SEQUOYAH FUELS
A GENERAL ATOMICS COMPANY

RE: 0923-N

July 31, 2009

Certified Mail - Return Receipt Requested
Receipt No. 7008 1140 0000 4060 7721

U.S. Nuclear Regulatory Commission
ATTN: Mr. Ken Kalman, Project Manager
FSME/DWMEP/DURLD
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852-2738

Subject: Nuclear Regulatory Commission, "Sequoyah Fuels Corporation - Materials License No. SUB-1010 Open Issue and Confirmatory Items Regarding Groundwater Corrective Action Plan (TAC J52528)", April 18, 2008.

Reference: Sequoyah Fuels Corporation, "License SUB-1010; Docket No. 40-8027 Responses to Open Issues and Confirmatory Items Regarding Groundwater Corrective Action Plan (TAC J52528) ...", August 15, 2008.

Dear Mr. Kalman:

Sequoyah Fuels Corporation (SFC) submits the enclosed responses to the open issues and confirmatory items of the subject correspondence. Since August 2008 SFC has re-run the groundwater model and submitted a revised Hydrogeological and Geochemical Site Characterization Report to NRC with a cover letter dated July 2, 2009. The groundwater flow and transport models have been updated. The corrective actions installed and operated at the site provided valuable data that were used to calibrate the models in a transient manner. The flow into the trenches and wells, as well as the available analytical data were used to make minor changes to the model that provide better agreement to the measured data. New information obtained from the re-run of the groundwater model required updating of some of the responses in the referenced correspondence. The enclosure thus provides complete response to the subject correspondence including revision of several responses of the referenced correspondence.

Also enclosed with this submittal is a set of four DVD's that contain the modeling files from the revised Hydrogeological and Geochemical Site Characterization Report.

If you have any questions, please do not hesitate to call me at 918-489-5511, extension 226.

Sincerely,

Scott C. Munson

for John H. Ellis
President, Sequoyah Fuels Corporation

Enclosures

cc: (with enclosure but without DVD's)
Al Gutterman – Morgan, Lewis & Bockius
Brad Carson – Cherokee Nation Business
Rita Ware – U.S. EPA, Region 6
Kelly Hunter Burch – Office of Oklahoma Attorney General

SEQUOYAH FUELS CORPORATION RESPONSES TO NRC OPEN ISSUES

SUBJECT: SEQUOYAH FUELS CORPORATION-MATERIALS LICENSE NO. SUB-1010 OPEN ISSUE AND CONFIRMATORY ITEMS REGARDING GROUNDWATER CORRECTIVE ACTION PLAN (TAC J52528)

NRC OPEN ISSUES

1. Sequoyah Fuels Corporation (SFC) needs to confirm the validity of the 2006 uranium isoconcentration map and explain why uranium contamination has migrated farther to the south, if the map is accurate.

U.S. Nuclear Regulatory Commission (NRC) staff reviewed isoconcentration surface maps from October 2002 [Figure 100 from SFC, 2005] and 2006 [Figures 11, 14 and 18 from SFC, 2007] to assess the migration of contaminants under the current conditions. A comparison of the October 2002 and 2006 uranium isoconcentration maps indicates that uranium concentrations have spread substantially in the Terrace/Shale 1 system. In 2002, most of the uranium contamination occurred in the processing area; however, in 2006, low concentrations (above 30 µg/l) appear south of the decorative pond near the Fertilizer Pond area. A review of the Shale 3, 2006 uranium isoconcentration map indicates that sufficient data may not be available to extend the isoconcentration lines toward the Fertilizer Ponds. SFC must confirm that the 2006 map represents uranium groundwater contamination at the site. If not, SFC must revise the 2006 map. If it does, SFC must explain why uranium contamination has migrated farther south than originally anticipated.

SFC Response: Refer to Sequoyah Fuels Corporation, "License SUB-1010; Docket No. 40-8027 Responses to Open Issues and Confirmatory Items Regarding Groundwater Corrective Action Plan (TAC J52528) ... ", August 15, 2008 at item 1, SFC Response.

