ATTACHMENT OP-2

NUMERICAL MODELING OF DRAWDOWN FROM IN-SITU MINING OF THE HJ AND KM HORIZONS

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LOST CREEK ISR, LLC
URANIUM IN-SITU RECOVERY PROJECT

LOST CREEK ISR PROJECT
SWEETWATER COUNTY, WY
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Petrotek Engineering Corporation
5935 South Zang Street, Suite 201
Littleton, Colorado 80127
Phone: (303) 290-9414
Fax: (303) 290-9580

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

NUMERICAL MODELING OF DRAWDOWN FROM IN-SITU MINING OF THE HJ AND KM HORIZONS
LOST CREEK ISR, LLC URANIUM PROJECT
SWEETWATER COUNTY, WYOMING

1 Introduction

Lost Creek ISR, LLC (LC), is submitting this response to the U.S. Nuclear Regulatory Commission (NRC) regarding requests for additional information (RAI) as part of the review of LC's application for the LC East Expansion area and KM Horizon amendments. NRC requested additional information regarding long-term life-of-mine (LOM) drawdown associated with mining and restoration activities in the HJ and KM Horizons present in the Lost Creek Project area. LC currently operates two Mine Units in the HJ Horizon.

Both the HJ and KM Horizons are discrete and continuous aquifers across the Project area and have sufficient confinement above and below these aquifers for the purpose of conducting In-Situ Recovery (ISR) operations. Numerical groundwater flow models were developed to predict the drawdown associated with operations in the HJ Horizon and KM Horizon Mine Units over a projected mining and restoration schedule for the mine.

This report describes the development of the numerical models and summarizes the results of numerical simulations used to address the RAI from the NRC. The methodologies and approach utilized in these simulations were discussed during a phone conversation with NRC on November 28, 2017.

2 Purpose and Objectives

These numerical groundwater flow models were developed to support LC in their proposed NRC license amendments for the KM Horizon and LC East expansion area. The objective of the modeling was to estimate drawdown that will result from mining and restoration from multiple Mine Units (MUs) in the HJ and KM Horizons. Figures 1 and 2 show the areal distribution of operating and proposed MUs in the HJ and KM Horizons, respectively. In the HJ Horizon, MU1 and MU2 are currently operational. MU1 has been operated since mid-2013. Mine Units 4, 5, 7, and 9 have yet to be constructed. As seen in Figure 1, the outlines for these MUs represent approximate extents and have not been finalized. In the KM Horizon, MU3, 8, 10, 11, and 12 have yet to be constructed, and the areas are estimated on Figure 2. Figures 1 and 2 also show the locations of simulated extraction wells in each MU that were utilized in the simulations to assess drawdown throughout LOM.

These simulations were conducted to provide additional and more detailed information to NRC regarding the drawdown associated with production and restoration operations in operating and proposed Mine Units within the HJ and KM Horizons, based on a preliminary operations schedule provided by LC. This schedule represents an aggressive mining and restoration scenario for the Lost Creek Project.

These simulations are not intended to evaluate detailed aquifer responses within individual Mine Units within the LC Permit Area. Calibration of these numerical models was focused on approximating the observed hydraulic gradient while using average hydrologic properties for the HJ and KM Horizons. Because the HJ Horizon is being actively mined, observed drawdown data at Mine Unit 1 (MU1) were utilized to assess the assignment of aquifer properties. For the purposes of these simulations and the stated objectives of assessing long-term drawdown at distance from the Project, average hydrologic properties evaluated by LC were utilized to define both aquifers. In addition, the influence and presence of local structure and faults was not explicitly incorporated into these simulations.

The numerical models for the HJ and KM Horizons are single-layer models that do not account for potential flow from overlying or underlying hydrostratigraphic units that could potentially reduce the level of drawdown simulated in these evaluations. As previously indicated, the proposed LOM schedule is considered the most aggressive scenario by LC. Therefore, the results of these drawdown simulations are considered conservative and probably overestimate the actual impacts of operations within these two Horizons.

3 Conceptual Model

The aquifers being simulated are within the HJ and KM Horizons, which are the uranium production zones for the Lost Creek ISR Project. Both Horizons are discrete and continuous sandstone aquifers across the Lost Creek Project area. The HJ Horizon is the shallower unit and the KM Horizon is deeper. The HJ Horizon crops out in the northeastern portion of the Permit Area within the LC East Expansion area. The underlying KM Horizon crops out to the northeast beyond the Permit Area. Figures 3 and 4 show the location of the recharge boundaries utilized in the simulations that approximate these outcrop areas in the HJ and KM Horizons, respectively. Both of these aquifers are expected to receive some level of recharge at outcrop through infiltration of precipitation and/or stream flow. Additional information regarding the locations of these simulated recharge areas and recharge volumes are provided in Section 4 and 5.

Utilizing drillhole data provided by LC, the tops of the HJ and KM Horizons were mapped within the areas where data are available within the Permit Area and extrapolated out to the edges of the model domains. Based on these data, both Horizons dip to the west-southwest at approximately 100 to 160 feet/mile (approximately 1 – 2 degrees), with dip angle decreasing slightly from northeast to southwest in the Project Area. The average total thickness assigned in the models, (based on drillhole data) is 120 feet for the HJ Horizon and 110 feet for the KM Horizon. Although there are localized variations in dip and thicknesses (that have been identified in areas of high drillhole density) the assumption of uniform aquifer thickness is appropriate for the purpose of assessing drawdown at distance from the Mine Units.

Potentiometric surfaces of the HJ and KM Horizons that are considered representative of pre-mining conditions were estimated from water level data collected primarily during July and August 2012, generally in the vicinity of MU1. Additional data to the northeast in the LC East Expansion area from September 2013 were also utilized to estimate potentiometric water elevations across the Permit Area. These data are provided in Appendix A. In general, the pre-mining groundwater flow direction (inferred to be perpendicular to the potentiometric surface contours) in both Horizons is oriented toward the southwest. Hydraulic gradients estimated from the pre-mining potentiometric surface range between approximately 0.008 ft/ft to 0.011 ft/ft, with the highest gradients estimated to occur in the northeastern portion of the Permit Area, closer to the areas of recharge. Similar to the approach for establishing the depth and overall dip of the Horizons, the presence of faulting that has been identified in the area of MU1 is ignored and an overall gradient has been estimated to encompass an area that extends a considerable distance outside of the Permit Area.

Hydraulic conductivity values for each Horizon are derived from the values presented in Table OP-3 ("Aquifer Characteristics for Drawdown Computation", previously provided to NRC, reproduced in Appendix A), which are considered representative values from the extensive hydrologic testing conducted at Lost Creek. As will be discussed later in this report, the initial hydraulic conductivity simulated for the HJ Horizon of 0.67 ft/day was revised to better reflect actual observed drawdown in the vicinity of MU1. A value of 1.0 ft/day was determined to be more appropriate based on these data. Hydraulic conductivity in the KM Horizon is simulated as 0.78 ft/day.

Storativity, or specific storage multiplied by aquifer thickness, is a measure of the water released from storage due to compaction of the aquifer and expansion of water in response to a decline in head. Storativity values simulated for both Horizons are also taken from the values presented in Table OP-3. For the HJ and KM Horizons, these values are 1.1×10^{-4} and 2.3×10^{-4}, respectively.

Specific yield is the volume of water that drains from a saturated rock under gravity and is the storage term utilized for partially saturated aquifers. Specific yield for both Horizons is estimated at a 2% which is considered a conservatively low value. Porosity for both Horizons is estimated at 24%. Additional information regarding aquifer properties is provided in Section 4.3.

4 Model Development

The model code used to simulate the Lost Creek ISR project was MODFLOW-SURFACT (Version 3.0), developed by HydroGeologic, Inc. (1996 and 2006). SURFACT is a proprietary version of the widely used and public domain MODFLOW code developed by the U.S. Geological Survey (McDonald, 1988 and 1996). MODFLOW simulates groundwater using a block-centered, finite difference approach that is capable of a wide array of boundary conditions. The code can simulate aquifer conditions as unconfined (partially saturated), confined (fully saturated), or a combination of the two. MODFLOW also supports variable layer thicknesses (i.e.,

variable top and bottom aquifer elevations). Documentation of all aspects of the MODFLOW code is provided in the user manuals (McDonald, 1988 and 1996).

SURFACT was designed to enhance the groundwater flow modeling capabilities of MODFLOW. SURFACT provides significant improvements over the original MODFLOW code with respect to variably saturated flow, dewatering and rewetting of cells within the model, and simulation of wells. Similar to the MODFLOW code, SURFACT is modular by design so that specific modules can be incorporated into the model simulations to address characteristics and physical processes of the site being modeled. These modules, or packages, work in conjunction with the original MODFLOW code. Only modules that address specifics of the site need to be included in the simulation. Full description of the SURFACT packages, including verification examples, is provided in the MODFLOW-SURFACT Software (Version 3.0) Documentation (HydroGeologic, Inc., 1996, 2006). Specific modules of SURFACT employed in this Project Area Model include the following:

- BCF4 – The block center flow package available in SURFACT provides rigorous treatment of partially saturated flow using a variably saturated formulation with psuedo-soil functions. The BCF4 package is superior to earlier versions of block centered flow packages in handling dewatering and rewetting of cells within the model simulation. The formulation has been designed to provide accurate delineation of the water table and capture the delayed yield response of a partially saturated system to pumping and recharge.

- FWL4 – The SURFACT fracture well package provides rigorous treatment of well withdrawal (or injection) conditions using one-dimensional fracture tube elements to emulate a well. This package allows accurate representation of wells screened across multi-layers, apportioning flow based on transmissivity and available head in each layer. The package also automatically adjusts flow rate when over-pumpage of a partially saturated aquifer occurs to prevent dewatering of the aquifer and can also simulate well bore storage. This package couples with the BCF4 package previously described to define partially saturated flow behavior in well cells such that the water table condition within a well cell is accurately represented.

- ATO4 – This adaptive time stepping package provided with SURFACT automatically controls time step size and simulation output. This package allows a simulation to be performed more efficiently and outputs to be reported at specific desired times of the simulation.

- PCG5 – SURFACT includes the option of using this Preconditioned Conjugate Gradient solver.

The pre/post-processor Groundwater Vistas (Environmental Simulations, Version 6, 2011) was used to assist with input of model parameters and output of model results. Groundwater Vistas serves as a direct interface with MODFLOW and SURFACT. Full

description of the Groundwater Vistas program is provided in the User's Guide to Groundwater Vistas, Version 6.0 (Environmental Simulations, Version 6, 2011).

4.1 Model Domain and Grid

The model domains utilized for both the HJ Horizon and the KM Horizon encompass an area of 900 square miles (30 miles by 30 miles). The Lost Creek Project Area is located in the central portion of the model domain. The boundaries of the model domain extend between approximately 11 to 18 miles beyond the Permit Area boundary. The extent of the model domains for the HJ and KM Horizons are illustrated on Figures 3 and 4, respectively.

The model grid was designed to provide adequate spatial resolution within the Project Area and the surrounding area in order to simulate drawdown at the Permit Area boundary and at distance from the Lost Creek Project. The model domain extends far enough beyond the Permit Area to minimize impacts of exterior boundary conditions on the model solution.

Cell dimensions within both the HJ and KM Horizon models are a uniform 200 feet by 200 feet. The models consists of 792 rows and 792 columns within one layer. In the HJ Horizon model there are 485,252 active cells; in the KM Horizon model there are 512,232 active cells. The northeast corners of the models are simulated using the No-Flow Boundary condition (blackened area referred to as "No-Flow Model Cells" on Figures 3 and 4), to represent the pinchout of both Horizons in that direction.

The model domains for these simulations represent the HJ and KM Horizons, with no-flow boundaries above and below these aquifers that represent the overlying and underlying aquitard confining units. This single layer modeling approach is appropriate for the objective of modeling in these two aquifers, which is to estimate long term drawdown resulting from operations at multiple mine units.

4.2 Boundary Conditions

Boundary conditions imposed on a numerical model define the external geometry of the groundwater flow system being evaluated in both Horizons. Boundary conditions assigned in the model were determined from observed geologic conditions and assumptions based on the likely regional flow direction and extrapolation of geologic data from drillholes. Descriptions of the types of boundary conditions that can be implemented with the MODFLOW code are found in McDonald and Harbaugh (1988). Boundary conditions used to represent hydrologic conditions at the Lost Creek site include general-head boundaries (GHB), recharge boundaries, and no-flow boundaries (NFB). The locations of these boundary conditions are shown on Figures 3 and 4 for the HJ and KM Horizons, respectively. Discussion of the placement and values for these boundary conditions is provided below.

GHBs were used in the Lost Creek Project Area model to account for inflow and outflow from the model domain. GHBs were assigned along the edges of the model domain where available water level data indicate the aquifer is being recharged from, or discharging to, a source external to the model domain. GHBs were used because the groundwater elevation near those boundaries can change in response to simulated stresses. The GHBs were located at a sufficient distance from the Project area (i.e., areas where groundwater is withdrawn) to minimize the impact on simulated drawdown in these models.

The heads in the GHBs at model boundaries were adjusted to approximate the observed pre-mining potentiometric surfaces in both Horizons.

Recharge area boundaries were assigned to both Horizons in the northeastern portions of these model domains based on an evaluation of the estimated geologic top of each Horizon, the estimated potentiometric surface for each Horizon, and a 30-meter digital elevation model (DEM; USGS National Elevation Dataset [NED]) for Sweetwater County, Wyoming. Initially, the extrapolated potentiometric surface elevation of each Horizon was subtracted from the extrapolated Horizon bottom elevation in Surfer® (Version 15, Golden Software [www.goldensoftware.com]) to locate the estimated extent of zero-head in each Horizon. This line was utilized as the downgradient extent of recharge applied for each Horizon. Assignment of the downgradient portion of recharge at this zero-head line was done to minimize the impacts of dry cells in these modeling simulations. The recharge boundaries were extended to the east (i.e., upgradient) a distance of approximately 3,400 feet, which represents the approximate distance between equal contour elevations of the extrapolated top and bottom of the HJ and KM Horizon near these recharge boundaries. The extrapolated tops for each Horizon were subtracted from the DEM to confirm these recharge boundaries are consistent with topography, and these evaluations confirm that the placement of the recharge boundaries in both Horizons is appropriate.

The conceptualization of recharge to the HJ and KM Horizons is that infiltration of precipitation and stream flow occurs to each unit where it is exposed in outcrop and that there is minimal, if any, recharge coming from overlying or underlying aquifers (at least under non-pumping conditions). Based on this conceptualization, the total flux of water through the recharge boundary of each Horizon must approximately equal the flux in the downgradient portion of each aquifer. If the recharge flux is too low, a steady-state solution will result in simulated water levels below those observed in these aquifers, and vice versa. Additional discussion of the determination of recharge is provided in Section 5.

Groundwater Vistas allows the option of simulating wells using either the MODFLOW well package or as analytical elements. MODFLOW simulation of the wells using either method of input is the same. The analytical elements method was selected for this model mainly for the ease of interactively adjusting well locations and for importing large numbers of wells into the model from spreadsheets. Analytical element wells were used to simulate the extraction of net bleed during mining operations and groundwater sweep

(GWS) and reverse-osmosis (RO) volumes during restoration. Specific rates applied to these wells varied according to the mining/restoration schedule that is described in Section 6 of this report.

