APPENDIX G

Cooper Jal Groundwater Model Memo

MEMO

To:

Bradford G. Billings
EMNRD/OCD
5200 Oakland, NE, Suite 100
Albuquerque, NM 87113

Copies:

File

Arcadis of New York, Inc.
Two Huntington Quadrangle
Suite 1S10
Melville
New York 11747
Tel 631 249 7600
Fax 631 249 7610

From:

Khandaker Ashfaque

Jack Wang

Date:

August 10, 2020

Arcadis Project No.:

30045941.0003A

Subject:

Cooper-Jal Groundwater Model
Chevron Environmental Management Company
Lea County, New Mexico

BACKGROUND

This technical memorandum summarizes the work conducted by Arcadis for the Chevron Environmental Management Company to assess the potential effectiveness of a chloride plume containment system at the Cooper-Jal Unit South Injection Station (Site), approximately 5.5 miles northeast of Jal, New Mexico, in Section 24, Township 24 South, Range 36 East, Lea County, New Mexico. The location of the Site is shown on **Figure 1**.

Chloride is presented at elevated concentrations in groundwater beneath the Site as a result of historic operations; in 2019 chloride concentrations exceeded 9,300 milligrams per Liter (mg/L) at RW-1.

GHD previously developed a Site-specific three-dimensional groundwater flow and transport model for the Site to assess potential future chloride migration in groundwater and evaluate potential options to remediate the chloride plume. Review of GHD supplied modeling files suggest four remedial alternative scenarios were evaluated with varying number of extraction / injection wells and pumping rates. A closer look at simulation results indicate it will take approximately 90 to 95 years for complete attenuation of the chloride plume under a proposed 21-gallons per minute (gpm) system consisting of 3 extraction and 1 injection wells.

A brief summary of the Site Setting and Hydrogeologic Conditions can be found in 2016 Annual Groundwater Monitoring Report (GHD 2016).

SCOPE OF WORK

Arcadis has been tasked with reviewing the original model design and construction, revising, and recalibrating the groundwater model, and applying the model to evaluate chloride plume transport under three scenarios:

- Scenario 1 – Monitored Natural Attenuation (non-pumping condition),
- Scenario 2 – Five (5) recovery wells with time-varying strategic pumping conditions, and
- Scenario 3 – Seven (7) recovery wells with time-varying strategic pumping conditions.

CONCEPTUAL SITE MODEL

The uppermost groundwater bearing zone underlying the Site is the Tertiary Ogallala Aquifer (Ogallala) formation which reportedly spans from approximately 165 feet to 175 feet below ground surface (bgs) across the Site. Based on Site boring logs, the average saturated aquifer thickness noted below the Site is approximately 40 feet and is generally encountered between 130 feet bgs and 175 feet bgs. “Red beds” consisting of fine-grained materials like shale, silt, or clay were encountered at approximately 171 feet bgs in several borings.

Hydraulic properties of the Ogallala formation were characterized through a pumping test performed on October 2, 2013 on recovery well RW-2R, and several slug tests carried out on 10 monitoring wells on March 21 and 23, 2017. Evaluation of the pumping test data resulted in a calculated aquifer transmissivity of 25.62 square feet per day and a hydraulic conductivity of 0.73 feet per day [ft/day]. However, hydraulic conductivity values obtained from slug test analysis ranged from 0.23 to 3.76 ft/d, with a geometric mean of 1.79 ft/d.

GROUNDWATER FLOW MODEL DEVELOPMENT

Flow Model Code Selection and Description

The groundwater flow model was developed using MODFLOW, a publicly-available groundwater flow simulation program developed by the USGS (McDonald and Harbaugh, 1988). MODFLOW is thoroughly documented; widely used by consultants, government agencies, and researchers; and is consistently accepted in regulatory environments. MODFLOW uses the method of finite differences to approximate groundwater flow equations. Spatial discretization consists of subdividing the entire model domain into a grid or mesh or blocks or cells. In the discretized system, hydraulic heads are computed at the center of each grid block. In general, computational accuracy increases as the number of rows and columns in the grid increases (the grid cells become smaller). MODFLOW allows the use of variable mesh spacing to enhance model accuracy in the area of concern — in this case, the Site area, within the chloride plume, and in the vicinity of existing and proposed groundwater pumping.

The hydrogeologic framework and the dynamics of the flow system require a code capable of simulating three-dimensional flow with dipping layers. The unconfined nature of the aquifer necessitates a code option for simulating a free-water surface. Simulation of various boundary conditions (specified flux and free-surface) is required, as is the ability to simulate the distribution of various aquifer and hydrologic parameters. MODFLOW meets all of these requirements.

Model Domain and Grid

The numerical model domain for the Site covers an aerial extent of approximately 7,100 feet by 3,800 feet (**Figure 2**). The model domain has been extended to better represent regional hydrogeologic boundaries. The finite-difference grid spacing ranges from 10 feet by 10 feet near the Site to 110 feet by 110 feet along the model extents. Vertically, the model consists of one layer, and represents the Tertiary Ogallala Aquifer formation.

Boundary Conditions

The numerical model is bounded by regional water level contours on the south-east and north-west, and no-flow boundary representing inferred regional groundwater flow line to the north-east and south-west (**Figure 2**). The boundary conditions align with the regional groundwater levels and extends a sufficient distance from the area of concern to minimize potential for boundary effects.

Head-dependent flux boundaries (i.e., general head boundaries) were utilized at the upgradient and downgradient model bounds based on 2019 gauged water levels from on-Site monitoring wells (i.e. MW-13 and MW-11). During flow model calibration, the stage and hydraulic conductance of flux boundaries were adjusted to better match observed flow conditions.

Hydraulic Parameters

The following sections discuss hydraulic parameter assignments in the model.

Hydraulic Conductivity

Initially, the groundwater model utilized a uniform hydraulic conductivity of 2.79 ft/day. During flow model calibration, the hydraulic conductivity value was adjusted to 1.4 ft/day – a value comparable to the calculated geomean of 1.79 ft/day from slug test analyses.

Recharge

Even though the annual evaporation rate likely exceeds annual precipitation, small amount of recharge likely occurs in months when evaporation rates are the lowest. As such, aerial recharge was applied uniformly over the model domain and was modified during model calibration. The rate of aerial recharge assigned in the calibrated model was estimated to be 0.06 inches per year, which is consistent with values obtained at nearby McKnight and Erwin facilities.

GROUNDWATER FLOW MODEL CALIBRATION

Calibration of a groundwater flow model refers to the process of adjusting model parameters to obtain a reasonable match between observed and simulated water levels. Model calibration is an iterative procedure that involves adjustment of hydraulic properties and/or boundary conditions to achieve the best match between observed and simulated water levels. During model calibration, model parameters are varied over a narrow range set by Site-specific data using the conceptual Site model as a guide.

The use of point data (targets) during calibration eliminates the potential for interpretive bias that may result from attempting to match a contoured potentiometric surface (Konikow, 1978; Anderson and

Woessner, 1992). The steady-state flow model was calibrated to average water level elevations between 2017 and 2019 collected at 19 water-level targets and distributed across the Site (**Figure 3**).

Simulated groundwater elevations and calibration target residuals for the Site area are shown on **Figure 3**. Residuals are defined as the difference between the model-simulated heads and the observed values. Positive residual values indicate that the model-simulated values are lower than the target values, and negative residual values indicate that the model-simulated values are higher than the target values. The residuals shown on **Figure 3** suggest measured water levels match reasonably well with model-simulated water levels in the Site area. Additionally, over-predictions in water levels are generally balanced with under-predicted water levels across the Site area which suggest minimal spatial bias in residuals.

The quality of the model calibration can be determined by a statistical analysis of the residuals, as shown in **Table 1**. Residual statistics **(Table 1)** for the calibrated groundwater flow model indicate an acceptable agreement between simulated and measured groundwater elevations. The residual mean, residual standard deviation, and sum of squared residuals (SSR) were calculated to be -0.07 feet, 0.43 feet, and 3.56 square feet, respectively. The scaled standard deviation (standard deviation divided by the range in observed water levels) is 4.6%. Ideally, the scaled standard deviation should be less than 10% to ensure the model accurately predicts groundwater flow direction and rates. These statistics indicate a good fit between the observed and simulated water levels. A plot of observed vs. simulated groundwater elevations for the 19 calibration targets is presented on **Figure 4**, which indicates that all simulated water levels are within 10% of the observed target levels.

SOLUTE TRANSPORT MODEL DEVELOPMENT

Transport Model Code Selection and Description

The solute transport modeling was performed using the modular three-dimensional transport model referred to as MT3DMS which was originally developed by Zheng and Wang (1999) for the United States Army Corps of Engineers. The MT3DMS code uses the flows computed by MODFLOW in its transport calculations and the same finite-difference grid structure and boundary conditions as MODFLOW, simplifying the effort to construct the solute transport model. MT3DMS has a comprehensive set of options and capabilities for simulating advection, dispersion/diffusion, and chemical reactions of contaminants in groundwater flow systems under a range of hydrogeologic conditions.

