Department of Environmental Quality

To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.

Dave Freudenthal, Governor

John Corra, Director

April 9, 2009

Mr. Michael Thomas
Uranerz Energy Corporation
1701 East "E" Street
P.O. Box 50850
Casper, WY 82605-0850

RE: Nichols Ranch In Situ Recovery Mining Permit Application, TFN 4 2/284

Dear Mr. Thomas:

Enclosed is a consolidated review memo containing comments from the Land Quality Division staff's review of the above application. As noted in the memo, these reviews found the application technically incomplete as per W. S. § 35-11-406(h).

If you have any questions concerning any comment in this memo, please feel free to contact me or the author of the comment in question.

A digital copy of this memo will be emailed to you to aid in your reply.

Sincerely,

Glenn Mooney
Senior Geologist

\gm

Enclosure

Cc: Cheyenne File w/enc.
NRC-MD w/enc.

Urancrv2cvlet.9gm

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NMSS MJK 4/9/

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AIR, LAND AND WATER DIVISIONS
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MEMORANDUM

To: File, Uranerz Energy Corporation's Nichols Ranch ISL Project, TFN 4 2/284

From: Glenn Mooney, Senior Geologist GM

Date: April 9, 2009

Subject: Second Consolidated Technical Reviews

Introduction

On December 7, 2007, Uranerz Energy submitted an application under cover of Mike Thomas' letter of November 30, 2007, to conduct in situ recovery uranium mining. The proposed permit area covers 3,370.53 acres in Campbell and Johnson counties. Completeness and some technical comments were sent February 11, 2008, under cover of my letter of the same date.

The application was declared Complete as per W.S. § 35-11-406(e) via my letter or August 13, 2008, to Michael Thomas of Uranerz.

A response package was received June 17, 2008, under cover of Mike Thomas' letter of June 16, 2008. Additional material was submitted under Mike Thomas's letter of January 23, 2009. This included Appendix D-3 archeological information and Appendix D-6, Hydrology, material.

Reviews of this application were carried out by Larry Barbula, Deanna Hill, Glenn Mooney, Stacy Page, David Schellinger, Jon Sweet and Mark Taylor. Their initials follow each of their comments.

These reviews were carried out for technical completeness as per W.S. § 35-11-406(h). All previous comments not requiring responses have been eliminated.

Review

Index of Changes

A detailed Index of Changes was provided with the June submittal. For the most part it accurately listed the changes made with the June submittal. Several omissions were noted however:

a. All of the pages were marked Page 1 of 1 making it impossible to know how many total pages were submitted. With 12 pages total, the first page, for example, should have been Page 1 of 12. (This was corrected with the January, 2009, Index of Changes.)

b. On Page 1, the sixth entry should have been: Pages C-4, C10, C-16 and C-19 were added: the entry omitted Page C-16.
c. On the second page, for the third entry the Index states Figure D1-1, March 08 (Map Pocket) was added; however, Figure D1-2 was actually submitted.
d. On Page 1 of 4 of the January 2009, Index, the third entry should have included Pages D3A and D3B.

No corrections to the current Indexes of Changes are requested. These comments are to document what was actually received in case any questions arise in the future.

Completeness

The application was declared Complete on August 13, 2008. The following items were originally Completeness concerns but are now considered technical comments.

Adjudication

6. Surface Owner Consent

   a. A letter was provided that shows the Jesse Dale Ruby Revocable Trust and the Max L. Ruby Revocable Trust are legally the same entity.

      This is acceptable; no response is needed. (GM)

   b. Surface owner consent has been provided by Patricia Clark signing for T-Chair Land for all of the lands where surface owner consent was needed.

      This is acceptable; no response is needed. (GM)

7. Appendix E

   New Appendix E maps were provided but they are still not suitable. They must depict the proposed permit areas and adjacent areas (within one-half mile) of the proposed permit area(s).

   Appendix E maps as required by W.S. § 35-11-406(a)(ix) must include the following:

   A map based upon public records showing the boundaries of the land to be affected, its surrounding immediate drainage area, the location and names, where known, of all roads, railroads, public or private rights-of-way and easements, utility lines, lakes, streams, creeks, springs, and other surface water courses, oil

wells, gas wells, water wells, and the probable limits of underground mines and surface mines, whether active or inactive, on or immediately adjacent to the land to be affected. The map shall also show:

(A) The names, last known addresses and boundary lines of the present surface landowners and occupants on the adjacent land to be affected; (This is fulfilled by the maps submitted for Appendices A and B and need not be duplicated.)

(B) The location, ownership, and uses of all buildings on, or on lands adjacent to, the land to be affected;

(C) An outline of all areas previously disturbed by underground mining or that will be affected by future underground mining as a guide to potential subsidence problems;

(D) Any political boundaries of special districts on or near the land to be affected;"

The maps submitted did not show any of the new roads, existing oil and gas wells, or proposed coal bed methane wells, powerlines and pipelines. They did show the outline of the ore body and the proposed locations of the plant buildings. These, however, are not required.

It is recognized that the proposed permit areas are currently undergoing intensive coal bed methane production development. Uranerz should commit to providing updated Appendix E maps at a future date just prior to going to public notice.

It is also not acceptable to reference the various areas in the application where information to depicted on the Appendix E map can be found. The statute is quite specific about what is to be shown on these maps. (GM)

8. Access Roads

Signed access agreements with T-Chair Land Company were provided that showed Uranerz has permission to use roads on that ranch.

This is acceptable; no response is necessary. (GM)

Appendix D-3, Archeology

11. A report on an archeological survey of W½SW¼ of Section 5, T. 43N., R.75W., the Hank property, was provided.

    This is acceptable; no response is needed. (GM)

Appendix D-9, Wildlife

17. In a February 15, 2008, letter the Wyoming Game and Fish Department provided comments on the application, This letter was forwarded to Uranerz under over of my letter of February 20, 2008. (GM)

Technical Review

General Comment

20. Please provide labels for all map pockets. (MT)

Adjudication

21. Adjudication: Response is acceptable. Uranerz provided a new Figure D1-1 at the front of the Adjudication (Volume 1) an 8.5"x11" map (similar to Figure D1-1) which shows the entire permit boundary (i.e., Nichols Ranch Unit and Hank Unit). **(MT)**

22. Appendix C, Legal Description of Permit Area

    a. My comment has been addressed. (DH)

    b. My comment has been addressed. (DH)

23. Surface Owner Consent

    a. My comment has been addressed. (DH)

    b. My comment has been addressed. (DH)

24. Reclamation Performance Bond

    An acceptable bonding instrument must be submitted prior to permit approval. (DH)

Appendix D-1, Land Use

25. Section D1.1.1, Land Resources, Page D1-1

The response is satisfactory. The past and present land uses have been listed. (SP)

26. Land Use, Map D1-3

Reply: I apologize for my typographic error. I see no revised Map D1-1 included in these materials. Please provide the revised Map D1-1 as indicated by your response.

The response of depicting land use in Map D1-2 is acceptable. I can understand if proprietary agreements do not allow depiction of well sites or other industrial locations on the map, but don't think this is the case. Perhaps the sites are too numerous. If Industrial land use is included in the land use description, please locate the industrial locations on Map D1-2 also, or provide a reason in the text for excluding the Industrial land use from the map. (DS)

Appendix D-5, Geology

27. Appendix D-5, Geology

Response is acceptable. Uranerz provided new Exhibit D5a and Exhibit D5b which illustrate general surface and subsurface geology of lands within and an adjacent to the proposed permit area. (MT)

28. Appendix D-5, Geology

Response is acceptable. Uranerz added Section D5.3.1 which discusses brine disposal and possible target stratigraphic units. (MT)

29. Appendix D-5, Geology

Response is acceptable. Uranerz added discussion to Section D5 which added more detailed as to the origin, geochemistry, and transport of the uranium ore deposits within the proposed permit area. (MT)

30. Appendix D5, Geology:

Response is acceptable. Uranerz added Figures D5a and D5b which provide excellent diagrams which illustrates a uranium roll front as well as a stacked roll front. (MT)

31. Appendix D5, Geology

Response is acceptable. All hydrogeologic cross-sections are now scaled horizontally as well as vertically. (MT)

32. Geologic Cross-Sections, Exhibits D5-1 through D5-4

Response is acceptable. All hydrogeologic cross-sections are now scaled horizontally as well as vertically. (GM)

33. Appendix D5, General

All geologic work (including all cross-sections and maps) must be certified by a Professional Geologist. (MT)

34. Appendix D5, General

Response is acceptable. Uranerz provided additional hydrogeologic cross-sections for the permit area. (MT)

35. Appendix D5, General

Response is acceptable. Uranerz provided digital copies (i.e. CD) of the lithologs on all drillholes/wells used to create the geologic cross-sections. (MT)

36. Appendix D5, General

Response is acceptable. Uranerz properly illustrated all coal/carbonaceous shale units on geologic cross-sections. (MT)

37. Appendix D5, General

Response is acceptable. Uranerz provided the requested isopach maps. (MT)

38. Appendix D5, General

The digital copies furnished to date by Uranerz have proven to be extremely useful. Uranerz should provide digital copies (i.e., CD) geophysical logs or SEO well completion reports for well Garden, Nichols Ranch #1, Pats #1, Pug #1, C#1, and SS1F. Prior to approval of this permit I would ask Uranerz to consolidate all the CD information submitted to date on one or two official CDs. (MT)

Appendix D-6, Hydrology

39. Table D6A.1-1, Surface Water Quality

The answer to my comment is satisfactory. (LB)

40. Appendix D-6, Figure D6-1

Locate and label surface water sampling sites on this map. (LB)

41. Section D6.1.3, Surface Water Quality, Page D6-3

The answer to my comment is satisfactory. (LB)

42. Appendix D6, Section D6.2, Ground Water Hydrology

Response is acknowledged; however, see 2nd Round Comment #35-M. (MT)

43. Appendix D6, Hydrology, Site Hydrogeology

Baseline groundwater quality and quantity information should be provided separately for the B, C, G, and H sand aquifers. (MT)

44. Appendix D6, Hydrology, Section D6.2.2.1, Aquifer Properties

Uranerz provided the pump tests SOP in Addendum D6K. However, this information needs to be paginated as a component of the permit document and Addendum D6K. Again, please provide copies of the actual well completion reports so that I may verify their completions. (MT)

45. Appendix D6, Hydrology, Section D6.2.2.1, Aquifer Properties

Some of the wells used to collect baseline information are over thirty (30) years old. Please explain what measure Uranerz has taken to ensure the integrity of

these and all other wells provide to collecting samples and conducting pump test. (MT)

46. Appendix D6, Section D-6.5, Exploration Drill Holes, Various Tables and Exhibits D6-7 and D6-8

What measures have been taken to locate and identify the locations of these old drill holes and to determine their status and integrity? Prior to mining Uranerz needs to be assured that these holes have been properly abandoned, and will not provide a conduit for the movement of fluids between aquifers. WDEQ/LQD Chapter 11, Section 3(a)(xii) and Section 8. (MT)

47. Appendix D6, Potentiometric Surface

Please provide regional (i.e., southern Powder River Basin) maps which illustrate the historical (pre-CBM, circa 1980?) and current potentiometric surfaces. This information should be present as eight (8) separate maps for the notable 1, A, B, C, F, G and H aquifers, plus the alluvium or as unique line-types on consolidated illustrations showing multiple potentiometric surfaces. These maps need to clearly identify in their titles the date of the data used to construct the potentiometric surfaces. In addition, please justify why Uranerz decided to combine and present the B & C sands and the G & H sand as one aquifer respectively when the Appendix D5 text (also see Figure D6-2) delineates these sand as separate and distinct aquifer sequences. (MT)

48. Appendix D6, Potentiometric Surface

See Comment 47 above. (MT)

49. Appendix D6, Baseline Groundwater

Response is acceptable.(MT)

50. Appendix D6, Table D6-2, Basic Well Data

Response is acceptable. (MT)

Appendix D-7, Soils

51. Section D7.3.2, Soil Mapping Unit Interpretation, Page D7-4

It remains unclear if the applicant and I am communicating, or if some other issue

with my initial comment exists, but no progress was made in the submittal by their response. The text of the soil baseline still states that the mapping units are site specific. The mapping units still state that the unit descriptions are based on the 2002 Campbell Co. survey. This is contradictory. I will accept that the descriptions are site specific in order to limit the exchange. (JS)

52. Section D7.1.0, Introduction, Page D7-1

The new soils map for Nichols Ranch is lacking several mapping unit designations, two are minor but the major "salmon-colored" unit traversing the primary well field is unlabeled. This new map must be corrected. I did not find similar omissions with the new Hank Map, but please further review that exhibit for similar errors. (JS)

53. Section D7.3.3, Analytical Results, Page D7-9

The response is acceptable. (JS)

54. Exhibit D7-1, Nichols Ranch Unit- Soils, Exhibit D7-2, Hank Unit, Soils

The response is acceptable. (JS)

Appendix D-8, Vegetation

55. Table D8-1, Vegetation/Habitat Types..., Page D8-7

Reply: Response is adequate. (DS)

56. Section D8.4.0, Results, Page D8-8, 3rd paragraph

Reply: Response is adequate. (DS)

57. Addendum D8D, Correspondence with the U.S. Fish and Wildlife Service..., Pages D8D-11 through D8D-30

Original comment: These pages should be removed from Appendix D-8 as they are related to wildlife and wildlife habitat assessment, not baseline vegetation sampling. Please move these pages to Appendix D-9.

Reply: The response is adequate only if Addendum D8D is referenced in Appendix D-9 where the content is more relevant. No response was provided for this subject. Please respond to the above request. (DS)

58. Section D8.4.2.1, Sagebrush Shrubland Community, Page D8-22

Reply: Response is adequate. (DS)

Mine Plan

59. Mine Plan, Pages MP-7 and MP-65

This text references a groundwater model, however no model was provided. Please provide in detail the proposed operation's groundwater flow simulation used to assess the monitoring well ring spacing. (MT)

60. Mine Plan, Section 3.1, Wellfield Design

Response is acceptable. (MT)

61. Mine Plan, Figure 3-1, Typical Injection/Recovery Well Construction Diagram and Figure 3-2, Typical Monitor Well Construction Diagram

Response is acceptable. (MT)

62. Mine Plan, Section 3.6, Mechanical Integrity Testing

Response is acceptable. (MT)

63. Section 3.11, Access Roads, Page MP-30

The answer to my comment is satisfactory. (LB)

64. Surface Water Monitoring

The answer to my comment is satisfactory. (LB)

65. Section 3.11, Access Roads, Page MP-30

The response discussion indicates that Section MP 3.11 is attached in response but I can only locate Pages MP-30 and MP-30a. The first page of the section is MP-29. I am assuming the changes in the application are provided by the submitted pages and not the beginning of the section on page MP-29. The provided changes are acceptable, but I ask that the applicant verify that the entire section is not being submitted, in contrast to the response discussion. (JS)

66. Section 3.12, Construction Considerations and Topsoil Handling, Page MP-31, Use of Vegetation in Temporary Stabilization

Reply: Response is adequate. (DS)

67. Section 3.12. Construction Considerations and Topsoil Handling

Topsoil salvage will be required form construction staging areas and drilling staging areas. Please add these areas to the discussion of topsoil salvage. (GM)

68. Section 3.12, Construction Considerations and Topsoil Handling, Page MP-31

The response is acceptable. (JS)

69. Section 3.12, Construction Considerations and Topsoil Handling, Page MP-31

The response is acceptable. (JS)

70. Figure 3-13, Nichols Ranch Unit Flow Diagram

A new diagram, Figure 3-13A, Proposed Nichols Ranch Plant Flow Diagram, was supplied that gives much more detail on the contents of the Nichols plant building. One item that was not in evidence was the presence or locations of the reverse osmosis units that are essential for well field restoration and for mining operations. Where will these units be located? (GM)

71. Figure 3-14, Hank Unit Flow Diagram

A new diagram, Figure 3-14A, Proposed Hank Unit Plant Flow Diagram, was supplied that gives much more detail on the contents of the Hank satellite plant building. One item that was not in evidence was the presence or locations of the reverse osmosis units that are essential for well field restoration and for mining operations. Where will these units be located? (GM)

72. Header Houses

A design of a typical header house was supplied as Figure 3-12A. This is acceptable; no response is required. (GM)

73. Figure 1-3, Nichols Ranch Contour Map

The scale of this map has been increased to 1":500'

This is acceptable; no response is required. (GM)

74. Figure 1-3, Hank Unit Contour Map

The scale of this map has been increased to 1":500'
This is acceptable; no response is required. (GM)

75. Figure 1-7, Nichols Ranch Unit, Proposed Monitor Well Locations

The new map shows the desired features at a useful scale.
This is acceptable; no response is required.(GM)

76. Figure 1-8, Hank Unit, Proposed Monitor Well Locations

The new map shows the desired features at a useful scale.

This is acceptable; no response is required. (GM)

77. Roads

While no monitor well access road designs were provided, Uranerz committed to providing them if they were to be built. Uranerz also mentioned the possibility that sampling equipment might be mounted on all-terrain vehicles which could access the wells in all typed of weather without the need for constructed roads.

This is acceptable; no response is required. (GM)

78. Section 3.18.2, Annual Reporting, Page MP-85

A section on excursion control and reporting, Section 3.19.1, has been created.
This is acceptable; no response is necessary. (GM)

79. Spills

The issues requested by my comment have been addressed in Section 3.19 of the Mine Plan. This is acceptable; no response is necessary. (GM)

80. Class I Disposal Well(s)

A commitment was made to supplying a summary of the Class I waste disposal well(s) to be permitted through the Water Quality Division into the Mine Plan as

an appendix when the details are available. This is acceptable; no response is required. (GM)

81. Surge Capacity

The text of the application in Section 3.3.7 was revised to show several large 17,000 gallon tanks in each plant building will be available for storage of surge water when the disposal wells are out of action. The text describes how large quantities of water will be handled during each phase of the mining and restoration operations. The text in Section 3.3.6 discusses modeling that shows the amount of water that would need to be handled during control of an excursion. This is acceptable; no response is required. (GM)

82. Waste Water

Discussion of how water in the plant building sumps would be pumped to the large waste water tanks for eventual pumping down the deep disposal wells was described in Sections 3.10.2 and 3.10.3. This is acceptable; no response is required. (GM)

Reclamation Plan

83. Section 3.2.2, Wellfield Access Roads, Page RP-15, Last Paragraph

Reply: Response is adequate. (DS)

84. Section 3.3, Topsoil Handling and Replacement, Page RP-16.

The total seeding rate should be 14 pounds. Please list the seeding rate of 6 pounds of western wheatgrass, 6 pounds of thickspike wheatgrass and 2 pounds of slender wheatgrass for the seed mix. (SP)

85. Section 3.3, Topsoil Handling and Replacement, Page RP-16, Second Paragraph

Reply: Response is adequate. (DS)

86. Section 3.3 Topsoil Handling and Replacement, Page RP-16

The response is satisfactory. A sentence has been added to seed topsoil stockpiles no later than the first fall or spring seeding season after stockpiling. (SP)

87. Section 3.5, Erosion Control Practices, Page RP-17

The response is satisfactory. A commitment for timing of seeding has been added to this section. (SP)

88. Section 3.5, Erosion Control Practices

The answer to my comment is satisfactory. (LB)

89. Section 3.5, Erosion Control Practices, Page RP-17

The answer to my comment is satisfactory. (LB)

90. Section 3.5, Erosion Control Practices, Page RP-17

The response is satisfactory. The temporary seed mix will be used instead of a cover crop. (SP)

91. Section 3.5, Erosion Control Practices, Page RP-18, Third Paragraph

Reply: Response is adequate. (DS)

92. Section 3.6, Vegetation Reclamation Practices, Page RP-20

Reply: Response is adequate. (DS)

93. Section 3.6, Vegetation Reclamation Practices, Page RP-20.

The response is satisfactory. A commitment has been added requiring a sampling plan for measuring revegetation success. (SP)

New Comments – Glenn Mooney March 31, 2009 Review

Adjudication

1-G. Appendix C – Legal Description of Proposed Permit Area

a. On Page C-4 there is an error in the description for Section 30. It should be the W½SE¼, not the E½SE¼.

Please correct. (GM)

b. The acreages for Section 31 do not add up correctly. These eleven Lots should add up to 483.72 acres, not 211.17 as shown.

Please correct. (GM)

c. On Page C-14, the SW¼ NW¼ of Section 31 is called Lot 9; on Page C-15 the SW¼ NW¼ of Section 31 is called 10; on A-9, the SW¼ NW¼ is Lot 10.

Please correct. (GM)

d. Section C-2, Right to Mine and Section C-3, No Right to Mine Claimed

On Page C-8 of C-2, Lots 6, 10, 12, 13, 15, 18 and 20 of Section 31, T.44N., R.75W. are listed while on Page C18 of Section C-3, Lots 6, 10, 12, 13, 15, 19, and 20 of Section 31, T.44, R.75W. also appear.

Please correct. (GM)

e. Section C-3, No Right to Mine Claimed

i. The NW¼SE¼ of Section 7, T.43., R.75W is listed on Page C-16 of this section, but the southern-most end of the Hank well field is depicted on Figure 1-8 as located in this tract.

Please correct or explain. (GM)

ii. The NE¼NE¼ (Lot 5) Section 31, T.44N., R.75W. listed on Page C-14 of this section and the NW¼NE¼ (Lot 6) Section 31, T.44N., R.75W. listed on Page C-15 but the northern end of the Hank well field is depicted on Figure 1-8 as located in these tracts.
Please correct or explain. (GM)

f. Section C-3, No Right to Mine Claimed

The installation of perimeter monitor wells on properties where the mineral is owned by others has been considered mineral trespass. This situation occurs is the following tracts:
Hank
i. SE¼SW¼ Section 30, T.44N., R.75W.
ii. NW¼NE¼ Section 31 T.44N., R.75W.
iii. NE¼NE¼ Section 31, T.44N., R.75W.

iv. SE¼NE¼ Section 31, T.44N., R.75W.
v. E½SE¼ Section 31, T.44N., R.75W.
Nichols
vi. NE¼SE¼ Section 18, T.43N., R.76W.
vii. NE¼NW¼ Section 20, T.43N., R.76W.
viii. NW¼NE¼ Section 20, T.43N., R.76W.
ix. NE¼SE¼ Section 20, T.43N., R.76W.
x. SE¼SE¼ Section 20, T.43N., R.76W.

Please correct or explain. (GM)

Mine Plan

2-G. Section 3.3.5, Projected Injection Procedures, Page MP-12

Experience with spills at other ISL operations has shown that no steel or iron pipe fittings should be allowed to come into contact with lixiviant. Corrosion of the fittings by the oxygen-rich lixiviant has caused numerous leaks and spills.