No-flow boundaries were applied to those areas of the model domains northeast (i.e., upgradient) of the recharge boundary areas.

4.3 Aquifer Properties

Input parameters used in these models to simulate aquifer properties are consistent with site-derived hydrologic data including; top and bottom elevations of the HJ and KM Horizons, average thickness of each Horizon, hydraulic gradient, hydraulic conductivity, and storativity. Table OP-3 (previously provided to NRC by LC, see Appendix A) was used to provide average aquifer properties (thickness, hydraulic conductivity, and storativity) for both Horizons. The simulated top elevation of each Horizon was based on drill-hole data provided by LC, and these data were extrapolated out to the edges of each model domain. Average thicknesses of the HJ Horizon (120 feet) and KM Horizon (110 feet) were subtracted from the extrapolated top elevations in the model domain to define the simulated base of these aquifers.

Potentiometric surfaces for both Horizons, which serve as the basis of the initial conditions for the LOM simulations, are based on water level data collected primarily during July and August 2012, with additional data collected in the LC East Expansion area collected during 2013. Water level data utilized to construct these initial potentiometric surfaces are provided in Appendix A.

Initially, the hydraulic conductivity (K) value utilized in LOM simulations for the HJ Horizon was 0.67 ft/day, as provided in Table OP-3 (Appendix A). However, the simulated drawdown that resulted using that K value was greater than the observed drawdown at MU1, which produces from the HJ Horizon. As part of the calibration of the HJ model, the K value was adjusted to provide a better match to the drawdown that has been observed at MU1 after several years of ISR mining. The K value utilized in the final LOM simulation was more appropriately assigned as 1.0 ft/day. Additional information regarding this is provided in Section 6 of this report.

Storativity, or specific storage multiplied by aquifer thickness, is a measure of the water released from storage due to compaction of the aquifer and expansion of water in response to a decline in head. Storativity is the storage term used for confined (fully saturated) aquifers, where lowering of the potentiometric surface in response to pumping does not result in physical dewatering of the aquifer. Storativity values utilized for both Horizons are also taken from the values presented in Table OP-3 (Appendix A). For the HJ and KM Horizons, these values are 1.1×10^{-4} and 2.3×10^{-4}, respectively.

A determination of specific yield (Sy), which is necessary for the evaluation of partially saturated flow in those areas adjacent to recharge, has not been evaluated during hydrologic testing at the Lost Creek Project. Specific yield is the volume of water that

drains from a saturated rock under gravity and is the storage term utilized for partially saturated aquifers and typically ranges from 0.01 to 0.30 (Freeze and Cherry, 1979). These partially saturated areas for both Horizons are located in the northeastern-most portions of the Permit Area. Based on the 5-spot injection test results at Moore Ranch ISR Project (located northeast of Lost Creek in the Powder River Basin), the Sy values ranged from approximately 0.01 to 0.04 (Petrotek, 2008). A conservative assignment of 0.02 (2%) has been utilized for both Horizons. A higher value of specific yield would yield lower results of simulated drawdown.

Based on the previous discussion of aquifer properties, the following summarizes the average aquifer properties utilized for the HJ and KM Horizon simulations. These values are uniformly assigned to each single-layer Horizon model.

- HJ Horizon: 120 ft thick, K = 1 ft/d, S = 1.1 x 10^{-4}, Sy = 0.02, Porosity = 0.24
- KM Horizon: 110 ft thick, K = 0.78 ft/d, S = 2.3 x 10^{-4}, Sy = 0.02, Porosity = 0.24

5 Model Calibration

Groundwater flow model calibration is an integral component of groundwater modeling applications. Calibration of a numerical groundwater flow model is the process of adjusting model parameters to obtain a reasonable match between field measured values and model predicted values of heads and fluxes (Woessner and Anderson, 1992). The calibration procedure is generally performed by varying estimates of model parameters (hydraulic properties) and/or boundary condition values from a set of initial estimates until an acceptable match of simulated and observed water levels and/or flux is achieved. Calibration can be accomplished using trial and error methods or automated techniques (often referred to as inverse modeling).

Initial calibration for both of these models involved a best-fit match to static (pre-mining) water level conditions utilizing the general head boundaries and flux through the recharge boundaries.

Based on the conceptual models of both Horizons, the flux through the recharge boundaries must approximately equal the flux downgradient in the aquifer. In the model domain, recharge is assigned a value of ft/day. Total flux (in ft^3/day) through all recharge cells is equivalent to this rate multiplied by the total area of recharge. Flux through the aquifer is defined by the following formula:

Q = K*i*A

Where Q = Flux (ft^3/day)
K = Hydraulic conductivity (ft/day)
I = Hydraulic gradient (ft/ft)
A = Cross-sectional area (ft^2, aquifer thickness * length parallel to hydraulic gradient)

Additional transient calibration was conducted for the HJ Horizon, based on observed drawdown in the vicinity of MU1 at the monitor well ring. This calibration involved approximately matching observed drawdown through adjustment of hydraulic conductivity. Additional information related to this calibration is provided in Section 5.2. All numerical model files are provided in Appendix B.

5.1 HJ Horizon Steady-State Calibration

Calibration to initial static (pre-mining) water level conditions was achieved by minor adjustments in the GHBs and in total flux through the recharge boundary. The primary goal of the steady state calibration was to simulate a potentiometric surface similar to observed data in the vicinity of the Permit Area, approximating the hydraulic gradient and inferred direction of groundwater flow (perpendicular to the potentiometric surface contours). To better simulate water level conditions observed near the areas of outcrop, water level data at monitor wells located in the northeastern extent of Permit Area were included as calibration targets.

Figure 5 presents the simulated steady-state potentiometric surface. Two head targets are shown on this figure, wells M-HJ4 and M-HJ5, located within and just northeast of MU9, respectively. Simulated water levels at these locations are within approximately ±2 feet of observed water level elevations (a negative value on Figure 5 indicates simulated water levels are above target elevations, and vice versa). This steady-state calibration was a reasonable approximation of the potentiometric surface data from 2012 and 2013 (provided in Appendix A) with respect to water level elevations nearest to outcrop, the hydraulic gradient, and groundwater flow direction. Simulated hydraulic gradients within the Permit Area range between approximately 0.008 to 0.010 ft/ft, which agrees well with the static potentiometric surface data.

Figure 5 also shows the extent of fully saturated (flooded) model cells downgradient of the recharge boundary. Adjacent to the recharge boundary near the Permit Area, the HJ Horizon is simulated as partially saturated for a distance of slightly less than one mile.

As previously discussed, recharge flux should approximate the flux through the downgradient aquifer. Total simulated recharge flux into the HJ Horizon model domain is equal to approximately 152,500 ft^3/day. A straight-line measurement of the recharge area from the northwestern to the southeastern edges of the model (parallel to the static potentiometric surface) measures approximately 26 miles. Assuming a hydraulic conductivity of 1 ft/day, and a hydraulic gradient of 0.008 to 0.01 ft/ft, the aquifer flux through a cross sectional area of 26 miles (137,280 ft) by 120 ft thick (using the equation previously described as Q = K*i*A), ranges from,

$$Q = 1 \text{ ft/d} * 0.008 \text{ ft/ft} * (137280 \text{ ft} * 120 \text{ ft}) = 131{,}789 \text{ ft}^3\text{/d, to}$$
$$Q = 1 \text{ ft/d} * 0.010 \text{ ft/ft} * (137280 \text{ ft} * 120 \text{ ft}) = 164{,}736 \text{ ft}^3\text{/d}$$

The total recharge applied in this steady state calibration is within the range of aquifer flux estimated and is appropriate based on the conceptual model of the HJ aquifer.

5.2 HJ Horizon, Calibration to MU1 Observed Drawdown

Initially, the HJ Model domain was developed assuming a hydraulic conductivity of 0.67 ft/day. The steady state calibration and results for this scenario are essentially identical, except recharge flux is 33% less (aquifer flux for K = 0.67 ft/day is 67% of that where K = 1.0 ft/day). Initial LOM simulations were conducted to evaluate simulated drawdown in the vicinity of MU1, where approximately 10 feet of drawdown has been observed at the monitor well ring.

Figure 7 presents the simulated drawdown at the end of Stress Period 4, or the 2nd quarter of 2017 (see Table 2). Drawdown in the vicinity of the monitoring well ring is approximately 15 feet with a K value of 0.67 ft/day. Alternate values for K were assessed and a value of 1.0 ft/day was chosen as this value resulted in simulated drawdown of approximately 10 feet near the monitor well ring. This simulated drawdown contour map is provided in Figure 8. Therefore, a value 1.0 ft/day for K was chosen for the final steady state calibration and for subsequent LOM simulations. It is noted that this value is within the range of aquifer properties that have been evaluated during hydrologic testing.

5.3 KM Horizon Steady State Calibration

Steady-state calibration of the KM Horizon to initial pre-mining water level conditions was achieved by minor adjustments in the GHBs and in total flux through the recharge boundary. As with the HJ model, the primary goal of steady state calibration of the KM Horizon was to simulate a potentiometric surface similar to observed data in the vicinity of the Permit Area, approximating the hydraulic gradient and inferred direction of groundwater flow (perpendicular to the potentiometric surface contours). Water level data at monitor wells located in the northeastern extent of Permit Area were included as calibration targets, to better simulate water level conditions observed near the areas of outcrop and areas where partially saturated flow conditions exist or are likely to exist during LOM simulations.

Figure 6 presents the simulated steady-state potentiometric surface for the KM Horizon. Two head targets are shown on this figure, wells M-KM9 and M-KM10, located near MU11. The simulated potentiometric head at well M-KM10 (upgradient) was approximately 10 feet lower than the target head value, and approximately 5.8 feet above the target head value at M-KM9. While the match to observed water level data was not quite as good for the HJ Horizon steady-state calibration, the calibration for initial conditions is considered sufficient as simulated hydraulic gradients range between approximately 0.008 to 0.010 ft/ft, which agrees well with the static potentiometric surface data, and water level elevation near recharge areas is reasonable.

Figure 6 also shows the extent of fully saturated (flooded) model cells downgradient of the recharge boundary. Adjacent to the recharge boundary near the Permit Area, the KM Horizon is simulated as partially saturated for a distance of slightly more than one mile.

Total recharge flux into the model domain is equal to approximately 115,300 ft^3/day. Several recharge zones were implemented in the KM Horizon model domain to improve the KM Horizon model calibration. Recharge values in these zones were varied by approximately 10% to improve the calibration to the head targets. A straight-line measurement of the recharge area from the northwestern to the southeastern edges of the model (parallel to the static potentiometric surface) measures approximately 23 miles. As previously discussed, the total recharge flux should approximate the flux through the downgradient aquifer.

Assuming a hydraulic conductivity of 0.78 ft/day, and a hydraulic gradient of 0.008 to 0.01 ft/ft, the aquifer flux through a cross sectional area of 23 miles (121,440 ft) by 110 ft thick (using the equation previously described as Q = K*i*A), ranges from,

Q = 0.78 ft/d * 0.008 ft/ft * (121,440 ft * 110 ft) = 83,356 ft^3/d, to
Q = 0.78 ft/d * 0.010 ft/ft * (121,440 ft * 110 ft) = 104,196 ft^3/d

The total recharge flux applied to achieve a steady-state calibration is slightly higher than that predicted based on the calculation of aquifer flux. However, the simulation of total recharge in the KM Horizon model is considered appropriate as it provided a reasonable steady state calibration for initial conditions (water levels and potentiometric surface).

6 Life-of-Mine Operational Simulations to Assess Drawdown

The numerical groundwater flow models were developed to estimate the drawdown resulting from ISR operations in the HJ and KM Horizons during projected mining and groundwater restoration operations. LC projected a preliminary mining and restoration schedule by Mine Unit that was developed for a 12 year period, where Year 1 is defined as 2017. Table 1 shows this schedule for all HJ and KM Horizon Mine Units. Data for MU1 through the 2^{nd} quarter of 2017 are based on actual flow volumes utilized in this operating Mine Unit. This preliminary schedule includes production flow rate, net bleed (approximately 0.6%), and GWS and RO withdrawals during restoration activities. This preliminary schedule represents an aggressive scenario for development of the HJ and KM Horizons in the Lost Creek area.

For the purposes of these simulations, the volumes extracted from both the HJ and KM Horizons represent only net bleed during operations, and GWS and RO volumes during restoration. Table 2 presents the simulated extraction volumes for HJ Horizon Mine Units (MU1, MU2, MU4, MU5, MU7, and MU9) that are based on the operational schedule in Table 1. The stress periods used during the modeling are also shown on Table 2, where 31 stress periods were set up in the numerical model to simulate extraction by Mine Unit through time. Stress periods were determined by evaluating quarterly flow and defining the average flow per Mine Unit over that duration. When there were significant changes in anticipated flow (i.e., initiation of restoration or a new Mine Unit going into production), a new stress period was initiated. Stress period 31

represents a five-year duration of monitoring (1,825 days) of simulated recovery following the cessation of operations. Stress period durations during mining and restoration range from 91.25 days (one quarter of a year) to 547.5 days (1.5 years).

Table 3 presents the simulated extraction volumes for the KM Horizon Mine Units (MU3, MU8, MU10, MU11, and MU12) and the simulated stress periods for the numerical modeling evaluation, which were determined in a similar manner as the HJ Horizon Mine Units. There are 22 stress periods, with the final stress period representing a five-year duration of monitoring of simulated recovery following the end of operations. Based on the preliminary schedule, restoration activities are estimated to end by the 3rd quarter of Year 12 (Table 1). For consistency with HJ Horizon simulations, the five-year period of post-operations drawdown simulations for the KM Mine Units is extended beyond the end of Year 12. Stress period durations during mining and restoration activities range from 91.25 days (one quarter of a year) to 456.25 days (1.25 years).

Extraction volumes were distributed to a discrete number of simulated extraction wells within the Mine Units, or the approximate extents of Mine Units not yet constructed. The number of wells varies from one Mine Unit to another and is loosely based on the size of the Mine Unit. The total extraction volume per stress period was divided equally among the simulated extraction wells within a single Mine Unit so the total flow volume is equivalent to the values presented in Tables 2 and 3. Figures 1 and 2 show the distribution and number of these simulated extraction wells for the HJ and KM Horizons, respectively. All numerical model files are provided in Appendix B.

6.1 HJ Horizon

The initial conditions for the HJ Horizon LOM simulation were based on the simulated steady-state potentiometric surface presented in Figure 5. As previously stated, the hydraulic conductivity for the HJ Horizon model was assigned 1 ft/day, based on calibration to the observed drawdown in the vicinity of MU1.

Figure 9 presents a simulated drawdown contour map that represents the maximum extent of simulated drawdown at distance from the Lost Creek Permit Area. This figure represents simulated conditions after the 2nd quarter of Year 6 of the operations schedule for the HJ Horizon (Table 2). The minimum drawdown shown on the figure is 5 feet which is considered a reasonable point of reference for potential impacts resulting from ISR operations at LC. The 5-foot simulated drawdown contour extends approximately 9.5 miles to the southwest of the Permit Area. Figure 10 presents the simulated drawdown contour map at the end of operations in the HJ Horizon. The 5-foot drawdown contour extends approximately 5 miles beyond the southwestern portion of the Permit Area. Simulated drawdown in this figure is concentrated in the central portion of the Permit Area, as restoration operations in MU9 have completed. Figure 11 presents the simulated drawdown contour map five years after the end of operations, as no extraction via pumping has been simulated during this duration. Simulated water levels have recovered to within approximately 4 to 9 feet of initial conditions five years following the end of ISR activities.