Solute Transport Parameters

The solute transport model was simulated using a single domain with an average porosity of 20%. No sorption, dispersion, or decay were simulated which is appropriate for evaluating chloride transport. However, the model included numerical dispersion, which is typical on the order of one half the grid cell spacing or about 5 feet. Plume dilution is represented by the groundwater recharge in the flow model and the dilution effect is expected to be minimal on the simulated chloride concentration.

CHLORIDE TRANSPORT ASSESSMENT

Solute transport modeling was performed to evaluate the migration and fate of the chloride plume detected in groundwater beneath the Site. Initial chloride plume was delineated based on observed chloride concentrations from June 2019 and November 2019 sampling events (**Figure 5**). To add conservatism in simulation results, maximum concentrations of the two sampling events at the monitoring wells were utilized. The solute transport model used the output from the calibrated flow model to simulate chloride transport under current average ambient groundwater flow conditions. The solute transport model was used to assess the effectiveness of various remedial alternatives in reducing chloride concentrations in groundwater.

Chloride plume transport was assessed under three scenarios:

- Scenario 1 – Monitored Natural Attenuation (non-pumping condition),
- Scenario 2 – Five (5) recovery wells with time-varying strategic pumping conditions, and
- Scenario 3 – Seven (7) recovery wells with time-varying strategic pumping conditions.

The following sections describe the results of transport simulations for each scenario. Each transport scenario began with the initial chloride plume distribution shown on **Figure 5**. Transport model output are shown on **Figures 6**, **8**, and **10**. Recovery well configurations for Scenarios 2 and 3 are presented on **Figures 7** and **9**.

Scenario 1. Monitored Natural Attenuation (MNA)

This scenario simulated the movement of the chloride plume under non-pumping conditions (i.e., RW-1 and RW-2R were not pumped). **Figure 6** depicts chloride plume distributions after 5, 10, 20, 30, and 50 years of simulated transport. The figure indicates that the extent of the highest concentration portion of the plume (>5,000 mg/L) remains generally unchanged from the start of the simulation. Also, the leading edge of the plume slowly migrates downgradient with minimal spreading and attenuation suggesting chloride mass is expected to remain fairly unchanged under MNA scenario.

Scenario 2. Five (5) Recovery Wells with Time-Varying Strategic Pumping

This scenario simulated the fate and transport of the chloride plume under the influence of pumping from select recovery wells. Note that there are currently two non-operational recovery wells, RW-1 and RW-2 at the Site (**Figure 7**). Based on preliminary modeling evaluation, three additional recovery wells (RW-3, RW-4, and RW-5) were proposed at strategic locations with respect to the chloride plume footprint. Recovery wells RW-3 and RW-5 are located along the centerline and adjacent to the highest concentration of the plume; whereas, recovery well RW-4 is placed further downgradient along plume centerline to prevent downgradient migration as well as to provide contaminant mass recovery. The configuration of recovery wells with respect to initial chloride plume distribution is presented on **Figure 7**.

Figure 8 illustrates chloride plume distributions after 10, 15, 18, 19, and 25 years of simulated transport. The transport simulation was performed in phases, where operation of various recovery wells was adjusted and individual well flow rates were optimized (i.e., reduced pumping rates, turning on and off recovery wells) to achieve chloride plume attenuation within a reasonable timeframe. The following table lists the different phases of modeling simulation along with active recovery wells and total pumping rates corresponding to individual phases:

Modeling Phase	Simulation Time Period (Years)	Total Pumping Rate (gpm)	Total Number of Operational Wells	Operating Recovery Wells
Phase 1	0 to 10	6.2	5	RW-1 through RW-5
Phase 2	10 to 15	6.0	4	RW-2 through RW-5
Phase 3	15 to 18	5.0	3	RW-3 through RW-5
Phase 4	18 to 19	3.6	2	RW-3 and RW-4
Phase 5	19 to 25	2.9	1	RW-4

As the table suggests, the total pumping rate for the recovery wells vary from 2.9 to 6.2 gpm across various phases. The table further indicates that the number of active recovery wells becomes less over time as the extent of the chloride plume decreases and the total chloride mass reduces, which are depicted on **Figure 8**. Modeling results (**Figure 8**) indicate that under the proposed five recovery well pumping configuration, chloride plume is expected to be completely attenuated below 250 mg/L in approximately 25 years.

Scenario 3. Seven (7) Recovery Wells with Time-Varying Strategic Pumping

The purpose of this scenario was to evaluate a pump-only remedy configuration that would achieve chloride plume attenuation in approximately 15 years. Based on review of Scenario 2 modeling results, two more recovery wells (RW-6 and RW-7) were added to the proposed five recovery wells from Scenario 2. **Figure 9** portrays the configuration of the seven recovery wells under Scenario 3 along with the initial chloride footprint. Besides existing recovery wells RW-1 and RW-2R, proposed locations of recovery wells RW-3 through RW-5 are generally consistent with those from Scenario-2. Additional recovery well RW-6 was proposed between RW-1 and RW-2R, and within the highest concentration (>5,000 mg/L) footprint of the chloride plume to enhance mass removal; whereas RW-7 was positioned between RW-3 and RW-4 to accelerate plume attenuation.

Figure 10 illustrates chloride plume distributions after 10, 13, and 15 years of simulated transport. Similar to Scenario 2, the transport simulation was performed in phases, where operation of various recovery wells was adjusted, and individual well flow rates were optimized to achieve chloride plume attenuation within a shorter timeframe. The following table lists the total pumping rates along with the number of recovery wells corresponding to each transport simulation phases:

Modeling Phase	Simulation Time Period (Years)	Total Pumping Rate (gpm)	Total Number of Operational Wells	Operating Recovery Wells
Phase 1	0 to 10	7.1	7	RW-1 through RW-7
Phase 2	10 to 13	5.9	5	RW-3 through RW-7
Phase 3	13 to 15	5.1	3	RW-3 through RW-5

As the table suggests, the total pumping rate for the recovery wells vary from 5.1 to 7.1 gpm across various phases. The table further indicates that the number of active recovery wells becomes less over time as the extent of the chloride plume decreases and chloride mass reduces, which are depicted on

Figure 10. Modeling results (**Figure 10**) indicate that under the proposed seven recovery well pumping configuration, chloride plume is expected to be completely attenuated below 250 mg/L in approximately 15 years.

CONCLUSIONS

A Site-specific, three-dimensional groundwater flow and solute transport model was used to assess potential approaches to mitigate the migration of a chloride plume beneath the Site. Using an initial chloride distribution based on 2019 groundwater quality samples, three scenarios were evaluated including MNA, time-varying strategic pumping with five recovery wells (two existing and three proposed wells), and time-varying strategic pumping with seven recovery wells (two existing and five proposed wells). The transport simulation predicted that chloride plume is expected to be completely attenuated below 250 mg/L in approximately 25 and 15 years under the five recovery well and seven recovery well scenarios, respectively.

REFERENCES

Anderson, M. P. and W. W. Woessner. 1992. Applied Groundwater Modeling: Simulation of Flow and Advective Transport, Academic Press, Inc., New York, 381 p.

GHD. 2016. 2016 Annual Groundwater Monitoring Report, Cooper-Jal Unit South Injection Station Case No. 1R289, OGRID No. 4323, Section 24, Township 24 South, Range 36 East, Lea County, New Mexico. Chevron Environmental Management Company. 039123. Report No. 16. February 6, 2017.

Konikow, L. 1978. Calibration of Groundwater Models, in Proceedings of the Specialty Conferences on Verification of Mathematical and Physical Models in Hydraulic Engineering, College Park, Maryland, August 9-11, 1978.

McDonald, Michael G. and Arlen W. Harbaugh. 1988. A Modular Three-Dimensional Finite-Difference Ground-Water Flow Model. Techniques of Water-Resources Investigations of the United States Geological Survey, Chapter A1.