Please commit to banning the use of steel or iron fittings in well field plumbing. The use of stainless steel is acceptable. (GM)

3-G. Section 3.6, Mechanical Integrity Testing, Page MP-20

If Uranerz chooses to convert a Class III well that has failed MIT into a production well, they must commit to making sure that well is pumped continuously in order to prevent excursions unit the well is repaired or properly abandoned. (GM)

4-G. Section 3.13.2.1, Liquid Effluents, Page MP-34

The reference to water generated during well development and aquifer testing as WDEQ/WQD Class IV (Livestock) is incorrect. Class IV is Industrial Use, Class III is Livestock Use.

Please correct. (GM)

5-G. Section 3.18.1, Quarterly Monitoring, Page MP-84

This section could be more accurately entitled "Quarterly Reporting." The reporting of MIT results is only one of the items required to be reported quarterly.

Land Quality Division NonCoal Rules and Regulations, Chapter 11, Section 15(b), lists the following items to be included in quarterly reports:

(i) Section 15(b)(i): The results of monitoring required per Sections 14(a)(ii) and (iii) of this Chapter.
(ii) Section 15(b)(ii): The results of all mechanical integrity testing conducted during that quarter,
(iii) Section 15(b)iii): The status of corrective action on defective wells, required per Section 13 of this Chapter.
(iv) Section 15(b)(iv): The results of well repair and plugging required per Section 8 of this Chapter... (GM)

6-G. Addendum MP-C, Well Completion SOP

On Page 2 of 7 in paragraph 13 to states the pilot hole will be drilled to the desired depth, "typically 15 feet below the depth of mineralization." If the mineralized zone is located at or near the bottom of the aquifer, this could have the very undesired effect of penetrating into or through the aquitard at the bottom of the aquifer. It has been found that the well completion typically does not seal this extra hole below the screen and casing.

Please revise to show procedures that will not endanger the aquitard below the mineralized aquifer. (GM)

7-G. Figure 3-16, Hank Unit Access Roads

This map shows the location of the Hank satellite building in a different location than Figure 1-3, Hank Unit Contour Map or Exhibit E-2, Hank Unit First Year of Operations.

Please correct. (GM)

Restoration and Reclamation Plan

8-G. Section 1.6, Well Abandonment, Page RP-10

In Part No. 4, it references the use of cement or a plastic plug to cap the abandoned well. The use of a plastic plug is not acceptable as it is not nearly secure or permanent enough. However, the February 2009 Bond Estimate shows (on Page 13) the use of a concrete plug which is the acceptable capping method.

Please correct this section. (GM)

9-G. Section 2.2, Wellfield, Page RP-12

Removal of well heads, wellfield piping and other equipment cannot begin after conclusion of wellfield stability period until after a wellfield restoration report has been prepared and submitted to both the WDEQ/LQD and the NRC and Uranerz has received approval of the wellfield restoration form both agencies. Only then may abandonment of the wellfield begin.

Please revise. (GM)

10-G. Section 3.2.2, Wellfield Access Roads, Page RP-15

In paragraph 2, it should state that once the gravel is removed, the roadbed should be ripping to reduce compaction. Ripping after the topsoil is replaced tends to bring subsoil and overburden to the surface, reducing the quality of the seed bed. Disking of the replaced topsoil may be done to reduce compaction created during topsoil placement.

Please revise. (GM)

11-G. Section 3.3, Topsoil Handling and Replacement, Page RP-16

This section should be moved to the Mine Plan as it describes practices to be carried out during active mining operations. (GM)

12-G. Section 3.5, Erosion Control Practices, Page RP-17

This section should be moved to the Mine Plan as these are procedures needed during active operations. (GM)

13-G. Bond

A new and updated bond estimate was received from Mike Thomas on March 20, 2009. The major feature of the new estimate is that it shows no activity for the first year at the Hank site in comparison to the earlier November 2007 estimate which did show construction and operations at Hank.

Other changes were a much greater reliance on reverse osmosis treatment of groundwater during restoration as opposed to groundwater sweep.

The stabilization period has been reduced markedly from 33.8 months total to 17 months, still a satisfactory time.

The following comments were generated following my review.

i. Bond - Electrical Efficiency

Uranerz's estimate includes 0.75 kwh/hp which assumes nearly 100% efficiency in that 750 watts would equal one horsepower which is defined as 746 watts. References state that small electric motors (less than 5 hp.) have efficiencies of 80% at best. A more appropriate number for this entry would be 0.933 which would be for motors of 80% efficiency. While seemingly a minor change, this number is important because of the huge importance electric motors have in mining and groundwater restoration operations at an ISL operation.

Please correct. (GM)

ii. Plant Equipment Removal and Disposal

This section must be updated to reflect the installation of the large tanks to be used for surge capacity storage described in Section 3.3.7, Water Balance Calculations, on Page MP-15. (GM)

iii. Building Demolition and Disposal, Bond Estimate, Page 8

There appears to be a couple of errors associated with Concrete Decontamination, Demo and Disposal. The spreadsheet under Header Houses shows there is an error with the formula calculating volume of concrete in cubic feet resulting in a total of 11,880ft^3 for what appears to be only one header house. Then, the weight of the concrete for this one header house is given as 1,722,600 pounds which, again, seems to be a lot for one header house.

Please review and correct. (GM)

iv. Wellfield Equipment Removal & Disposal, Production Well Pumps, Bond Estimate, Page 12

Under Part D.2.) the distance to the licensed disposal area is 160 miles, not 50 as shown.

Please correct. (GM)

v. Transferability of Agreement with Licensed Disposal Area

The agreement that Uranerz has with the owner of the Licensed Disposal Area must be transferable to the State of Wyoming and the NRC so that in the event the State or the NRC has to assume reclamation liability, they can dispose of material at the same rate as negotiated by Uranerz. (GM)

Mark Taylor Second Round Technical Review Comments

Appendix D-5 Geology

1-M. Section D5.1, (Geology) History, pg. D5-1, para. 2, sent.4: Please remove "(SPELLING)" of text. **(MT)**

2-M. Section D5.3, Site Geology: Uranerz needs to investigate and characterize the extent, thickness and potential groundwater quality of the flood plain/low terrace alluvium along Cottonwood Creek and its north tributary running along the Section 17/16 boundary (Nichols Ranch Unit) as well as the valley fill deposits along Dry Willow Creek (Hank Unit). **(MT)**

3-M. Section D5.3, Site Geology, pg. D5-1, para. 4: I found the "consolidated" site geology discussions a little cumbersome. For clarity please consider describing the site geology under two separate categories {i.e., 1) the Nichols Ranch Unit; and 2) the Hank Unit}. **(MT)**

4-M. Section D5.3, Site Geology, pg. D5-5, para. 4: Due to the complex nature of the fluvial sandstone deposition, the Wasatch formation is not well understood. Uranerz needs to go into much more detailed discussion into site-specific fluvial environments and their deposits (i.e., point bar or natural levee deposits, abandoned channel fill deposits, crevasse splay, lacustrine deposits, lacustrine delta , etc.) seen at the Nichols Ranch Unit and the Hank Unit. Please consider providing block diagrams to aid these discussions. **(MT)**

5-M. Section D5.3, Site Geology, pg. D5-6, para. 2, sent.1: Please revise this text to include a discussion of the G sand and the H sand. **(MT)**

6-M. Section D5.3, Site Geology, pg. D5-6, para. 4, sent.1: Please remove the word "impermeable" as this word tends to imply that groundwater will not move through these strata. I request Uranerz to revise this discussion to clearly define the term "aquitard" along the lines of LQD's Guideline No. 4 which defines an

aquitard as "A layer of low permeability that can store groundwater and also transmit it slowly from one aquifer to another." **(MT)**

7-M. Section D5.3, Site Geology, pg. D5-6, para. 4, sent.3: Please provide a tabulation of the measured permeability of the sites mudstones or provide a site specific literature reference. **(MT)**

8-M. Section D5.3, Site Geology, pg. D5-6, last sentence: For clarity please consider providing a typical stratigraphic column for each separate unit (i.e., Nichols Ranch Unit and Hank Unit). **(MT)**

9-M. Section D5.3, Site Geology, pg. D5-7 thru D5-10: Several locations in this text discuss a range of thicknesses which do not agree with the range of thicknesses presented on the corresponding isopach maps or geological cross-sections. Please revise this text to ensure that all discussions are consistent with the other permit text and presentations. **(MT)**

10-M. Section D5.3, Site Geology, pg. D5-7, para. 2: Please also reference the Nichols Ranch aquitard as the "1 – A" SHALE to be consistent with Exhibit D5-16 . **(MT)**

11-M. Section D5.3, Site Geology, pg. D5-8: I was unable to verify the character (i.e., extent and thickness) of the B sand the C sand over a substantial portion of the Hank Unit with the limit drillhole data provide. Please provide data from additional drillholes so that I may complete this verification across the entire permit area. **(MT)**

12-M. Section D5.3, Site Geology, pg. D5-10, para. 4: Isopach maps provided do not adequately characterize the strata and aquifers on all lands within the entire permit area. {Ref: W.S. 35-11-428(a); Chapter 2, Sec. 2(a)(i)(F)(IV); and Chapter 11, Sec. 3(b)}. Please update/revise the isopach maps to describe and characterize the strata and aquifers within the entire permit area. Uranerz should feel free to provide data from drillholes within the area immediately adjacent to the permit area to augment any weak geologic control in areas within the permit area. **(MT)**

13-M. Figure D5-2, Stratigraphic Column: Please consider provide separate Wasatch Formation inserts of both the Nichols ranch Unit and the Hank. Should Uranerz elect to stay with only one insert then they must revise the insert to illustrate the location of the H sand and the G sand; remove the label Upper Aquitard and Lower Aquitard as this terminology does not really work for the Hank unit. Also see Comment 8. **(MT)**

14-M. Exhibit D5-a, Preliminary Surface Geology Map: This map lacks the detail of the publicly available information. Please revise this map using the detailed information on available USGS publications. **(MT)**

15-M. Geologic Cross-sections, General: Please provide digital copies of the all of the geophysical logs used to construct the geological cross-sections (as the DVD dated 11-30-2007 entitled "Exhibits, Figures, Logs, Water Quality Data, and Gamma Survey" does not provide a complete set). Please capture nearby wells with geophysical logs presented on Figures D6-3 and D6-4 and include these wells on the cross-sections. In addition, it appears deep well North Dry Willow #1 and deep drill holes RAM-5 could have been used to provide deeper control for the cross-sections. **(MT)**

16-M. Geologic Cross Sections, General: I found several errors: typography, duplicate or mislabeling, cross-section intersects mismatching, etc. I attempted to capture many of these in the following comments. However, I ask Uranerz review these cross-sections in their entirely looking for inconsistencies. **(MT)**

17-M. Exhibit D5-1, Cross Section A – A': Well CCI-27 is labeled as CC-27 on the Location Map insert; Well U07N-21 well elevation and lithology do not agree with the same on cross-section E-E'; Well U07N-24 well elevation does not agree with the same on cross-section M-M'; Well U07N-24 the H sand should be labeled as the G sand to agree with the same on cross-section M-M'; Well U07N-87 well elevation does not agree with the same on cross-section B-B'; Well U07N-117 well elevation does not agree with the same on cross-section L - L' **(MT)**

18-M. Exhibit D5-2, Cross Section B - B': This cross-section uses well CC-11, however, another well with this same name appears on cross-section C - C' (twice). This cross-section uses well CC-10, however, another well with this same name appears on cross-section G - G'. For clarity please provide unique well names and revise all cross-sections accordingly. **(MT)**

19-M. Exhibit D5-3, Cross Section C – C': This cross-section needs significant editing. On the location map insert wells CC-11 and CC-14 appears twice on cross-section C - C' and well CC-11 also appears on cross-sections F – F' and H - H'; Well CC-14 also appears on cross-section E – E'. Well CC-12 also appears on three non-intersecting cross-sections (i.e., E - E', D - D', H - H'). For clarity please provide unique well names and revise all cross-sections accordingly. Please shale and label the uranium ore/mineralization within the F sand to be consistent with cross-section H – H'. I found no data points (i.e., wells) within the proposed Hank Unit well field for about a mile along the southernmost end. If possible, please revise

this cross-section to include data points within the well field. I opine that the uppermost F sand at well CC-14, CC-18 and CC-23 correlate to the G sand and that the F sand and the G sand may coalesce in this area. Also it appears the F sand and the G sand may be coalescing in the area of Well CC-12 and CC-61. **(MT)**

20-M. Exhibit D5-4, Cross Section D – D': Wells CC-11 and CC-12 are also used for well labels on several other cross-sections. For clarity please provide unique well names and revise all cross-sections accordingly. At well CC-12 there appears to be at least two sand intervals (at 4915' and 4940') which could have been illustrated. At a minimum, the lower G sand should be shaded and labeled at this well to be consistent with cross-section C – C'. **(MT)**

21-M. Exhibit D5-5, Cross Section E – E': Wells CC-12 and CC-14 are also used for well labels on other cross-sections. For clarity please provide unique well names and revise all cross-sections accordingly. **(MT)**

22-M. Exhibit D5-6, Cross Section G – G': At well CC-11 there appears to be at least three sand intervals (at 4940', 4960' and 4970') which could have been illustrated. At a minimum, the two uppermost G sands should be shaded and labeled at this well to be consistent with cross-section C – C'. **(MT)**

23-M. Exhibit D5-6, Cross Section H – H': At well CC-40 there appears to be at least one sand interval at 5010' which could have been illustrated. At a minimum, the H sands should be shaded and labeled at wells CC-4-6, U06-65, CC-40 and CC-2. **(MT)**

24-M. Exhibit D5-10, Cross Section K – K': At well U07N-50 the F sand at 4530' should be shaded and labeled to be consistent with cross-section M – M'. **(MT)**

25-M. Exhibit D5-11, Cross Section L – L': The F sand should be shaded and labeled at wells U07N-121 and U07N-117 to be consistent with cross-section A – A'. Should shade and label the F sand at well CC-4 at 4590' and revised the F-sand (shade & label) at well CC-4 at 4550' to read the C sand to be consistent with cross-section E – E'. **(MT)**

26-M. Exhibit D5-11, Cross Section M – M': The cross-section intersect at well U07N-50 should be labeled K – K'. Please revise the "Hank Unit Projected Well Field" on the location map insert to read "Nichols Ranch Projected Well Field". **(MT)**

27-M. Isopach maps, General: Please provide a State Plane Coordinate System (i.e., Wyoming East Zone 4901 UTM 13N) grid index border as well as section,

township and range index. Please remove all points (i.e., NDE, NL, no data provided etc.) which do not provide thickness data. Data control points outside of the immediate well fields are lacking, please provide aerial control points for all areas within the permit area {LQD R&R, Chapter 2, Sec 2(a)(i)}. Where data is weak or absent the applicant must interpolate the data to the permit boundary. All control points must have unique labels, duplicate labeling makes for a cumbersome review. Please provide digital copies of geophysical logs where the mapped silt/mudstone/shale thin to 20 feet or less. Please ensure that all text discussion concerning thickness agree with the isopach presentations and that the isopach presentation agree the cross-sections. **(MT)**

28-M. Exhibit D5-14, Nichols Ranch Unit "A – B" Shale Isopach: Hole U07N-204 should be revised from NDE (Not Deep Enough) to 30' to be consistent with cross-section K – K'. The 10' contour around wells U07N-204 and U07N-147 should be removed. **(MT)**

29-M. Exhibit D5-15, Nichols Ranch Unit "A" Sand Isopach: In the northwest corner of the permit area the isopach indicates the A sand is thinning to the west. However, wells CC-26 and CC-27 indicates that this sand remains approximately 100 feet thick; please explain/correct. Cross-section indicate that the thickness of the A sand at well U07D-66 and U06-98 are 55 feet and 85 feet, respectively; please revise this isopach accordingly. **(MT)**

30-M. Exhibit D5-16, Nichols Ranch Unit "1 - A" Shale Isopach: Well U07N-6 shows 48' of shale on isopach, however, only about 20' are shown on cross-section L – L'. Well U07N-204 shows NDE (Not Deep Enough) on isopach, however, about 20' of shale is shown on cross-section K – K'. Well U07N-1 shows 35' of shale on isopach, however, about 40' are shown on cross-section K – K'. Well U07N-139 shows 31' of shale on isopach, however, only about 10' are shown on cross-section K – K'. Well U07N-19 shows NDE (Not Deep Enough) on isopach, however, about 35' of shale is shown on cross-section B – B'. Please explain or correct these apparent discrepancies. **(MT)**

31-M. Exhibit D5-17, Nichols Ranch Unit "I" Sand Isopach: Please include the word "Exhibit" in the title block. Also, please change "I SAND" to read "1 SAND". I found several discrepancies between the isopach and cross sections. Wells U07N-139 and U06-19 show sand thickness of 0' and 3' feet, respectively. However, 15' of sand is shown on cross-section B - B'). Well U07N-61 shows 2' of sand on isopach, however, 0' are shown on cross-section K – K'. Well U07N-137 shows 0' of sand on isopach, however, about 5' are shown on cross-section K – K'. Well U07N-6 shows 0' of sand on isopach, however, about 5' are shown on cross-section K – K'. Well U07N-204 shows 0' of sand on isopach, however,

about 5' are shown on cross-section K – K'. Well labels are covered by the O'-5' contour shading in the NW corner of the permit area. Please explain or correct all of these errors/discrepancies. **(MT)**

32-M. Exhibit D5-19, Hank Unit "G" & "F" Shale Isopach: For clarity please provide two separate isopachs, one showing the G shale and the other showing F shale. **(MT)**

33-M. Exhibit D5-21, Hank Unit "C" & "B" Shale Isopach: For clarity please provide two separate isopachs, one showing the B shale and the other showing C shale. The transition zone from the C shale to the B shale must be "filled-in" so that when the two isopach will overlay/abut in this transition zone. **(MT)**

34-M. Exhibit D5-22, Hank Unit "B" & "C" Sand Isopach: For clarity please provide two separate isopachs, one showing the B sand and the other showing C sand across the entire Hank Unit permit area. The transition zone from the C sand to the B sand must be "filled-in" so that when the two isopach will overlay/abut in this transition zone. **(MT)**

Appendix D-6, Hydrology

35-M. Section D6.2, Groundwater Hydrology, pg. D6-3: Please include a discussion of the Quaternary aquifers. In addition to the water quality discussion provided, please include a general range of transmissivity (gpd/ft) and general water yields (gpm) for all aquifers described in these discussions. **(MT)**

36-M. Section D6.2, Groundwater Hydrology, pg. D6-3: Please provide discussions concerning groundwater uses and withdraws for the regional, general site area, and proposed mining operation. For clarity I suggest breaking these discussions into at least two categories {i.e. 1) Regional/general; and 2) Local/Site-specific}. **(MT)**

37-M. Section D6.2.1, Geological Setting and Well Construction, General, pg. D6-3a: Please consider changing the title of this section to "Hydrologic Setting and Uranerz needs to provide geophysical logs and well completions details for all holes and wells use to present baseline geologic and hydrologic information. **(MT)**

38-M. Section D6.2.1, Geological Setting and Well Construction, pg. D6-3a, para. 1 and 2: The number and types of wells described in this text do not agree with those on the corresponding tables (i.e., Table D6-2 and Table D6-3). Please make the appropriate corrections. **(MT)**

39-M. Section D6.2.1, Geological Setting and Well Construction, pg. D6-3a, para. 2: Please describe how many of the Hank Unit wells are completed as open-hole completions. **(MT)**

40-M. Section D6.2.1, Geological Setting and Well Construction, pg. D6-3a, para. 2, last sentence: This text states "...four existing stock wells are completed across a combination of the sands". Then text in Section D6.2.2 and pg. D6-4 states "Tables D6-3 and D6-4 present the basic well data for wells used to define the aquifer properties for the Nichols and Hank Units respectively". A review of data on theses tables shows that at least six (6) of these "baseline" wells are completed in a combination of aquifers. Uranerz should remove any well completed in combination sand intervals from the any specific sand discussions. Uranerz may present this data simply as background information to document the water quality of each specific well; however, Uranerz should not attempt to use this information to characterize a specific sand unit. Data from any well which is screened/open-hole across a combination of aquifers or any well whose completion intervals are unknown should not be provide as information to characterize an aquifer. These wells should be properly sealed and abandoned so that they do not bias further groundwater investigations and potential comprise the mining and reclamation operations. **(MT)**

41-M. Section D6.2.1, Geological Setting and Well Construction, pg. D6-4, para. 1: This text does not agree with the information presented on Table D6-2. Please revise this text so that it is consistent with the information presented in Table D6-2. In addition, for clarity please identify which wells were used to collected water level and which were used to sample water quality. **(MT)**

42-M. Section D6.2.2.1, Aquifer Properties, pg. D6-4: For clarity please provide separate headings for the Nichol Ranch Unit and the Hank Unit. Under these headings please provide sub-headings which provide descriptions of each aquifer from shallowest to deepest (i.e., underlying aquifer). These discussions should describe each aquifers thickness, velocity and direction of groundwater movement, storage coefficients or specific yields, transmissivity or hydraulic conductivity and the direction(s) of preferred flow under hydraulic stress in the saturated zones. Please provide a table which clearly summaries these properties by unit by aquifer. In addition, please describe the extent of hydraulic connection between overlying and underlying aquifers, and the hydraulic characteristics of any influencing boundaries in or near the proposed well field area(s). **(MT)**

43-M. Section D6.2.2.2: Aquitard Properties, pg. D6-5: Please provide discussions describing the leaky aquitards thickness and direction of groundwater movement. For clarity please provide separate headings for the Nichol Ranch Unit and the

Hank Unit. Under these headings please provide sub-headings which provide descriptions of each aquitard from shallowest to deepest (i.e., underlying aquitard). Please provide a table which clearly summaries these properties by unit by aquitard. **(MT)**

44-M. Section D6.2.2.2: Aquitard Properties, pg. D6-6, para. 1, lines 6 and 8: For clarity please also provide the units in feet/year (i.e., 6.9E-3 to 7.3E-2 ft/yr and 6.6E-3 and 1.4E-2 ft/yr, respectively). **(MT)**

45-M. Section D6.2.2.2: Aquitard Properties, pg. D6-6, para. 1, last sentence: This text states "Aquifer confinement will be further defined for each of the wellfields during the wellfield multi-well pump test." Please provide this information for the first wellfield as a component of this permit application. **(MT)**