Figure 12 presents a hydrograph of simulated drawdown through the entire simulation period at select locations along the edges of the Permit Area as well as a location 5 miles southwest of the Permit Area. The locations of these points are provided on Figures 9 through 11. These hydrographs provide a visualization of simulated drawdown through time at distance from the Mine Units during the projected production/restoration and recovery schedule.

6.2 KM Horizon

The initial conditions for the LOM simulation for the KM Horizon were based on the simulated steady-state potentiometric surface presented in Figure 6. Figure 13 presents the maximum extent of simulated drawdown in the KM Horizon, which occurs after the end of the 4th quarter of Year 12. While projected operations ceased after the 3rd quarter, simulated drawdown continued to expand slightly further away from the Permit Area. The minimum drawdown shown on the figure is 5 feet, which is considered a reasonable point of reference for potential impacts resulting from ISR operations at LC within the KM Horizon. The simulated 5-foot drawdown contour extends approximately 5 miles beyond the southwestern corner of the Permit Area and approximately 5.5 miles beyond the northwestern corner. Figure 14 presents the simulated drawdown contour map five years beyond Year 12 of the operations schedule (or 5.25 years beyond the end of ISR operations in the KM Horizon). Recovery of water levels to initial conditions is relatively slower at distance from the Permit Area in the KM Horizon versus the HJ Horizon, which is likely due to the location of final Mine Unit undergoing restoration (MU12) in the KM Horizon. This KM Horizon Mine Unit is located in the far western portion of the Permit Area, whereas the final Mine Unit undergoing restoration in the HJ Horizon is located much closer to the area of recharge (see Figure 10) where the storage term for a partially saturated aquifer is based on the specific yield.

Figure 15 presents a hydrograph of simulated drawdown through the entire simulation period at select locations along the edges of the Permit Area as well as a location 5 miles southwest of the Permit Area boundary. The locations of these points are provided on Figures 13 and 14. These hydrographs provide a visualization of simulated drawdown through time at distance from the Mine Units during the projected production/restoration and recovery schedule for the KM Horizon.

7 Summary

Numerical groundwater models were developed for the HJ and KM Horizons to evaluate long-term drawdown resulting from ISR operations of the Lost Creek uranium project. The models were developed using site-specific data regarding the geology and aquifer properties for both Horizons, as provided in Table OP-3. Water level data from 2012 and 2013 were utilized to determine static pre-mining potentiometric conditions for both Horizons, and observed drawdown in MU1 during ISR operations was used to calibrate hydraulic conductivity for the HJ Horizon.

The numerical models were used to simulate the preliminary operational schedule of mining and groundwater restoration for each Horizon. The production/restoration schedule utilized in the modeling represents the most aggressive scenario for operations at the site. Single-layer model domains were utilized for simulating both Horizons, at a size sufficient to assess long-term drawdown at distance from the Permit Area. These models do no incorporate or consider potential inflow through adjacent units to the production Horizons that could potentially increase under non-equilibrium (i.e., pumping) scenarios. Therefore, these simulated drawdown impacts are considered to be conservative.

Based on these simulations, maximum extent of drawdown of 5 feet or more in the HJ Horizon is estimated to be approximately 10 miles beyond the Permit Area. This occurs in the 2nd Quarter of Year 6 of the Projected Operations Schedule (Table 1). In the KM Horizon, the maximum extent of drawdown of five feet or more is estimated to be slightly more than 5 miles beyond the Permit Area and occurs in the 4th quarter of Year 12 of the Projected Operations Schedule.

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Table 1. Proposed Operations Schedule, Lost Creek ISR Project

		Year -4		Year -3				Year -2				Year -1				Year 1				Year 2				Year 3				Year 4				Year 5				Year 6				Year 7				Year 8				Year 9				Year 10				Year 11				Year 12			
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
MU1	Production Flowrate (gpm)	735	695	1366	803	970	1145	1681	1839	1935	2385	1854	2210	2469	2559	2404	2378	2005	1887	1821	1412																																										
(HJ)	Net Bleed (gpm)	4	4	8	5	6	7	10	11	12	14	11	13	15	15	14	14	12	11	11	8																																										
	Net GWS Withdrawal (gpm)																		200	72	72	72																																									
	Net RO Withdrawal (gpm)																						72	72	72																																						
	Net Withdrawal (gpm)	**4**	**4**	**8**	**5**	**6**	**7**	**10**	**11**	**12**	**14**	**11**	**13**	**15**	**15**	**14**	**14**	**12**	**211**	**83**	**80**	**72**	**72**	**72**	**72**																																						
MU2	Production Flowrate (gpm)																	400	400	3721	4421	6000	5468	4987	4202	3544	3497	2174	314																																		
(HJ)	Net Bleed (gpm)																	2	2	22	27	36	33	30	25	21	21	13	2																																		
	Net GWS Withdrawal (gpm)																									80	72	72	72	72																																	
	Net RO Withdrawal (gpm)																														72	72																															
	Net Withdrawal (gpm)																	**2**	**2**	**22**	**27**	**36**	**33**	**30**	**25**	**101**	**93**	**85**	**74**	**72**	**72**	**72**																															
MU5	Production Flowrate (gpm)																						532	1013	1798	2456	2503	2155	1795	1795	1795	1795	1795	663																													
(HJ)	Net Bleed (gpm)																						3	6	11	15	15	13	11	11	11	11	11	4																													
	Net GWS Withdrawal (gpm)																																80	72																													
	Net RO Withdrawal (gpm)																																																														
	Net Withdrawal (gpm)																						**3**	**6**	**11**	**15**	**15**	**13**	**11**	**11**	**11**	**11**	**91**	**76**																													
MU4	Production Flowrate (gpm)																											1671	1509	1500	1500	1500	1500	707	910																												
(HJ)	Net Bleed (gpm)																											10	9	9	9	9	9	4	5																												
	Net GWS Withdrawal (gpm)																																		80	72																											
	Net RO Withdrawal (gpm)																																				72																										
	Net Withdrawal (gpm)																											**10**	**9**	**9**	**9**	**9**	**9**	**4**	**85**	**72**	**72**																										
MU8	Production Flowrate (gpm)																												2381	2705	2705	2705	2705	1372	1600	462	316	296	200																								
(KM)	Net Bleed (gpm)																												14	16	16	16	16	8	10	3	2	2	1																								
	Net GWS Withdrawal (gpm)																																						80	72																							
	Net RO Withdrawal (gpm)																																																													
	Net Withdrawal (gpm)																												**14**	**16**	**16**	**16**	**16**	**8**	**10**	**3**	**2**	**2**	**81**	**72**																							
MU3	Production Flowrate (gpm)																																	3258	3490	2523	2159	1834	1846	1153	250	250																					
(KM)	Net Bleed (gpm)																																	20	21	15	13	11	11	7	2	2																					
	Net GWS Withdrawal (gpm)																																								80	80	72																				
	Net RO Withdrawal (gpm)																																											72																			
	Net Withdrawal (gpm)																																	**20**	**21**	**15**	**13**	**11**	**11**	**7**	**82**	**82**	**72**	**72**																			
MU7	Production Flowrate (gpm)																																			3015	3525	3870	3954	4847	5750	5750	6000	6000	6000	6000	4569	3294	638	638	638	638	638										
(HJ)	Net Bleed (gpm)																																			18	21	23	24	29	35	35	36	36	36	36	27	20	4	4	4	4	4										
	Net GWS Withdrawal (gpm)																																																	80	72	72	72	36									
	Net RO Withdrawal (gpm)																																																								36						
	Net Withdrawal (gpm)																																			**18**	**21**	**23**	**24**	**29**	**35**	**35**	**36**	**36**	**36**	**36**	**27**	**20**	**4**	**84**	**76**	**76**	**76**	**36**			**36**						
MU10	Production Flowrate (gpm)																																														1431	1431	1108	1108	1108	1108	1108	597									
(KM)	Net Bleed (gpm)																																														9	9	7	7	7	7	7	4									
	Net GWS Withdrawal (gpm)																																																					40	40								
	Net RO Withdrawal (gpm)																																																								36	36					
	Net Withdrawal (gpm)																																														**9**	**9**	**7**	**7**	**7**	**7**	**7**	**44**	**40**		**36**	**36**					
MU11	Production Flowrate (gpm)																																															1275	1152	1152	1152	1152	1152	800	800								
(KM)	Net Bleed (gpm)																																															8	7	7	7	7	7	5	5								
	Net GWS Withdrawal (gpm)																																																						40	80							
	Net RO Withdrawal (gpm)																																																									36					
	Net Withdrawal (gpm)																																															**8**	**7**	**7**	**7**	**7**	**7**	**5**	**45**	**80**		**36**					
MU12	Production Flowrate (gpm)																																																3102	3102	3102	3102	3102	2800	2800	2800	2800	2200	2000				
(KM)	Net Bleed (gpm)																																																19	19	19	19	19	17	17	17	17	13	12				
	Net GWS Withdrawal (gpm)																																																										80	72	72		
	Net RO Withdrawal (gpm)																																																													145	
	Net Withdrawal (gpm)																																																**19**	**19**	**19**	**19**	**19**	**17**	**17**	**17**	**17**	**13**	**92**	**72**	**72**	**145**	
MU9	Production Flowrate (gpm)																																																				1803	1803	1803	1800	1700	1600	1500	1300		
(HJ)	Net Bleed (gpm)																																																				11	11	11	11	10	10	9	8		
	Net GWS Withdrawal (gpm)																																																													40	
	Net RO Withdrawal (gpm)																																																													145	290
	Net Withdrawal (gpm)																																																				**11**	**11**	**11**	**11**	**10**	**10**	**9**	**8**	**185**	**290**
Quarterly Plant Flow (gpm)		735	695	1366	803	970	1145	1681	1839	1935	2385	1854	2210	2469	2559	2404	2378	2405	2287	5542	5833	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	5403	4603	4600	3900	3600	1500	1300	0	0
Bleed Flow (gpm)		4	4	8	5	6	7	10	11	12	14	11	13	15	15	14	14	14	14	33	35	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	32	28	28	23	22	9	8	0	0
GWS Flow (gpm)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200	72	72	72	0	0	0	80	72	72	72	72	0	0	80	72	80	72	0	0	80	72	80	80	72	0	0	0	0	0	0	80	72	72	72	76	80	80	0	0	80	72	72	40	0
RO Flow (gpm)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	72	72	0	0	0	0	0	72	72	0	0	0	0	72	0	0	0	0	0	0	72	0	0	0	0	0	0	0	0	0	0	0	0	72	72	0	0	0	290	290
Total Consumptive Use (gpm)		**4**	**4**	**8**	**5**	**6**	**7**	**10**	**11**	**12**	**14**	**11**	**13**	**15**	**15**	**14**	**14**	**14**	**214**	**105**	**107**	**108**	**108**	**108**	**108**	**116**	**108**	**108**	**108**	**108**	**108**	**108**	**116**	**108**	**116**	**108**	**108**	**36**	**116**	**108**	**116**	**116**	**108**	**108**	**36**	**36**	**36**	**36**	**36**	**116**	**108**	**108**	**108**	**112**	**112**	**108**	**100**	**95**	**102**	**81**	**80**	**330**	**290**

Table 2. HJ Horizon Model, Simulated Extraction by Year and Stress Period

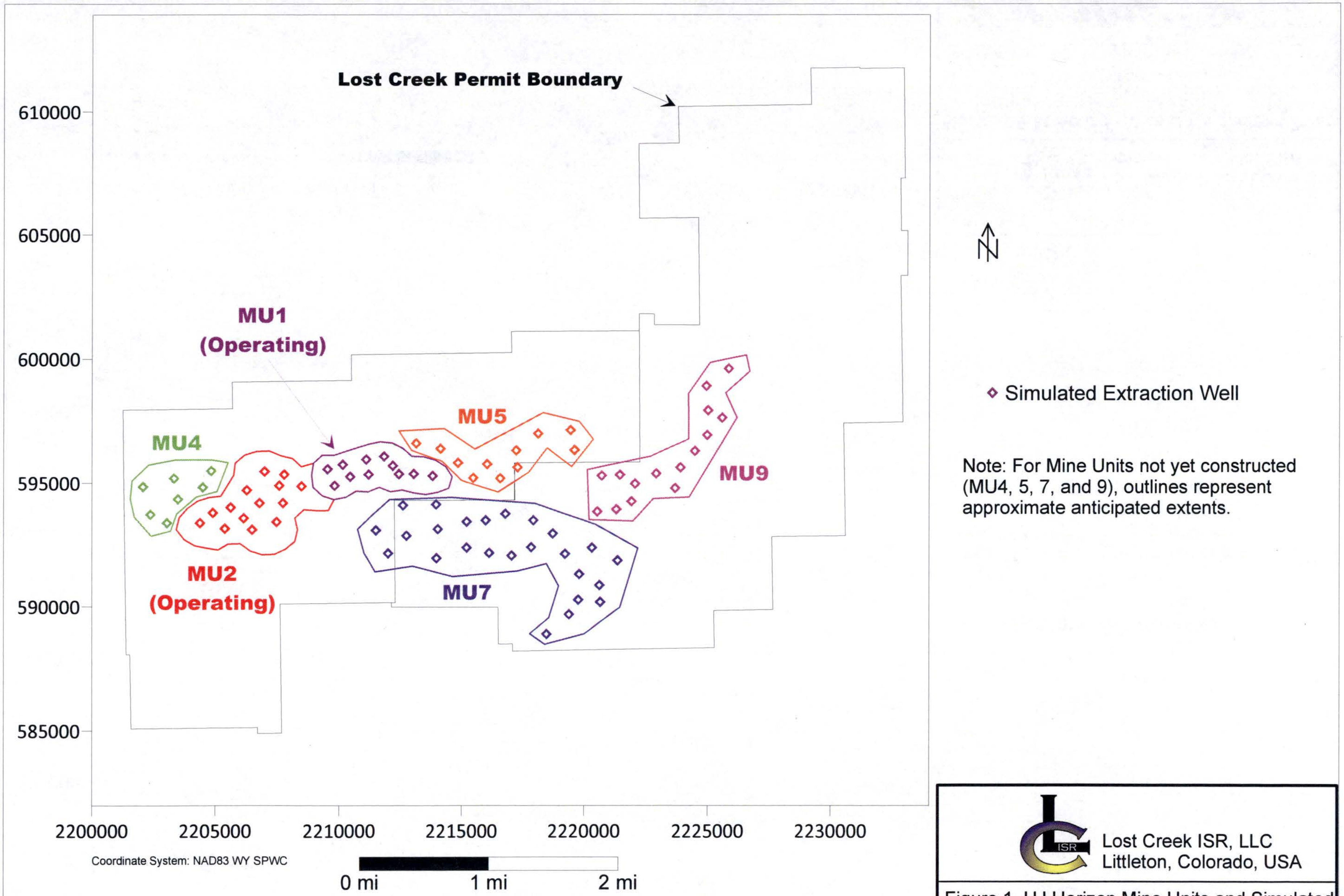
Stress Period (SP)		1		2				3				4						5	6	7		8	9
Duration (Days)		182.50		365.00				365.00				547.50						91.25	91.25	182.50		91.25	91.25
		Year -4		Year -3				Year -2				Year -1				Year 1				Year 2			
HJ Mine Units		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
MU1	Net Withdrawal (gpm)	4.4	4.2	8.2	4.8	5.8	6.9	10.1	11.0	11.6	14.3	11.1	13.3	14.8	15.4	14.4	14.3	12.0	211.3	82.9	80.5	72.0	72.0
MU2	Net Withdrawal (gpm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	2.4	22.3	26.5	36.0	32.8
MU5	Net Withdrawal (gpm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2
MU4	Net Withdrawal (gpm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MU7	Net Withdrawal (gpm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MU9	Net Withdrawal (gpm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total HJ Bleed (GPM)		4.4	4.2	8.2	4.8	5.8	6.9	10.1	11.0	11.6	14.3	11.1	13.3	14.8	15.4	14.4	14.3	14.4	213.7	105.3	107.0	108.0	108.0
MU1	Ave. Net Withdrawal per SP (gpm)		4.3				6.4				11.8						13.9	12.0	211.3		81.7	72.0	72.0
MU2	Ave. Net Withdrawal per SP (gpm)		0.0				0.0				0.0						0.0	2.4	2.4		24.4	36.0	32.8
MU5	Ave. Net Withdrawal per SP (gpm)		0.0				0.0				0.0						0.0	0.0	0.0		0.0	0.0	3.2
MU4	Ave. Net Withdrawal per SP (gpm)		0.0				0.0				0.0						0.0	0.0	0.0		0.0	0.0	0.0
MU7	Ave. Net Withdrawal per SP (gpm)		0.0				0.0				0.0						0.0	0.0	0.0		0.0	0.0	0.0
MU9	Ave. Net Withdrawal per SP (gpm)		0.0				0.0				0.0						0.0	0.0	0.0		0.0	0.0	0.0