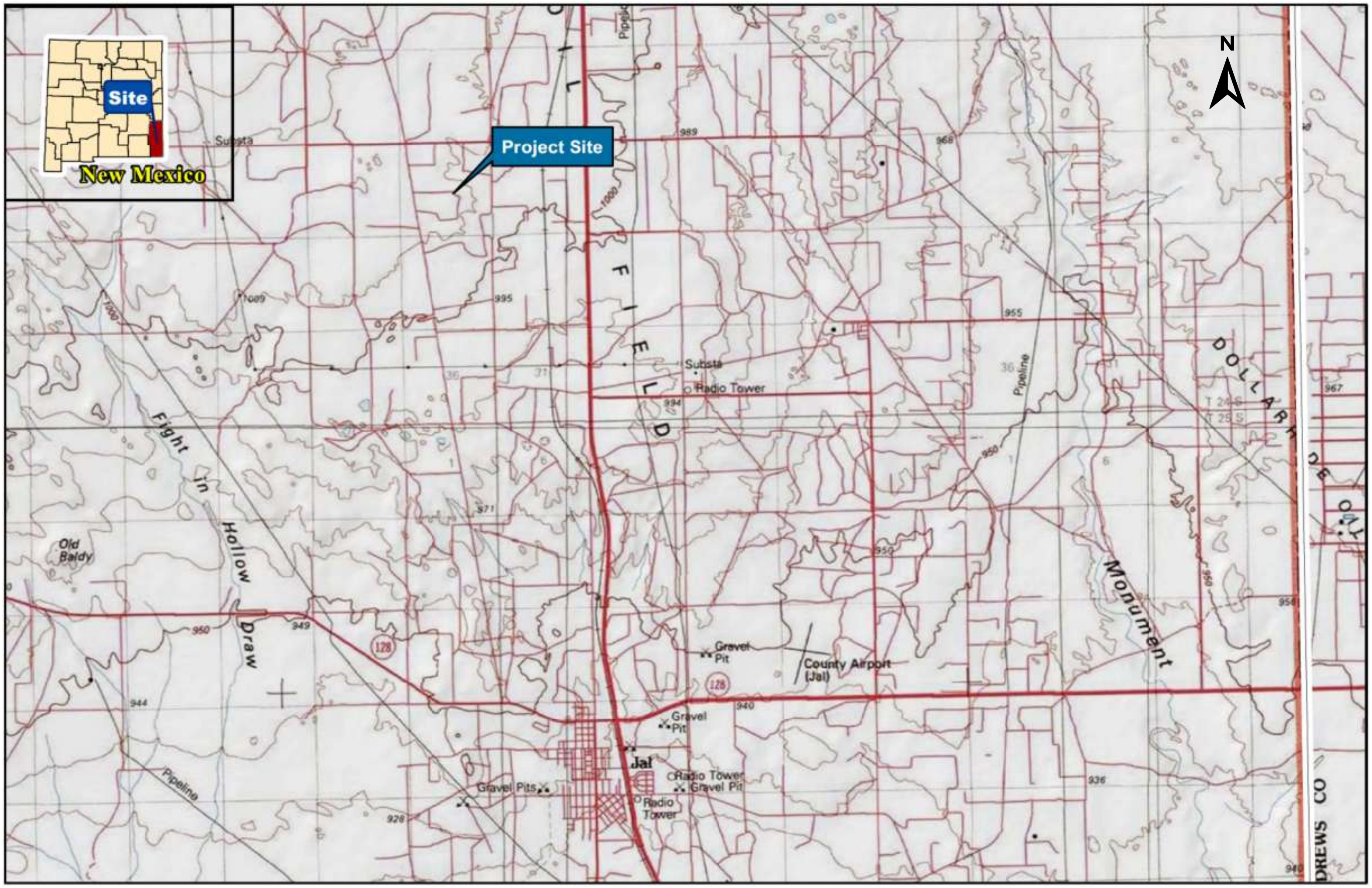
Zheng, Chunmiao and P. Patrick Wang. 1999. MT3DMS: A Modular Three-Dimensional Multispecies Transport Model for Simulation of Advection, Dispersion, and Chemical Reactions of Contaminants in Groundwater Systems; Documentation and User’s Guide Strategic Environmental Research and Development Program. Prepared for U.S. Army Corps of Engineers, Washington, DC. Contract Report SERDP-99-1. December.

Table 1
Groundwater Flow Model Steady-State Calibration Targets
Cooper-Jal Groundwater Model
Lea County, New Mexico

Well ID	Model Layer	Observed Groundwater Elevation (feet msl)	Simulated Groundwater Elevation (feet msl)	Residual (observed - simulated, feet)
MW-1	1	3187.11	3186.98	0.13
MW-10	1	3185.54	3184.61	0.93
MW-11	1	3181.16	3181.55	-0.39
MW-12	1	3190.35	3190.38	-0.03
MW-14	1	3184.33	3183.95	0.38
MW-2	1	3186.83	3186.57	0.26
MW-2A	1	3186.73	3186.60	0.13
MW-3	1	3187.50	3187.48	0.02
MW-4	1	3185.89	3186.13	-0.24
MW-4A	1	3186.07	3186.11	-0.04
MW-5	1	3186.00	3185.93	0.07
MW-6R	1	3186.65	3186.45	0.20
MW-7	1	3184.44	3184.66	-0.22
MW-8	1	3184.92	3185.13	-0.21
MW-9	1	3182.44	3182.98	-0.55
MW-9A	1	3182.47	3182.98	-0.51
RW-1	1	3186.32	3186.22	0.10
RW-2	1	3184.94	3185.05	-0.11
RW-2R	1	3183.86	3185.09	-1.23

Total targets: 19
Mean residual: -0.07 feet
Residual standard deviation: 0.43 feet
Observed target range: 9.20 feet
Residual sum-of-squares: 3.56 ft^2

Notes:
Average water-level measurements from 2019.
ft^2 = square feet
msl = mean sea level



SOURCE: USGS 7.5 MINUTE QUADRANGLE; JAL NW, NEW MEXICO (1977)

0 500 1500ft

Coordinate System:
NAD83 State Plane
New Mexico East

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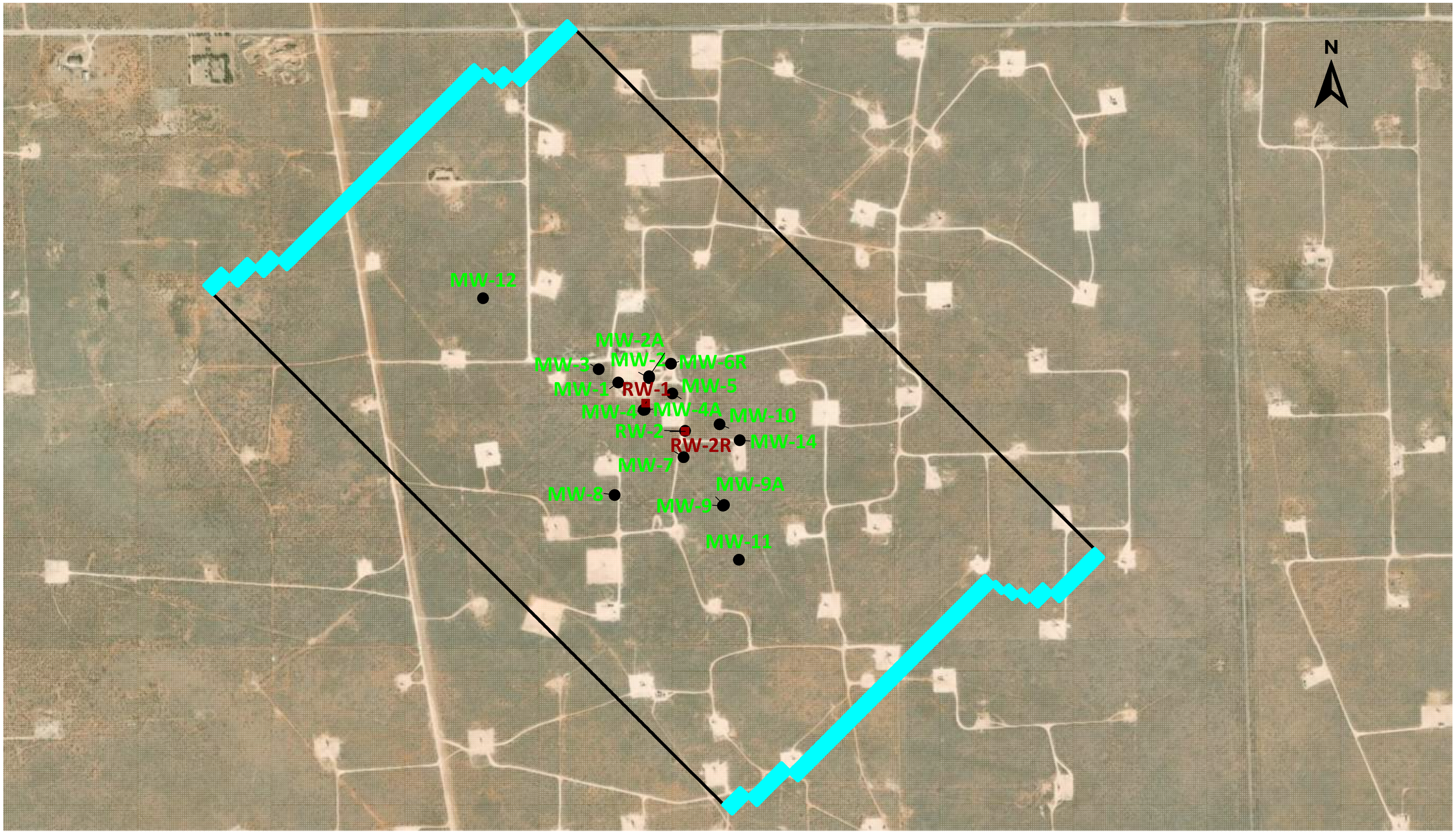
LEA COUNTY, NEW MEXICO