2. SFC needs to confirm that the 2006 nitrate isoconcentration map is accurate and explain why nitrate contamination is migrating easterly.

A comparison of the arsenic isoconcentration maps from October 2002 [Figures 113 from SFC, 2005] and 2006 [Figures 8, 12,15 and 19 from SFC, 2007] indicate that arsenic contamination has spread substantially to the southern portion of the site. The 10,000 µg/l concentration of 2002 no longer appear in 2006. Arsenic concentrations in the northern Processing Area appear to the higher in 2006 than in 2002, which do not correspond to model predictions [Figure 113 from SFC, 2005]. However, the center of mass of the plume does appear to be migrating west according to model predications.

A comparison of the nitrate isoconcentration maps from October 2002 [Figure 108, SFC, 2005] and 2006 [Figures 10, 13, 17, and 20, SFC, 2006] indicates that the nitrate plume appears to be spreading slightly east, as well as west. This may be an unintended artifact of the contouring process; therefore, SFC must confirm the 2006 nitrate isoconcentration map to ensure its accuracy. Otherwise, SFC must explain why nitrate concentration is migrating eastward.

SFC Response: Refer to Sequoyah Fuels Corporation, "License SUB-1010; Docket No. 40-8027 Responses to Open Issues and Confirmatory Items Regarding Groundwater Corrective Action Plan (TAC J52528) ...", August 15, 2008 at item 2, SFC Response.

3. SFC needs to address nitrate contamination in the southern portion of the site.

Capture zone data was provided by SFC in the form of particle tracking analyses from its groundwater flow model (SFC, 2005). Particle tracking traces, in a computer model, particles or groundwater from on location to another and is used to assess flow paths and capture zones for groundwater extraction structures (i.e., wells and trenches). Attachment CAP2B in the December 2005 response to NRC staff's Request for Additional Information (RAI) (SFC, 2005) presents capture zones for all wells and trenches based on SFC's particle tracking data.

A review of these figures indicates that SFC placed groundwater recovery trenches and wells at strategic locations to take advantage of natural groundwater flow patterns. However, the spacing between trenches MW-95 and 005 is approximately 305 m (1000 ft); therefore, some contamination will likely pass between the trenches and subsequently migrate offsite. Furthermore, no remediation is being performed or proposed in the southern portion of the site near the Fertilizer ponds. Nitrate contamination is extensive in this area, and the lack of groundwater remediation in this area will allow concentrations of nitrates well above the groundwater protective standard (GPS) to flow into the Illinois River. SFC must state how it intends to address the nitrate contamination in the southern portion of the site.

SFC Response: This response replaces the response provided by the correspondence referenced at Item 1 (i.e. of August 15, 2008). Nitrate impacted groundwater between MW-95 and Drainage 005 do exceed the MCL for 50 years of model simulation. The un-retarded nature of nitrate transport indicates that most of the nitrate will have either dissipated due to dispersion or discharged to the river in less than 50 years. Mass loading of nitrate to the river has been calculated to be at a maximum of 15.8 kg/day in five years. The average flow in the Illinois River is 1610 cfs or 139,104,000 cubic feet per day. Nitrate concentrations in the river system will be raised by no more than 0.004 mg/L from nitrate at the facility

Modeling of nitrate in the southern portion of the site (Agland) indicates that dispersion lowers the nitrate concentration to just above 10 mg/L for the modeling period. Nitrate concentration above 10 mg/L does reach the river, but only for a limited time. The long term modeling results indicate that nitrate in this area does not enter the river above the MCL.

4. SFC needs to provide an initial estimate of the mass of groundwater contamination that entered the subsurface.

In addition to hydraulic effectiveness, remediation structures must be capable of actually removing contaminant mass. SFC has measured mass removal during the operation of the remediation structures by measuring volume of water removed and analyzing samples to obtain the contaminant concentrations in extracted water. According to its records, SFC has removed 20 lbs of uranium, 5,645 lbs of nitrate, and 0.3 lbs of arsenic between January 2004 and September 2005 (SFC, 2005). SFC did not provide any initial estimates of contaminant mass in the aquifer; consequently, NRC staff cannot determine the relative amount of contaminant mass removed. SFC must provide an estimate of initial contaminant mass in the aquifer and the basis for its estimate.