Stress Period (SP)		10		11		12	13				14	15	16	17		18		19				20			
Duration (Days)		182.50		182.50		91.25	365.00				91.25	91.25	91.25	182.50		182.50		365.00				365.00			
		Year 3				Year 4				Year 5				Year 6				Year 7				Year 8			
HJ Mine Units		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
MU1	Net Withdrawal (gpm)	72.0	72.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MU2	Net Withdrawal (gpm)	29.9	25.2	101.3	93.0	85.0	73.9	72.0	72.0	72.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MU5	Net Withdrawal (gpm)	6.1	10.8	14.7	15.0	12.9	10.8	10.8	10.8	10.8	90.8	76.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MU4	Net Withdrawal (gpm)	0.0	0.0	0.0	0.0	10.0	9.1	9.0	9.0	9.0	9.0	4.2	85.5	72.0	72.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MU7	Net Withdrawal (gpm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.1	21.2	23.2	23.7	29.1	34.5	34.5	36.0	36.0	36.0	36.0	27.4
MU9	Net Withdrawal (gpm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total HJ Bleed (GPM)		108.0	108.0	116.0	108.0	108.0	93.7	91.8	91.8	91.8	99.8	80.2	85.5	90.1	93.2	23.2	23.7	29.1	34.5	34.5	36.0	36.0	36.0	36.0	27.4
MU1	Ave. Net Withdrawal per SP (gpm)		72.0		0.0	0.0				0.0	0.0	0.0	0.0		0.0		0.0				0.0				0.0
MU2	Ave. Net Withdrawal per SP (gpm)		27.6		97.1	85.0				72.5	0.0	0.0	0.0		0.0		0.0				0.0				0.0
MU5	Ave. Net Withdrawal per SP (gpm)		8.4		14.9	12.9				10.8	90.8	76.0	0.0		0.0		0.0				0.0				0.0
MU4	Ave. Net Withdrawal per SP (gpm)		0.0		0.0	10.0				9.0	9.0	4.2	85.5		72.0		0.0				0.0				0.0
MU7	Ave. Net Withdrawal per SP (gpm)		0.0		0.0	0.0				0.0	0.0	0.0	0.0		19.6		23.5				33.5				33.9
MU9	Ave. Net Withdrawal per SP (gpm)		0.0		0.0	0.0				0.0	0.0	0.0	0.0		0.0		0.0				0.0				0.0

Stress Period (SP)		21	22	23	24			25	26		27	28				29	30	31
Duration (Days)		91.25	91.25	91.25	273.75			91.25	182.50		91.25	365.00				91.25	91.25	1825.00
		Year 9				Year 10				Year 11				Year 12				Post-Op
HJ Mine Units		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
MU1	Net Withdrawal (gpm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MU2	Net Withdrawal (gpm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MU5	Net Withdrawal (gpm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MU4	Net Withdrawal (gpm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MU7	Net Withdrawal (gpm)	19.8	3.8	83.8	75.8	75.8	75.8	36.0	0.0	0.0	36.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MU9	Net Withdrawal (gpm)	0.0	0.0	0.0	0.0	0.0	0.0	10.8	10.8	10.8	10.8	10.2	9.6	9.0	7.8	185.0	290.0	0.0
Total HJ Bleed (GPM)		19.8	3.8	83.8	75.8	75.8	75.8	46.8	10.8	10.8	46.8	10.2	9.6	9.0	7.8	185.0	290.0	0.0
MU1	Ave. Net Withdrawal per SP (gpm)	0.0	0.0	0.0			0.0	0.0		0.0	0.0				0.0	0.0	0.0	0.0
MU2	Ave. Net Withdrawal per SP (gpm)	0.0	0.0	0.0			0.0	0.0		0.0	0.0				0.0	0.0	0.0	0.0
MU5	Ave. Net Withdrawal per SP (gpm)	0.0	0.0	0.0			0.0	0.0		0.0	0.0				0.0	0.0	0.0	0.0
MU4	Ave. Net Withdrawal per SP (gpm)	0.0	0.0	0.0			0.0	0.0		0.0	0.0				0.0	0.0	0.0	0.0
MU7	Ave. Net Withdrawal per SP (gpm)	19.8	3.8	83.8			75.8	36.0		0.0	36.0				0.0	0.0	0.0	0.0
MU9	Ave. Net Withdrawal per SP (gpm)	0.0	0.0	0.0			0.0	10.8		10.8	10.8				9.2	185.0	290.0	0.0

Table 3. KM Horizon Model, Simulated Extraction by Year and Stress Period

	Stress Period (SP)	1					2		3			4	5	6		7		8		9	10	11					12	13	14	15	16	17	18	19	20	21	22
	Duration (Days)	456.25					182.50		273.75			91.25	91.25	182.50		182.50		182.50		91.25	91.25	456.25					91.25	91.25	91.25	91.25	91.25	91.25	91.25	91.25	91.25	91.25	1825.00
		Year 4			Year 5				Year 6				Year 7				Year 8				Year 9				Year 10				Year 11				Year 12				Post-Op
KM Mine Units		Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
MU8	Net Withdrawal (gpm)	14.29	16.23	16.23	16.23	16.23	8.23	9.60	2.77	1.90	1.78	81.20	72.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MU3	Net Withdrawal (gpm)	0.00	0.00	0.00	0.00	0.00	19.55	20.94	15.14	12.95	11.00	11.08	6.92	81.50	81.50	72.00	72.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MU10	Net Withdrawal (gpm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.59	8.59	6.65	6.65	6.65	6.65	6.65	43.58	40.00	0.00	36.00	36.00	0.00	0.00	0.00	0.00	0.00	0.00
MU11	Net Withdrawal (gpm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.65	6.91	6.91	6.91	6.91	6.91	4.80	44.80	80.00	0.00	36.00	0.00	0.00	0.00	0.00	0.00	0.00
MU12	Net Withdrawal (gpm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.61	18.61	18.61	18.61	18.61	16.80	16.80	16.80	16.80	13.20	92.00	72.00	72.00	145.00	0.00	0.00
	Total KM Bleed (GPM)	14.29	16.23	16.23	16.23	16.23	27.78	30.54	17.91	14.85	12.78	92.28	78.92	81.50	81.50	72.00	72.00	0.00	0.00	8.59	16.24	32.17	32.17	32.17	32.17	32.17	65.18	101.60	96.80	52.80	85.20	92.00	72.00	72.00	145.00	0.00	
MU8	Ave. Net Withdrawal per SP (gpm)					15.84		8.92			2.15	81.20	72.00		0.00		0.00		0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MU3	Ave. Net Withdrawal per SP (gpm)					0.00		20.24			13.03	11.08	6.92		81.50		72.00		0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MU10	Ave. Net Withdrawal per SP (gpm)					0.00		0.00			0.00	0.00	0.00		0.00		0.00		0.00	8.59	8.59					6.65	43.58	40.00	0.00	36.00	36.00	0.00	0.00	0.00	0.00	0.00	0.00
MU11	Ave. Net Withdrawal per SP (gpm)					0.00		0.00			0.00	0.00	0.00		0.00		0.00		0.00	0.00	7.65					6.91	4.80	44.80	80.00	0.00	36.00	0.00	0.00	0.00	0.00	0.00	0.00
MU12	Ave. Net Withdrawal per SP (gpm)					0.00		0.00			0.00	0.00	0.00		0.00		0.00		0.00	0.00	0.00					18.61	16.80	16.80	16.80	16.80	13.20	92.00	72.00	72.00	145.00	0.00	0.00



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Littleton, Colorado, USA

Figure 1. HJ Horizon Mine Units and Simulated Extraction Wells

January 2018 NRC RAI Response

Fig1_HJ MUs.srf	Date: January 2018	By: AAP	Checked: HD

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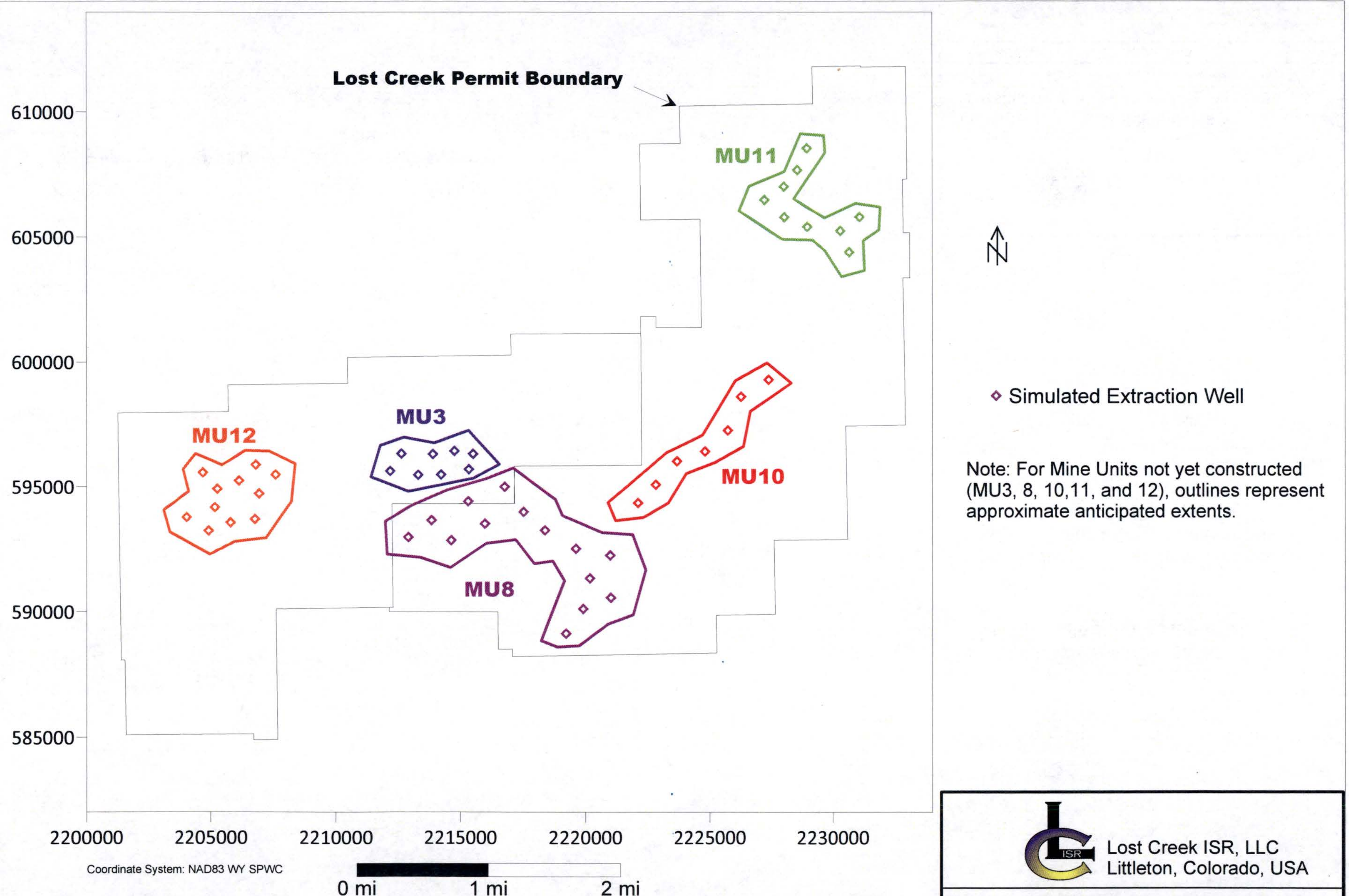

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Littleton, Colorado, USA

Figure 2. KM Horizon Mine Units and Simulated Extraction Wells

January 2018 NRC RAI Response

Fig2_KM MUs.srf	Date: January 2018	By: AAP	Checked: HD

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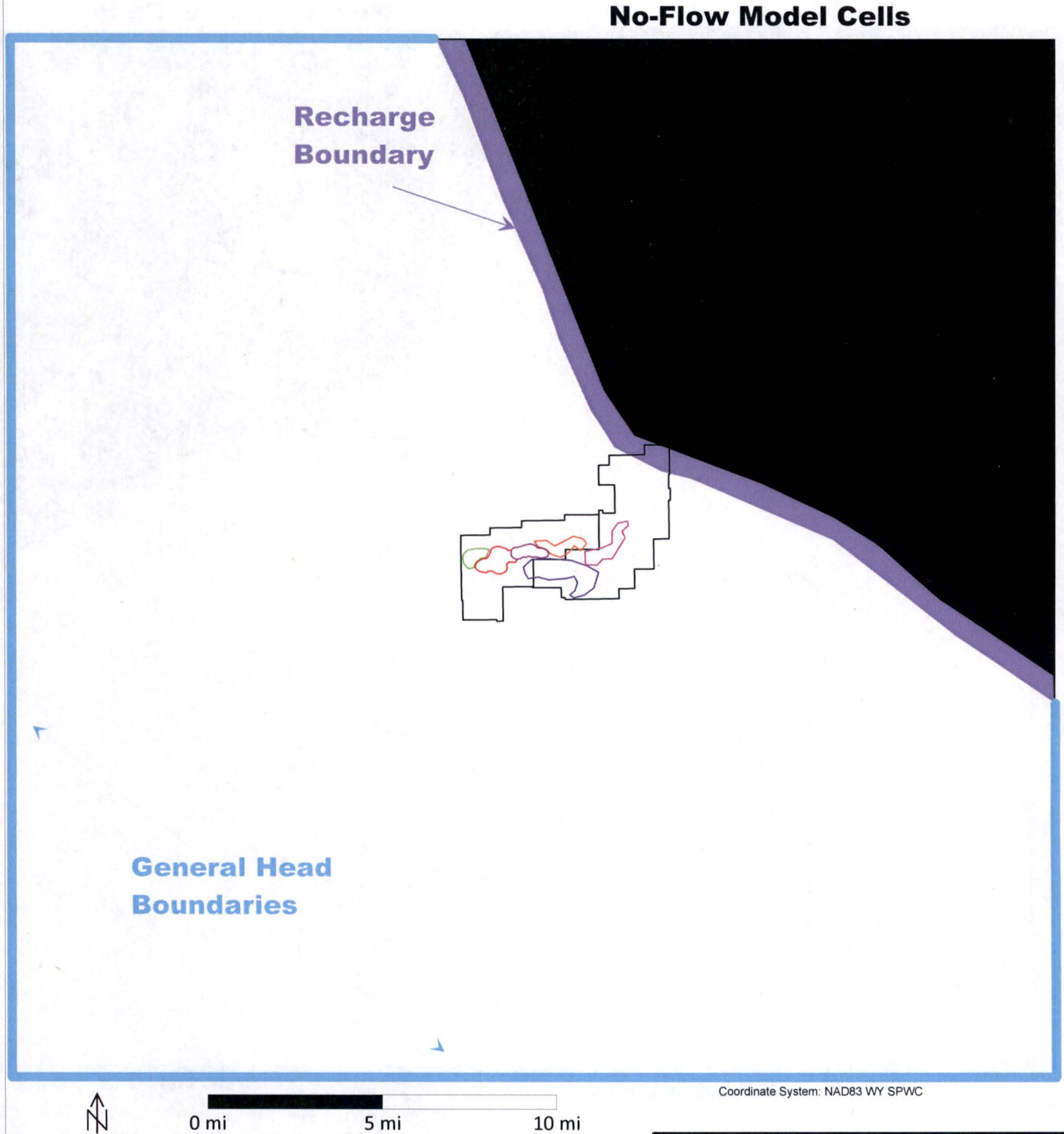

Coordinate System: NAD83 WY SPWC

Note: For Mine Units not yet constructed (MU4, 5, 7, and 9), outlines represent approximate anticipated extents.