COOPER-JAL GROUNDWATER MODEL

SITE LOCATION

ARCADIS

FIGURE
1



Model Extent

General Head Boundary

MW-2 Monitoring Wells

RW-1 Extraction Wells

SCALE IN FEET

0 1000 2000 3000

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LEA COUNTY, NEW MEXICO

COOPER-JAL GROUNDWATER MODEL

GROUNDWATER MODEL EXTENT AND BOUNDARY CONDITIONS

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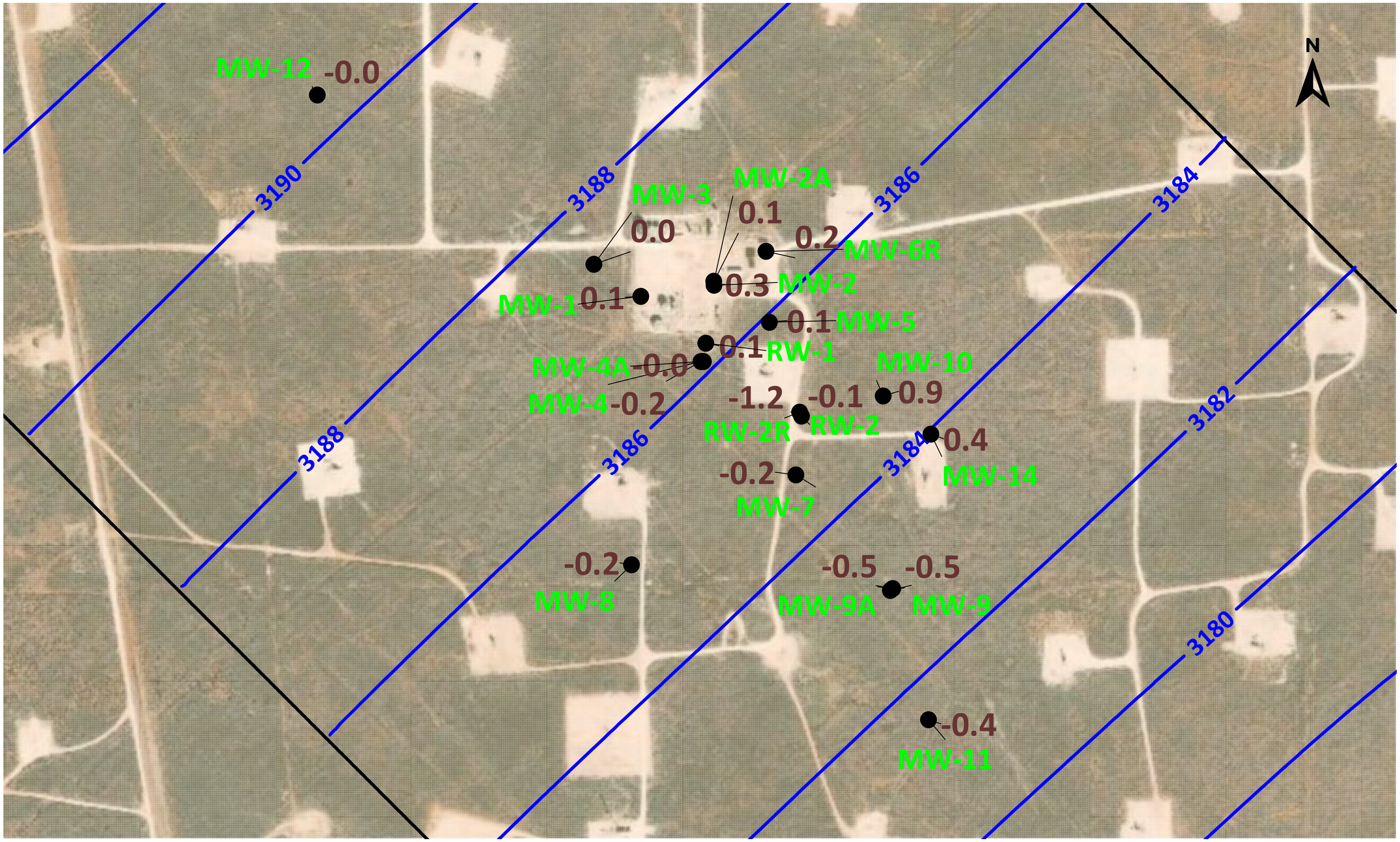
FIGURE 2



Model Extent

SCALE IN FEET
0 500 1000

--3190-- Simulated Water Level Contours (feet msl)
(contour interval: 2 feet); msl = mean sea level

-0.2
MW-2
Simulated Residuals (feet)
[Observed minus Modeled Water Levels]

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LEA COUNTY, NEW MEXICO
COOPER-JAL GROUNDWATER MODEL

SIMULATED NON-PUMPING WATER LEVEL AND RESIDUAL DISTRIBUTIONS

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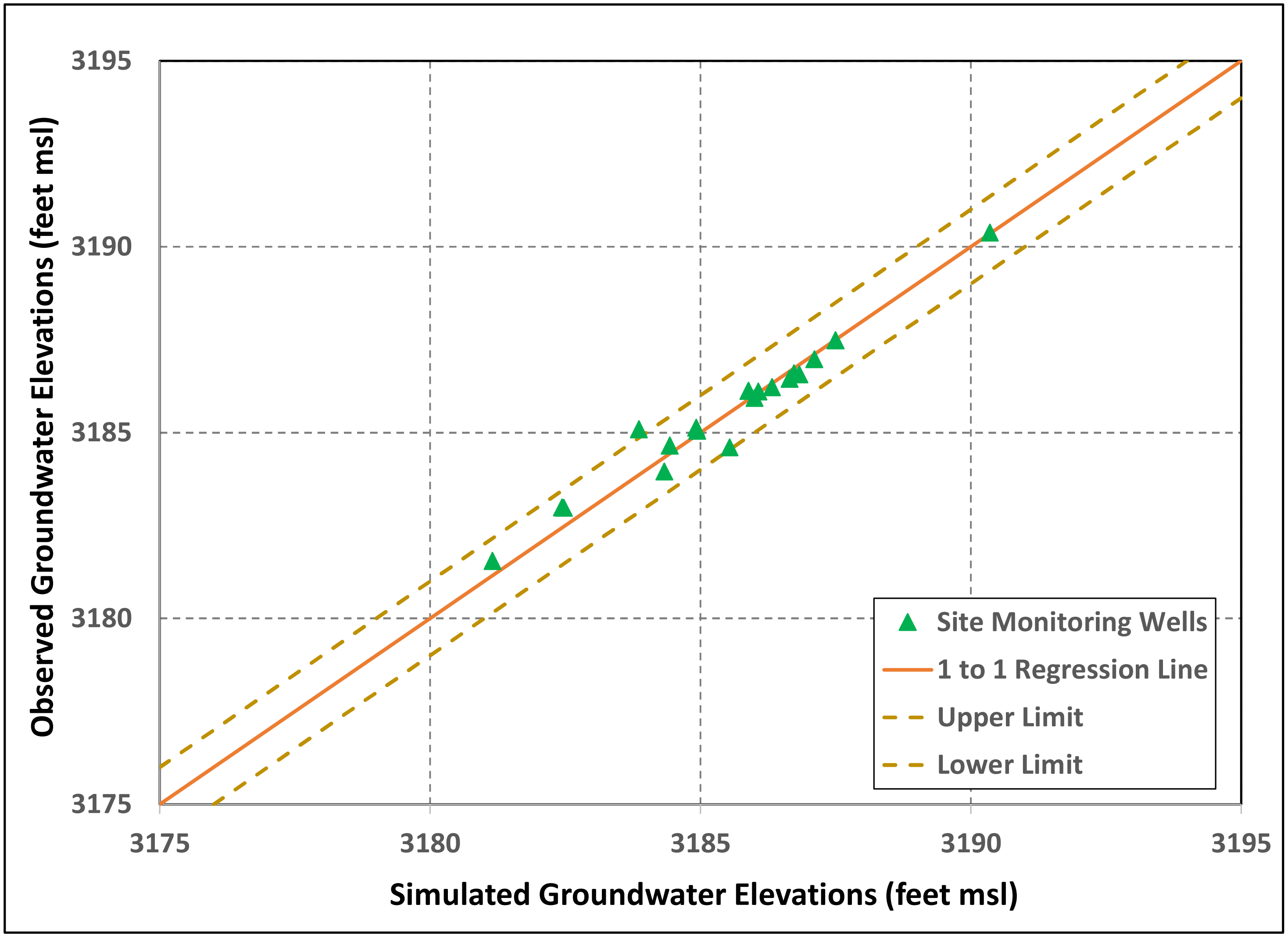
FIGURE
3