SFC Response: This response replaces the response provided by the correspondence referenced at Item 1 (i.e. of August 15, 2008). As of July 1, 2008, 27, 10200, and 2 pounds of uranium, nitrate and arsenic, respectively were removed via remedial actions at the facility. These estimates were computed using the monthly recovery volumes and constituent concentrations.

Using the model results for the same time period, July 1, 2008, there were 106500000, and 140 pounds of uranium, nitrate and arsenic, respectively, remaining in the groundwater. The hydrostratigraphic unit top, bottom, and concentration for each constituent were exported to ASCII data files that were gridded using the program Surfer. The data were kriged to a uniform grid 50 feet by 50 feet over the domain of the groundwater model. These results were obtained using a FORTRAN program that calculated the volume of each resulting grid cell and computed the constituent mass from the concentration, volume and porosity of each cell.

Layer Number	*Hydrostratigraphic Unit*
1	*Terrace*
2	*Shale 1*
3	*Shale 2*
4	*Shale 3*
5	*Shale 4*
6	*Shale 5*

Arsenic Results:

PLUME MASS FOR LAYER 1 = 4.21187375E-04
PLUME MASS FOR LAYER 2 = 6.07585096
PLUME MASS FOR LAYER 3 = 9.67036057
PLUME MASS FOR LAYER 4 = 19.4574890
PLUME MASS FOR LAYER 5 = 104.179604
PLUME MASS FOR LAYER 6 = 2.13772511
TOTAL PLUME MASS (lb) = 141.521454

Nitrate Results:

PLUME MASS FOR LAYER 1 = 0.416650832
PLUME MASS FOR LAYER 2 = 7776.13379
PLUME MASS FOR LAYER 3 = 8205.04199
PLUME MASS FOR LAYER 4 = 32572.2910
PLUME MASS FOR LAYER 5 = 290443.750
PLUME MASS FOR LAYER 6 = 161092.266
TOTAL PLUME MASS (lb) = 500089.906

Uranium Results:

PLUME MASS FOR LAYER 1 = 4.21187375E-04
PLUME MASS FOR LAYER 2 = 47.0517311
PLUME MASS FOR LAYER 3 = 37.3237114
PLUME MASS FOR LAYER 4 = 11.1297617
PLUME MASS FOR LAYER 5 = 10.1575212
PLUME MASS FOR LAYER 6 = 0.587537706
TOTAL PLUME MASS (lb) = 106.250687

5. SFC needs to provide stream measurements or modeled stream flows for use in verifying the groundwater model.

SFC calibrated the groundwater flow model with steady-state conditions that represent the hydrogeologic and operational conditions at the site in 2002. SFC also evaluated the calibration of the groundwater flow model by comparing calculated stream flow at Streams 001, 004, 005, and 007 to the simulated flow at these stream cells. The NRC staff is concerned that the calculated stream flows based upon the empirical model in the Hydrogeologic Site Characterization Report (HGSCR) have limited usefulness. These calculated flows should not be used to support or reject the calibration of the revised model. Instead, SFC must measure flows at these streams or use a hydrologic model to estimate stream flows for use in comparisons with simulated discharges from MODFLOW.

SFC Response: This response replaces the response provided by the correspondence referenced at Item 1 (i.e. of August 15, 2008). SFC's hydrogeological consultant who performed the groundwater modeling for the site has determined that the calibration of the model is not heavily reliant on stream flow and that additional field measurements are not necessary to validate the model.

The stream flow calculation was used as a general indication of calibration and was not intended to be relied upon directly. Stream flows at the facility vary widely in response to precipitation events and these events were not used in the calibration effort. Average monthly precipitation was calculated and used in the model calibration. The average stream flow was

not available and was estimated using the state approved equation based on the drainage basin size.