46-M. Section D6.2.3, Groundwater Flow, pg. D6-6, para. 2: Please very briefly discuss CBM drawdowns. **(MT)**

47-M. Section D6.2.3.1, Nichols Ranch Unit Water Level Changes, pg. D6-7a: Using the oldest available information (SEO well completion reports; 1981; 1988) it appears all of the A sand monitoring levels in the Nichols Ranch Unit have seen an average 16-foot decrease in water levels. Uranerz should confirm these changes and revise this text accordingly. Uranerz should offer a possible explanation for these changes. **(MT)**

48-M. Section D6.2.3.2, Hank Unit Water Level Changes, pg. D6-8: The last measurement reported for wells BR-T and BR-U were done in 1981 and 1982, respectively. If possible, please provide discussion of any more recent measurements. The data in Table D6D.2-1 do not agree the discussions concerning well WC-MN1. Please correct. The measurement reported for well WC-MN1 for 12/20/2007 appears to be incorrect, please correct. B sand wells Brown #5 and Franklin Brown #1 have shown significant declines (using the base-year elevations) -126 feet and -98 feet, respectively. Please investigate and explain. **(MT)**

49-M. Section D6.2.3.3, Coal Bed Production Effects on Water Levels, pg. D6-8: Excellent discussion. The BLM now has released water elevations for the Fourmile and West Pinetree wells which are the closest to the proposed Nichols Ranch permit area. Pleases consider revising this section to include these two new wells. Also please consider insert the attached map showing the location of these BLM wells. **(MT)**

50-M. Section D6.2.4, Ground-Water Quality, pg. D6-9e. Uranerz needs to provide water quality data for all aquifers (i.e., 1, A, B, C, F, G, H, and alluvium) with the first well field at a density of 1 well per 3 acres. **(MT)**

51-M. Section D6.2.4, Ground-Water Quality, pg. D6-9e. Please provide a simple table which clearly lists Uranerz's Baseline Water Quality Monitoring Parameters. **(MT)**

52-M. Section D6.2.4, Ground-Water Quality, pg. D6-9e. Please provide Piper diagrams which illustrate the average ion concentrations for each baseline well by aquifers (i.e., 1, A, B, C, F, G, H, and alluvium). In addition, please provide Stiff diagrams to illustrate the character of the average water quality by aquifer. **(MT)**

53-M. Section D6.2.4, Ground-Water Quality, pg. D6-11, para. 1: Uranerz has elected to group together the water quality data for the B sand and C sand. The entire permit document up to this point has described and delineated these as separate sands. Please segregated these data/discussion and continue to keep these as two separate aquifers to be consistent with other proposed permit text and exhibits. **(MT)**

54-M. Section D6.3, Water Rights, pg. D6-12, para. 3: This text states "Those wells that are completed in the ore bearing sand will be abandoned using acceptable WDEQ methods or will be used as monitoring wells if not completed in multiple sands." This commitment should be relocated to an appropriate location in the Mine Plan. In addition, Uranerz should provide specific abandonment procedures, techniques and materials. **(MT)**

55-M. Section D6.3, Water Rights, pg. D6-12, para. 3: Please investigate into where the Nichols Ranch house historically got its water and provide a discussion in the text. **(MT)**

56-M. Section D6.5, Exploration Drill Holes, pg. D6-13: I conducted a search of the LQD Abandoned Drill Hole Reports and found approximately 160 drillholes (see spreadsheet attached) which should be added to this discussion, Addendum D6I, and Exhibits D6-7 and D6-8. What measures have been taken to locate and identify the locations of these old drill holes and to determine their status and integrity? Prior to mining Uranerz needs to provide assurances that these holes have been properly abandoned, and will not provide a conduit for the movement of fluids between aquifers. WDEQ/LQD Chapter 11, Section 3(a)(xii) and Section 8. **(MT)**

57-M. General, Well Locations: Uranerz needs conduct a more thorough investigation to ensure that all cased wells within the proposed permit area and within 3 miles of the proposed permit area (i.e., water wells, pump tests wells, miscellaneous well, monitoring well, gas well oils wells) are captured on one of tables and one of figures or exhibits. **(MT)**

58-M. Tables D6-2, pg. D6-16 and Table D6-3, pg. D6-17: Please add a column to the far right of this table to identify if the well was used for baseline water level (WL), water quality (WQ) or both. Wells Brown 20-9, Calving #1, Dry Fork #3, Garden, Red Springs A#1, W. of WW1, Brown-WS, Means #1, North Dry Willow, OW43756, Paden #1, and SS1-FPU should be removed from any specific baseline characterization of a specific strata since they are completed in multiple interval or the interval(s) is unknown. Uranerz way provide this data to document the water of pre-existing condition of these stock wells, but not to characterize a specific aquifer. There are inconsistencies with the wells listed on these tables and Tables? in Addendum D6L. Please correct. Also, to improve the utility of these tables please categories these lists by aquifer. Dry Willow #1 should be listed as an open-hole completion. If well URZHF-5 is an open hole completion then why is its monitored interval 369' to 386' instead of 369' to 410'? The total depth and monitored interval listed for well URZHF-1 do not agree with the information shown on its SEO completion report. Please correct. According to SEO records well URZHC-2 should show a total depth of 450 feet and the monitored interval as 440' to 450'. According to SEO records well SS1-L should show a monitored interval as 540' to 652'. **(MT)**

59-M. Tables D6-2, pg. D6-16 and Table D6-3, pg. D6-17: Please explain how Pug #1 was determined to be a "C Sand" versus a "B Sand"; how Pats # 1 was determined to be a "B Sand" versus a "A Sand"; and how BR-F was determined to be a "G Sand' versus a "H Sand". Nichols #1 should be changed to Nichols Ranch #1 and N1,11894 should be changed to Nichols #1 to avoid confusion. **(MT)**

60-M. Please provide a table which shows the results of the vertical hydraulic gradient calculations. **(MT)**

61-M. Table D6-4, Summary of Aquifer Properties for Nichols Ranch Unit, pg. D6-19: Please remove well DW-4L from the "1 Sand" sub-table, as this is a "A Sand" well. The aquifer thickness used on the wells needs to remain consistent throughout the various pump tests. Please correct. The aquifers thicknesses listed in most cases do not agree with the monitored intervals shown on SEO well completion reports. The thicknesses I found are as follows: MN-1=77'; MN-2=102'; MN-3=106'; MN-4=103'; MN-5=99'; DW-4L=69'; Nichols Ranch

#1=110'; URZNB-1=45'; DW-4U=54'; and DW-4M. Please investigate and explain/correct this table accordingly. **(MT)**

62-M. Table D6-5, Summary of Aquifer Properties for Hank Unit, pg. D6-20: Please remove well OW43756 from the "F Sand" sub-table, as this is completed both in the G sand and the F sand. The aquifer thickness used on the wells needs to remain consistent throughout the various pump tests. Please correct. The aquifers thicknesses listed in most cases do not agree with the monitored intervals shown on SEO well completion reports. The thicknesses I found are as follows: Hank #1=86'; Dry Willow #1=100', BR-B=80'; BR-G=80'; URZHF-5=41'; URZHF-1=35'; SS1-F=40'; BR-F=30'; BR-H=40'; BR-Q=100'; NBHW-13=22'; and SS1-L=112'. Please investigate and explain/correct calculations and table accordingly. **(MT)**

63-M. Table D6-6, Summary of Ground-Water Quality, pgs. D6-21 through D6-23: Uranerz should provide a summary of the alluvium water quality. Baseline groundwater quality should be provided separately for the B, C, G, and H sand aquifers, unless Uranerz is making the case that these sands are the same aquifers. If this is the case the entire permit must be revised accordingly. Please add a "No. of Samples > WDEQ Class 1 Standards" and a "No. of Samples > MCL" rows to this table. In addition, please add columns to list gross alpha, gross beta, Ra228 and Ra228(e). **(MT)**

64-M. Addendum D6B, Nichols Unit Pump Tests: Instead of providing the non-illustrative and lengthy raw transducer data tables, I would prefer that Uranerz provide histograms of each well used during pumps tests. These histograms should have two graphs one showing water elevations and the other showing barometric pressure. The left (y-axis) should be in elevation (ft) rather than water-level change. Please illustrate the recordings of baseline water elevations a minimum of 5 days prior to starting the pump test period. Please note it is acceptable and preferable to keep the manually recorded data table as they are. **(MT)**

65-M. Addendum D6B, Nichols Unit Pump Tests: I conducted a detailed technical review of the information presented in this addendum. Attached are copies of some of my type curve matching efforts for many of the pump tests. These are only included to document my review; no actions are requested of Uranerz. I generally agree with all of Uranerz's summaries and conclusions in this addendum, with the exception of the pump test for well DW-4M and the first test of well URZNB-1. These tests may be unreliable and Uranerz may wish to consider removing these test results from the permit document. In addition, we prefer that all pump tests be conducted for a minimum 4 days. Also, several of

the recorded recovery times were too short. Uranerz and LQD should have agreements (i.e., specific wells, pump rates, and duration of tests) prior to conducting any future pump tests. **(MT)**

66-M. Addendum D6C, Hank Unit Pump Test: I conducted a cursory review of the information presented in this addendum. I generally agree with all of Uranerz's summaries and conclusions in this addendum, with the exception of the pump test for well Hank 1 and the first test of well BR-H. These tests may be unreliable and Uranerz may wish to consider removing these tests results from the permit document. Also, no match line was provided on Figure D6C.1-16. In addition, please refer to Comments 64 and 65. **(MT)**

67-M. Addendum D6D: Please provide measured flow rates for artesian wells Red Springs Artesian #1, N1, 11894, Brown 20-9, and Dry Fork Flowing #3. In addition, please provide any historical water-level elevation tables and histogram for wells Brown 20-9, N1, 11894, Pats #1, and Pug#1. Also, please provide histogram for wells Brown 20-9, N1, 11894, Pats #1, Pug#1, URZNF-3, URZNQ-4, and W. of WW1. **(MT)**

68-M. Addendum D6D, Section D6D.1, Nichols Ranch Unit Ground-Water Levels, pg. D6D.1-1: Please revise this text by addressing the total water level changes (i.e. base year or static water levels seen upon well completion). **(MT)**

69-M. Addendum D6D, Section D6D.1, Figures D6D.1-1, D6D.1-2, and D6D.1-3: Please revise these histographs by including the base-year water levels for all wells. In addition, please consider providing an additional illustration showing all A sand wells on one histograph. **(MT)**

70-M. Addendum D6D, Section D6D.1, Table D6D.1-1, Water-Level Data for Nichols Ranch Unit Wells, pgs. D6D.1-5 and D6D.1-6: Please revise this table by including the base-year water levels for all wells. The Water Level Elevations of Well MN-2 have been apparently miscalculated (they should be around approx. 4660 ft.). Please correct. I was unable to locate e-logs or the SEO completion reports for wells Nichols Ranch #1 and W. of WW1. Please provide if possible. **(MT)**

71-M. Addendum D6D, Section D6D.2, Hank Unit Ground-Water Levels, pg. D6D.2-1: Please revise this text by addressing the total water level changes (i.e. base year or static water levels seen upon well completion). **(MT)**

72-M. Addendum D6D, Section D6D.1, Figures D6D.2-1 through D6D.1-5: Please revise these histographs by including the base-year water levels for all wells. In

addition, please consider providing two additional illustration showing all B sand wells and F sand wells on separate histographs. **(MT)**

73-M. Addendum D6D, Table D6D.2-1, Water-Level Data For Hank Unit Wells, pgs. D6D.2-7 through D6D.2-9: Please remove wells Brown-WS, Means #1, OW43756 and Paden #1 from this table as they are completed in multiple zones. Data from any well which is screened across multiple aquifers should not be used as information to character an aquifer. Wells North Dry Willow and Paden #1 should be properly sealed and abandoned so that they do not bias further groundwater investigations and potential comprise the mining and reclamation operations. Also, Well URZHF-8 listed on this table needs to be listed on Table D6-3 and location shown on Figure D6-3. No e-logs or SEO well completion reports were provided for OW43756, SS1-F and SS1-FPU. Please provide if possible. The last measurement reported for wells BR-T and BR-U were done in 1981 and 1982, respectively. If possible, please provide any more recent measurements. The measurement reported for well WC-MN1 for 12/20/2007 appears to be incorrect, please correct. B sand wells Brown #5 and Franklin Brown #1 have shown significant declines (using the base-year elevations) -126 feet and -98 feet, respectively. Please explain. **(MT)**

74-M. Addendum D6D, D6D.3, Coal Bed Water Levels: Excellent discussion. The BLM now has released water elevations for the Fourmile and West Pinetree wells which are the closest to the proposed Nichols Ranch permit area. Pleases consider revising this section to include these two new wells. Also please consider inserting the attached map showing the location of these BLM wells. **(MT)**

75-M. Addendum D6E, Table D6E.1-1, Nichols Ranch Unit Ground-Water Quality Data: If possible, please provide water samples from the nearby flowing wells Dry Fork Flowing #3, Red Springs Artesian #1, and Nichols Ranch #1. Please remove this well from this table as Table D6-2 indicates this well is completed in the A Sand and the B Sand. Uranerz may present this data as baseline for this specific stockwell; however, this data should not be used to characterize a specific aquifer. **(MT)**

76-M. Addendum D6E, Table D6E.2-1, Hank Ranch Unit Ground-Water Quality Data: If possible, please provide water samples from the nearby flowing well Connie #2. Please remove wells Brown-WS, Means #1, OW43756, and Paden #1 from this table as Table D6-2 indicates these wells are completed in multiple aquifers. Uranerz may wish to present data from all stockwells that are completed in multiple aquifers in a separate table. **(MT)**

77-M. Addendum D6G, Groundwater Rights, Table D6G.1-1: For clarity please remove all duplicate well entries from the table. Wells Red Springs #4 Lower, Middle, and Upper are primarily discussed/illustrated in the proposed permit document as Wells DW-U, DW-M and DW-L. To avoid confusion please insert/add these names to the Red Springs #4 names. Nichols #1 should be listed on table and shown maps as such instead of N1, 11894. **(MT)**

78-M. Addendum D6G, Groundwater Rights, Table D6G.2-2: For clarity please remove all duplicate well entries from the table. Please remove cancelled wells Franklin Brown #2, Sheeptick Well #1, Brown #6, North Butte #1, Brown Lake #1 and South Fork #1 from this table and Exhibit D6-2, unless these wells are still in use and labeled accordingly. **(MT)**

79-M. Addendum D6K, Pump Test SOP: See Comments 64-M and 65-M. Also, items in this addendum need to have footers and pagination as a component of the permit application. **(MT)**

80-M. Figure D6-3, Nichols Ranch Unit Water Wells: Please present this information at a scale which clearly shows the locations of each individual well (i.e., no well cluster). Please provide a State Plane Coordinate System (i.e., Wyoming East Zone 4901 UTM 13N) grid index border as well as section, township and range index. Wells listed on Table D6.2 should include only wells shown on this figure; likewise all wells shown on this figure should be listed on Table D6.2. In addition, several STO/CBM wells (see SEO database) owned by Williams Production Company and Yates Petroleum Company are not shown on Figure D6-3, Exhibit D6-6, Exhibit D6-3 or their corresponding tables. Please correct these inconsistencies. According the SEO records wells DW-4U, DW-4M and DW-4L have been cancelled; apparently these wells were transferred to the T-Chair Cattle Company as Red Springs #4 Lower, Red Springs #4 Middle, and Red Springs #4 Upper, respectively. Please correct the tables and maps accordingly. It appears that wells 11894, URZ NQ-4, URZ N1-2, and URZ NF-3 have not been permitted with the SEO office; please do so. Well N1 should be labeled as Nichols #1 to be consistent with SEO records. Pug Well #2 is not shown in Section 20. Well Brown 20-9 has been cancelled. Uranerz should take measure to ensure that the SEO record are updated form all wells being used to establish baseline. In addition, Uranerz should transfer all Rio Algom Mining Corporation, The Cleveland Cliffs Iron Company, Power Resources, Inc., Cities Service and American Nuclear wells they are using to rather data for these permit application to Uranerz ownership. **(MT)**

81-M. Figure D6-4, Hank Unit Water Wells: Please present this information at a scale which clearly shows the locations of each individual well (i.e., no well cluster).

Please provide a State Plane Coordinate System (i.e., Wyoming East Zone 4901 UTM 13N) grid index border as well as section, township and range index. This map does no show the location of wells BR-H, BR-K, BR-T, C#1, Dry MW1, Dry MW3, F. Brown #1, NBHN-13, Old Maid #1, SS1-F, SS1-FPU, SS1-L, SS1-M and SS1-U which are listed on Table D6-3 and Table? in Addendum D6L. Figure D6-4 shows the location of wells BR-C, BR-J, B-87, B-85, and Connie #2, however, these wells are not listed on Table D6-3 or Table? in Addendum D6L. Please correct these inconsistencies. In addition, several STO/CBM wells (see SEO database) owned by Anadarko Petroleum Corporation, Devon Energy Production Company, Lance Oil & Gas, and CH4 Energy, LLC. are not shown on Figure D6-3, Exhibit D6-6, Exhibit D6-3 or their corresponding tables. Please correct these inconsistencies. Several wells owned by Wyoming Resources Corporation located in Section 36, T.44N., R.76W. are not shown on Figure D6-4 or Exhibit D6-2. Well Dobie Hill Well #1 (29-44-75), Brown P (29-44-75), URZ-HF-8 (31-44-75), and UR2-HF-2 (7-44-75) are listed in SEO records but their locations are not shown on Figure D6-4. Uranerz well URZHH-7 apparently has not been permitted with SEO. Please correct. Wells SS1-PU and URZHF-8 is listed on Table D6D.2-1 but is not listed on Table D6-3. The locations of these wells are also not shown on Figure D6-4. Please correct. The configuration of the projected well field does not appear to agree with the drilling patterns illustrated on Exhibit D6-8 in Section 7. It appears that the southernmost lobe of the well field should be shown in the SENE and NESE of Section 7. Please examine and revise the map if needed. **(MT)**

82-M. Figure D6-5a, Regional Water-Levels for the A Sand Aquifer: The intent of this map should be to illustrate older or "base-year" water levels (ex: well MN-3@4685' in 1981, well DW-4L@4680' in 1978, well SS1-L @ 4840' in 1988 {ref: North Butte ISL Permit), etc. Please collect this data and revise this map. **(MT)**

83-M. Figure D6-6, Water-Levels Elevations for the F Sand Aquifer: The contours on this figure blend nicely with the contours presented on Figure D6.1.4 (Piezometric Surface Map of J Sandstone) of Permit No. 478. Uranerz may wish to consider capturing the data from Figure 6.1.4 and revising Figure D6-6. Please insert the word "Regional" into the figure's title to be consistent with other figure titles. **(MT)**

84-M. Figure D6-6a, Regional Water-Levels for the "1 Sand" Aquifer: Please provide justification for using wells over 10 miles away (i.e., DW-3L and DW-96) to correlate with well URZN1-2. If possible, please use data from closer wells (i.e., North Butte; PT-632 or Christensen Ranch; PT-478). **(MT)**

85-M. Figure D6-6b, Hank Unit Water-Levels Elevations for the F Sand Aquifer: The contours on this figure blend nicely with the contours presented on Figure A-5 (Location of Wells and Water Level Elevation in the "A", "B" and "F" Sand Aquifers) of Permit No. 632. Please remove the "red" wells from this figure since they provide no data and only appear add clutter. **(MT)**

86-M. Figure D6-7, Water-Levels for the B & C Sand Aquifers: Please put this information on two separate maps. For consistency please use the word "REGIONAL" in their titles. **(MT)**

87-M. Figure D6-7a, Depth to Water in the F & G Sands and Cottonwood Alluvial at the Nichols Ranch Unit: Please provide an explanation or the logic for illustrating fairly detail contours by only providing one (1) well over approximately three (3) square miles of Hank Unit permit area. Please provide the status of the two (2) proposed H Sand Wells. If these wells have been installed please update/revise this figure accordingly. Uranerz should illustrate the extent of the alluvium/valley fill aquifer similar to Figure D6-7a. In addition, please show the location of the BLM's Dry Willow alluvial wells discussed in paragraph 3 on pg. D6-7 of the proposed permit text. **(MT)**

88-M. Figure D6-7b, Depth to Water for the H Sand Aquifers at the Hank Unit: Please provide an explanation or the logic for illustrating fairly detail contours considering there are no wells completed in the G Sand and only one (1) well completed in the F sand within the entire Nichols Ranch Unit permit area. Please provide the status of the two (2) proposed wells. If these wells have been installed please update/revise this figure accordingly. Well URZNQ-4 should be labeled as an alluvial well to be consistent with Table D6-2. **(MT)**

89-M. Figure D6-8, Water-Levels for the G & H Sand Aquifers: Please put these information on two separate maps or for clarity please use different line types (similar to Figure D6-7a) to illustrate the water levels in each separate aquifer. Uranerz should use the base-year elevation (i.e., 5081') for well BR-I and include nearby H-Sand well BR-K on this figure. **(MT)**

90-M. Figure D6-8b, Location of Coal Bed Monitoring: See Comment 73. **(MT)**

91-M. Figure D6-8c, Uranerz should provide some spatial reference for this selected model cell. **(MT)**

92-M. Exhibit D6-2, Hank Unit Water Wells (3 Mile Radius): Please label well Doughstick #1. **(MT)**

93-M. Exhibit D6-4, Hank Unit Coal Bed Methane Wells (3 Mile Radius): Please label all wells as was done on Nichols Ranch Unit Exhibit D6-3. **(MT)**

94-M. Exhibits D6-7 and D6-8, Exploration Drill Holes: These maps need to be update to include the additional drill holes furnish by LQD. In addition, please furnish a survey grid border on these maps to aid in the location of these historical holes in the field. **(MT)**

Mine Plan

95-M. Mine Plan, General: Uranerz needs to add discussions providing clear assessments of the impact to water resources (i.e., water quantity and quality) within the permit area and on adjacent lands during mining and reclamation. These assessment must discuss what may be reasonably expected and provide mitigation plans (ref: W.S.§35-11-428(a)(iii)(E). **(MT)**

96-M. Mine Plan, Section 2.1, Description of Production Zones, pg. MP-4: Please consider enhancing this discussion by providing a few sentences describing the roll front and provide a reference to Figure D5-a. **(MT)**

97-M. Mine Plan, Section 3.1, Wellfield Design, pg. MP-7: Line 3…please remove the word "impermeable" as this word tends to imply that groundwater will not move through these strata. Line 5…please replace the word "horizontal" with "perimeter" in this text and at <u>all</u> locations in the permit document when describing perimeter monitor wells rings. **(MT)**