Steady-State calibration statistics:

1. Residual Mean is -0.07 feet.
2. Redisual Standard Deviation is 0.43 feet.
3. Sum of Square is 3.56 feet^2.

Note: msl = mean sea level

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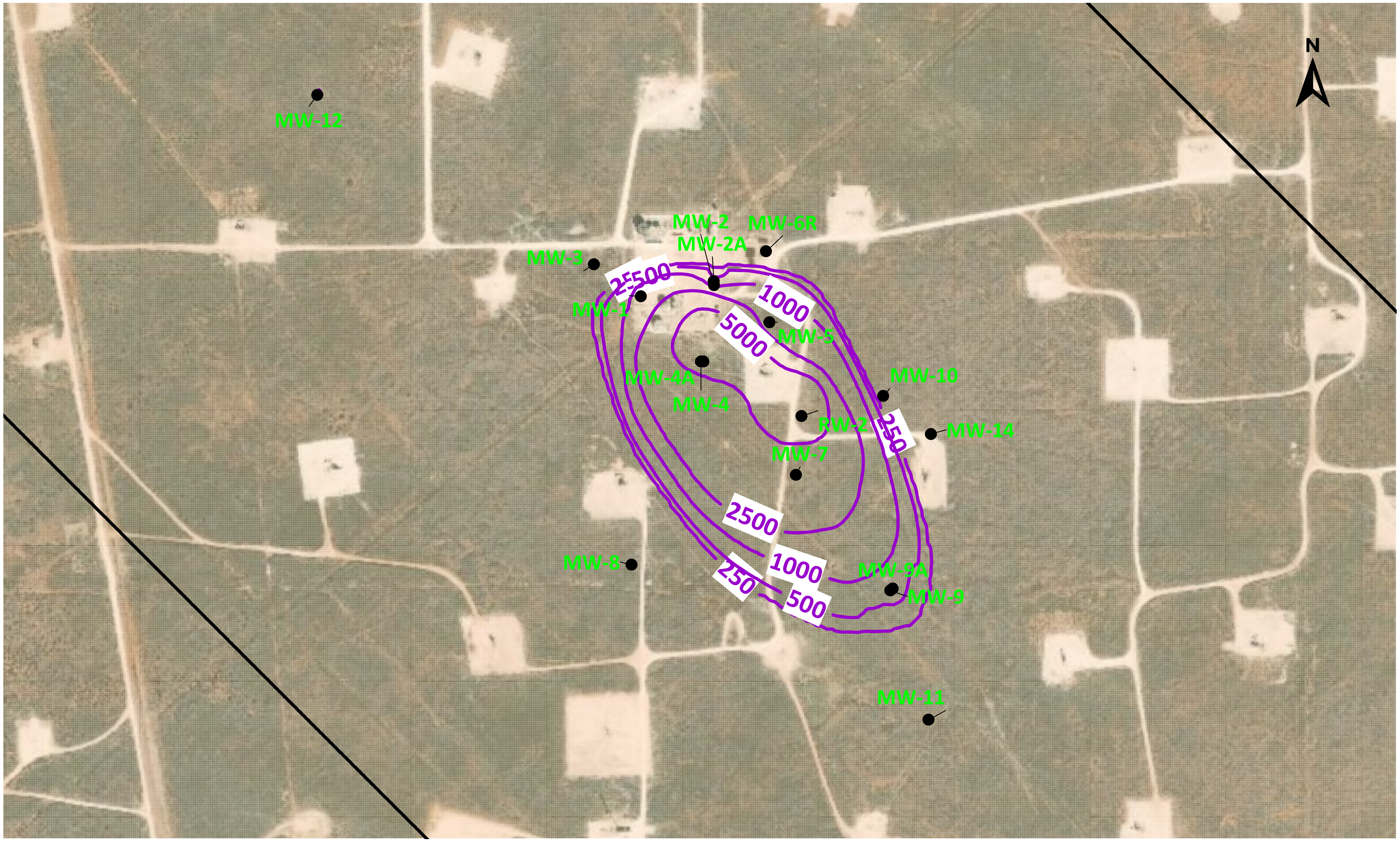
LEA COUNTY, NEW MEXICO

COOPER-JAL GROUNDWATER MODEL

STEADY-STATE MODEL CALIBRATION TARGETS: OBSERVED VS SIMULATED GROUNDWATER ELEVATIONS

ARCADIS

FIGURE 4



Model Extent

SCALE IN FEET
0 500 1000

--500-- Simulated Chloride Concentration Contours (mg/L)
mg/L = milligrams per liter

MW-2 Monitoring Wells

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LEA COUNTY, NEW MEXICO
COOPER-JAL GROUNDWATER MODEL

INITIAL CHLORIDE PLUME DISTRIBUTION

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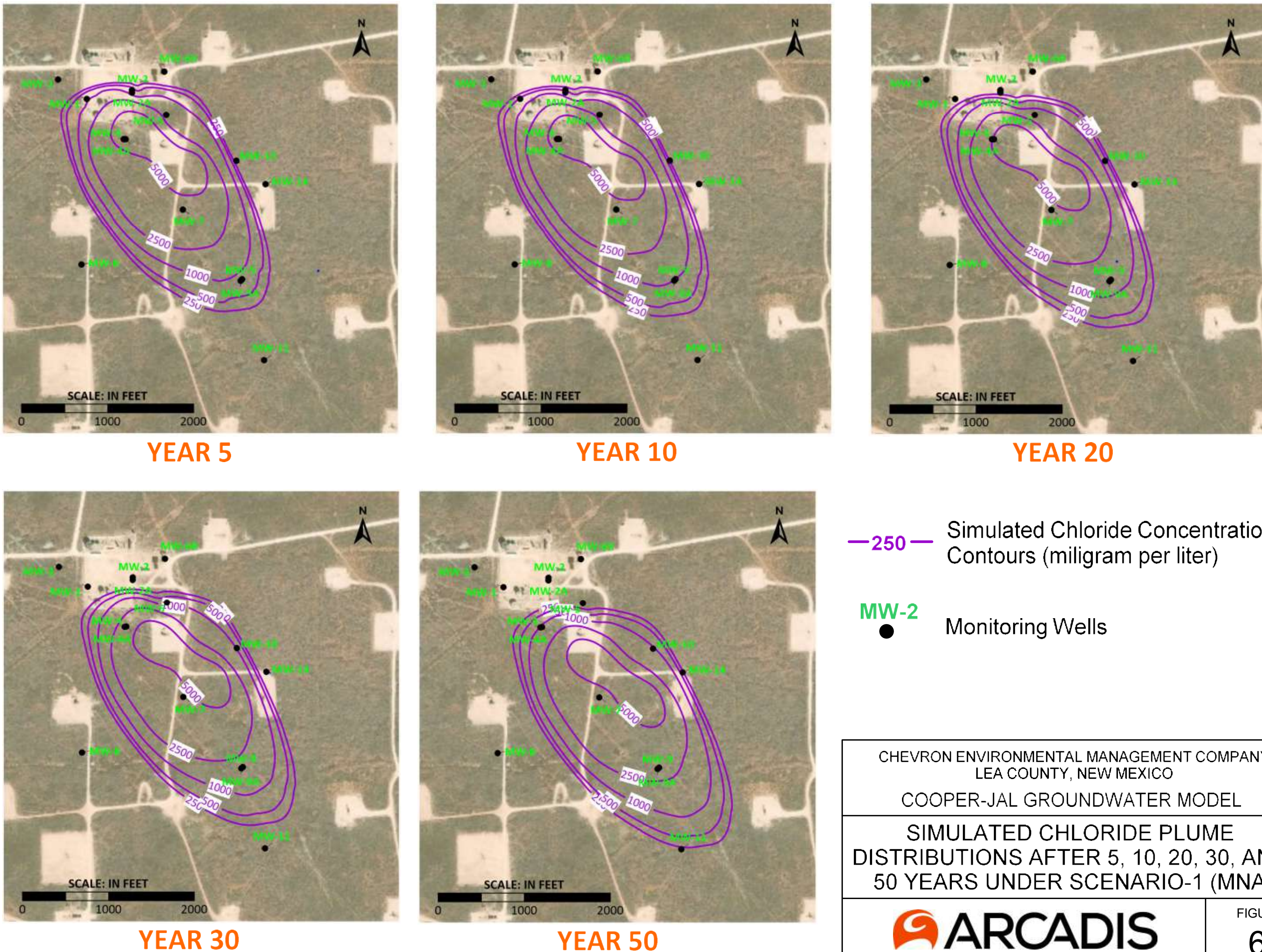
FIGURE
5



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LEA COUNTY, NEW MEXICO

COOPER-JAL GROUNDWATER MODEL

SIMULATED CHLORIDE PLUME DISTRIBUTIONS AFTER 5, 10, 20, 30, AND 50 YEARS UNDER SCENARIO-1 (MNA)