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Figure 3. HJ Horizon Model Domain and Boundary Conditions

January 2018 NRC RAI Response

Fig3_HJ Model Domain.srf	Date: January 2018	By: AAP	Checked: HD

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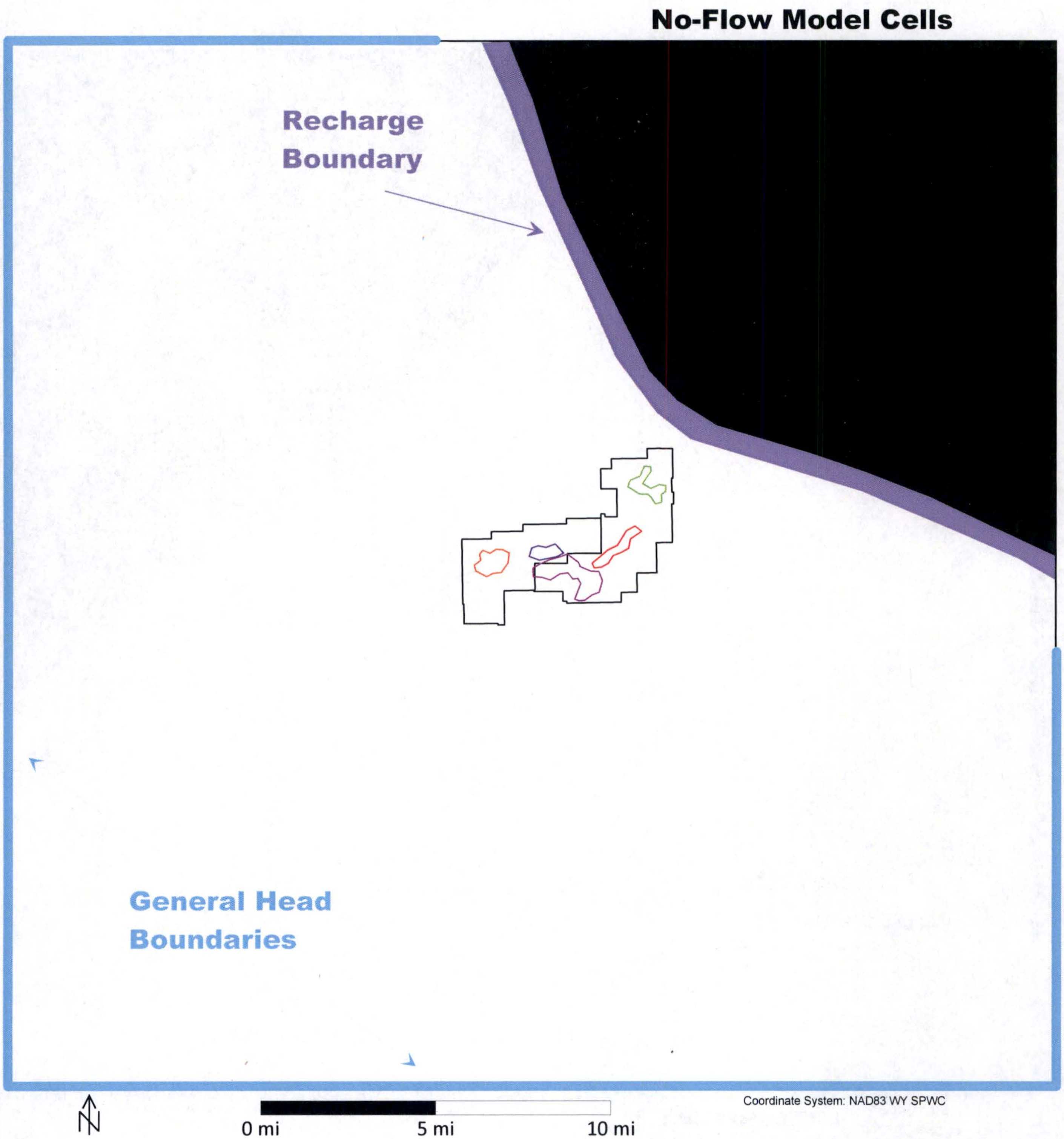

Note: For KM Mine Units not yet constructed (MU3, 8, 10, 11, and 12), outlines represent approximate anticipated extents.

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Figure 4. KM Horizon Model Domain and Boundary Conditions

January 2018 NRC RAI Response

Fig4_KM Model Domain.srf	Date: January 2018	By: AAP	Checked: HD

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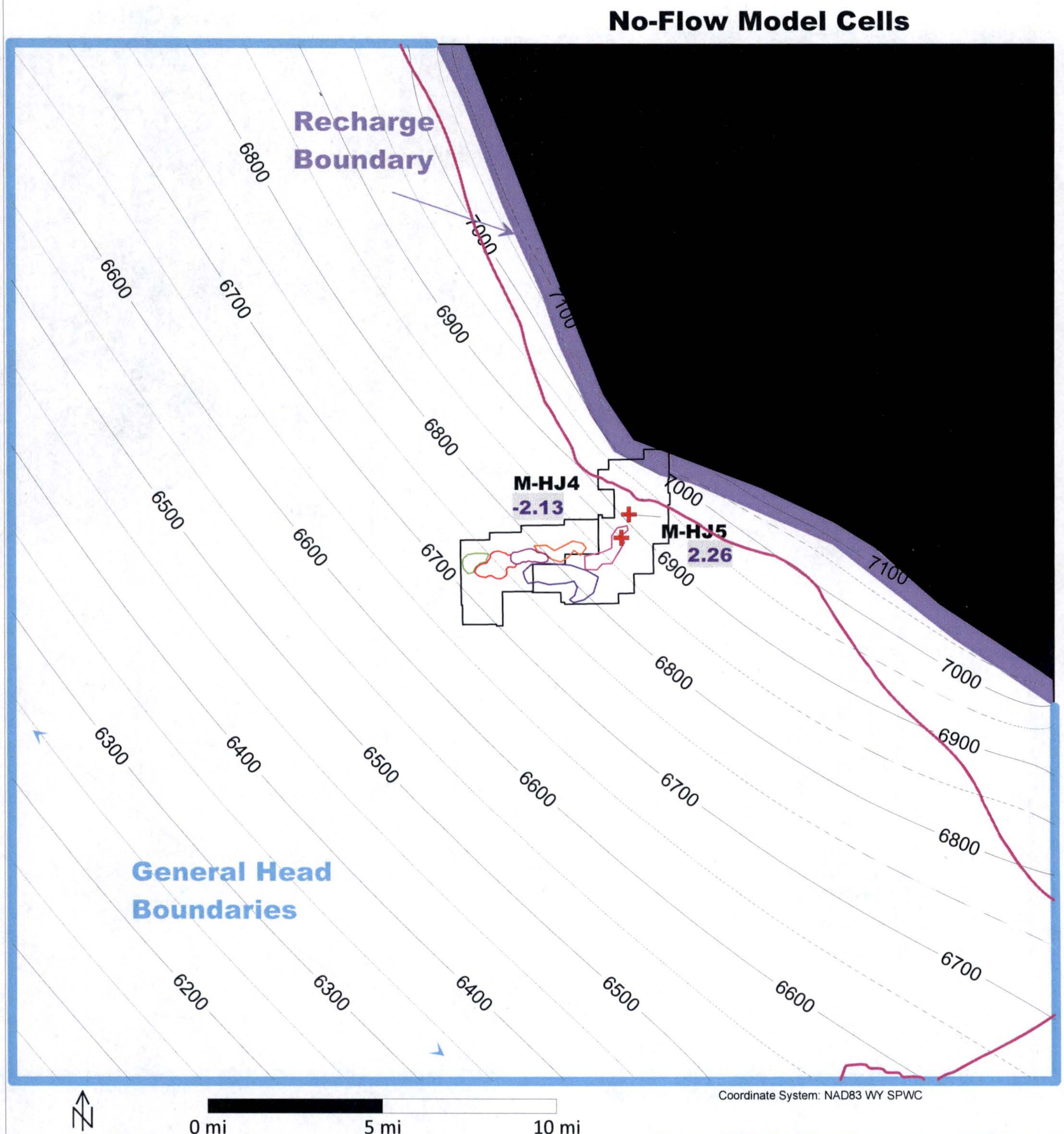

— 6500 — Simulated Potentiometric Surface Contours (contour interval 50 feet)

+ Water Level Target Well

2.26 (Positive Values indicate Simulated Water Level < Observed) (Negative Value indicates Simulated Water Level > Observed)

Extent of Flooded Cells (Fully Saturated)

Note: For Mine Units not yet constructed (MU4, 5, 7, and 9), outlines represent approximate anticipated extents.

Lost Creek ISR, LLC
Littleton, Colorado, USA

Figure 5. HJ Horizon Model, Simulated Steady State Potentiometric Surface

January 2018 NRC RAI Response

Fig5_HJ SS PotSurf.srf	Date: January 2018	By: AAP	Checked: HD

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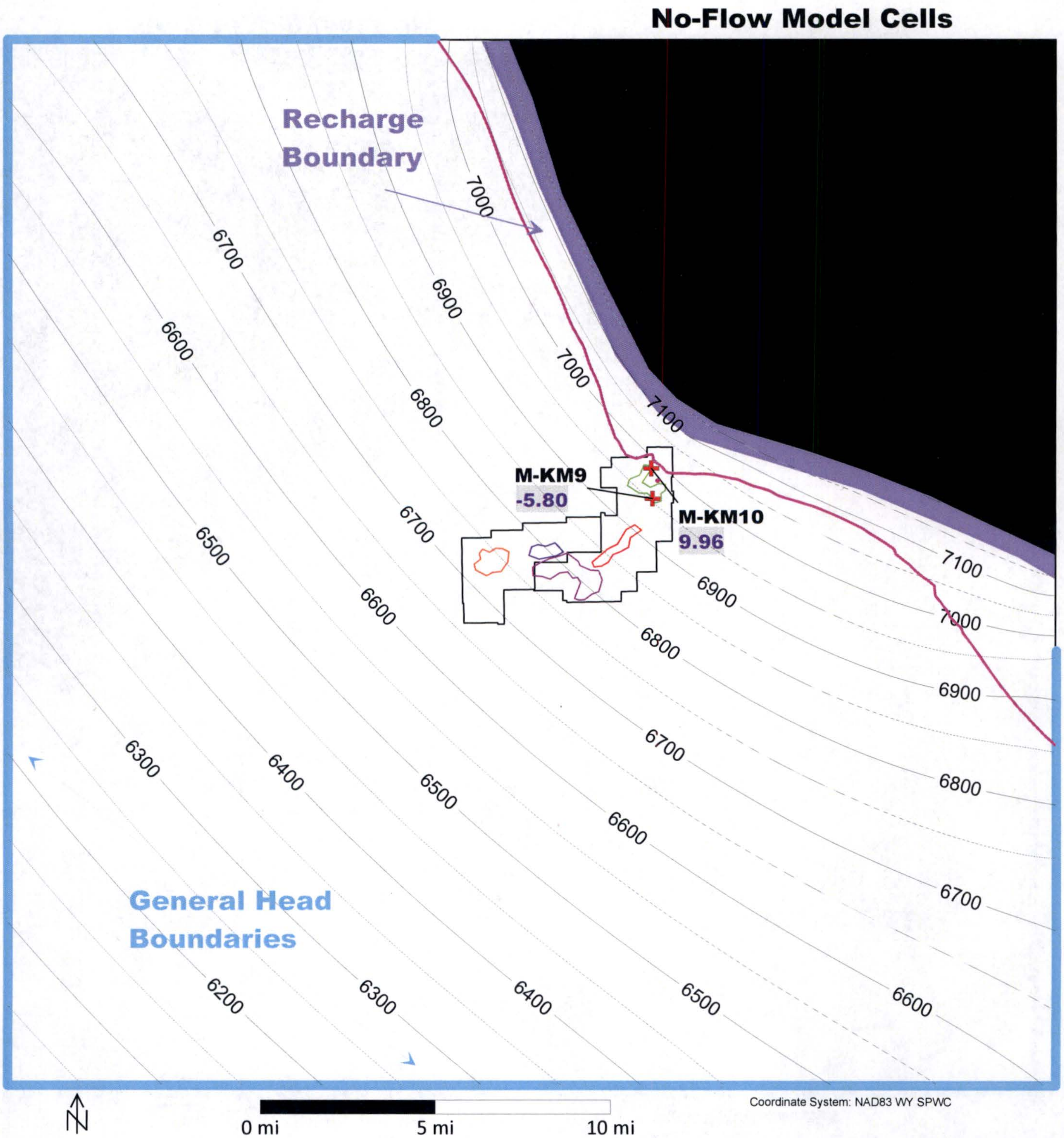

6500 — Simulated Potentiometric Surface Contours (contour interval 50 feet)

+ Water Level Target Well

-5.80 (Positive Values indicate Simulated Water Level < Observed)
(Negative Value indicates Simulated Water Level > Observed)

Extent of Flooded Cells (Fully Saturated)

Note: For KM Mine Units not yet constructed (MU3, 8, 10, 11, and 12), outlines represent approximate anticipated extents.