98-M. Mine Plan, Section 3.1.1.2, Completion Details for Injection and Recovery Wells, pg. MP-8: When drilling pilot holes through the target completion interval, Uranerz should provide a commitment not over-drilled the pilot holes to more than two feet into the underlying aquitard. Over-drilling of pilot holes may provide a man-made avenue for communication between the ore zone and the underlying aquifer. **(MT)**

99-M. Mine Plan, Section 3.1.1.2, Completion Details for Injection and Recovery Wells, pg. MP-8: Please delete the phrase "or other possible completion methods". **(MT)**

100-M. Mine Plan, Section 3.1.1.2, Completion Details for Injection and Recovery Wells, pg. MP-9, para. 1: Please provide a table which provides the specifications for <u>all</u> casings which Uranerz is proposing to use. This table, at a minimum, should include the following: casing size (i.e., I.D. and O.D.), manufacturer, type, SDR or Schedule number, wall thickness, cell class (PVC), calculated burst yield and

collapse strength, manufactures recommended safety factors and the maximum depth to which each specific casing would be used. When calculating casing hydraulic collapse pressure Uranerz should be aware that significant heat is evolved during the hydration of cement. The resultant temperature increase will reduce the collapse strength of PVC casing. PVC loses about 0.6 psi per 1°F increase over 72°F. A 2:1 or greater factor of safety is generally recommended. As an example 5-inch PVC (published/calculated collapse pressure 59 psi; no safety factor included) should not be installed in any well (cemented with 14.8#/gal cement) to a depth greater than 87 feet. **(MT)**

101-M. Mine Plan, Section 3.1.1.2, Completion Details for Injection and Recovery Wells, pg. MP-9, para. 2, sent. 1: Please replace "approximately" with "at a minimum of" in order to be consistent with LQD R&R. **(MT)**

102-M. Mine Plan, Section 3.1.1.2, Completion Details for Injection and Recovery Wells, pg. MP-9, para. 2, last sent.: Please replace "needed" with "the primary cementing process fails to circulate the cement slurry to the surface then". **(MT)**

103-M. Mine Plan, Section 3.1.1.2, Completion Details for Injection and Recovery Wells, pg. MP-9, para. 3, sent.1: Please insert "(minimum of 72 hours)" immediately behind the word "set". **(MT)**

104-M. Mine Plan, Section 3.1.1.2, Completion Details for Injection and Recovery Wells, pg. MP-9, para. 3, sent.2: Please replace the word "may" with "will". **(MT)**

105-M. Mine Plan, Section 3.3.2, Injection Pressures, pg. MP-10: Uranerz should perform a series of actual injection tests using water to determine the actual fracture pressures of the A sand, F sand and any deep disposal sands rather than using a calculated estimate number. **(MT)**

106-M. Mine Plan, Section 3.3.3, Stimulation Program, pg. MP-11: Uranerz should provide a commitment not to exceed the fracture pressure of the zone in which the well is completed during any stimulation activity. In addition, Uranerz should provide a commitment to report any well stimulation via the annual report. This report, at a minimum, should provide the stimulation technique used, materials pumped, injection rates, total volumes, maximum pressures encountered and a brief discussion of the stimulations efforts results. **(MT)**

107-M. Mine Plan, Section 3.3.4, Type of Recovery Fluid Used, pg. MP-11: Uranerz should provide a detailed chemical constituents description of the typical lixiviant solution as wells as the pregnant solution. In addition, Uranerz should discuss

other elements which will likely be removed from the production zone sands during the oxidation of the tetravalent uranium. **(MT)**

108-M.Mine Plan, Section 3.3.5, Proposed Injection Procedure, pg. MP-12, para.1, sent.3: For clarity Uranerz should consider revising Figure 3-3 to illustrate the entire wellfield construction layout that may be used. (see attached Figure 22.36 from Groundwater and Wells, Driscoll, 1986, pg. 774). **(MT)**

109-M.Mine Plan, Section 3.3.5, Proposed Injection Procedure, pg. MP-12, para.1: Uranerz must provide groundwater potentiometric maps which illustrate the projected drawdown expected during the first year of operation as well as the estimated life-of-mine drawdown in both the A sand and F sand aquifers. **(MT)**

110-M.Mine Plan, Section 3.3.5, Proposed Injection Procedure, pg. MP-12, last para.: Uranerz needs to provide details of the pipeline construction (pipe, depth, etc.). How will these pipelines be maintained? How and at what frequency will these piping be tested? What is the life expectancy of the pipeline materials? How will these piping be repaired and ultimately be abandoned? **(MT)**

111-M.Mine Plan, Section 3.3,6, Expected Changes in Pressure, Natural Groundwater Displacement and Direction of Injection Fluid, pg. MP-13: Given this site's complex hydrogeologic nature LQD requests that Uranerz use the prevailing MODFLOW/MODPATH numeric model (e.g. Groundwater Vistas, Visual MODFLOW) to predict drawdown as well as fate and transport. This model should be accompanied by text which describe the model, tables provide input parameters, and maps which at a minimum illustrate the following: model domain, boundary conditions, layers simulated premining potentiometric surface (approx. 2-foot contours), projected drawdown with 1% (Nichols Ranch) and 3% (Hank Ranch) bleed (1-year and life-of-mine; approx. 2-foot contours, projected capture zone and projected excursion recovery. **(MT)**

112-M.Mine Plan, Section 3.3,6, Expected Changes in Pressure, Natural Groundwater Displacement and Direction of Injection Fluid, pg. MP-13: Uranerz should discuss and tabulated the volume of groundwater consumed and disposed of annually and over life-of-mine of the proposed mining operations. Also see Comment No. 109. **(MT)**

113-M.Mine Plan, Section 3.3,7, Water Balance Calculations, pg. MP-17, para. 1: Please revise this text to also present the average annual net water consumption in terms of acre-feet per year. **(MT)**

114-M. Mine Plan, Section 3.4, Lixiviant Control, pg. MP-17a, last para.: Please include text which describe the density of these monitor wells and the monitoring frequency of these wells or provide an reference to the permit section where these items are discussed. **(MT)**

115-M. Mine Plan, Section 3.8, Repair and Abandonment of Wells, pg. MP-22: Please provide detail methods(s) and include figures to describe the timing, materials, and procedures to be used abandoned wells which are no longer useful to continued mining or restoration operations. Please include the various types of wells such as under-reamed, screened, sand pack, open-hole etc. **(MT)**

116-M. Mine Plan, Section 3.9, Wellfield Data Package, pg. MP-23: LQD requests that Uranerz include the well field package for the first mine unit in the permit application. **(MT)**

117-M. Mine Plan, Section 3.10.4.1, Process Related Chemicals, pg. MP-27, para. 1, last sent.: Please replace the word "may" with "will". **(MT)**

118-M. Mine Plan, Section 3.10.4.1, Process Related Chemicals, pg. MP-27, para. 3, sent. 4: Please revise this sentence to read "The hydrochloric acid storage tank will be located within a concrete curbed secondary containment basin". **(MT)**

119-M. Mine Plan, Section 3.13, Effluent Control Systems, pg. MP-32: I would prefer this entire section be presented as the last section of the Mine Plan. **(MT)**

120-M. Mine Plan, Section 3.14.7.8.5.1, Data Collection, pg. MP-67: Uranerz must revise this text and commit to providing baseline water quality data for all aquifers (i.e., 1, A, B, C, F, G, H, and alluvium). **(MT)**

121-M. Mine Plan, Table 3-1, Groundwater Monitoring Sampling Parameters, pg. MP-69: Please change "Ammonium" to "Ammonia". In addition, please add zinc, Radium-228, gross alpha and gross beta to the list of constituents. **(MT)**

122-M. Mine Plan, Section 3.18.2, Annual Reporting, pg. MP-84, Last para. sent.4: W.S. §35-11-404(e) requires "a report which shall include the location of each hole, utilizing Wyoming state plane coordinates". Please revise this text accordingly. **(MT)**

123-M. Mine Plan, Addendum MP-B, Groundwater Model: See Comment No. 111-M. **(MT)**

124-M. Mine Plan, Addendum MP-C and EXP-SOP-02, Well Completion Procedure, pg. 1: must provide detailed manufactures specifications and diagrams to illustrate centralizers, "J" collars, Figure K packers, casing shoes, etc.). **(MT)**

125-M. Mine Plan, Addendum MP-C and EXP-SOP-02, Well Completion Procedure, pg. 2, item 9 : I was unable to find EXP-SOP-01 "Exploration Hole and Well Pilot Hole DNC Procedure". Please provide. **(MT)**

126-M. Mine Plan, Addendum MP-C, EXP-SOP-02, Well Completion Procedure, pg. 1, item 2: Please revise "...dig mud pit and remove top soil..." to read "...remove topsoil and dig mud pit..." Please provide a commitment to fence all mud pits to prevent injury to humans, wildlife and livestock. **(MT)**

127-M. Mine Plan, Addendum MP-C, EXP-SOP-02, Well Completion Procedure, pg. 1, item 5: Please insert the words "Marsh funnel" immediately before the word "viscosity". **(MT)**

128-M. Mine Plan, Addendum MP-C, EXP-SOP-02, Well Completion Procedure, pg. 2, item 7: Uranerz should provide a commitment not over-drilled the pilot holes more than two feet into the underlying aquitard. **(MT)**

129-M. Mine Plan, Addendum MP-C, EXP-SOP-02, Well Completion Procedure, pg. 2, item 13: Please explain the logic for reaming the pilot to below the mineralized zone and into the underlying aquitard as shown on Figure 3-1. Uranerz should provide a commitment not over-drilled the pilot holes more than two feet into the underlying aquitard. **(MT)**

130-M. Mine Plan, Addendum MP-C, EXP-SOP-02, Well Completion Procedure, pg. 2, item 14: Please describe approximately how many wellbore volumes will be circulated to clean cuttings out of the well. **(MT)**

131-M. Mine Plan, Addendum MP-C, EXP-SOP-02, Well Completion Procedure, pg. 3, item 17: Please replace the word "may" with "will". To ensure that the cement slurry is not over-displaced a manufactured cement wiper plug must be used. "3 inches" needs to be revised to "8-3/4 inches" or larger to accommodate 5-inch casing. **(MT)**

132-M. Mine Plan, Addendum MP-C, EXP-SOP-02, Well Completion Procedure, pg. 3, item 18: See Comment No. 100. **(MT)**

133-M. Mine Plan, Addendum MP-C, EXP-SOP-02, Well Completion Procedure, pg. 3, items 20 & 21: Please indicate the maximum amount of time that will lapse between item 20 and item 21. **(MT)**

134-M. Mine Plan, Addendum MP-C, EXP-SOP-02, Well Completion Procedure, pg. 3, item 21: Please replace "may or may not" with "will" as a wiper plug is essential to the quality of the primary cement displacement. In addition, please provide what percent excess cement slurry will be mixed and pumped in excess of the calculated annular volume. **(MT)**

135-M. Mine Plan, Addendum MP-C, EXP-SOP-02, Well Completion Procedure, pg. 4, item 22: Please describe the slurry mixing procedures and provide a picture or illustration of a "standard grouting/mixing unit. In addition, please provide the range of acceptable chemically and physical parameters of the cement's mix water. API cementing tables show that Class A (Portland) has a mix weight of 15.6#/gal; water = 5.20 gal/sk.; and a yield of 1.18 cu.ft./sk. API cementing tables show that Class A (Portland) with 2% bentonite by weight of cement has a mix weight of 14.8#/gal; water = 6.40 gal/sk.; and a yield of 1.35 cu.ft./sk. Please correct/revise the cement slurry discussion accordingly. **(MT)**

136-M. Mine Plan, Addendum MP-C, EXP-SOP-02, Well Completion Procedure, pg. 4, item 23: Please provide a commitment to bump the cement wiper plug against the cement shoe to a pressure only slightly above the cement slurry's circulating pressure. **(MT)**

137-M. Mine Plan, Addendum MP-C, EXP-SOP-02, Well Completion Procedure, Section C, Procedure for Gravel Packing pg. 6: please consider change "Gravel" to read Sand". At item 4 to add clarity to this discussion please consider incorporating language similar to the following into this discussion: "The screen assembly will be lowered on a drill stem and positioned in the underreamed interval adjacent the mineralized zone. Knowing the diameter and length of the underreamed interval, the volume of a 10-20 mesh sand is calculated which will be needed to completely fill the annulus between the screen and the wall of the underreamed hole wall. This volume of sand is added to water and is pumped down through the drill stem to a stinger pipe which extends out through the lower end of the screen and through the check valves. The water deposits the sand around the screen, and then flows through the screen slots to return to the surface through the annulus formed between the drill stem and the casing. When the annulus between the screen and the underreamed hole is completely filled with sand, there will be an increase in pump pressure and a decrease in water flow. The stinger pipe is then raised out of the check valves so its lower end will lie within the screen and water is circulated

there through to clean the inside of the screen. The drill stem and stinger pipe is then removed, leaving the screen and the surrounding sand pack in place." **(MT)**

138-M. Mine Plan, Addendum MP-C, EXP-SOP-03, Calculations for Cementing and Displacement, pg. 1: See Comment No. 135. **(MT)**

139-M. Mine Plan, Figure 3-1, Typical Injection/Recovery Well Construction Diagram: Please remove reference to 6-inch PVC/Fiberglass well casing, as the required minimum annular space is not possible in a 8-5/8 inch reamed drill hole. Please revise "Type I Portland Cement (or Equivalent)" to read "Type 1 or Class A Portland Cement". Please revise "Drill Hole" to read "Reamed Pilot Hole to 8-8/5 inches". Please re-label "Ore Zone" to "Mineralized zone" to be consistent with text in Addendum MP-C. Please indicate that the "Under ream Depth Cut" is 12-inches and scale it accordingly on the figure. Please illustrate the 5-inch pilot hole will be drilled no more than 2 feet into the underlying silt/mudstone aquitard. **(MT)**

140-M. Mine Plan, Figure 3-2, Typical Monitor Well Construction Diagram: Please remove reference to 6-inch PVC/Fiberglass well casing, as the required minimum annular space is not possible in a 8-5/8 inch reamed drill hole. Please revise "Type I Portland Cement (or Equivalent)" to read "Type 1 or Class A Portland Cement. Please indicate that the reamed hole and the pilot hole are 8-5/8-inches and 5-inches respectively, to be consistent with text on pg. 2 of 7 on EXP-SOP-02. Please illustrate the 5-inch pilot hole will be drilled no more than 2 feet into the underlying silt/mudstone aquitard. **(MT)**

Restoration and Reclamation Plan

141-M. Reclamation Plan: This entire section needs to be updated and revised to provide clear groundwater restoration standards specific to the initial wellfield. **(MT)**

142-M. Reclamation Plan, Section 1.3, Groundwater Restoration Methods, pg. RP-3, para 1, last sent. and pg. RP-5, para. 4: Please commit to providing LQD with a **minimum** of twelve month of monitoring during the groundwater stabilization period. **(MT)**

143-M. Reclamation Plan, Table 1-1, Restoration Target Values Parameters, pg. RP-4: Please change "Ammonium" to "Ammonia". In addition, please add zinc, Radium-228, gross alpha and gross beta to the list of constituents. **(MT)**

144-M. Reclamation Plan, Section 1.4, Restoration Monitoring, pg. RP-9: Please provide a commitment to report all sampling results on a quarterly basis. **(MT)**

145-M. Reclamation Plan, Section 1.6, Well Abandonment, pg. RP-10: Please change the reference from "Chapter III" to "LQDs Non-Coal Chapter 8 and Chapter 11". At the first bullet, please delete "When practicable,". **(MT)**

Conclusions

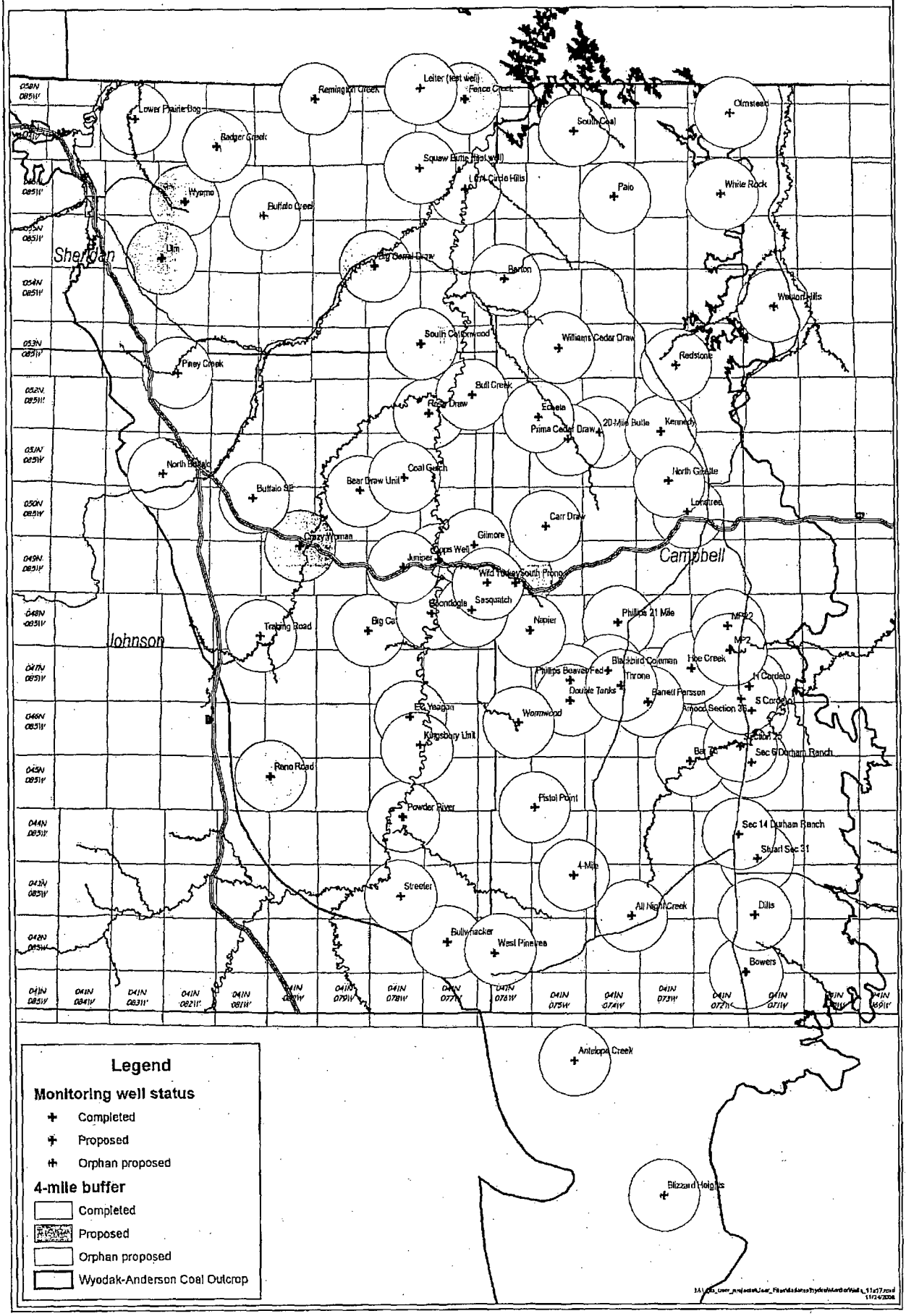
Review of the application found that it is not yet technically acceptable as per W.S. § 35-11-406(h).