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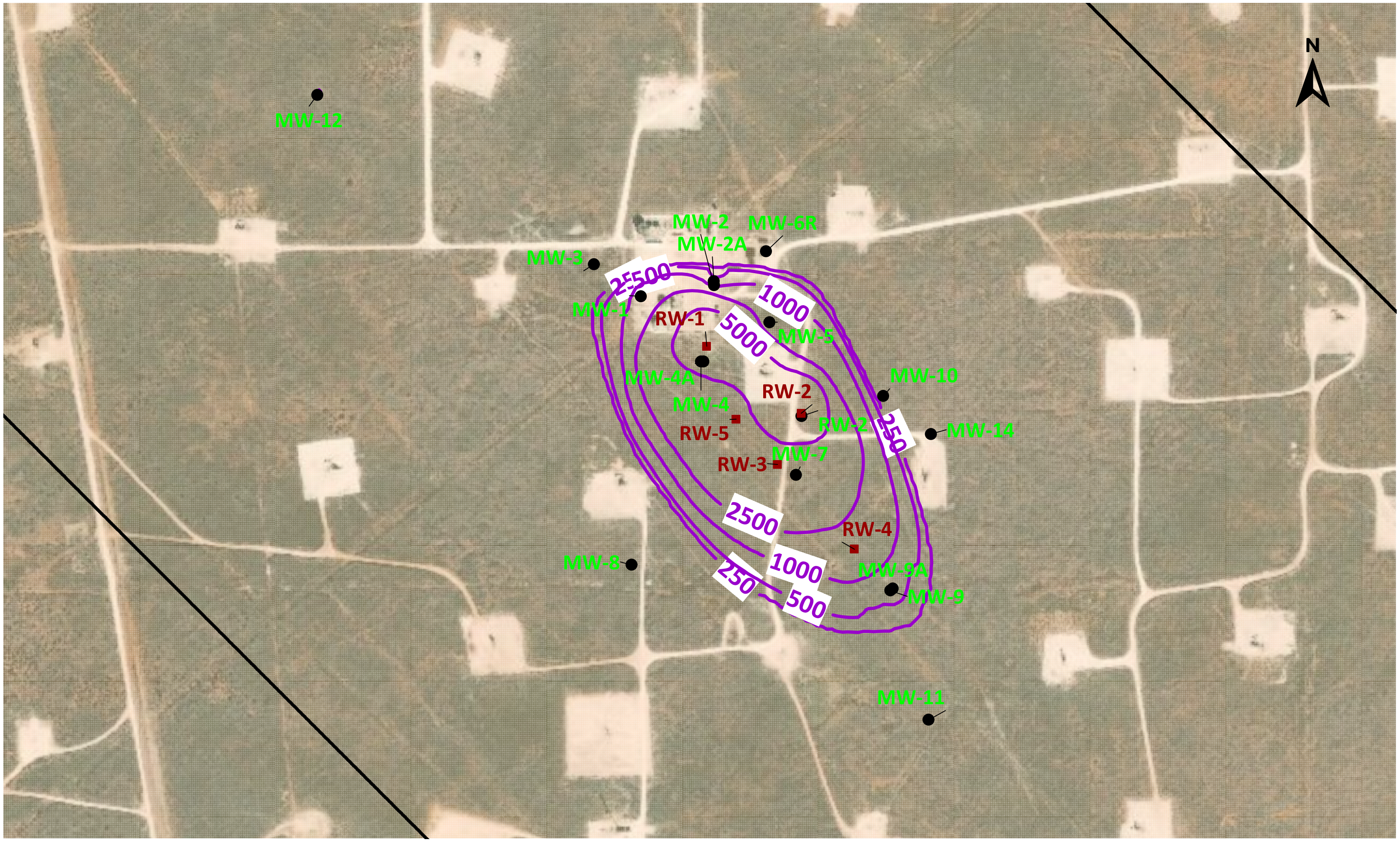
FIGURE
6



Model Extent

SCALE IN FEET
0 500 1000

--500-- Simulated Chloride Concentration Contours (mg/L)
mg/L = milligrams per liter

RW-1 Recovery Wells

MW-2 Monitoring Wells

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
LEA COUNTY, NEW MEXICO

COOPER-JAL GROUNDWATER MODEL

INITIAL CHLORIDE PLUME DISTRIBUTION AND RECOVERY WELL CONFIGURATION FOR SCENARIO-2 (5 RWs)

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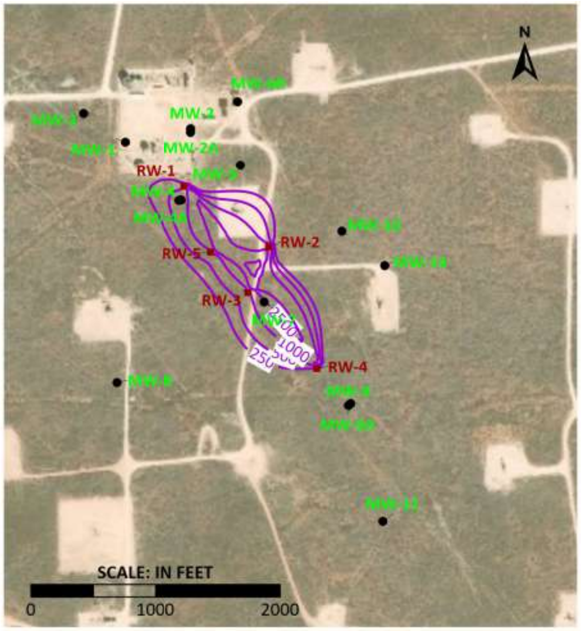
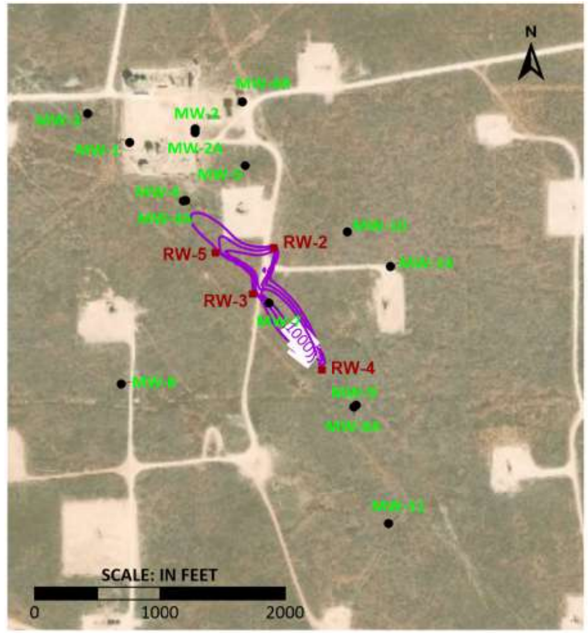
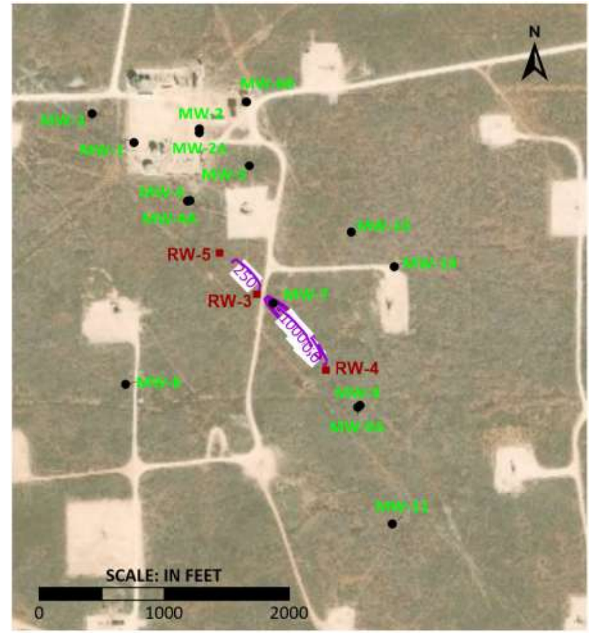
FIGURE
7