6. SFC needs to clarify whether or not the predictive modeling assumes that active corrective actions will occur over the entire compliance period and whether or not this assumption is valid.

The purpose of predictive groundwater flow and transport modeling was to estimate the effects of remedial actions on long-term contaminant transport and the concentrations of COCs at receptor locations during the 1000-year compliance period. A review of the March 2005 RAI response indicates that SFC assumes that active corrective actions will be ongoing for the entire compliance period. If that is correct, SFC will need to revise its analyses to model active corrective actions for a more reasonable period. Note that the license cannot be terminated and the site transferred to the U.S. Department of Energy (DOE) while active corrective actions are being undertaken. Therefore, SFC must clarify whether or not the predictive modeling assumes that active corrective actions will occur over the entire compliance period and whether or not this assumption is valid. Until such confirmation, NRC staff cannot assess the validity of the long-term predictions.

SFC Response: This response replaces the response provided by the correspondence referenced at Item 1 (i.e. of August 15, 2008). The revised model assumes that the corrective actions are operational. The corrective actions are then removed by 2015, although some were removed earlier in response to the reclamation schedule.

7. SFC needs to perform a thorough check of the input files for all its predictive runs. If revisions are made, SFC needs to rerun the nitrate predictive transport. 5.3.1

Staff reviewed several of the input lies for both the flow and transport models in the predictive model for the constituents of concern (COCs). A few input files appear to have been incorrectly used. The nitrate predictive groundwater flow model has the original calibration K values for Layers 2 through 5 instead of the revised calibration K values (Table 9). Also, the uranium predictive groundwater flow model contains the incorrect Kz values for Layers 2 through 4, which is not a significant problem. However, incorrect K values for the nitrate predictive groundwater flow model present a more significant problem. The licensee, therefore, should rerun the nitrate predictive transport model using the appropriate K values. Also, the licensee should perform a thorough check of the input files used for all its predictive model runs and provide the NRC staff confirmation that correct files were used or revise the model.

SFC Response: The model has been re-calibrated to transient conditions that include the installation and operation of the various corrective actions and more precise timing of the

reclamation schedule. The model files that accompany the report have been updated. Table 9 has also been revised to reflect the update model parameters.

8. SFC needs to state whether the assumptions used still apply with the revised transport model. SFC also needs to discuss how it handled the constant nitrate source terms in the calibration transport model within the revised predictive transport modeling.

SFC needs to clarify its predictive model assumptions for the transport model, which are as follows:

> Decommissioning activities will not remove the poorly constructed multi-unit screened wells that are simulated with the HCCs
>
> Any existing COC source material above the water table will be totally remediated and the only remaining source material is dissolved in the groundwater or permanently sorbed to the rock materials below the water table.

SFC needs to state whether these assumptions still apply with the revised transport model and if not, it must revise the model. SFC also needs to discuss how it handled the constant nitrate source terms in the calibration transport model within the revised predictive transport modeling.

SFC Response: Section 7.3 in Appendix B of the Reclamation Plan states that zones of vertical, unfilled fractures and wells and boreholes completed in multiple layers can provide pathways for contaminant transport from the terrace groundwater system to the shallow groundwater system.

SFC removed the remaining poorly completed or multi-cased wells in accordance with the Groundwater Monitoring Plan approved by NRC in Amendment 32 to License Number SUB-1010 dated December 20, 2005. Any geo-borings or wells identified during reclamation activities will be properly plugged and abandoned.

Soil with radiological constituents of concern above the DCGLs or cleanup levels as applicable will be removed during reclamation activities. Based on the findings reported in the Final RCRA Facility Investigation Report dated October 14, 1996, SFC does not believe any chemical constituents of concern exceed the EPA screening process and require removal from site soils.

The constant nitrate source terms in the groundwater model were removed commensurate with the Reclamation Plan schedule. For example, Pond 2 is scheduled to be removed in 2010 per the Reclamation Plan. The constant source boundary conditions were removed in the groundwater flow and transport models in the stress period representing that date.