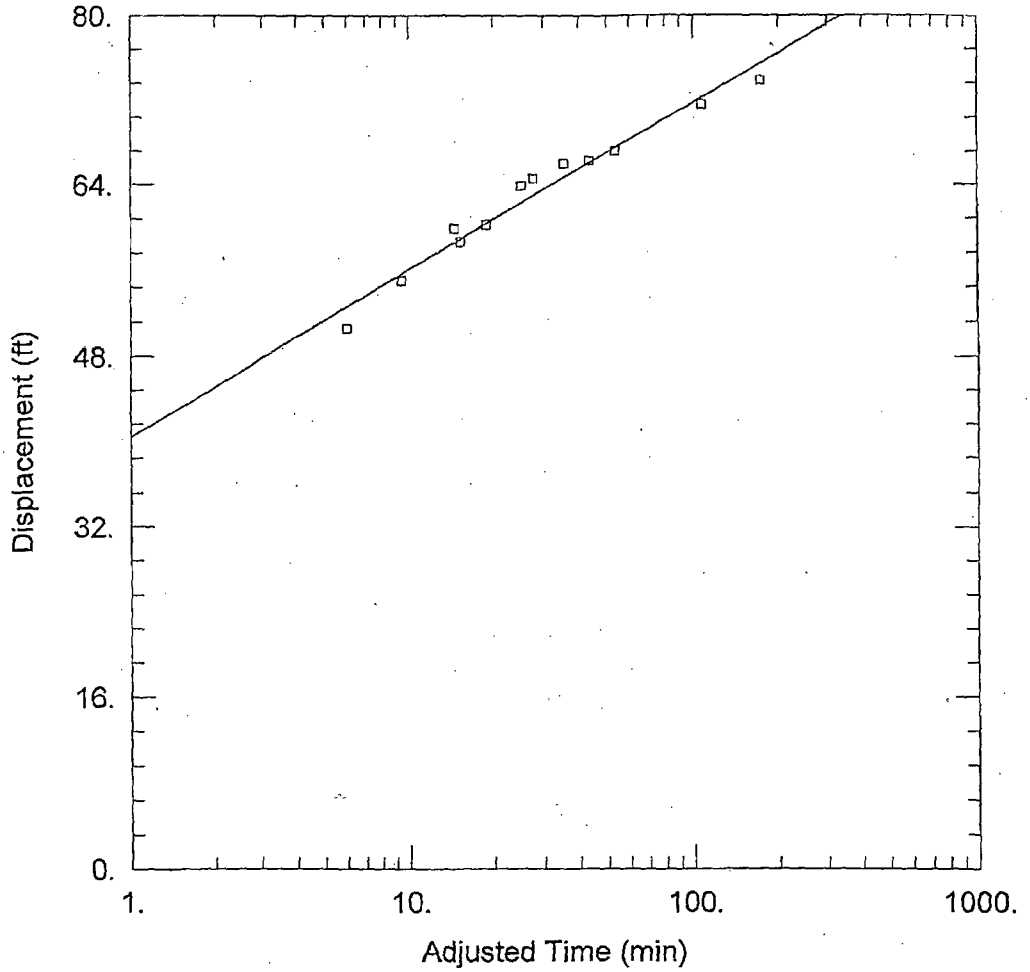
Attachments

/gm

Uranconrev2.9gm

Buffalo Field Office - BLM
Monitoring Wells





WELL TEST ANALYSIS

Data Set: W:\...\MN-1_Test_1.aqt
Date: 03/17/09 Time: 08:08:24

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: MN-1
Test Date: 03/27/07

AQUIFER DATA

Saturated Thickness: 77. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MN-1	0	0

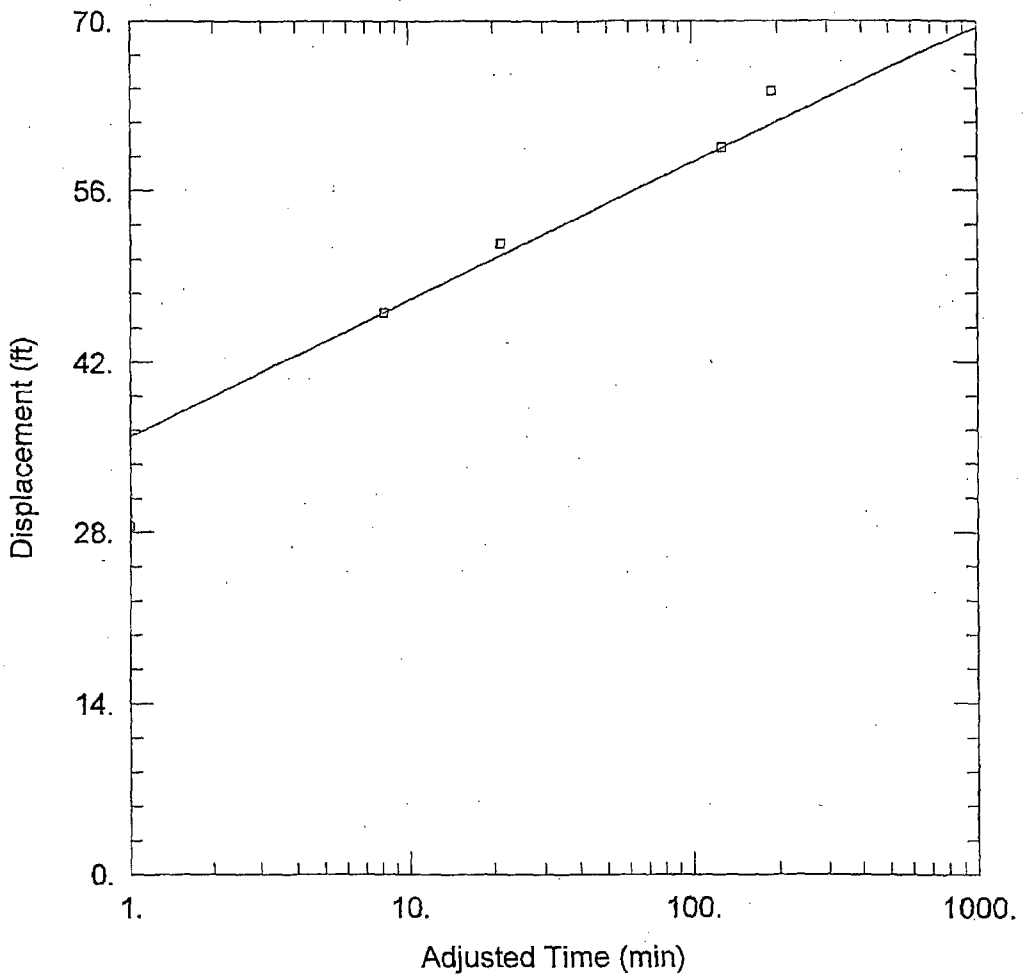
Observation Wells

Well Name	X (ft)	Y (ft)
MN-1	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 244.5 gal/day/ft S = 0.0009985



WELL TEST ANALYSIS

Data Set: W:\...\MN-1_Test_2.aqt
Date: 03/17/09 Time: 08:08:35

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: MN-1, 2nd TEST
Test Date: 05/02/07

AQUIFER DATA

Saturated Thickness: 77. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MN-1, 2nd TEST	0	0

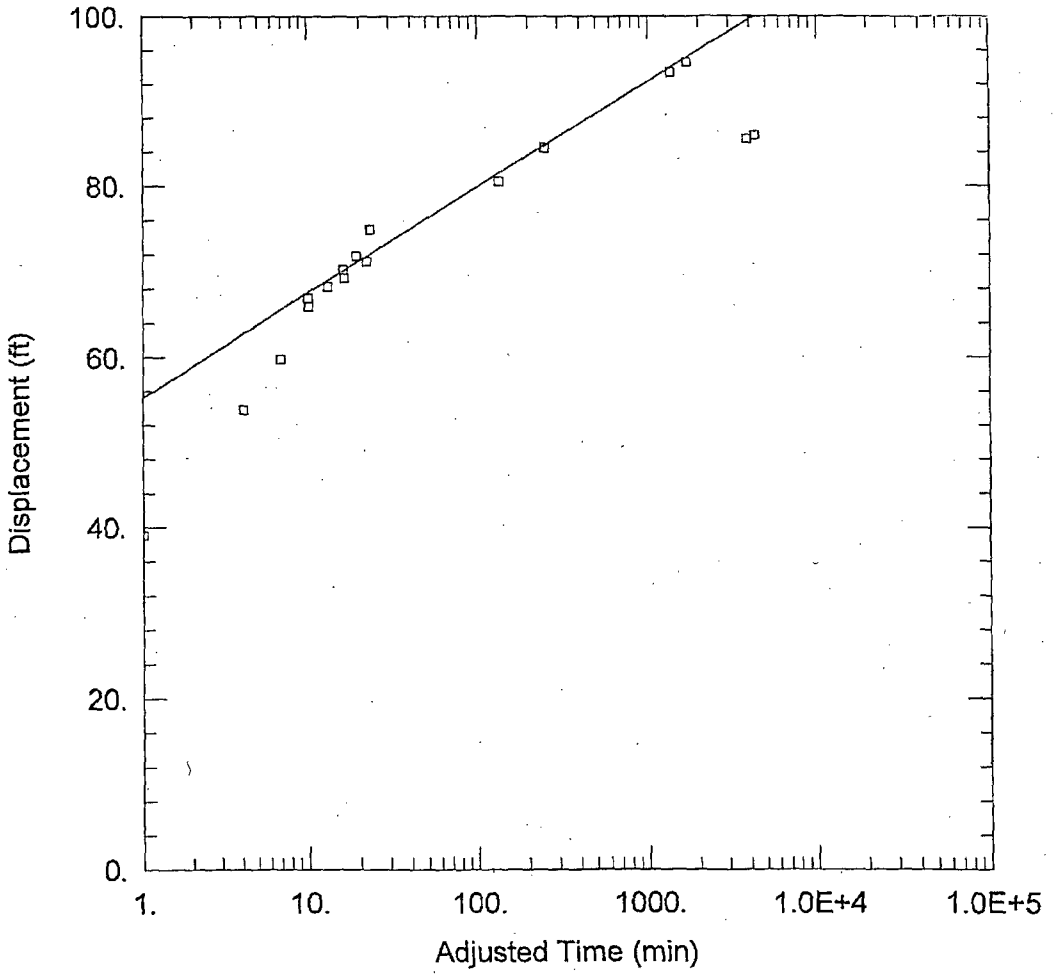
Observation Wells

Well Name	X (ft)	Y (ft)
MN-1, 2nd TEST	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 254.3 gal/day/ft S = 0.0002507



WELL TEST ANALYSIS

Data Set: W:\...\MN-1, Multi-TEST (MN-1).aqt
Date: 03/17/09 Time: 08:09:12

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: MN-1, Multi-well
Test Date: 07/10/07

AQUIFER DATA

Saturated Thickness: 100. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MN-1	0	0

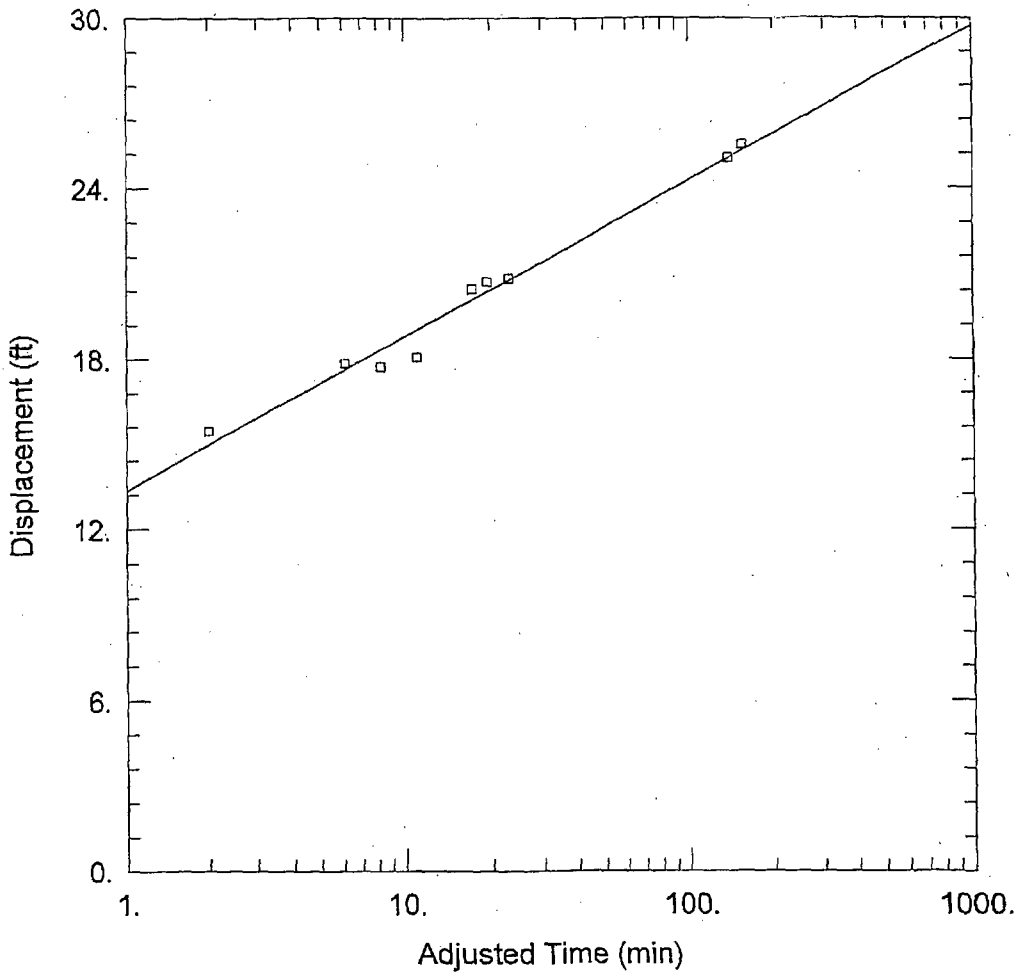
Observation Wells

Well Name	X (ft)	Y (ft)
MN-1	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 297.9 gal/day/ft S = 1.521E-5



WELL TEST ANALYSIS

Data Set: W:\...\MN-3.aqt
Date: 03/16/09 Time: 09:00:07

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: MN-3
Test Date: 04/18/07

AQUIFER DATA

Saturated Thickness: 106. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MN-3	0	0

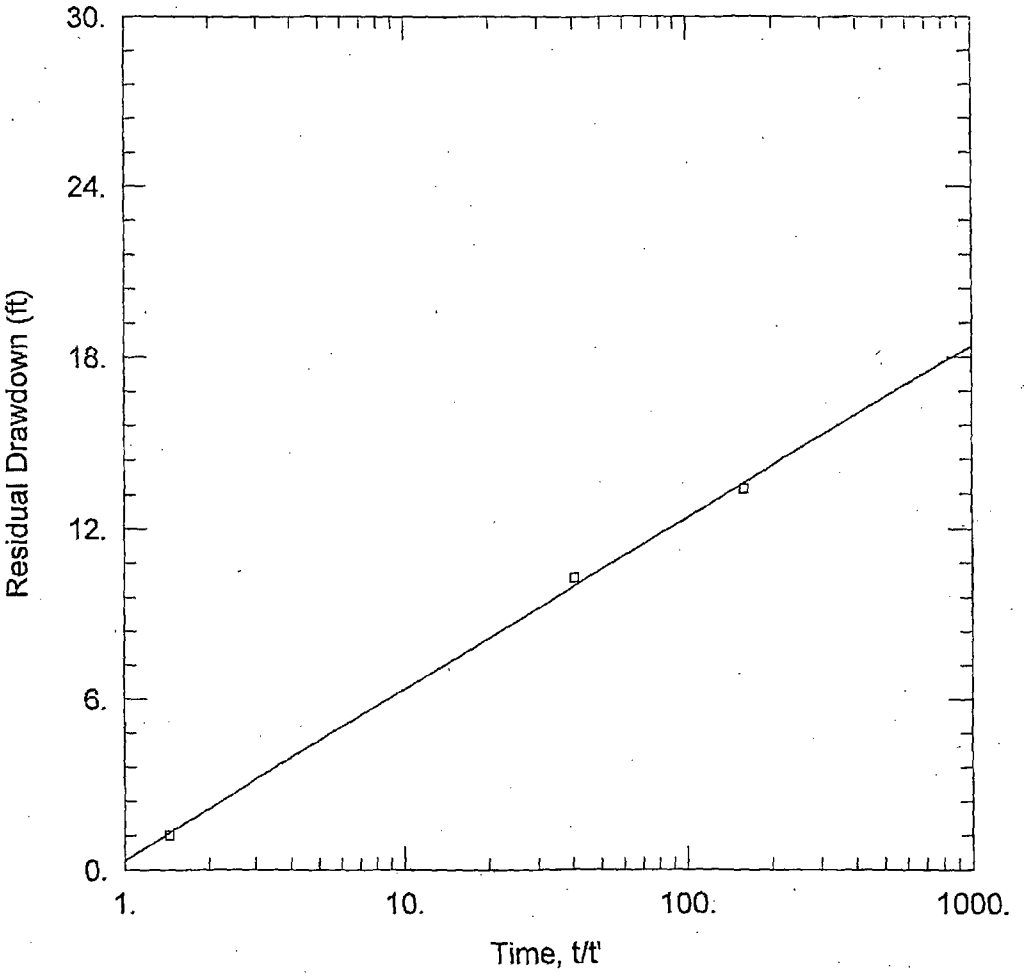
Observation Wells

Well Name	X (ft)	Y (ft)
MN-3	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 518. gal/day/ft S = 0.002897



WELL TEST ANALYSIS

Data Set: W:\...\MN-3.aqt
Date: 03/16/09 Time: 08:59:36

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: MN-3
Test Date: 04/18/07

AQUIFER DATA

Saturated Thickness: 106. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MN-3	0	0

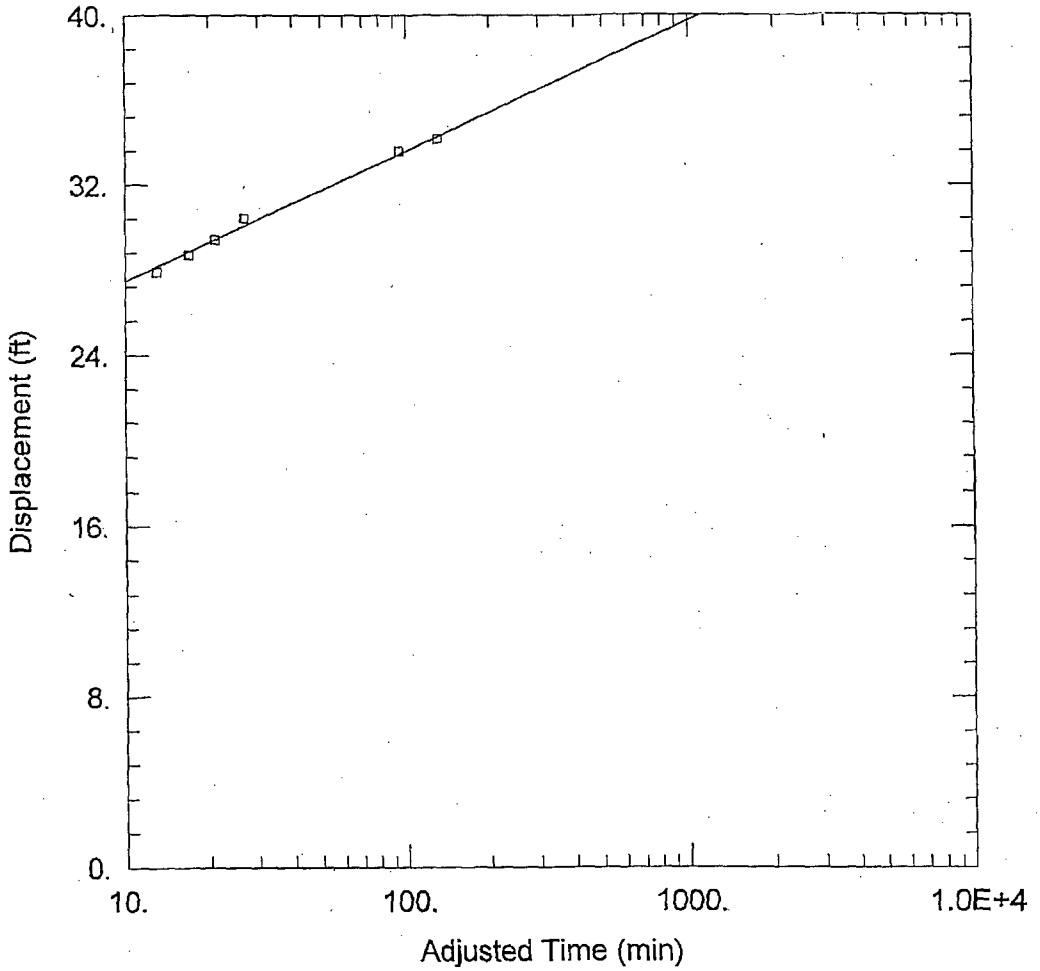
Observation Wells

Well Name	X (ft)	Y (ft)
MN-3	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 468.9 gal/day/ft S/S' = 0.8861



WELL TEST ANALYSIS

Data Set: W:\...\MN-4.aqt
Date: 03/17/09 Time: 08:26:16

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: MN-4
Test Date: 07/10/07

AQUIFER DATA

Saturated Thickness: 103. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MN-4	0	0

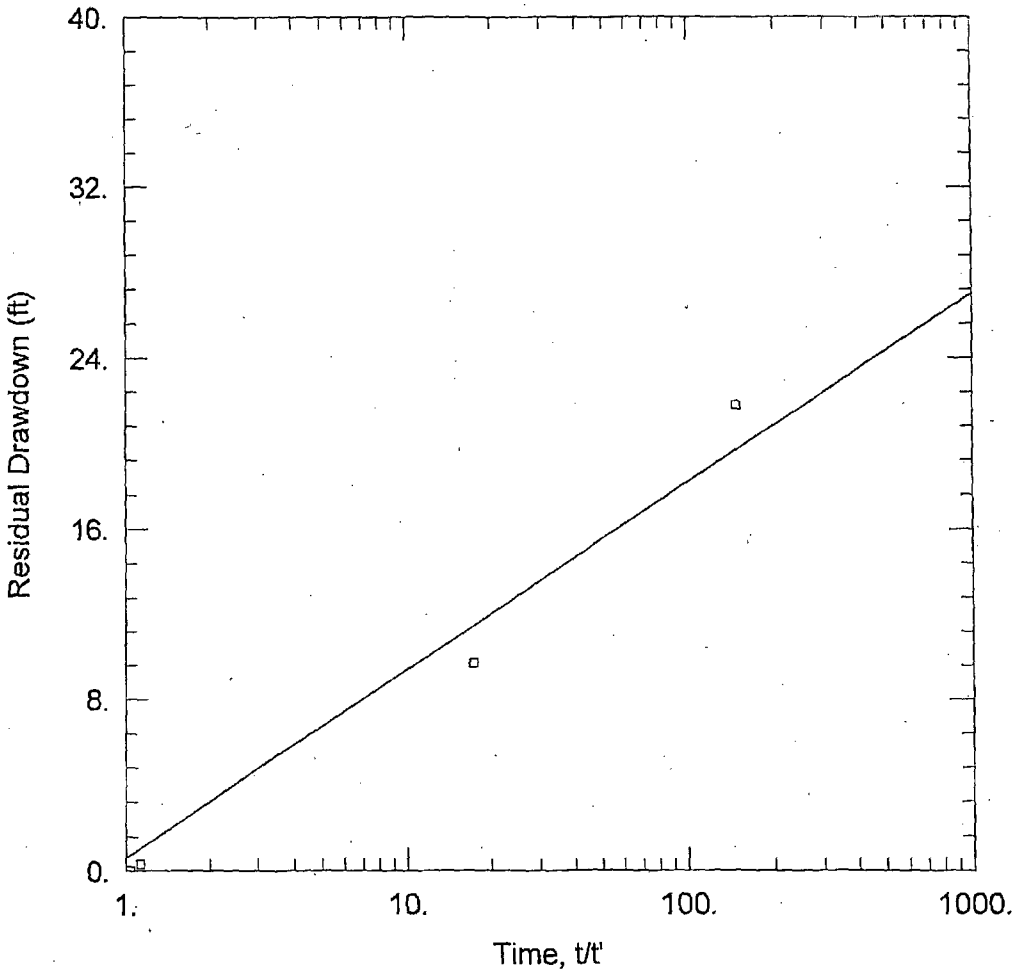
Observation Wells

Well Name	X (ft)	Y (ft)
MN-4	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 272.1 gal/day/ft S = 0.0001357



WELL TEST ANALYSIS

Data Set: W:\...\MN-4.aqt
Date: 03/17/09 Time: 08:28:06

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: MN-4
Test Date: 07/10/07

AQUIFER DATA

Saturated Thickness: 103. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MN-4	0	0