Lost Creek ISR, LLC
Littleton, Colorado, USA

Figure 6. KM Horizon Model, Simulated Steady State Potentiometric Surface

January 2018 NRC RAI Response

Fig6_KM SS PotSurf.srf	Date: January 2018	By: AAP	Checked: HD

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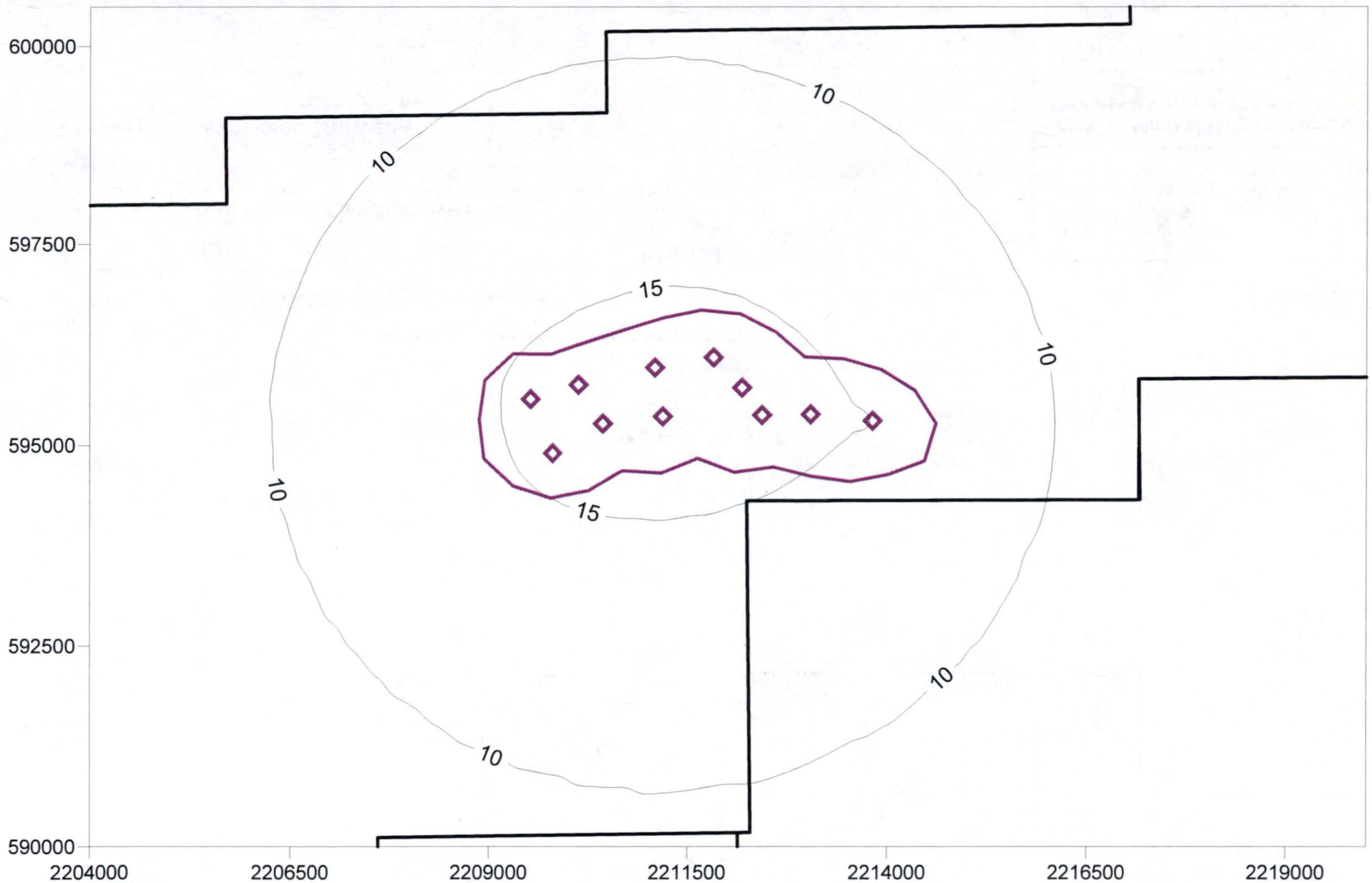

Coordinate System: NAD83 WY SPWC

0 ft 1000 ft 2000 ft

N

◇ Simulated Extraction Well

10 Simulated Drawdown Contour Interval 5 feet

Lost Creek ISR, LLC
Littleton, Colorado, USA

Figure 7. Mine Unit 1, HJ Horizon, Simulated Drawdown through Mid-2017, K = 0.67 ft/d

January 2018 NRC RAI Response

Fig7_MU1 dd K 0.67.srf	Date: January 2018	By: AAP	Checked: HD

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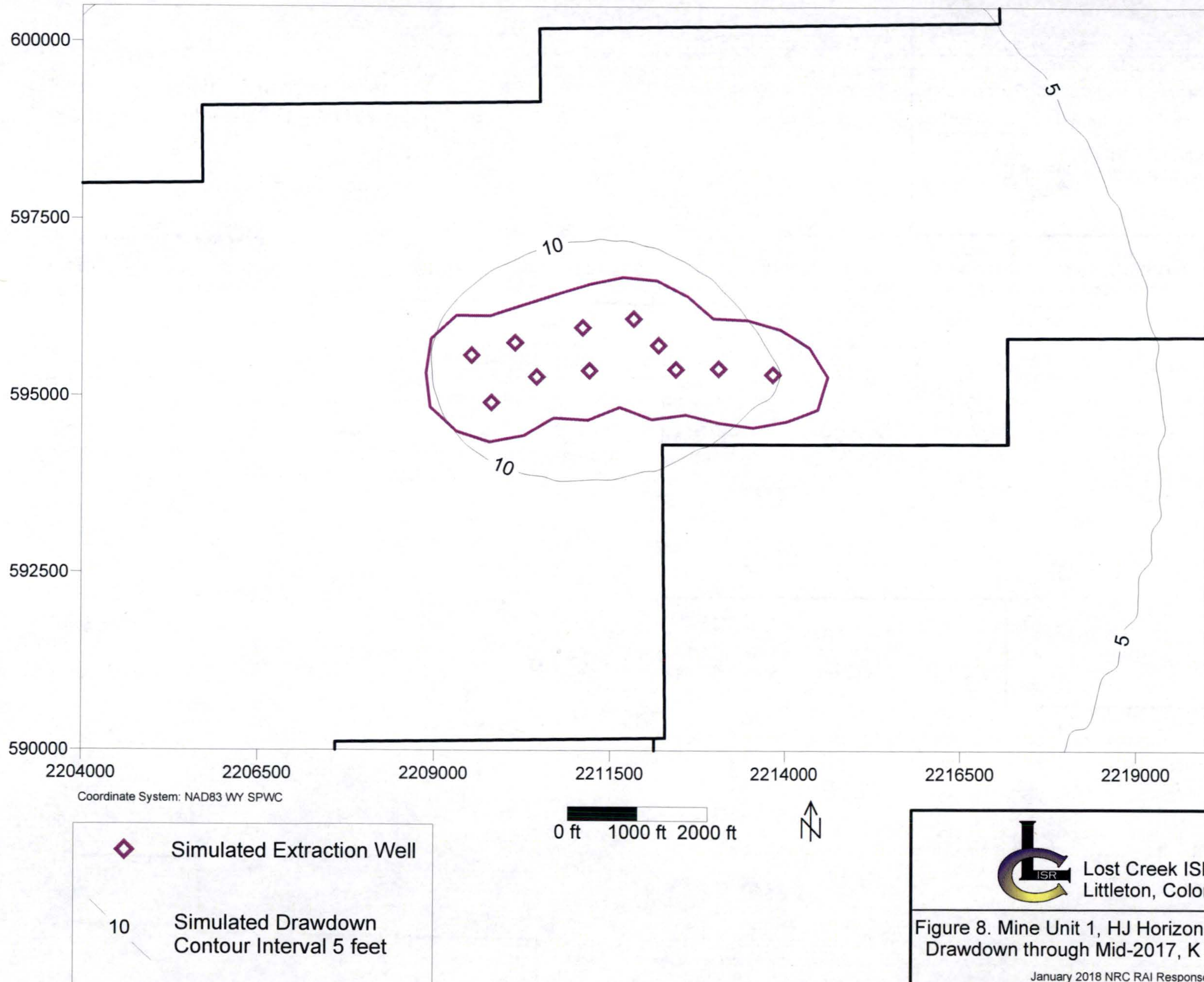

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Littleton, Colorado, USA

Figure 8. Mine Unit 1, HJ Horizon, Simulated Drawdown through Mid-2017, K = 1.0 ft/d

January 2018 NRC RAI Response

Fig8_MU1 dd K 1.0.srf	Date: January 2018	By: AAP	Checked: HD

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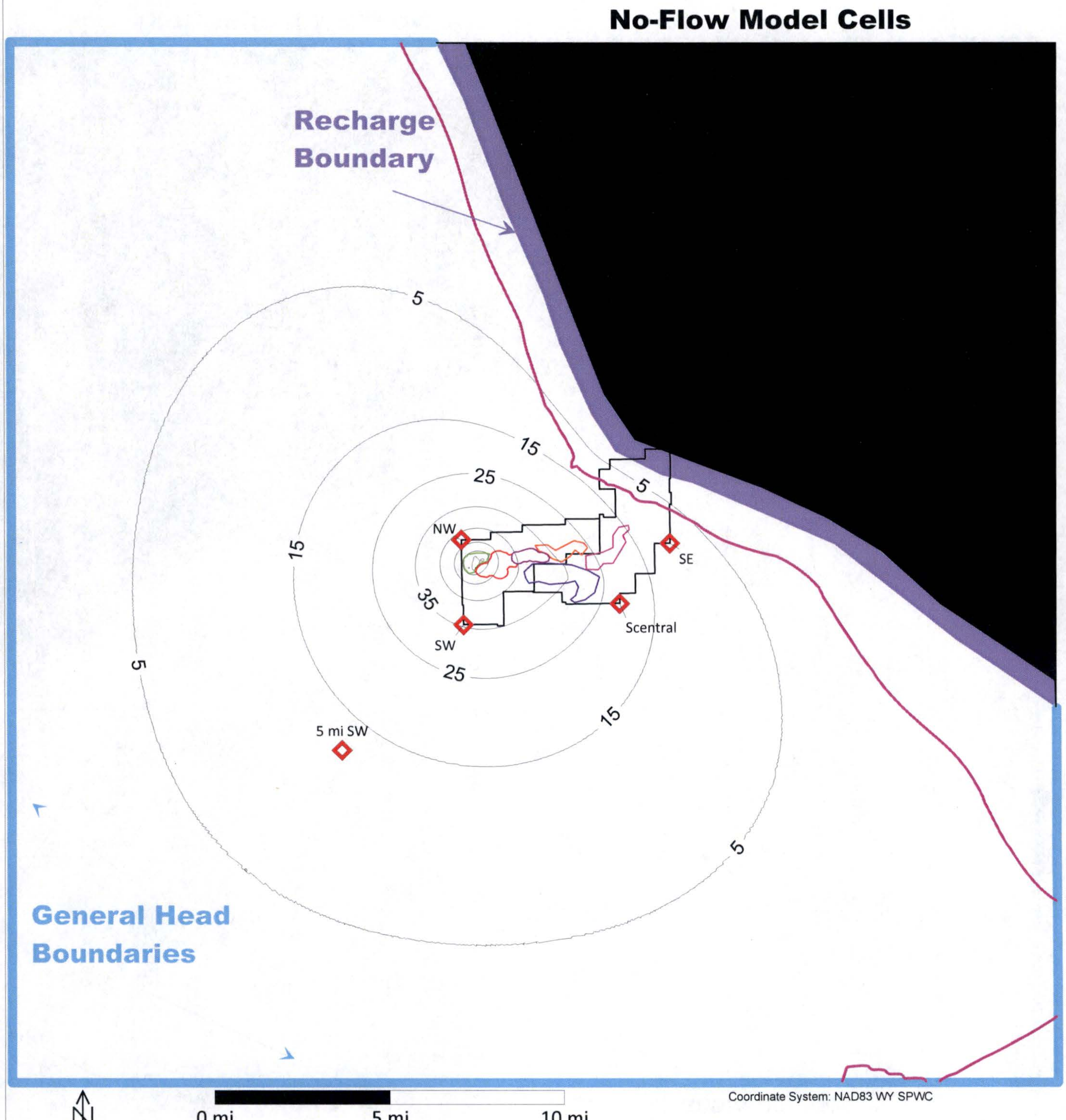

Note: For Mine Units not yet constructed (MU4, 5, 7, and 9), outlines represent approximate anticipated extents.

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Figure 9. HJ Horizon Model, Maximum Extent of Simulated Drawdown (2Q Year 6)

January 2018 NRC RAI Response

Fig9_HJ Max s SP17.srf	Date: January 2018	By: AAP	Checked: HD

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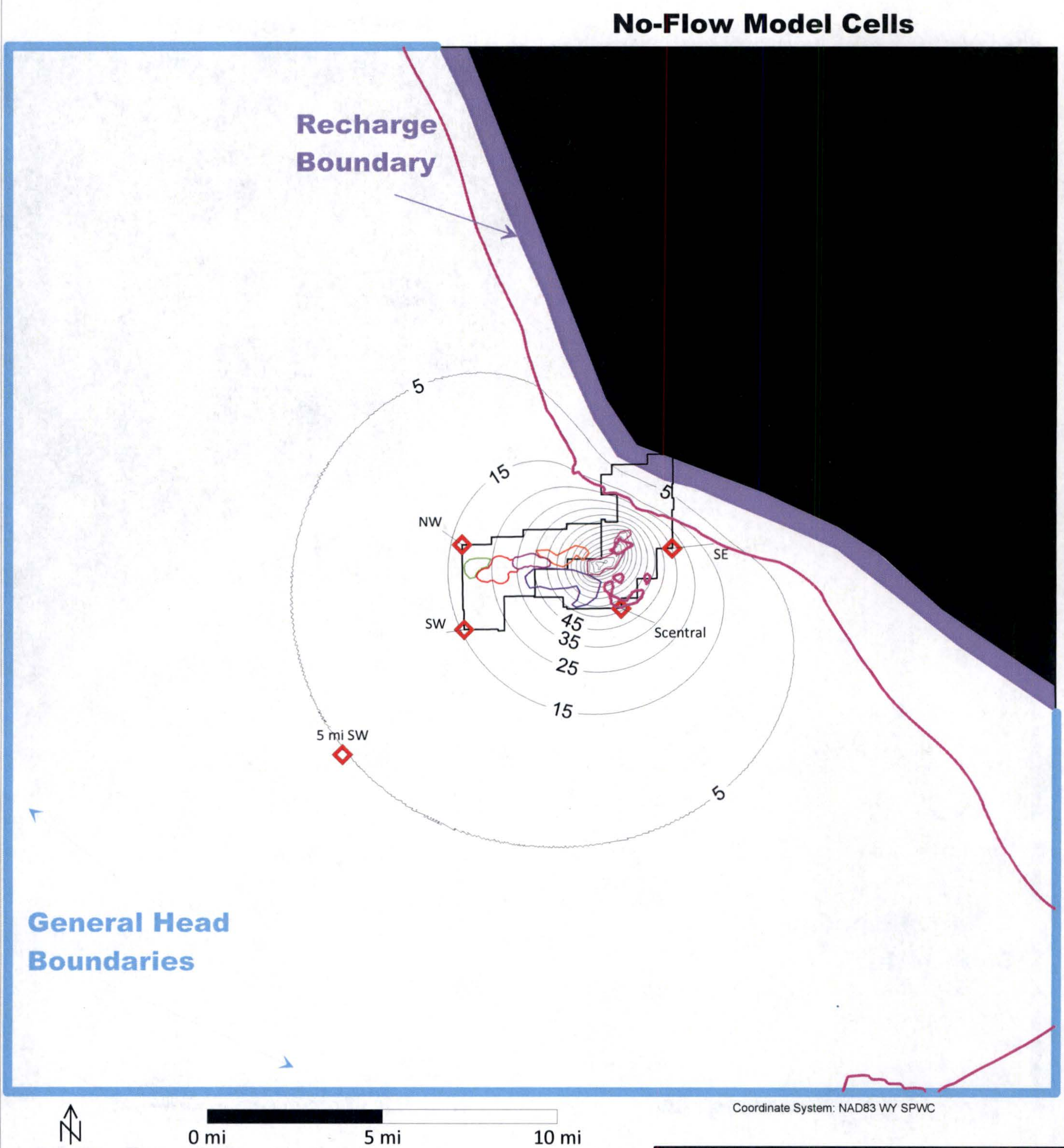

5 Simulated Drawdown Contour Interval 5 feet

Simulated Hydrograph Location

Extent of Flooded Cells (Fully Saturated)

Note: For Mine Units not yet constructed (MU4, 5, 7, and 9), outlines represent approximate anticipated extents.