9. SFC must demonstrate that the model does not underestimate uranium migration velocity from the Industrial Area in light of the conflicts between the 2006 uranium monitoring data and model simulations. 5.3.2

A review of uranium isoconcentration maps in the 2006 annual groundwater monitoring report (SFC, 2007) indicates that uranium above 30 µg/L has migrated approximately 457 m (1500 ft) south of the Decorative Pond to the Fertilizer Ponds. Such migration does not correlate with the 5-year uranium isoconcentration map (Figure 101, MFG, 2005) that shows uranium is a short distance south of the Decorative Pond. In the northern portion of the industrial Area, 2006 data indicates that contamination has spread over a wider area than that represented on the five-year map. These conflicts may indicate that the model underestimates uranium migration velocity from the Industrial Area SFC must address these conflicts between the model and actual groundwater monitoring data.

SFC Response: Refer to Sequoyah Fuels Corporation, "License SUB-1010; Docket No. 40-8027 Responses to Open Issues and Confirmatory Items Regarding Groundwater Corrective Action Plan (TAC J52528) ...", August 15, 2008 at item 9, SFC Response.

10. SFC must compare the 2006 nitrate data to the predicted 5-year isoconcentration map and discuss the validity of the model. Results should be presented in maps with comparable contour intervals.

According to the HGSCR, nitrate contamination in the streams does not exceed the 10 mg/l GPS during the compliance period. Although, contamination apparently decreases to levels below the GPS at the points of exposure (POEs), much of the nitrate contamination is allowed to migrate offsite in concentrations of hundreds of mg/l. Allowing such contaminant migration does not comply with the requirements in 10CFR40, Appendix A.

NRC staff attempted to compare the 2006 data to the five-year nitrate isoconcentration map (Figure 109, MFG, 2003); however, the contour intervals were too different to render valid conclusions. SFC should compare the 2006 nitrate data with the five-year modeled concentrations to determine if the predictive model results are valid.

SFC Response : This response replaces the response provided by the correspondence referenced at Item 1 (i.e. of August 15, 2008). The revised model results for the 2006 time period are consistent with the 2006 Groundwater Monitoring Report.

11. SFC needs to correct model Input errors.

SFC committed to revising the HGSCR to include the latest version of the groundwater model. In addition to the groundwater model, SFC should include the new calibration procedures committed to in its March 15, 2005 letter in response to NRC's RAI, dated December 6, 2004.

SFC must also perform a thorough review of files used in the calibration of the groundwater flow and transport models and in running the predictive groundwater flow and transport models to confirm that the appropriate files were used in each model. Several errors were observed with model input files during our evaluation of these models.

SFC Response: The Model has been recalibrated and predictions re-run. The calibration procedures as well as the predictions are included in the updated HGSCR submitted to NRC on July 2, 2009. The attached table summarizes the changes that were made to the model.

Confirmatory Items

1. SFC must properly label the potentiometric surfaces in the map provided in attachment CAP3B-1 from the December 2005 RAI Response.

SFC Response: The figure was designed to be printed out in 11 x 17 or larger format. When printed at this scale, the contour labels are legible. Increasing the font size of the contour labels makes the figure very busy and difficult to understand.

2. SFC must provide a table that presents the changes made to the groundwater flow and transport models.

SFC Response: The requested table is attached.

3. SFC must update the HGSCR to include the latest groundwater flow and transport models.

SFC Response: The updated HGSCR report submitted to NRC on July 2, 2009 has the latest model results and modeling files.