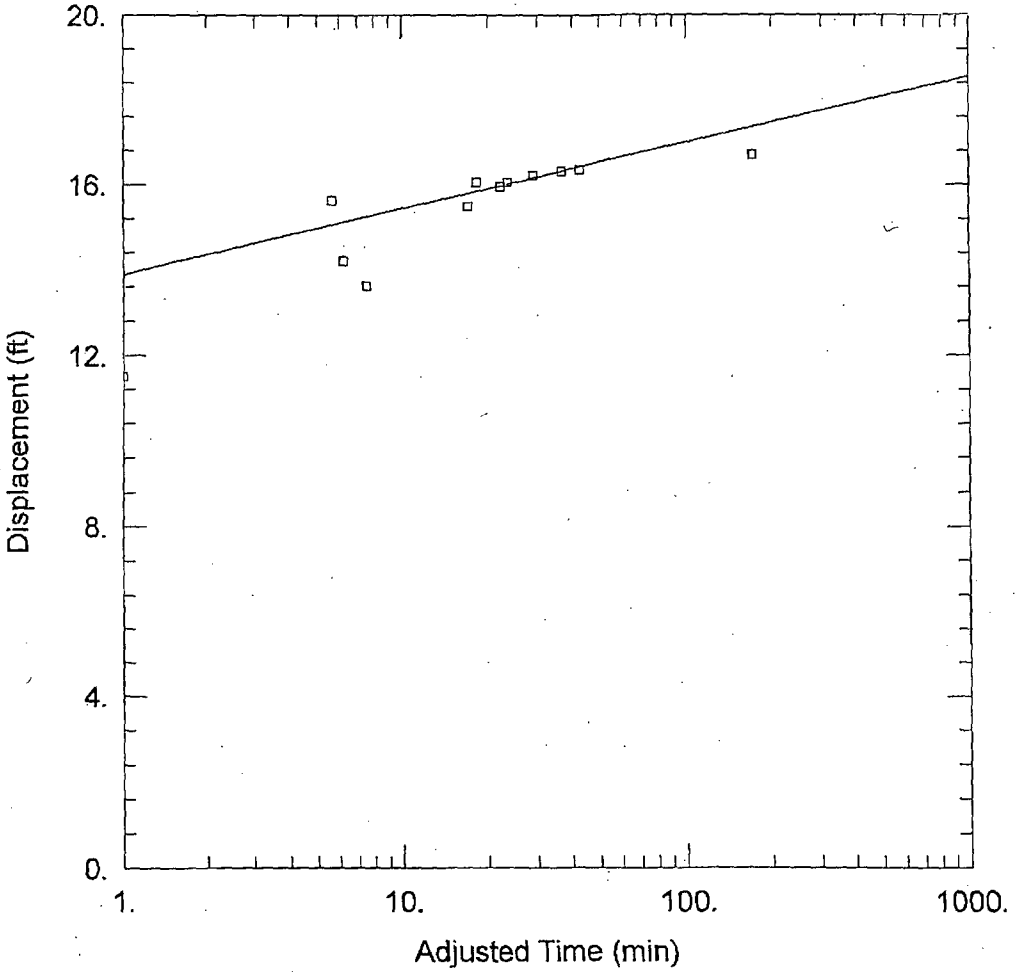
Observation Wells

Well Name	X (ft)	Y (ft)
MN-4	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 188.9 gal/day/ft S/S' = 0.8583



WELL TEST ANALYSIS

Data Set: W:\...\MN-5.aqt
Date: 03/17/09 Time: 08:39:00

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: MN-5
Test Date: 05/14/07

AQUIFER DATA

Saturated Thickness: 99. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MN-5	0	0

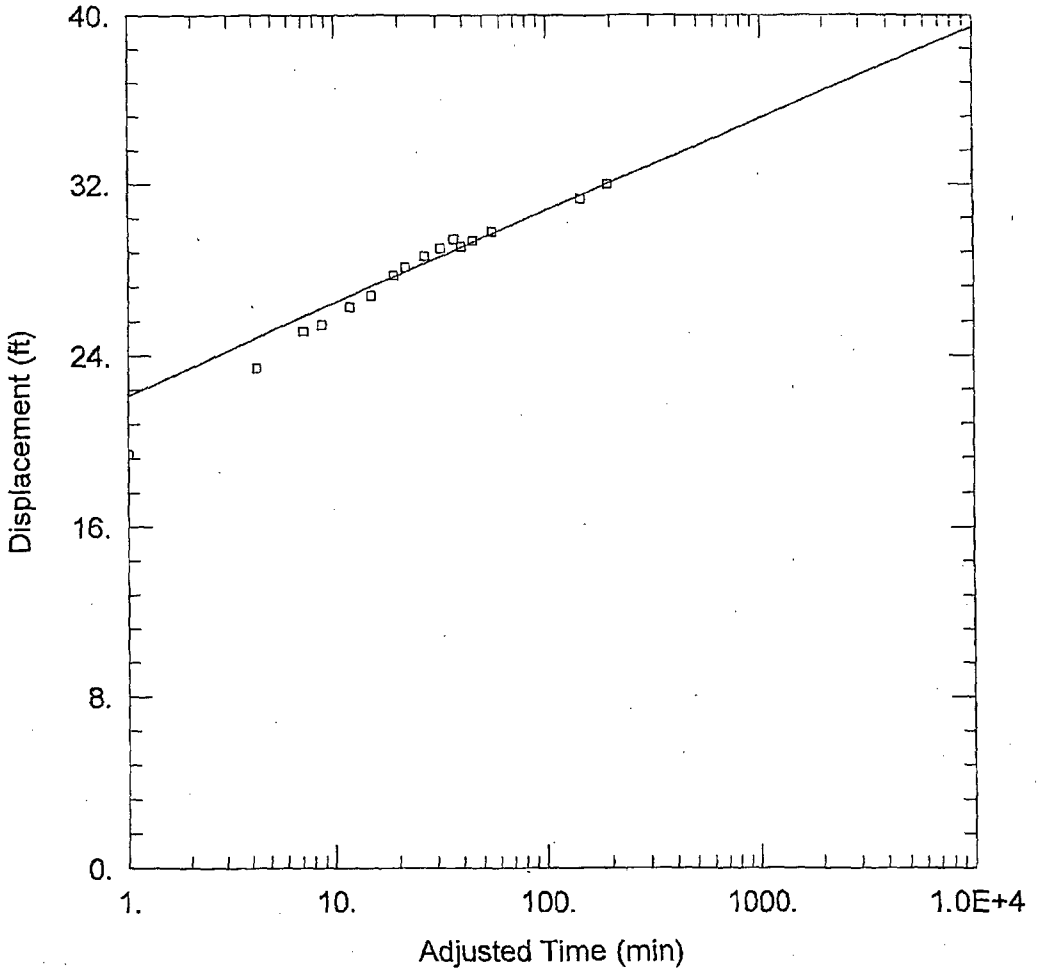
Observation Wells

Well Name	X (ft)	Y (ft)
▫ MN-5	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 475.7 gal/day/ft S = 8.54E-10



WELL TEST ANALYSIS

Data Set: W:\...\MN-5, 2nd TEST.aqt
Date: 03/17/09 Time: 08:40:00

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: MN-5, 2nd Test
Test Date: 05/30/07

AQUIFER DATA

Saturated Thickness: 99. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MN-5, 2nd TEST	0	0

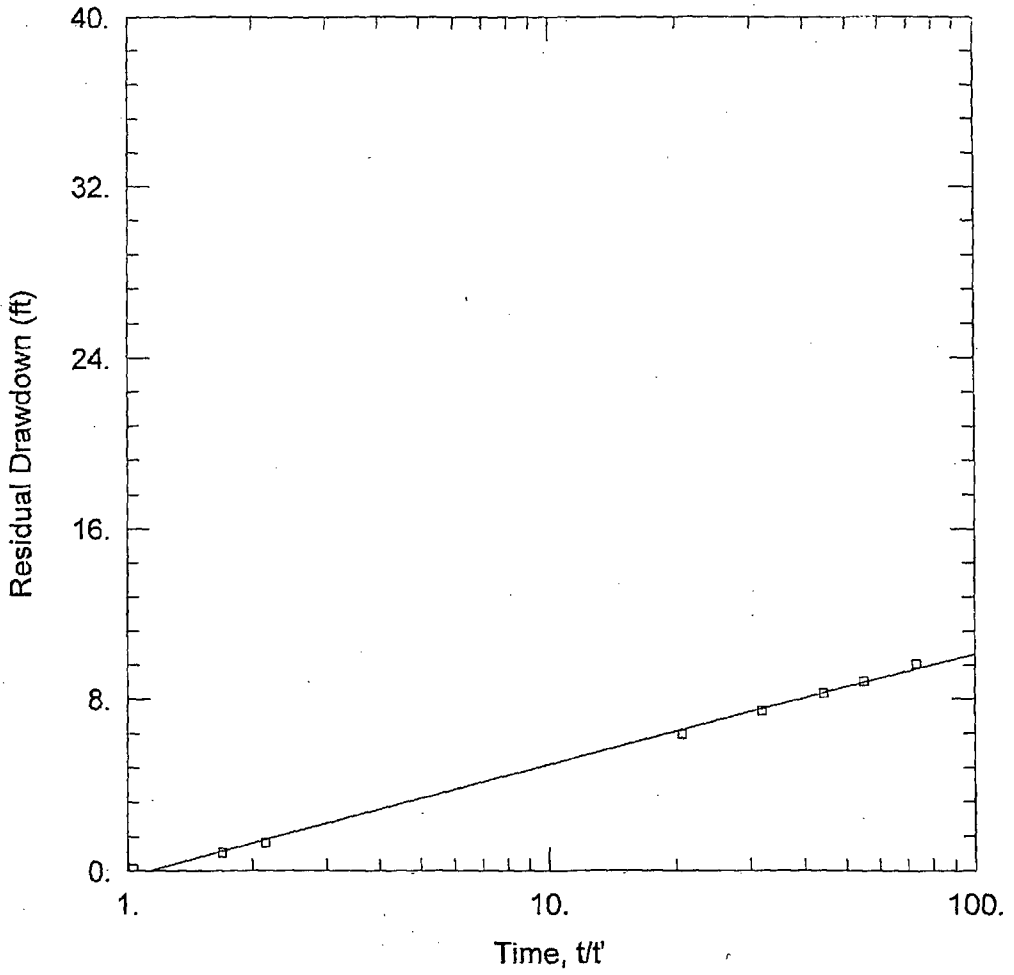
Observation Wells

Well Name	X (ft)	Y (ft)
MN-5, 2nd TEST	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 299.2 gal/day/ft S = 3.544E-6



WELL TEST ANALYSIS

Data Set: W:\...\MN-5, 2nd TEST.aqt
Date: 03/17/09 Time: 08:42:59

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: MN-5, 2nd Test
Test Date: 05/30/07

AQUIFER DATA

Saturated Thickness: 99. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MN-5, 2nd TEST	0	0

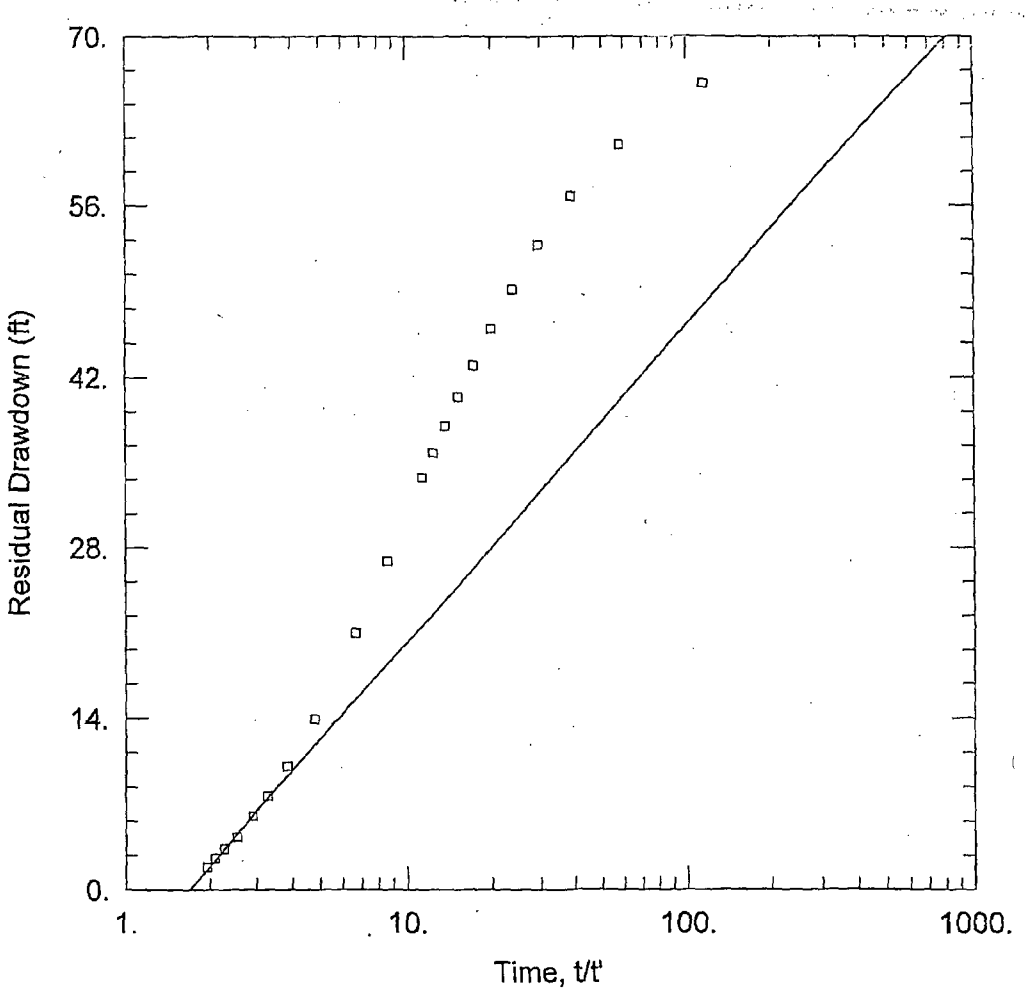
Observation Wells

Well Name	X (ft)	Y (ft)
MN-5, 2nd TEST	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 249.8 gal/day/ft S/S' = 1.123



WELL TEST ANALYSIS

Data Set: W:\...\DW-4L.aqt
Date: 04/02/09 Time: 09:00:05

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: DW-4L
Test Date: 11/02/78

AQUIFER DATA

Saturated Thickness: 69. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
DW-4L	0	0

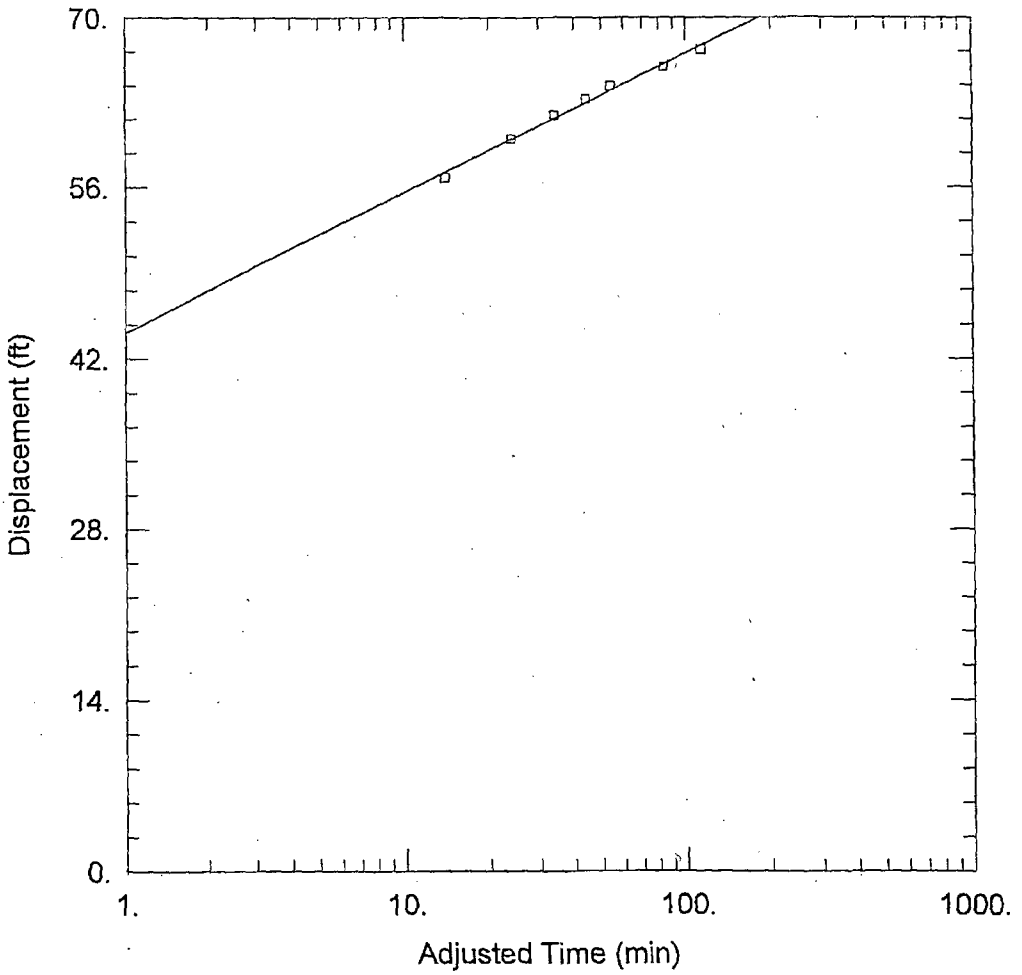
Observation Wells

Well Name	X (ft)	Y (ft)
DW-4L	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 42.45 gal/day/ft S/S' = 1.69



WELL TEST ANALYSIS

Data Set: W:\...\DW-4L.aqt
Date: 03/17/09 Time: 14:14:37

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: DW-4L
Test Date: 11/02/78

AQUIFER DATA

Saturated Thickness: 69. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
DW-4L	0	0

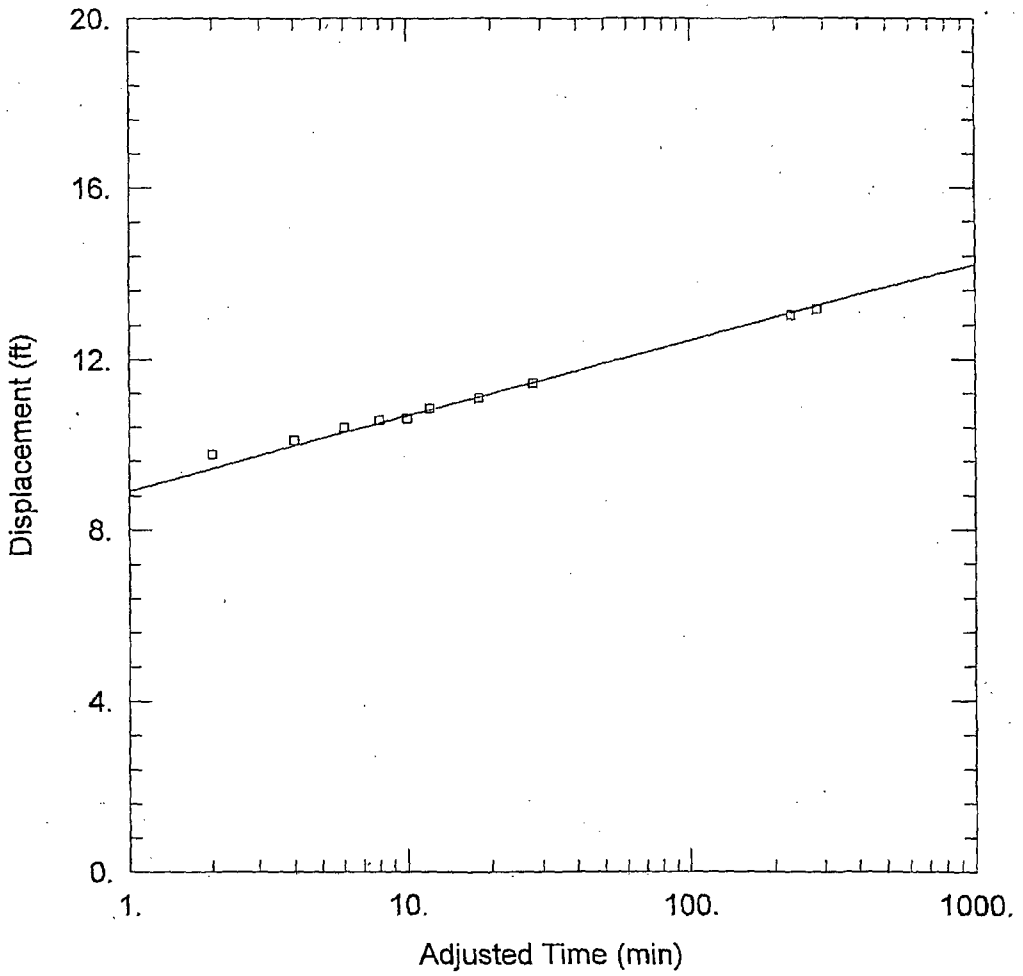
Observation Wells

Well Name	X (ft)	Y (ft)
▫ DW-4L	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 96.89 gal/day/ft S = 5.343E-5



WELL TEST ANALYSIS

Data Set: W:\...\DW-4U, 2nd TEST.aqt
Date: 03/24/09 Time: 10:38:48

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: DW-4U
Test Date: 05/14/07

AQUIFER DATA

Saturated Thickness: 54. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
DW-4U	0	0