Lost Creek ISR, LLC
Littleton, Colorado, USA

Figure 10. HJ Horizon Model, Simulated Drawdown, End of Operations

January 2018 NRC RAI Response

Fig10_HJ s SP30.srf	Date: January 2018	By: AAP	Checked: HD

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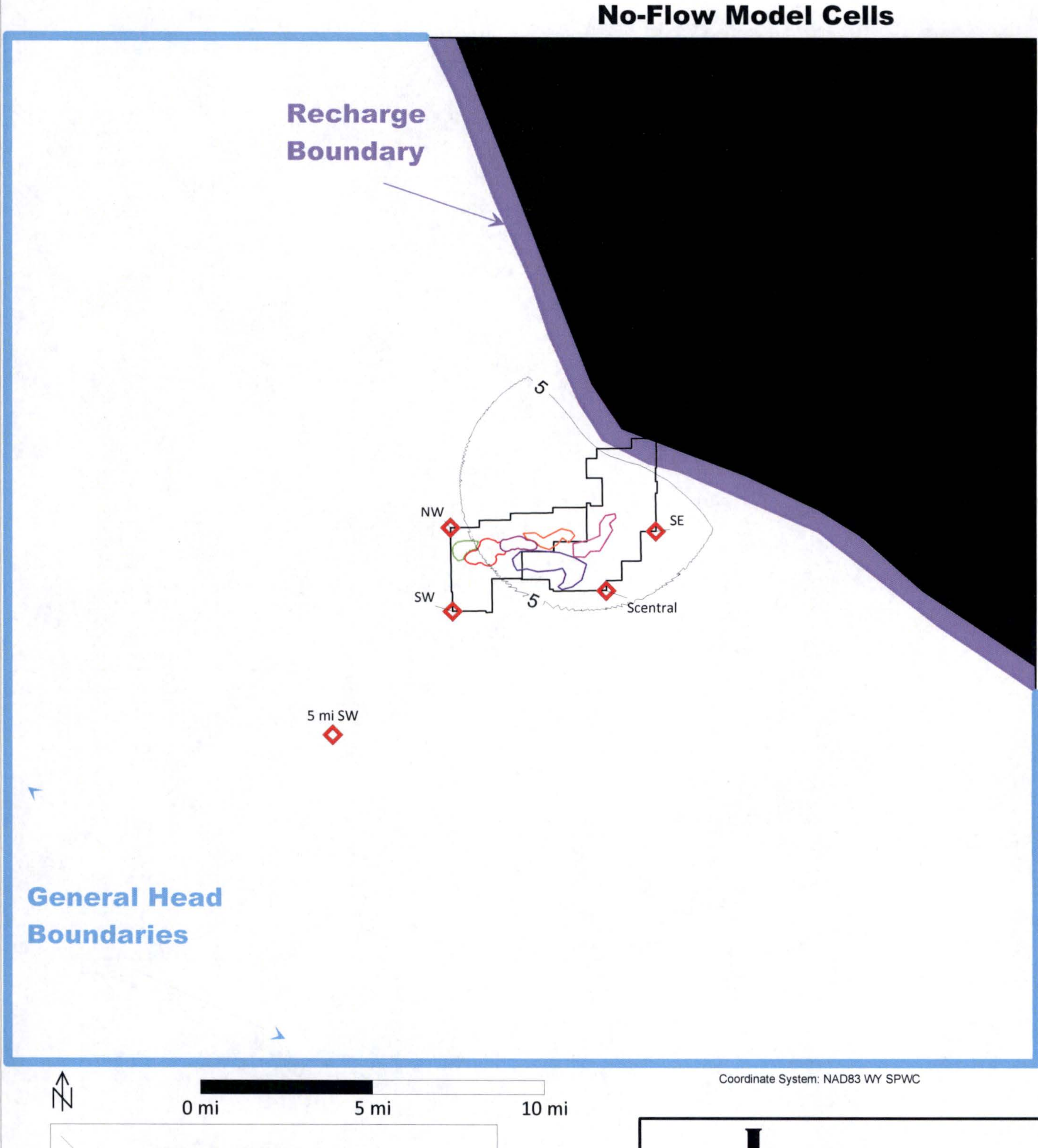

Note: For Mine Units not yet constructed (MU4, 5, 7, and 9), outlines represent approximate anticipated extents.

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Figure 11. HJ Horizon Model, Simulated Drawdown, Five Years After End of Operations

January 2018 NRC RAI Response

Fig11_HJ s SP31.srf	Date: January 2018	By: AAP	Checked: HD

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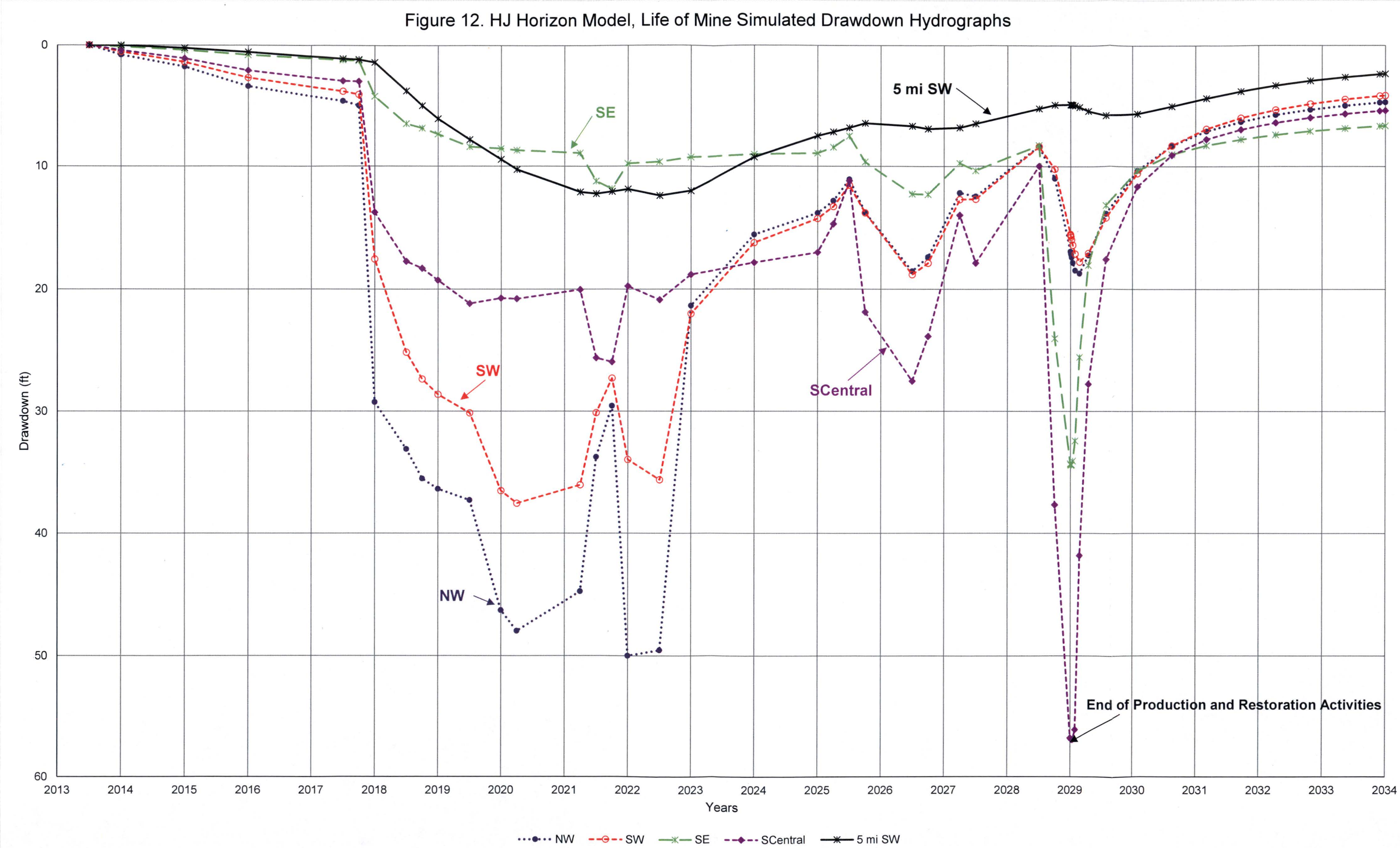
Figure 12. HJ Horizon Model, Life of Mine Simulated Drawdown Hydrographs
Drawdown (ft)
Years
5 mi SW
SE
SW
SCentral
NW
End of Production and Restoration Activities
NW
SW
SE
SCentral
5 mi SW
0
10
20
30
40
50
60
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
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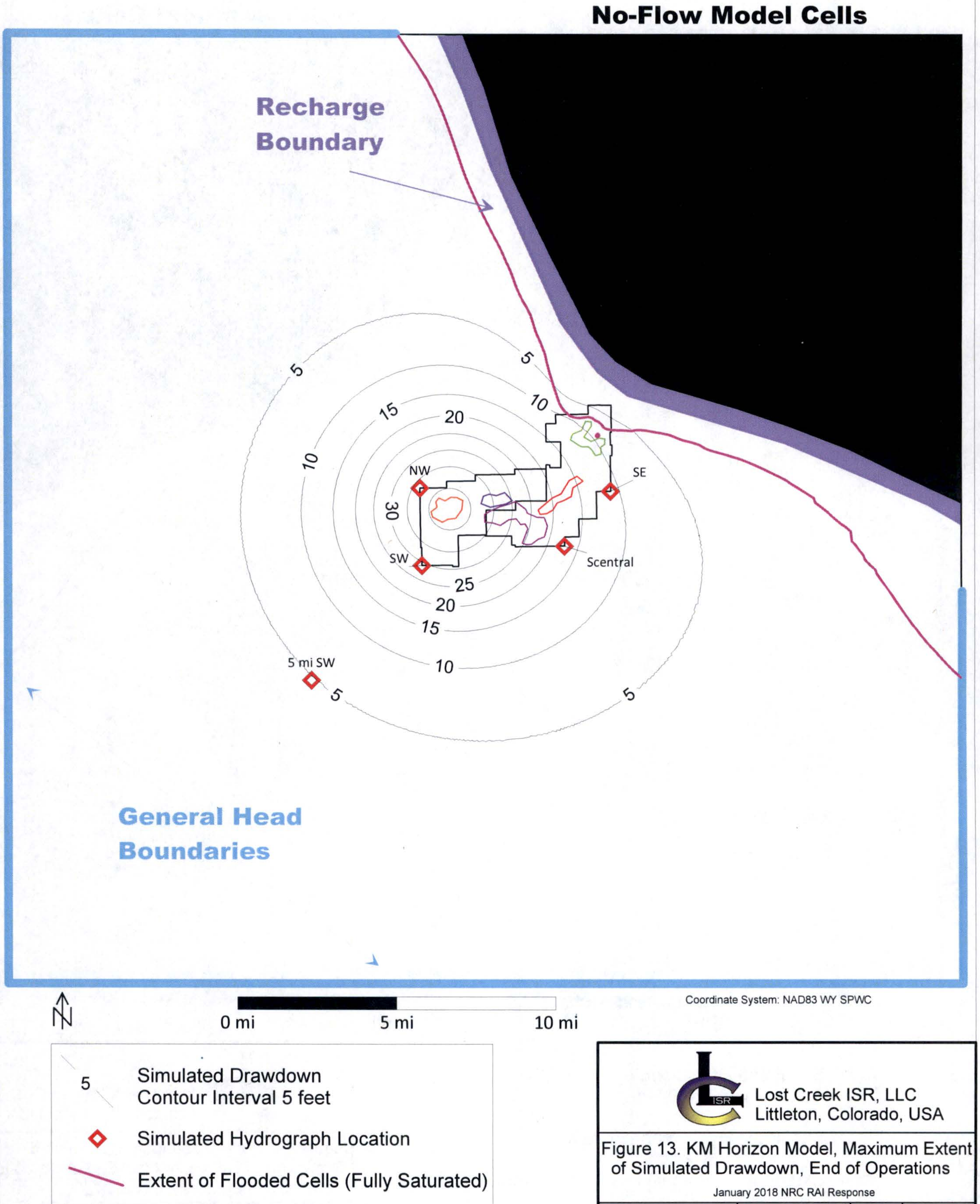
2031
2032
2033
2034

Petrotek



Note: For Mine Units not yet constructed (MU4, 5, 7, and 9), outlines represent approximate anticipated extents.