Changes Made to the Model					
Type of Change		Change Made to Model	Layer(s)	Starting Time	Ending Time
Overall Model Changes					
	Transient Transport and Flow Models	Transient Transport and Flow Calibration Period was Extended from 1/1/2002 to 1/1/2009 to Include Recent Monitoring Data	1-6	1/1/1990	1/1/2009
	Predictive Transport and Flow Models	The Predictive Transport and Flow Models were Separated into 3 Models to Account for the Decommissioning Phases and Long Term Predictions	1-6	1/1/1990	1/1/2009
	Phase I	The Phase I Models are from 1/1/2009 to 1/1/2010	1-6	1/1/2009	1/1/2010
	Phase II	The Phase II Models are from 1/1/2010 to 1/1/2012	1-6	1/1/2010	1/1/2012
	Phase III	The Phase III Models are from 1/1/2012 to 1/1/3009	1-6	1/1/2012	1/1/3009
Drains					
	Ditch West Pond No. 2	Trench was Calibrated for Flow & Transport - See Appendix A, Figure 226	1	4/1/2003	1/1/2010
	Catchment Trench No. 3	Trench was Calibrated - See Appendix A, Figure 227	1	4/1/2003	1/1/2010
	SX FD-B	Trench was Added to the Model and Calibrated for Flow & Transport - See Appendix A, Figure 228	2	1/18/2006	1/1/2010
	Decorative Pond Trench and Wall	Trench was Added to the Model and Calibrated for Flow & Transport - See Appendix A, Figure 229	3-4	7/26/2003	1/1/2015
	Drain MW095A	Trench was Added to the Model and Calibrated for Flow & Transport - See Appendix A, Figure 230	4-5	4/1/2003	1/1/2015
	Drain MW005	Trench was Added to the Model and Calibrated for Flow & Transport - See Appendix A, Figure 231	4-5	1/1/2002	1/1/2015
	Combination Drain	Combination Drain was Removed Starting with Phase III	4-5	1/1/1990	1/1/2012
Constant Head/Concentration					
	Decorative Pond	The Constant Head for the Decorative Pond was Removed After Stress Period 5	1-2	1/1/1990	3/1/2004
	Emergency Basin	The Constant Head for the Emergency Basin was Removed Starting with Phase I	1	1/1/1990	1/1/2009
	Pond 2 (Nitrate Only)	Source Term for Nitrate of 12,000 mg/L was Removed for Prediction Model Starting with Phase II	4	1/1/1990	1/1/2010
	Clarifier A - Basin 1 (Nitrate Only)	Source Term for Nitrate of 1,500 mg/L was Removed for Prediction Model Starting with Phase II	2	1/1/1990	1/1/2010
Streams					
	All	Did Not Change			
River					
	All	Did Not Change			
No Flow					
	Ponds 4 and 6	The No Flow Cells for Ponds 4 and 6 were Removed Starting with Phase I - See Figure 2-4 for Location	1-3	1/1/1990	1/1/2009
	Pond 3E	The No Flow Cells for Pond 3E were Removed Starting with Phase II - See Figure 2-4 for Location	1-3	1/1/1990	1/1/2010
	Ponds 3W and 5	The No Flow Cells for Ponds 3W and 5 were Removed Starting with Phase III - See Figure 2-4 for Location	1-3	1/1/1990	1/1/2012
Hydraulic Conductivity					
	Decorative Pond (Fill Material)	Hydraulic Conductivity was Calibrated from Kx=2.5 & Kz=2.5 to Kx=0.175 & Kz=.00175 (ft/day)	1	Constant throughout Model	
	Decorative Pond (Fill Material)	Hydraulic Conductivity was Calibrated from Kx=2.5 & Kz=2.5 to Kx=2.7 & Kz=0.1 (ft/day)	2	Constant throughout Model	
	Pond 2 (Altered Shale)	Hydraulic Conductivity was Calibrated from Kx=8.6 & Kz=8.6 to Kx=6.8 & Kz= 6.8 (ft/day)	1-2	Constant throughout Model	
	Pond 2 (Altered Shale)	Hydraulic Conductivity was Calibrated from Kx=0.125 & Kz=0.0125 to Kx=6.8 & Kz= 6.8 (ft/day)	3	Constant throughout Model	
	Colluvium Material	Colluvium Material was Delineated Separate from Fill Material - See Figure 9-3	1-2	Constant throughout Model	
	Disposal Cell	Hydraulic Conductivity was Determined to be Kx=0.0001 & Kz=0.0001 (ft/day) Starting with Phase I	1	1/1/2009	1/1/3009
Walls					
	Decorative Pond	A Wall was Added to the Southside of the Decorative Pond - See Figure 8-1 for Location	1	Constant throughout Model	

