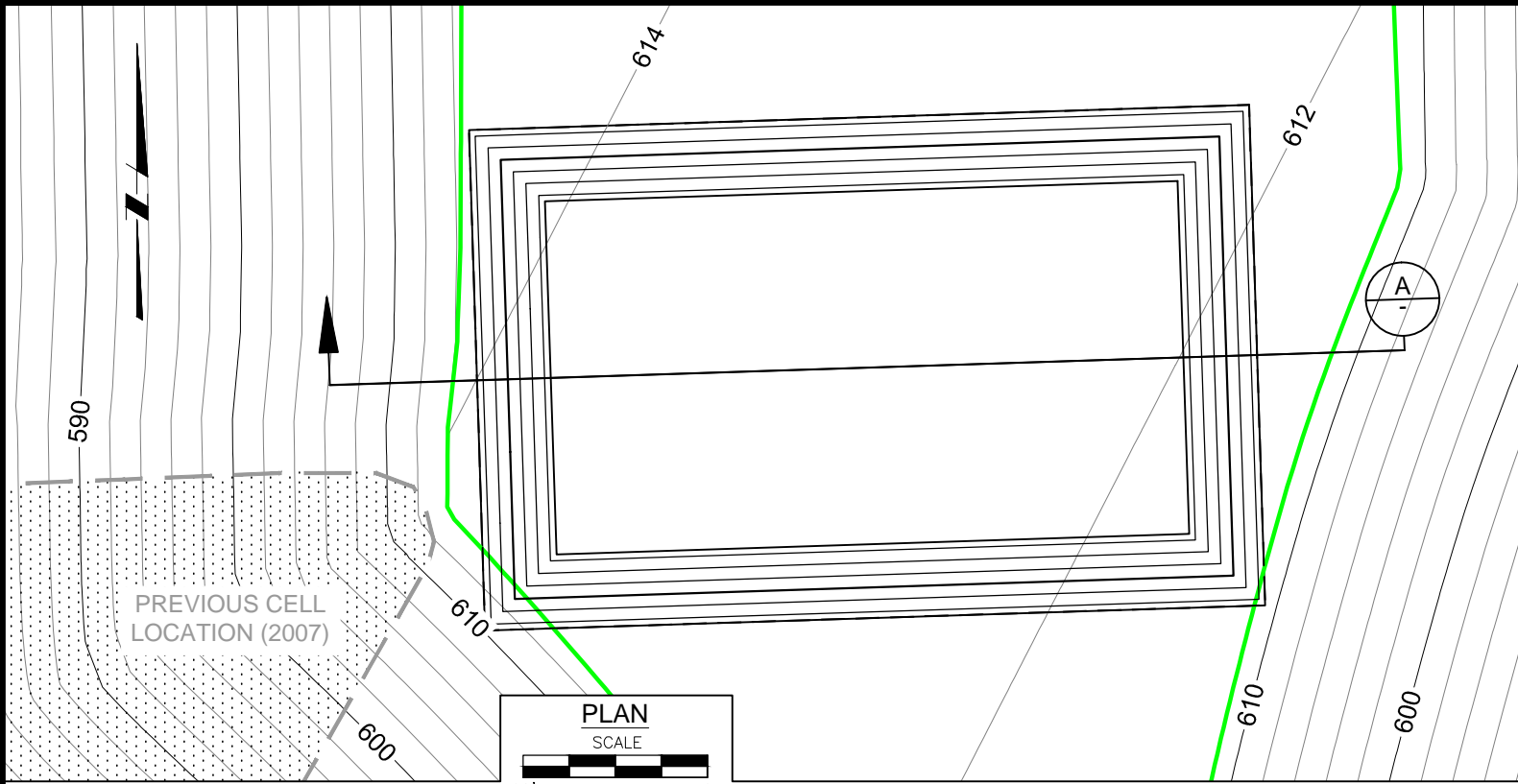
The recovery systems around monitoring well MW-95A and the south end of Pond 2(Catchment Trench 3), which produce high nitrate water, are routed to Pond 5 for land application.