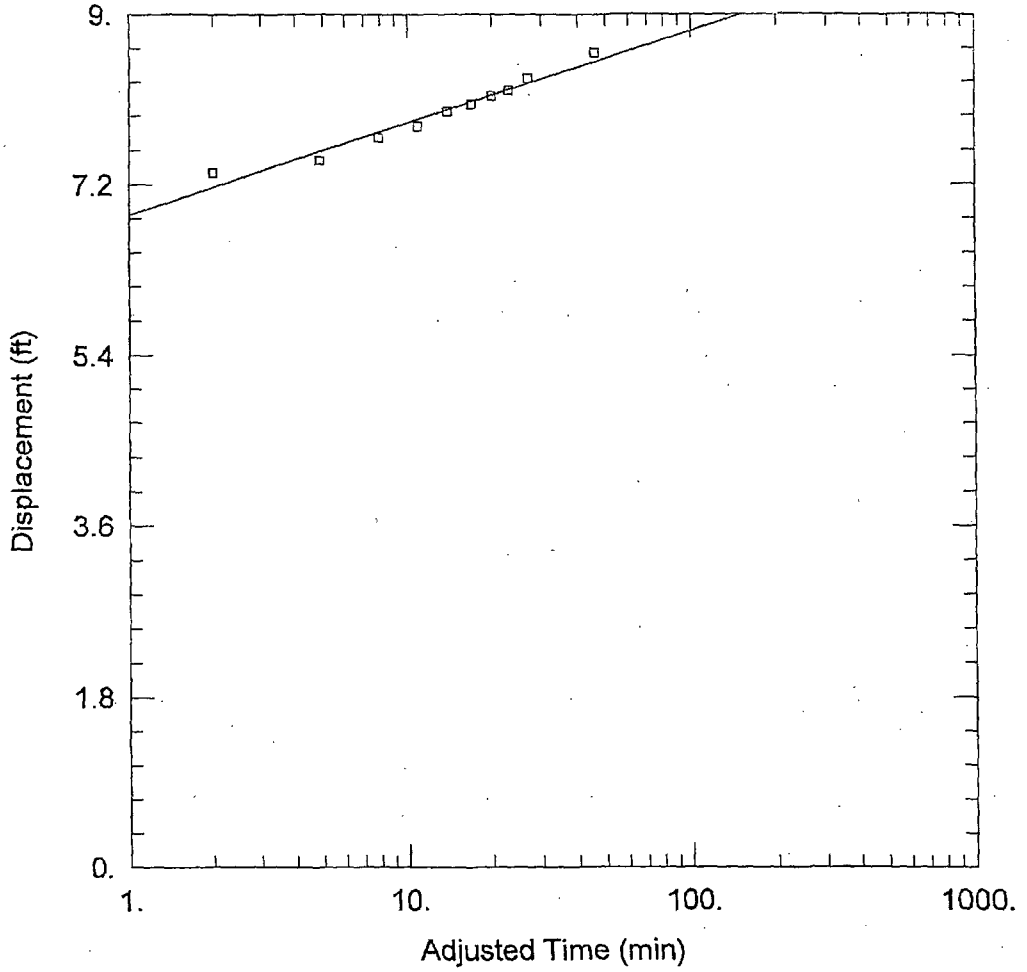
Observation Wells

Well Name	X (ft)	Y (ft)
▫ DW-4U	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 1495. gal/day/ft S = 2.064E-5



WELL TEST ANALYSIS

Data Set: W:\...\DW-4U.aqt
Date: 03/24/09 Time: 10:31:46

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: DW-4U
Test Date: 05/14/07

AQUIFER DATA

Saturated Thickness: 54. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
DW-4U	0	0

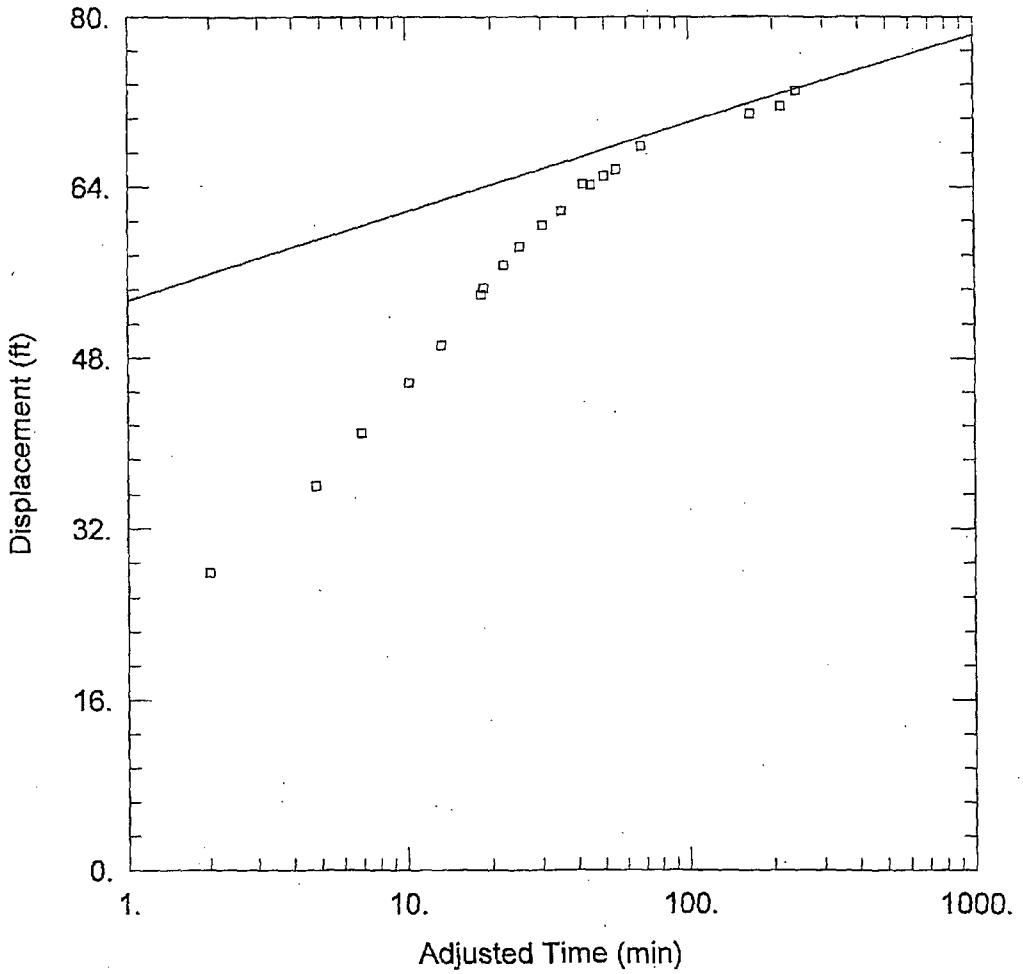
Observation Wells

Well Name	X (ft)	Y (ft)
▫ DW-4U	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 1959.9 gal/day/ft S = 2.398E-7



WELL TEST ANALYSIS

Data Set: W:\...\URZNB-1, 2nd TEST.aqt
Date: 03/24/09 Time: 14:30:02

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: URZNB-1, 2nd TEST
Test Date: 05/30/07

AQUIFER DATA

Saturated Thickness: 45. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
URZNB-1, 2nd TEST	0	0

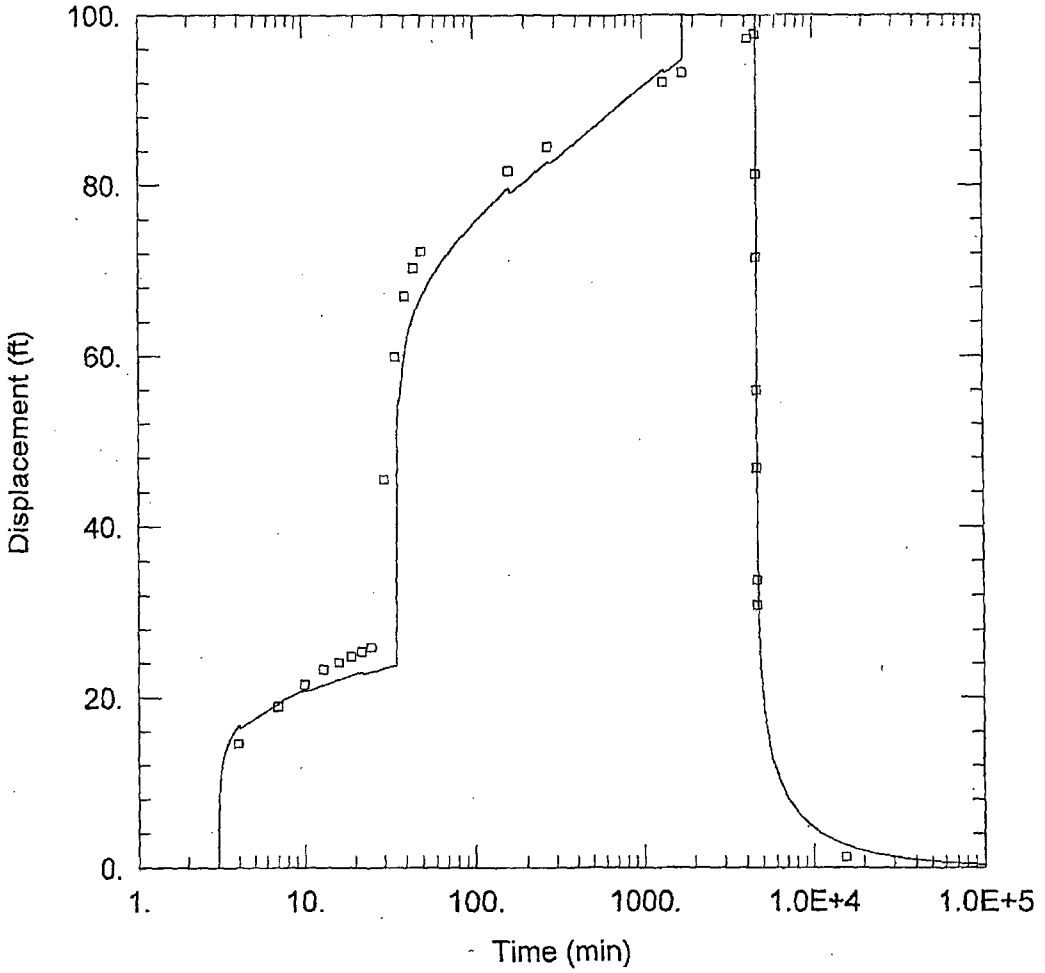
Observation Wells

Well Name	X (ft)	Y (ft)
URZNB-1, 2nd TEST	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 152.7 gal/day/ft S = 1.044E-7



MULTI-WELL TEST

Data Set: W:\...\MN-1 Pumping Multi-TEST.aqt
Date: 03/25/09 Time: 09:15:21

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: MN-1
Test Date: 05/10/07

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MN-1	0	0

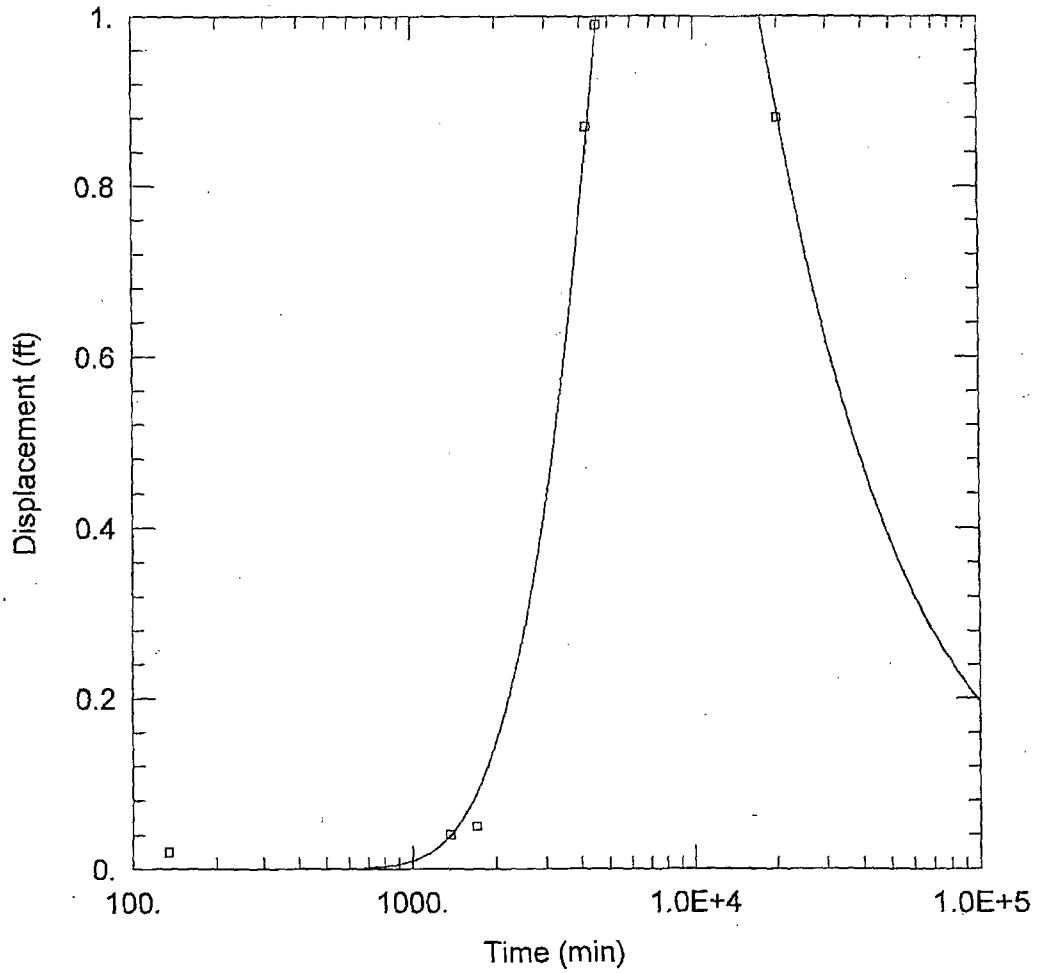
Observation Wells

Well Name	X (ft)	Y (ft)
MN-1	0	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 231.5 gal/day/ft
S = 0.0005438
Kz/Kr = 1.
b = 77. ft



MULTI-WELL TEST

Data Set: W:\...\MN-1 Pumping Nichols 1 OBS.aqt
Date: 03/25/09 Time: 08:44:50

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: MN-1
Test Date: 05/10/07

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MN-1	0	0

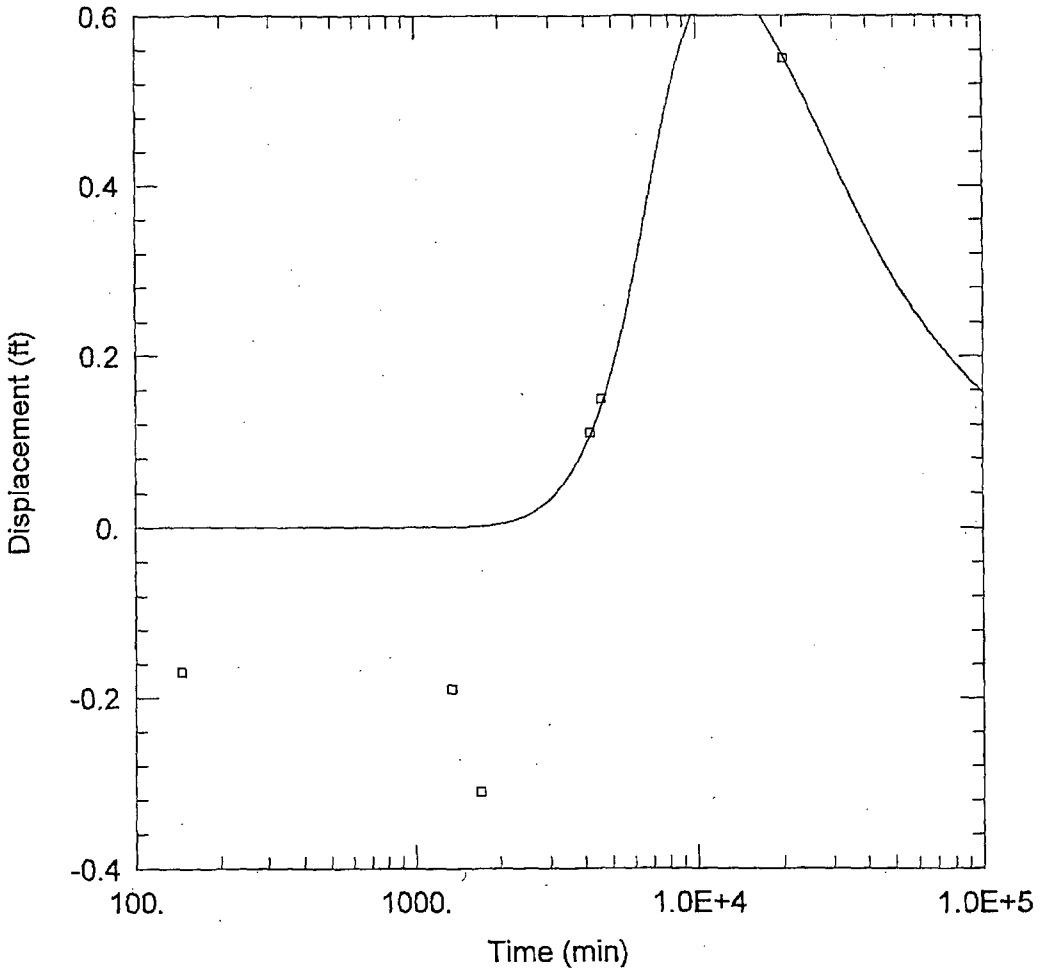
Observation Wells

Well Name	X (ft)	Y (ft)
Nichols 1	1920	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 397.1 gal/day/ft
S = 0.0001733
Kz/Kr = 1.
b = 77. ft



MULTI-WELL TEST

Data Set: W:\...\MN-1 Pumping MN-2 OBS.aqt
Date: 03/25/09 Time: 08:54:21

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: MN-1
Test Date: 05/10/07

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MN-1	0	0

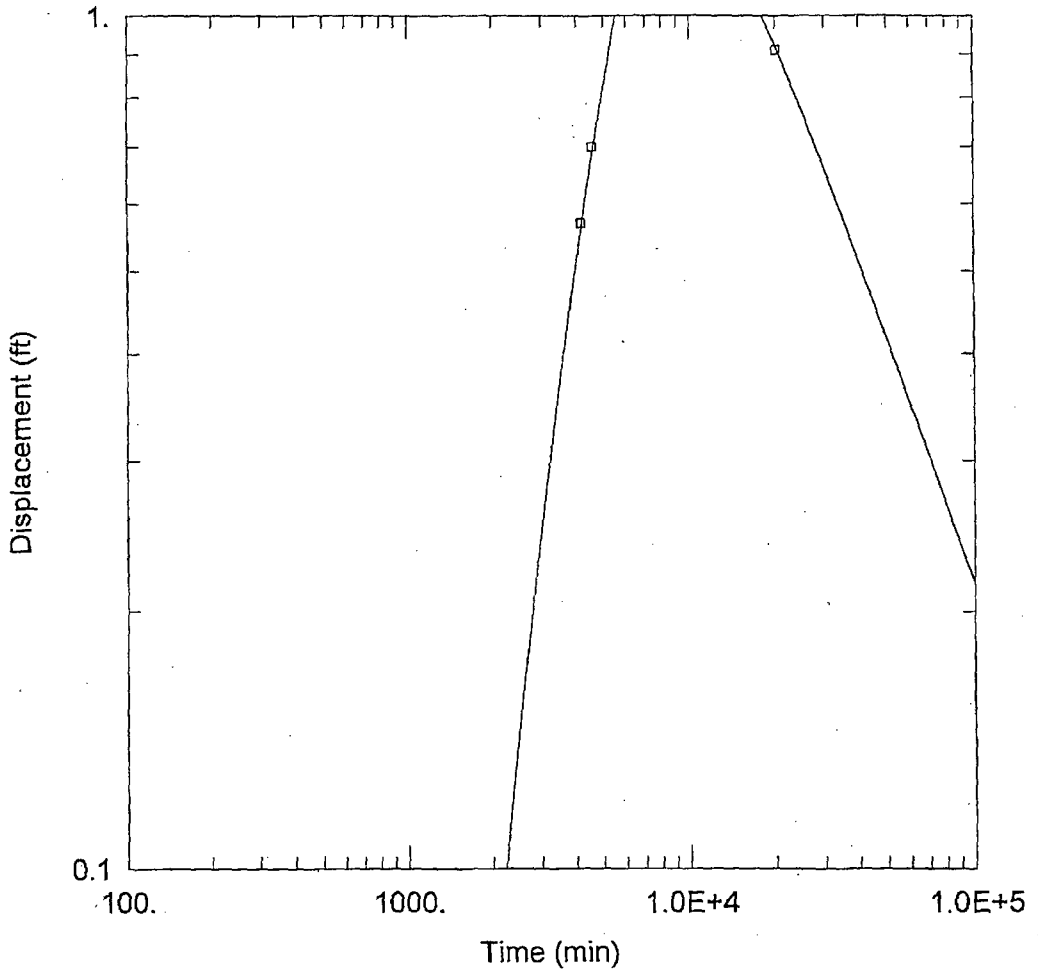
Observation Wells

Well Name	X (ft)	Y (ft)
MN-2	0	2400

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 468.8 gal/day/ft
S = 0.0002921
Kz/Kr = 1.
b = 77. ft



MULTI-WELL TEST

Data Set: W:\...\MN-1 Pumping MN-3 OBS.aqt
Date: 03/25/09 Time: 09:00:06

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: MN-1
Test Date: 05/10/07

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MN-1	0	0

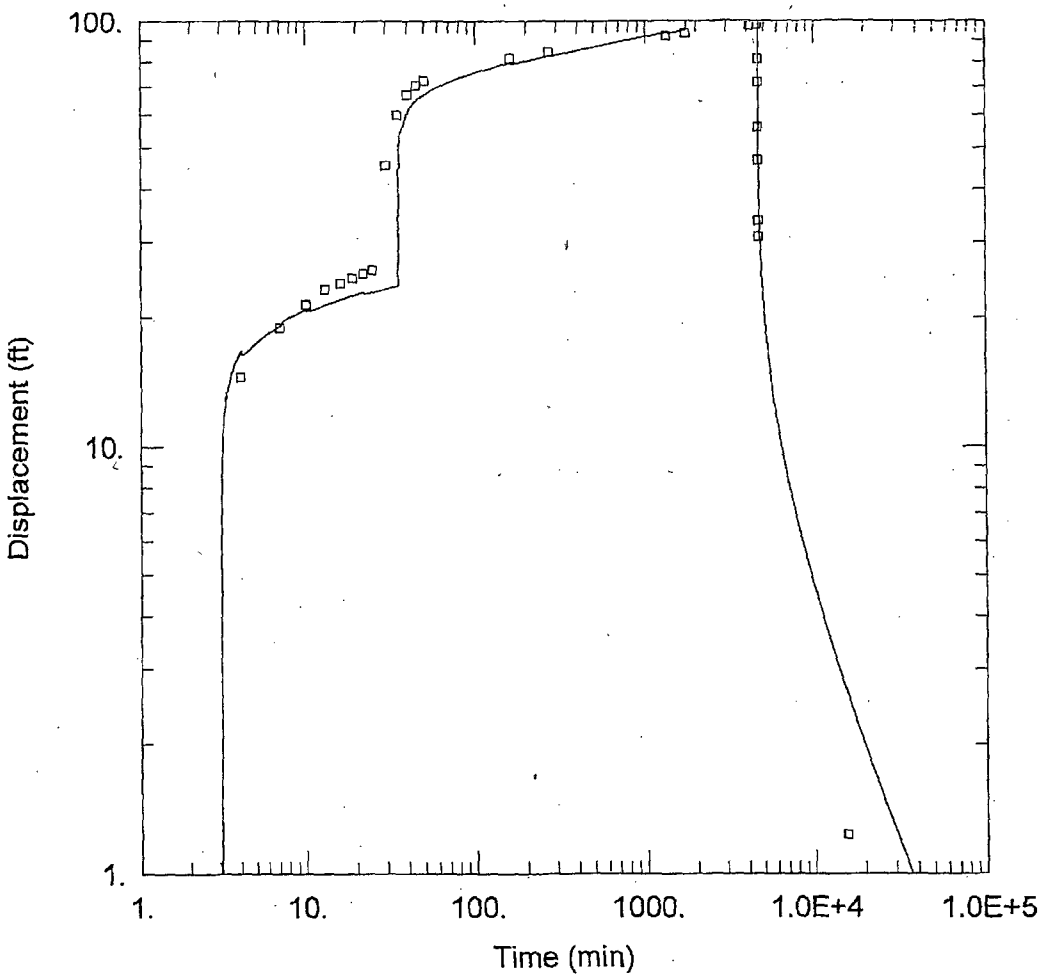
Observation Wells

Well Name	X (ft)	Y (ft)
MN-3	2401	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 355.2 gal/day/ft
S = 0.0001293
Kz/Kr = 1.
b = 77. ft