Changes Made to the Model					
Type of Change	Change Made to Model	Layer(s)	Starting Time	Ending Time	
Pumping Wells					
MWRW7	Pumping Well MWRW7 was Added to the Model - See Figure 8-1 for Location	1-2	1/19/2006	1/1/2015	
MWRW2	Pumping Well MWRW2 was Added to the Model - See Figure 8-1 for Location	2	4/1/2003	6/1/2007	
MWRW4	Pumping Well MWRW4 was Added to the Model - See Figure 8-1 for Location	5	1/25/2006	1/1/2015	
MWRW5	Pumping Well MWRW5 was Added to the Model - See Figure 8-1 for Location	5	6/1/2007	1/1/2015	
MW095A PIT	Pumping Well MW095A PIT was Added to the Model - See Figure 8-1 for Location	5	7/26/2003	1/1/2015	
Recharge					
Pond 2	Recharge Increased in Pond 2 from 5.0e-04 to 7.0e-03 (ft/day) for Steady State Conditions	1	1/1/1990	1/1/3009	
Overall Model	Recharge was Updated to Reflect Scaled Average Recharge per Stress Period from Average Recharge for the Entire Model Run	1	1/1/1990	1/1/3009	
Storage/Porosity					
Shale	Did Not Change				
Non-Shale	Did Not Change				
Leakance					
Alluvium, Colluvium, Terrace, Shale 1, Shale 3, and Shale 4	Did Not Change	1-2,4-5	1/1/1990	1/1/3009	
Shale 2	Leakance of 0.00001 increased to 0.00027 (ft/day)	3	1/1/1990	1/1/3009	
Shale 5	NA	6			
Evapotranspiration					
Site	Did Not Change				
Stream and Tree Areas	Did Not Change				
Tops and Bottoms					
Calibration Model	Did Not Change				
Prediction Model	Top of Layer 1 was Updated to Reflect Disposal Cell and Proposed Grading Starting with PhaseIII	1	1/1/2012	1/1/3009	
Dispersivity					
Model	Dispersivity for All Constitents Changed to: Longitudinal D=15, Transverse D=1.5, and Vertical D=0.15 (ft)	1-6	1/1/1990	1/1/3009	
Grid					
Rows	Rows were Added to the Model from 122 to 149	1-6	1/1/1990	1/1/3009	
Columns	Columns were Added to the Model from 123 to 131	1-6	1/1/1990	1/1/3009	
Transport Models					
Nitrate	Separate Model	1-6	1/1/1990	1/1/3009	
Arsenic and Uranium	Arsenic is Component 1 and Uranium is Component 2 in the Groundwater Vistas Model	1-6	1/1/1990	1/1/3009	
Chemical Reactions					
Uranium Kd, Bulk Density, and Half Life	Did Not Change				
Arsenic Kd	Kd was Recalibrated and New Kd Values Updated to Reflect the Calibration - See Table 9-7	1-6	1/1/1990	1/1/3009	
Arsenic Bulk Density, and Half Life	Did Not Change				
Initial Concentrations					
Nitrate	Initial Nitrate Concentrations Calibrated and Values Updated - Figures 9-31 through 9-35	1-6	1/1/1990	1/1/1990	
Uranium	Initial Uranium Concentrations Calibrated and Values Updated - Figures 9-37 through 9-41	1-6	1/1/1990	1/1/1990	
Arsenic	Initial Arsenic Concentrations Calibrated and Values Updated - Figures 9-44 through 9-48	1-6	1/1/1990	1/1/1990	
Initial Heads					
Steady-State Model	Initial Head Values were Updated Based on Steady-State Calibration	1-6	1/1/1990	1/1/1990	