8. Will contaminated groundwater continue to be collected and treated after the cell is completed?

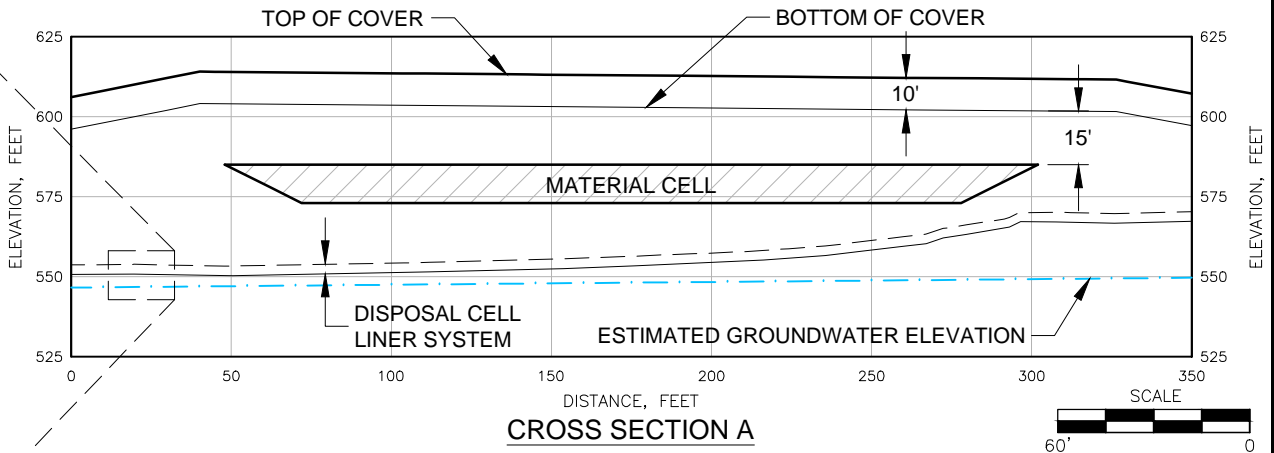
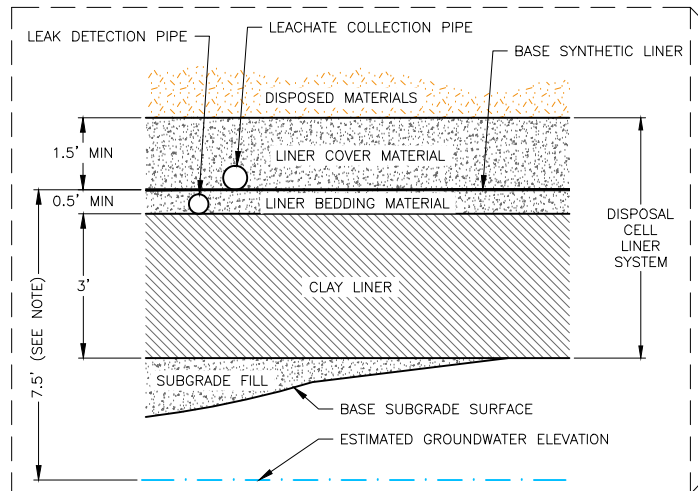
We plan to apply to the NRC for alternate groundwater concentration limits, which, if approved, would allow us to discontinue groundwater recovery. Until this happens, some groundwater treatment will likely continue to be required. If the water volumes are small enough, we can go to ion exchange only, which will allow us to demolish all but the ix columns at the water treatment area and place the debris in the cell. The cell could then be completed and closed. The ix columns and loaded resin would have to be sent off-site for disposal.

9. When will the lagoon used for storage of high nitrate waters for land application be closed?

There are three high nitrate water holding ponds (lagoons) still open, 3E, 3W and 5. 3E may be available to close next year, 3W in 2017 and 5 when the alternate concentration limits mentioned in the answer to question 8 are approved. I think that 2018 is the earliest that will happen.



**PLAN**  
SCALE  
60' 0'



**CROSS SECTION A**

**DISPOSAL CELL LINER SYSTEM**  
NOT TO SCALE

NOTE: GROUNDWATER ELEVATIONS PROVIDED TO MWH BY SFC ON 7/2/15. DIMENSION BASED ON LOCATION SHOWN.



PROJECT: SEQUOYAH SITE DISPOSAL CELL  
TITLE: PROPOSED MATERIAL CELL LOCATION



DATE: JULY 2015  
FILE NAME: SF RAFF CELL  
FIGURE A