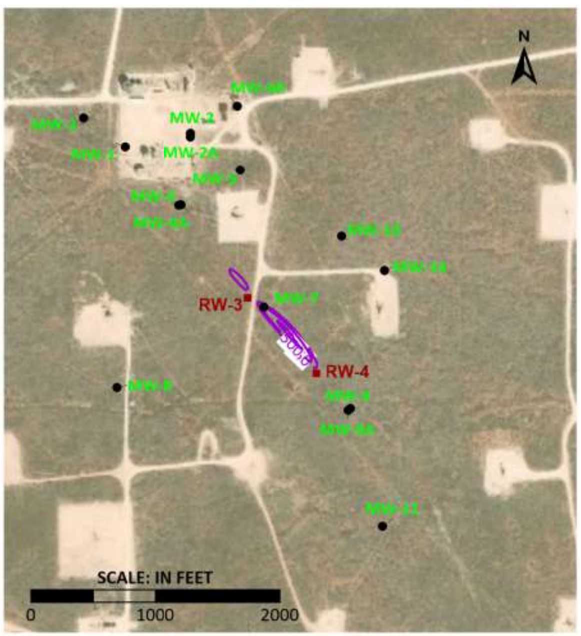
YEAR 10



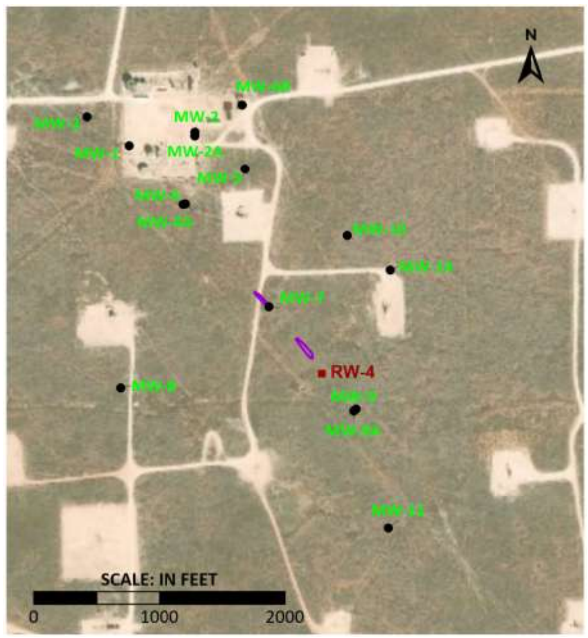
YEAR 15



YEAR 18



YEAR 19



YEAR 25

—250— Simulated Chloride Concentration Contours (miligram per liter)

MW-2 ● Monitoring Wells

RW-1 ■ Recovery Wells

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LEA COUNTY, NEW MEXICO

COOPER-JAL GROUNDWATER MODEL

SIMULATED CHLORIDE PLUME DISTRIBUTIONS AFTER 10, 15, 18, 19, AND 25 YEARS UNDER SCENARIO-2 (5 RWs)

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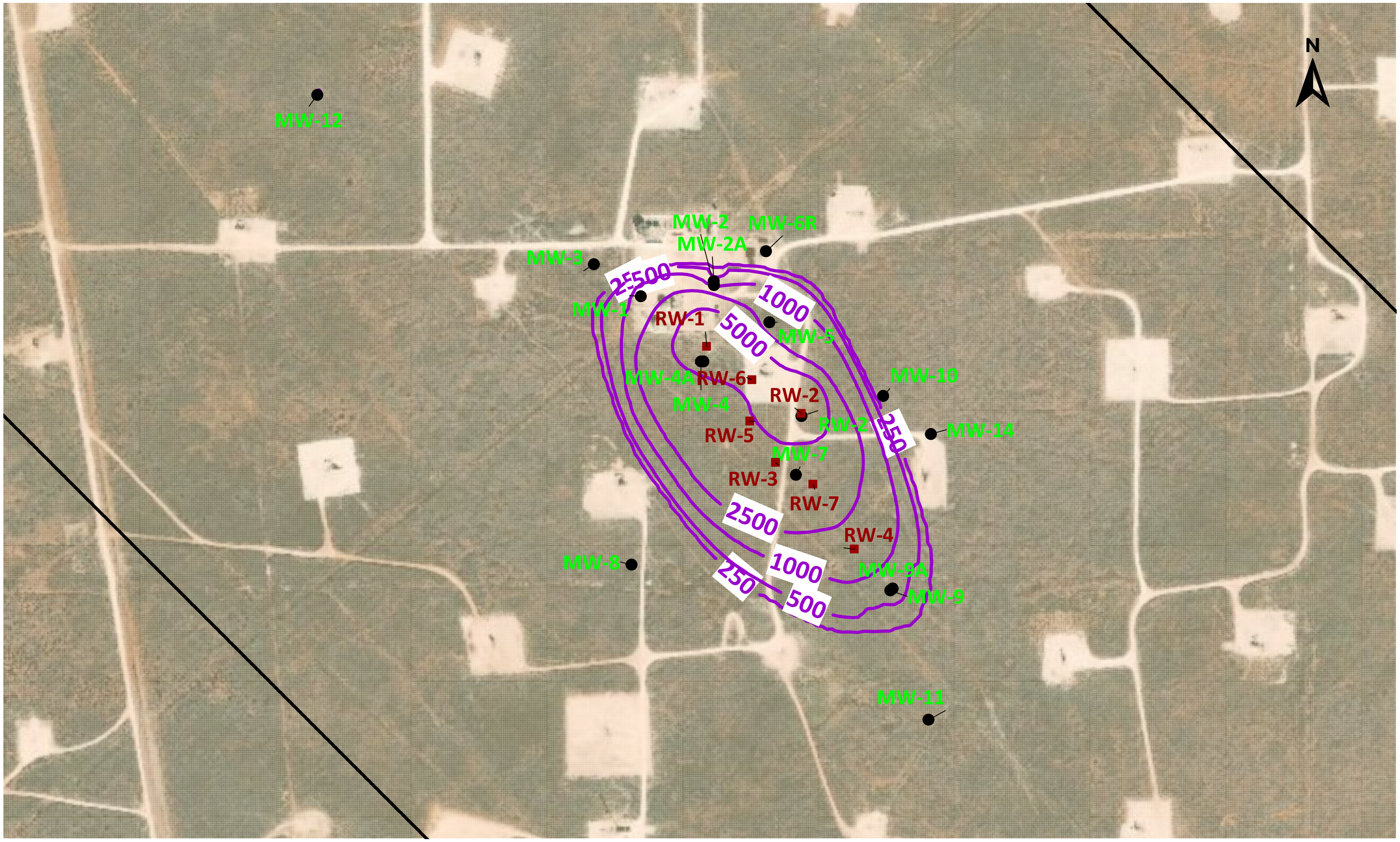
FIGURE
8



Model Extent

SCALE IN FEET

0 500 1000

--500-- Simulated Chloride Concentration Contours (mg/L)
mg/L = milligrams per liter

RW-1 Recovery Wells

MW-2 Monitoring Wells

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
LEA COUNTY, NEW MEXICO

COOPER-JAL GROUNDWATER MODEL

INITIAL CHLORIDE PLUME DISTRIBUTION AND RECOVERY WELL CONFIGURATION FOR SCENARIO-3 (7 RWs)

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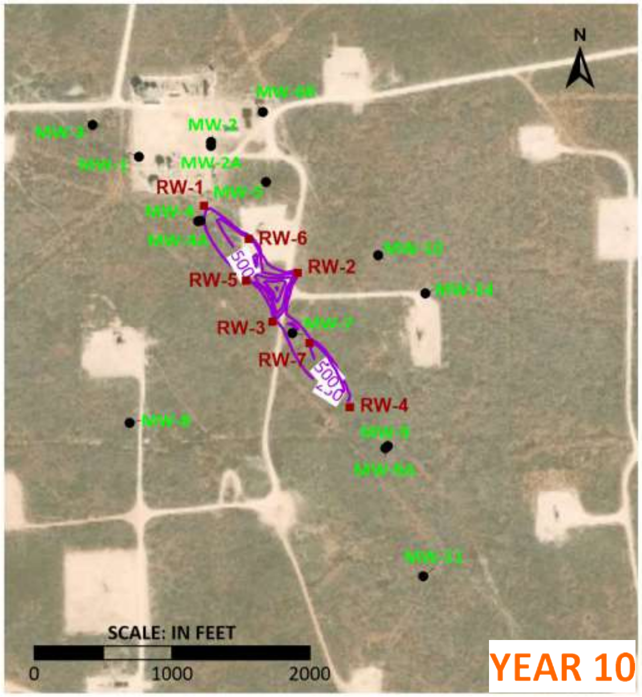
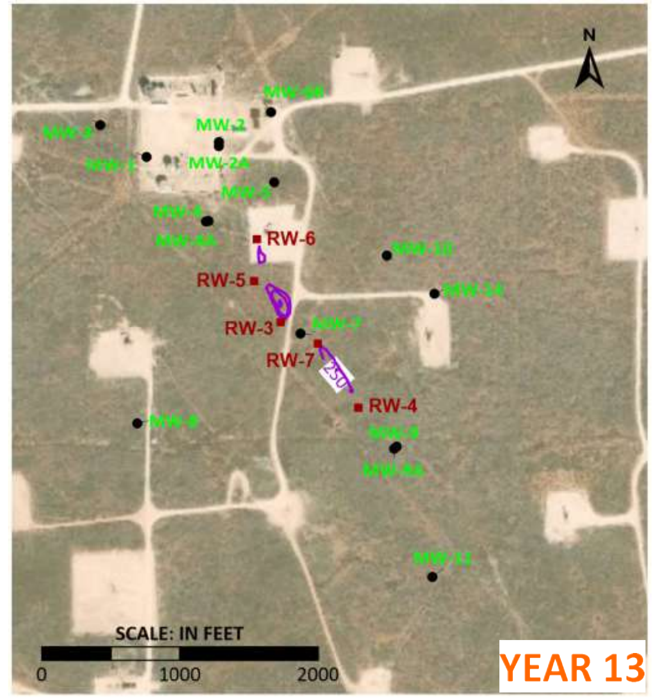
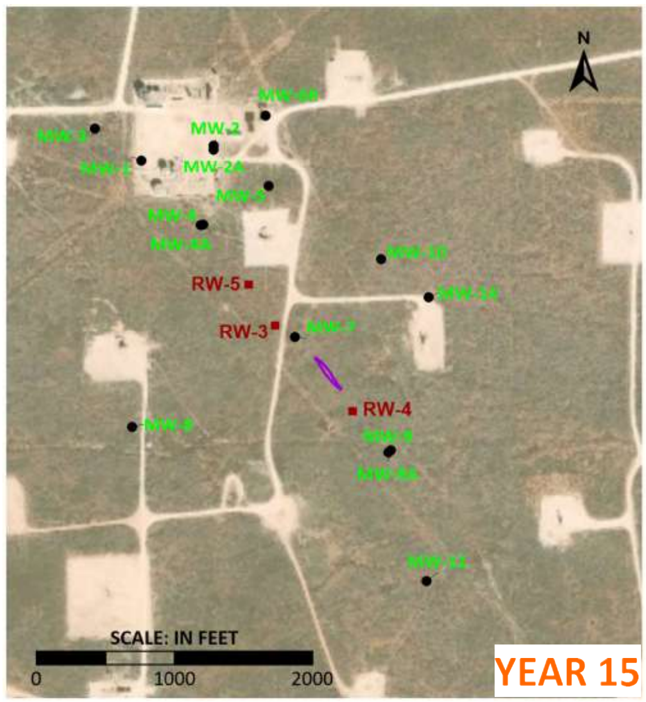
FIGURE 9