MULTI-WELL TEST

Data Set: W:\...\MN-1 Pumping Multi-TEST.aqt
Date: 03/25/09 Time: 09:13:41

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: MN-1
Test Date: 05/10/07

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MN-1	0	0

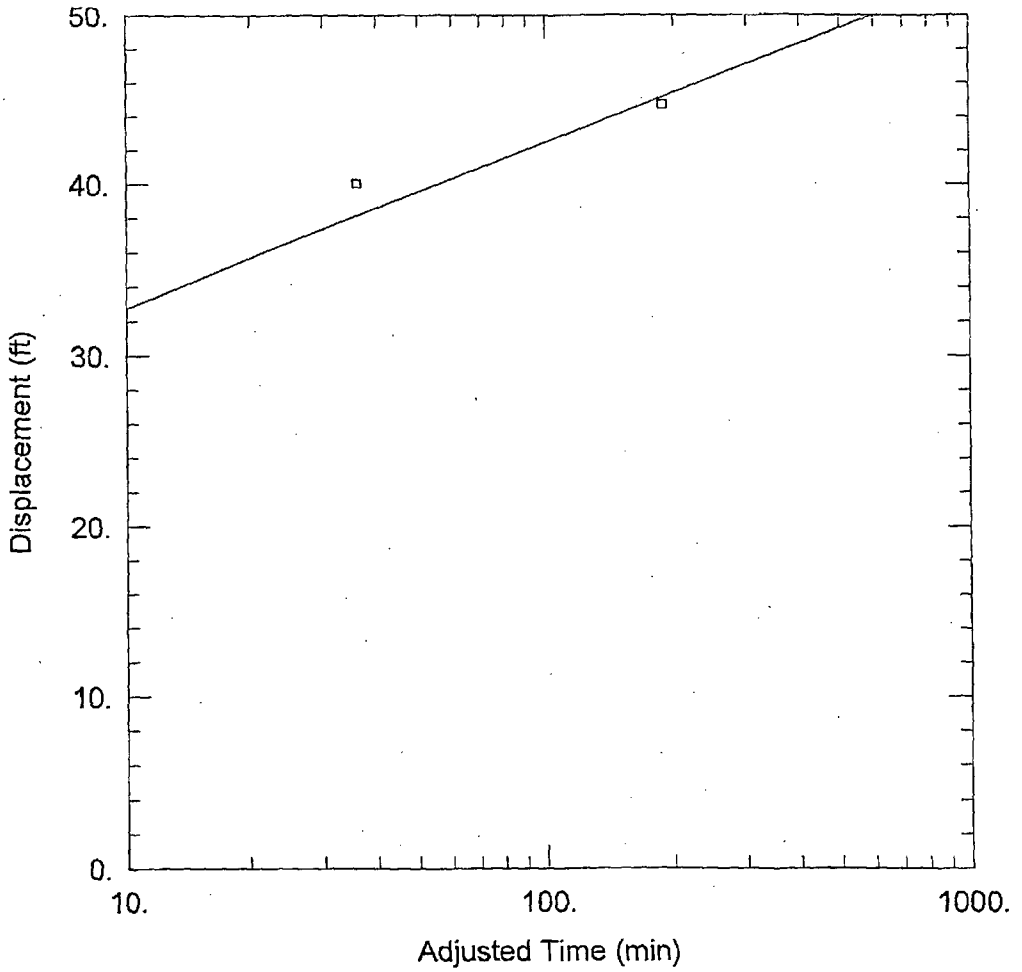
Observation Wells

Well Name	X (ft)	Y (ft)
MN-1	0	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 231.5 gal/day/ft
S = 0.0005438
Kz/Kr = 1.
b = 77. ft



WELL TEST ANALYSIS

Data Set: W:\...\DW-4M.aqt
Date: 03/24/09 Time: 14:58:10

PROJECT INFORMATION

Company: Uranerz
Client: Mark Taylor
Project: Nichols Ranch
Test Well: DW-4M late data
Test Date: 05/17/07

AQUIFER DATA

Saturated Thickness: 52. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
DW-4M late data	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ DW-4M late data	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 34.59 gal/day/ft S = 0.0002192

Additional Historical Expolration Drillholes within the Proposed Moore Ranch Permit Area

table prepared by Mark Taylor for attachment to Uranerz Energy Corporation, TFN 4 2/284, Nichols Ranch – Uranium ISL Application, Mark Taylor's 2nd RoundTechnical Review Memorandum of April 8, 2009

Company	Type	Qtr Qtr	Section	Township	Range	Hole Name	Date Drilled	Depth
Cleveland Cliff Iron Company	DN70	SWSW	8	43	76	CC-47	1980	640
Cleveland Cliff Iron Company	LE35	NENE	18	43	76	CC-4	1976	655
Cleveland Cliff Iron Company	LE35	NENE	18	43	76	CC-5	1976	735
Cleveland Cliff Iron Company	LE35	NENE	18	43	76	CC-6	1976	735
Cleveland Cliff Iron Company	LE35	NENE	18	43	76	CC-7	1976	715
Cleveland Cliff Iron Company	LE35	NENE	18	43	76	CC-8	1976	755
Cleveland Cliff Iron Company	LE35	NENE	18	43	76	CC-9	1976	695
Cleveland Cliff Iron Company	LE35	SENE	18	43	76	CC-1	1976	615
Cleveland Cliff Iron Company	LE35	SENE	18	43	76	CC-2	1976	615
Cleveland Cliff Iron Company	LE35	SENE	18	43	76	CC-3	1976	655
Cleveland Cliff Iron Company	LE35	NWNE	6	43	75	CC-81	1979	1000
Cleveland Cliff Iron Company	DN70	NWNE	6	43	75	CC-83	1980	460
Cleveland Cliff Iron Company	DN70	NWNE	6	43	75	CC-84	1980	460
Cleveland Cliff Iron Company	DN70	NWNE	6	43	75	CC-86	1980	460
Cleveland Cliff Iron Company	DN70	NWNE	6	43	75	CC-87	1980	460
Cleveland Cliff Iron Company	DN70	NWNE	6	43	75	CC-88	1980	460
Cleveland Cliff Iron Company	LE35	SESE	6	43	75	CC-80	1979	965
Cleveland Cliff Iron Company	DN70	SWNE	6	43	75	CC-85	1980	460
Cleveland Cliff Iron Company	LE35	SWNW	6	43	75	CC-82	1979	960
Cleveland Cliff Iron Company	DN70	SWSE	6	43	75	TE-1	1982	440
Cleveland Cliff Iron Company	DN70	SWSE	6	43	75	TE-2	1982	460
Cleveland Cliff Iron Company	LE35	SWSW	6	43	75	CC-79	1979	640
Cleveland Cliff Iron Company	LE35	NWNW	7	43	75	CC-43	1979	720
Cleveland Cliff Iron Company	LE35	NWNW	7	43	75	CC-44	1979	720
Cleveland Cliff Iron Company	LE35	NWNW	7	43	75	CC-45	1979	700
Cleveland Cliff Iron Company	LE35	NWNW	7	43	75	CC-46	1979	680
Cleveland Cliff Iron Company	DN70	SESW	8	43	76	CC-51	1982	300
Cleveland Cliff Iron Company	DN70	SWSW	8	43	76	CC-49	1982	680

Cleveland Cliff Iron Company	DN70	SWSW	8	43	76 CC-50	1982	700
Cleveland Cliff Iron Company	DN70	SESW	30	44	75 CC-10	1981	360
Cleveland Cliff Iron Company	DN70	SESW	30	44	75 CC-11	1981	360
Silver King Mines, Inc.	DN11	NWSW	30	44	75 B 756-1	1985	760
American Nulclear Corp.	LE7	NENW	20	43	76 80 Brown 20-10	1981	480
American Nulclear Corp.	LE7	NENW	20	43	76 80 Brown 20-12	1981	500
American Nulclear Corp.	LE7	NWNW	20	43	76 80 Brown 20-11	1981	480
American Nulclear Corp.	LE7	NWNW	20	43	76 80 Brown 20-2	1980	600
American Nulclear Corp.	LE7	SESE	31	44	75 Christie #33-15	1979	700
American Nulclear Corp.	LE7	NWNW	6	43	75 80 Brown 6-8	1978	680
American Nulclear Corp.	LE7	NWNW	6	43	75 80 Brown 6-9	1978	640
American Nulclear Corp.	LE7	NWNW	6	43	75 80 Brown 6-10	1979	680
American Nulclear Corp.	LE7	NWNW	6	43	75 80 Brown 6-11	1979	700
American Nulclear Corp.	LE7	NWNW	6	43	75 80 Brown 6-12	1979	600
American Nulclear Corp.	LE7	NWNW	6	43	75 80 Brown 6-13	1979	600
American Nulclear Corp.	LE7	NWNW	6	43	75 80 Brown 6-14	1979	560
American Nulclear Corp.	LE7	NWNW	6	43	75 80 Brown 6-15	1979	740
American Nulclear Corp.	LE7	NWNW	6	43	75 80 Brown 6-16	1979	600
American Nulclear Corp.	LE7	NWNW	6	43	75 80 Brown 6-17	1979	740
American Nulclear Corp.	LE7	NWNW	6	43	75 80 Brown 6-18	1979	660
American Nulclear Corp.	LE7	NWNW	6	43	75 80 Brown 6-19	1979	500
American Nulclear Corp.	LE7	NWNW	6	43	75 80 Brown 6-20	1979	500
American Nulclear Corp.	LE7	NESW	7	43	75 80 Brown 7-15	1979	960
American Nulclear Corp.	LE7	NESW	7	43	75 80 Brown 7-31	1979	800
American Nulclear Corp.	LE7	NWNW	7	43	75 80 Brown 7-16	1979	860
American Nulclear Corp.	LE7	NWSE	7	43	75 80 Brown 7-40	1981	840
American Nulclear Corp.	LE7	NWSW	7	43	75 80 Brown 7-25	1980	800
American Nulclear Corp.	LE7	NWSW	7	43	75 80 Brown 7-30	1980	800
American Nulclear Corp.	LE7	NWSW	7	43	75 80 Brown 7-38	1980	800
American Nulclear Corp.	LE7	NWSW	7	43	75 80 Brown 7-4	1978	840
American Nulclear Corp.	LE7	NENE	17	43	76 80 Brown 17-11	1981	700
American Nulclear Corp.	LE7	NESE	17	43	76 80 Brown 17-10	1981	580
American Nulclear Corp.	LE7	NESE	17	43	76 80 Brown 17-9	1981	600

American Nulclear Corp.	LE7	NENE	20	43	76 80 Brown 20-6	1980	600
American Nulclear Corp.	LE7	NENE	20	43	76 80 Brown 20-7	1980	600
American Nulclear Corp.	LE7	NWNE	20	43	76 80 Brown 20-3	1980	600
American Nulclear Corp.	LE7	NWNE	20	43	76 80 Brown 20-4	1980	600
American Nulclear Corp.	LE7	NWNE	20	43	76 80 Brown 20-5	1980	600
American Nulclear Corp.	LE7	NESE	30	44	75 80 Brown 30-428	1979	640
American Nulclear Corp.	LE7	NESW	30	44	75 B 755-5	1979	300
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-C3	1980	380
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-200	1978	340
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-201	1978	340
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-201	1978	340
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-202	1978	360
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-228	1978	300
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-237	1980	340
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-252	1980	300
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-253	1980	280
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-257	1980	280
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-258	1980	300
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-372	1979	320
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-380	1979	320
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-381	1979	320
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-384	1979	340
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-385	1979	360
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-386	1979	320
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-387	1979	320
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-388	1979	340
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-389	1979	320
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-390	1979	340
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-391	1979	320
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-392	1979	320
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-396	1979	340
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-397	1979	320
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-399	1979	320
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-400	1979	320
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-401	1979	320
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-402	1979	320
American Nulclear Corp.	LE7	NESW	30	44	75 80 Brown 30-403	1979	320

American Nuclear Corp.	LE7	NESW	30	44	75 80 Brown 30-404	1979	320
American Nuclear Corp.	LE7	NESW	30	44	75 80 Brown 30-405	1979	320
American Nuclear Corp.	LE7	NESW	30	44	75 80 Brown 30-406	1979	320
American Nuclear Corp.	LE7	NESW	30	44	75 80 Brown 30-407	1979	320
American Nuclear Corp.	LE7	NESW	30	44	75 80 Brown 30-408	1979	320
American Nuclear Corp.	LE7	NESW	30	44	75 80 Brown 30-409	1979	320
American Nuclear Corp.	LE7	NESW	30	44	75 80 Brown 30-410	1979	320
American Nuclear Corp.	LE7	NESW	30	44	75 80 Brown 30-411	1979	320
American Nuclear Corp.	LE7	NESW	30	44	75 80 Brown 30-412	1979	320
American Nuclear Corp.	LE7	NESW	30	44	75 80 Brown 30-439	1979	300
American Nuclear Corp.	LE7	NESW	30	44	75 80 Brown 30-453	1979	340
American Nuclear Corp.	LE7	NESW	30	44	75 80 Brown 30-454	1979	340
American Nuclear Corp.	LE7	NESW	30	44	75 80 Brown 30-455	1979	320
American Nuclear Corp.	LE7	NESW	30	44	75 80 Brown 30-456	1979	320
American Nuclear Corp.	LE7	NWSW	30	44	75 B 755-10	1979	340
American Nuclear Corp.	LE7	NWSW	30	44	75 B 755-9	1979	740
American Nuclear Corp.	LE7	NWSW	30	44	75 80 Brown 30-398	1979	300
American Nuclear Corp.	LE7	SESW	30	44	75 Butte 17-1 DM	1979	380
American Nuclear Corp.	LE7	SESW	30	44	75 Butte 18-1 DM	1979	360
American Nuclear Corp.	LE7	SESW	30	44	75 Butte 19-1 DM	1979	340
American Nuclear Corp.	LE7	SWSW	30	44	75 80 Brown 30-248	1978	880
American Nuclear Corp.	LE7	SWSW	30	44	75 80 Brown 30-463	1979	800
American Nuclear Corp.	LE7	NENE	31	44	75 80 Brown 31-25	1978	820
American Nuclear Corp.	LE7	NENE	31	44	75 80 Brown 31-31	1978	820
American Nuclear Corp.	LE7	NENE	31	44	75 80 Brown 31-32	1978	780
American Nuclear Corp.	LE7	NENE	31	44	75 80 Brown 31-33	1978	800
American Nuclear Corp.	LE7	NENE	31	44	75 80 Brown 31-34	1978	820
American Nuclear Corp.	LE7	NENE	31	44	75 80 Brown 31-36	1978	780
American Nuclear Corp.	LE7	NENE	31	44	75 80 Brown 31-37	1978	800
American Nuclear Corp.	LE7	NWNW	31	44	75 80 Brown 31-21	1978	820
American Nuclear Corp.	LE7	NWNW	31	44	75 80 Brown 31-22	1978	840
American Nuclear Corp.	LE7	NWNW	31	44	75 80 Brown 31-23	1978	840
American Nuclear Corp.	LE7	NWNW	31	44	75 80 Brown 31-24	1978	840
American Nuclear Corp.	LE7	NWNW	31	44	75 80 Brown 31-26	1978	820
American Nuclear Corp.	LE7	NWNW	31	44	75 80 Brown 31-38	1979	820
American Nuclear Corp.	LE7	NWNW	31	44	75 80 Brown 31-39	1979	800
American Nuclear Corp.	LE7	NWSW	31	44	75 80 Brown 31-41	1979	620

American Nulclear Corp.	LE7	NWSW	31	44	75 80 Brown 31-42	1979	600
American Nulclear Corp.	LE7	NWSW	31	44	75 80 Brown 31-43	1979	560
American Nulclear Corp.	LE7	NWSW	31	44	75 80 Brown 31-45	1979	540
American Nulclear Corp.	LE7	NWSW	31	44	75 80 Brown 31-47	1979	520
American Nulclear Corp.	LE7	NWSW	31	44	75 80 Brown 31-48	1979	540
American Nulclear Corp.	LE7	SWSW	31	44	75 80 Brown 31-27	1978	480
American Nulclear Corp.	LE7	SWSW	31	44	75 80 Brown 31-28	1978	680
American Nulclear Corp.	LE7	SWSW	31	44	75 80 Brown 31-29	1978	620
American Nulclear Corp.	LE7	SWSW	31	44	75 80 Brown 31-30	1978	520
American Nulclear Corp.	LE7	SWSW	31	44	75 80 Brown 31-35	1978	560
American Nulclear Corp.	LE7	SWSW	31	44	75 80 Brown 31-40	1979	600
American Nulclear Corp.	LE7	SWSW	31	44	75 80 Brown 31-44	1979	600
American Nulclear Corp.	LE7	SWSW	31	44	75 80 Brown 31-46	1979	520
American Nulclear Corp.	LE7	SWSW	31	44	75 80 Brown 31-49	1979	500
American Nulclear Corp.	LE7	SWSW	31	44	75 80 Brown 31-50	1979	500
Texas Eastern Nuclear	DN146	SESE	7	43	76 TE-1	1984	660
Texas Eastern Nuclear	DN146	SWSW	8	43	76 TE-1	1984	660
Texas Eastern Nuclear	DN146	SWSW	8	43	76 TE-2	1984	700
Texas Eastern Nuclear	DN146	SWSW	8	43	76 TE-3	1984	720
Texas Eastern Nuclear	DN146	NWSW	17	43	76 TE-3	1985	580
Texas Eastern Nuclear	DN146	NWSW	17	43	76 TE-4	1985	580
Texas Eastern Nuclear	DN146	SWSW	17	43	76 TE-5	1985	560
Texas Eastern Nuclear	DN146	NWSW	6	43	75 TE-5	1985	460
Texas Eastern Nuclear	DN146	NWSW	6	43	75 TE-6	1985	540
Texas Eastern Nuclear	DN146	NWSW	6	43	75 TE-7	1985	500
Texas Eastern Nuclear	DN146	SWNW	6	43	75 TE-4	1983	580

erals are precipitated. Both injection wells and recovery wells are used in this operation. Besides eliminating the need for large excavations, in-situ mining causes significantly less environmental damage, lowers capital and labor costs, increases mining flexibility because wells can be installed relatively quickly compared with traditional mining excavations, and provides greater safety for workers (Tweeton and Connor, 1978).

In-situ mining of uranium, for example, is carried on extensively in Texas by solution methods. There are several steps in the development of in-situ uranium mining fields (Roberts, 1980). The first is to locate and define the ore body. This is done principally by test drilling and core sampling, which determines the areal extent of the ore body, the ore grade, and the ore's chemical equilibrium with its daughter (radioactive decay) products. Core analyses and pumping tests are also conducted to determine hydraulic conductivity, transmissivity, and other hydraulic characteristics of the aquifer.

The second step is to drill and construct production and injection wells. These wells are drilled into the ore body in a pattern best suited for leaching that particular ore. The pattern is determined from the tests run during the exploration phase. Several different patterns of construction have been used in the in-situ mining business, but three of the principal patterns used are the five-spot pattern, the seven-spot pattern, and the line-drive configuration (Figure 22.36). Several injection wells are usually placed around a single recovery well in each pattern. Distances between wells may vary in a spot pattern, depending on the hydraulic characteristics of the ore body, but a distance of 50 ft (15.2 m) is used in a typical production field. In-situ well production varies from 5 to 70 gpm (27.3 to 382 m^3/day), depending on the aquifer in which the ore body is contained and its hydraulic characteristics. Well depth

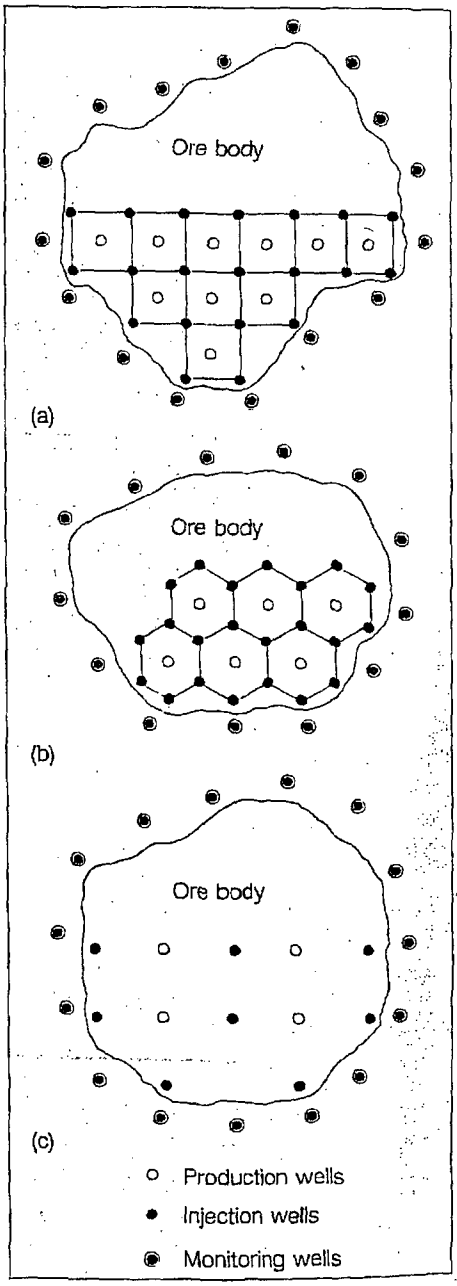


Figure 22.36. There are several construction plans used in in-situ mining: (a) five-spot pattern, (b) seven-spot pattern, and (c) line-drive pattern. Distances vary between each well, although 50 ft (15.2 m) is typical.