—250— Simulated Chloride Concentration Contours (miligram per liter)

MW-2 ● Monitoring Wells

RW-1 ■ Recovery Wells

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
LEA COUNTY, NEW MEXICO

COOPER-JAL GROUNDWATER MODEL

SIMULATED CHLORIDE PLUME DISTRIBUTIONS AFTER 10, 13, AND 15 YEARS UNDER SCENARIO-3 (7 RWs)

ARCADIS

FIGURE
10

C:\Users\wdberndg.ARCADIS-US\ACCDocs\Arcadis\AUS-CHEVRON-COOPER-JAL-LEA COUNTY New Mexico\Project Files\2023\01-In Progress\01-DWG\COOPER-JAL CHLORIDE TREATMENT.dwg LAYOUT: 1 SAVED: 11/20/2023 9:00 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ----
PLOTSTYLETABLE: PLTFULLRED.CTB PLOTTED: 11/29/2023 2:50 PM BY: BERNDGEN, WENDY DARLENE
XREFS: IMAGES: PROJECTNAME: ----

200' 0 200' 400'
1"=200' SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

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Professional Engineer's Name
(PE'S FULL NAME)
Professional Engineer's No.
(PE NUM)

State	Date Signed	Project Mgr.
(ST)		(MGR)
Designed by (DSN)	Drawn by (DFT)	Checked by (CHK)

ARCADIS
ARCADIS U.S., INC.

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY • COOPER-JAL UNIT SOUTH INJECTION SITE, LEA COUNTY, NEW MEXICO
CHLORIDE TREATMENT SYSTEM

PROPOSED RECOVERY SYSTEM PROCESS PIPING DIAGRAM

GENERAL, MECHANICAL, ELECTRICAL, STRUCTURAL, ETC. (IF REQUIRED)

ARCADIS Project No.
12345678.0000.12345
Date
OCTOBER 2023
ARCADIS
ADDRESS LINE1
ADDRESS LINE2
CITY, STATE
TEL. XXX.XXX.XXXX

1

C:\Users\wdberndg.ARCADIS-US\ACCDocs\Arcadis\AUS-CHEVRON-COOPER-JAL-LEA COUNTY New Mexico\Project Files\2023\01-In Progress\01-DWG\COOPER-JAL CHLORIDE TREATMENT.dwg LAYOUT: 2 SAVED: 11/20/2023 9:00 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ----
PLOTSTYLETABLE: PLTFULLRED.CTB PLOTTED: 11/29/2023 2:53 PM BY: BERNDGEN, WENDY DARLENE
XREFS: IMAGES: PROJECTNAME: ----

10' 0 5' 10'
1"=10' SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

Professional Engineer's Name (PE'S FULL NAME)		
Professional Engineer's No. (PE NUM)		
State (ST)	Date Signed	Project Mgr. (MGR)
Designed by (DSN)	Drawn by (DFT)	Checked by (CHK)

ARCADIS

ARCADIS U.S., INC.

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY • COOPER-JAL UNIT SOUTH INJECTION SITE, LEA COUNTY, NEW MEXICO

CHLORIDE TREATMENT SYSTEM

PROPOSED AST RECOVERY BATTERY DIAGRAM

GENERAL, MECHANICAL, ELECTRICAL, STRUCTURAL, ETC. (IF REQUIRED)

ARCADIS Project No.
12345678.0000.12345

Date
OCTOBER 2023

ARCADIS
ADDRESS LINE1
ADDRESS LINE2
CITY, STATE
TEL. XXX.XXX.XXXX

2

Dear Neighbor,

Chevron Environmental Management Company has issued for public comment a Stage 1 and Stage 2 Abatement Plan for the Cooper-Jal Unit South Injection Station (Station) in Lea County, New Mexico. Impacted groundwater from a historical earthen produced waterflow pit were investigated by the New Mexico Oil Conservation Division (NMOCD) beginning in 1993.The Stage 1 and Stage 2 Abatement Plan summarizes environmental monitoring and investigations at the Station (including data and maps of the extent), describes current conditions and need for abatement, and presents the proposed abatement plan, engineering design, and implementation details.

The NMOCD Director has reviewed the Stage 1 and Stage 2 Abatement Plan and determined that the Plan is administratively complete. The NMOCD Director has complied with Subsection B of 19.15.30.15 of the New Mexico Administrative Code by reviewing the document and concluding that it satisfies the requirements of Subsection C of 19.15.30.13.

The public may view the Stage 1 and Stage 2 Abatement Plan electronically on the NMOCD public database at https://wwwapps.emnrd.nm.gov/OCD/OCDPermitting/Data/Incidents/Incidents.aspx. Enter nAUTOfAB000105 in the Incident ID box, then scroll to the bottom of the page and click on Continue. To find the Stage 2 Abatement Plan, click on Item XXX dated XXX. The Stage 1 and Stage 2 Abatement Plan can also be viewed by contacting the NMOCD office listed below.

NMOCD is accepting written comments and requests for public hearing that include reasons why a hearing should be held. Before approving the Stage 1 and Stage 2 Abatement Plan, NMOCD will consider comments and requests if received within 30 days after publication of this public notice.

Please submit written comments by XXX, 2024 to Mike Buchanan, Environmental Specialist, New Mexico Oil Conservation Division, 8801 Horizon Blvd. NE, Suite 260, Albuquerque, NM 87113 or via email at michael.buchanan@emnrd.nm.gov. The responsible party's address is Chevron Environmental Management Company, Armando Martinez, P.O. Box 469, Questa, NM, 87564

PUBLIC NOTICE OF 30-DAY PUBLIC COMMENT PERIOD FOR STAGE 1 and Stage 2 ABATEMENT PLAN FOR THE COOPER-JAL SOUTH INJECTION STATION

Chevron Environmental Management Company has issued for public comment a Stage 1 and Stage 2 Abatement Plan for the Cooper-Jal Unit South Injection Station (Station) in Lea County, New Mexico. Impacted groundwater from a historical earthen produced waterflow pit were investigated by the New Mexico Oil Conservation Division (NMOCD) beginning in 1993.The Stage 1 and Stage 2 Abatement Plan summarizes environmental monitoring and investigations at the Station (including data and maps of the extent), describes current conditions and need for abatement, and presents the proposed abatement plan, engineering design, and implementation details.

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This notice was published on or near February 13, 2023, in the Albuquerque Journal, Hobbs News-Sun, and Jal Record newspapers.

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 376914

CONDITIONS

Operator:	
CHEVRON U S A INC 6301 Deauville Blvd Midland, TX 79706	OGRID: 4323
	Action Number: 376914
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
michael.buchanan	Appendices H, I and G have been accepted for the record. This has been submitted to complete the full ST1 & 2 submittal for the Cooper Jal Injection Station site.	8/23/2024