Lost Creek ISR, LLC
Littleton, Colorado, USA

Figure 13. KM Horizon Model, Maximum Extent of Simulated Drawdown, End of Operations

January 2018 NRC RAI Response

Fig13_KM Max s SP21.srf	Date: January 2018	By: AAP	Checked: HD

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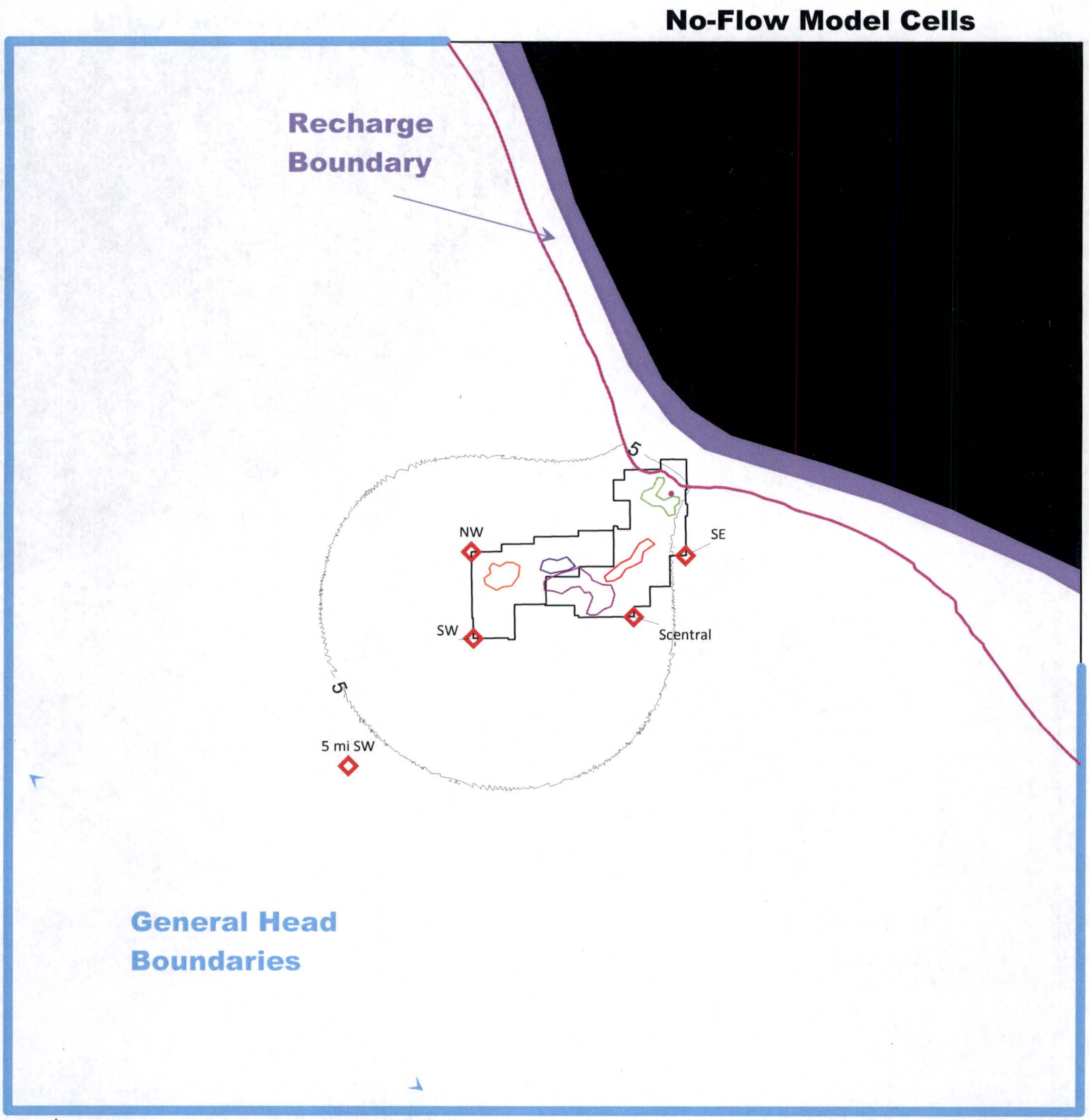

0 mi 5 mi 10 mi

Coordinate System: NAD83 WY SPWC

5 Simulated Drawdown Contour Interval 5 feet

Simulated Hydrograph Location

Extent of Flooded Cells (Fully Saturated)

Note: For Mine Units not yet constructed (MU4, 5, 7, and 9), outlines represent approximate anticipated extents.

Lost Creek ISR, LLC
Littleton, Colorado, USA

Figure 14. KM Horizon Model, Simulated Drawdown, Five Years After End of Operations

January 2018 NRC RAI Response

Fig14_KM s SP22.srf	Date: January 2018	By: AAP	Checked: HD

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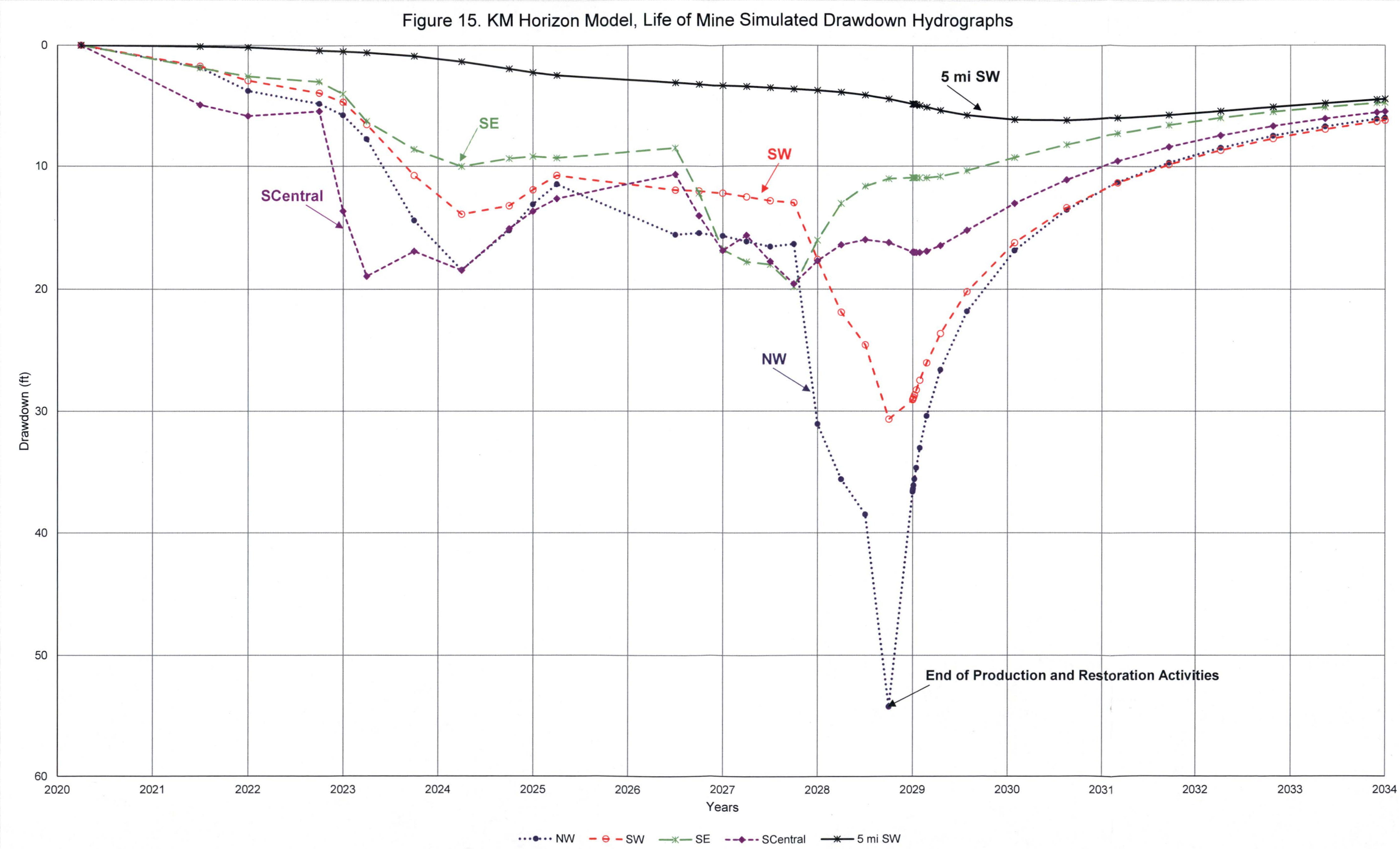

Numerical Modeling of Drawdown Impacts
Lost Creek ISR Project, Wyoming
Lost Creek ISR, LLC, January 2018

Petrotek

APPENDIX A

HJ AND KM HORIZON WATER LEVEL DATA AND TABLE OP-3

Appendix A - HJ Horizon Water Level Data

Well ID	Interval	NAD 83 Easting [feet]	NAD 83 Northing [feet]	MP Elev (ft-msl)	Date	DTW (ft-bmp)	GW Elev (ft-amsl)
HJMP-101	HJ	2211609.9	595711.0	6950.09	7/31/2012	180.92	6769.17
HJMP-104	HJ	2211208.2	595610.4	6941.04	8/2/2012	174.48	6766.56
HJMP-105	HJ	2211255.2	595786.9	6937.38	7/31/2012	170.51	6766.87
HJMP-108	HJ	2211784.4	596011.3	6952.20	7/31/2012	182.88	6769.32
HJMP-109	HJ	2212218.2	595543.4	6939.10	8/2/2012	178	6761.10
HJMP-110	HJ	2212004.5	595896.9	6947.02	7/31/2012	177.79	6769.23
HJMP-113	HJ	2212595.8	595510.1	6937.27	7/31/2012	180.95	6756.32
HJT-101	HJ	2210883.2	595323.3	6937.56	8/2/2012	174.86	6762.70
HJT-102	HJ	2211208.8	595409.4	6939.15	7/31/2012	172.9	6766.25
HJT-103	HJ	2211502.4	595383.2	6938.22	8/2/2012	190.4	6747.82
HJT-104	HJ	2211976.3	595604.8	6940.15	8/2/2012	172.15	6768.00
HJT-105	HJ	2212759.6	595739.8	6938.87	8/2/2012	172.97	6765.90
LC19M	HJ	2211685.0	596020.0	6951.30	7/31/2012	182.85	6768.45
M-101	HJ	2214618.7	595288.0	6950.58	8/2/2012	179	6771.58
M-102	HJ	2214475.8	594821.9	6954.04	7/31/2012	183.25	6770.79
M-103	HJ	2214018.5	594644.5	6947.51	8/2/2012	177.31	6770.20
M-104	HJ	2213542.8	594564.9	6943.36	8/2/2012	183.64	6759.72
M-105	HJ	2213051.9	594631.2	6933.45	8/2/2012	177.87	6755.58
M-106	HJ	2212578.0	594746.3	6922.85	7/31/2012	168.57	6754.28
M-107	HJ	2212094.5	594680.9	6927.93	8/2/2012	179.15	6748.78
M-108	HJ	2211633.4	594853.5	6929.17	8/2/2012	180.12	6749.05
M-109	HJ	2211180.0	594671.2	6923.03	7/31/2012	177.33	6745.70
M-110	HJ	2210690.4	594699.5	6923.69	7/31/2012	180.5	6743.19
M-111	HJ	2210270.1	594451.5	6910.88	8/2/2012	172.26	6738.62
M-112	HJ	2209790.3	594357.9	6919.30	8/2/2012	182.1	6737.20
M-113	HJ	2209309.8	594510.4	6929.31	8/2/2012	192.78	6736.53
M-114	HJ	2208941.6	594834.1	6932.09	8/2/2012	189.45	6742.64
M-115	HJ	2208879.3	595320.5	6940.40	8/2/2012	187.3	6753.10
M-116	HJ	2208958.8	595807.5	6934.00	7/31/2012	179.88	6754.12
M-117	HJ	2209307.6	596148.3	6946.09	8/2/2012	187.82	6758.27
M-118	HJ	2209796.5	596145.6	6946.47	7/31/2012	183.5	6762.97
M-119	HJ	2210265.9	596302.7	6948.65	7/31/2012	184.9	6763.75
M-120	HJ	2210727.0	596441.7	6947.85	8/2/2012	180.93	6766.92
M-121	HJ	2211199.0	596594.8	6951.71	7/31/2012	181.39	6770.32
M-122	HJ	2211676.7	596693.0	6953.72	7/31/2012	182.78	6770.94
M-123	HJ	2212165.5	596646.8	6953.15	8/2/2012	180.4	6772.75
M-124	HJ	2212603.4	596424.6	6957.76	7/31/2012	184.41	6773.35
M-125	HJ	2212970.0	596111.0	6949.09	7/31/2012	175	6774.09
M-126	HJ	2213463.7	596087.1	6951.00	8/2/2012	176.1	6774.90
M-127	HJ	2213932.3	595954.4	6948.97	8/2/2012	175.89	6773.08
M-128	HJ	2214350.4	595698.0	6949.85	8/2/2012	176.3	6773.55
MP-101	HJ	2213875.0	595193.7	6941.62	7/31/2012	171.8	6769.82
MP-102	HJ	2213298.8	595399.8	6942.32	7/31/2012	180.53	6761.79
MP-103	HJ	2212708.4	595381.0	6936.81	8/2/2012	179.96	6756.85
MP-104	HJ	2212007.2	595515.4	6939.74	7/31/2012	185.68	6754.06
MP-105	HJ	2212158.0	596078.7	6950.79	8/2/2012	181.65	6769.14
MP-106	HJ	2211488.3	595980.1	6942.56	8/2/2012	175.75	6766.81
MP-107	HJ	2210975.5	595822.0	6937.82	8/2/2012	171.5	6766.32
MP-108	HJ	2210881.6	595468.8	6937.45	8/2/2012	172.5	6764.95
MP-109	HJ	2210954.5	595234.7	6932.73	7/24/2012	185.53	6747.20
MP-110	HJ	2210184.7	595648.4	6940.00	8/2/2012	179.55	6760.45
MP-111	HJ	2209950.7	595360.7	6937.61	8/2/2012	178.56	6759.05
MP-112	HJ	2209585.4	595534.5	6937.87	7/24/2012	179.7	6758.17
MP-113	HJ	2209861.3	594950.0	6924.49	8/2/2012	186.22	6738.27
UKMO-101	HJ	2212408.5	595655.7	6942.28	8/2/2012	178.4	6763.88
UKMO-102	HJ	2212528.0	595846.9	6940.79	8/2/2012	168.6	6772.19
UKMO-103	HJ	2212823.1	596269.5	6950.53	7/31/2012	177.64	6772.89
M-HJ1	HJ	2217809.5	590918.0	6896.30	5/21/2013	149.56	6746.74
M-HJ2A	HJ	2218596.4	590895.3	6902.50	9/18/2013	153.82	6748.68
M-HJ3	HJ	2214767.1	590831.1	6893.71	9/19/2013	155.86	6737.85
M-HJ4	HJ	2225725.1	598329.9	7006.89	9/18/2013	129.32	6877.57
M-HJ5	HJ	2226867.9	601893.9	7045.79	9/19/2013	135.46	6910.33
M-HJ6	HJ	2230244.3	604051.5	7095.39	10/23/2013	139.65	6955.74
M-HJ8	HJ	2218207.2	593694.2	6928.37	12/30/2014	166.45	6761.92

Appendix A - KM Horizon Water Level Data

Well ID	Interval	NAD 83 Easting [feet]	NAD 83 Northing [feet]	MP Elev (ft-msl)	Date	DTW (ft-bmp)	GW Elev (ft-amsl)
HJMU-101	KM	2211599.8	595710.5	6951.2	7/31/2012	202.59	6748.61
HJMU-104	KM	2211213.9	595620.2	6940.52	8/2/2012	197.1	6743.42
HJMU-105	KM	2211264.5	595789.9	6937.58	7/31/2012	193.76	6743.82
HJMU-108	KM	2211799.4	596011.5	6951.52	7/31/2012	203.93	6747.59
HJMU-109	KM	2212227.8	595549.1	6939.38	8/2/2012	190.8	6748.58
HJMU-110	KM	2212007.9	595908.7	6947.86	7/31/2012	199.81	6748.05
HJMU-113	KM	2212599.9	595521.2	6936.99	7/31/2012	186.91	6750.08
LC17M	KM	2212869.0	595542.0	6938.21	8/2/2012	187.78	6750.43
LC20M	KM	2211684.0	596034.0	6951.84	7/31/2012	204.64	6747.2
LC24M	KM	2212886.0	595906.0	6944.33	7/31/2012	192.1	6752.23
MU-101	KM	2213857.6	595191.9	6940.7	8/1/2012	188.38	6752.32
MU-102	KM	2213288.7	595391.3	6941.73	7/31/2012	190.32	6751.41
MU-103	KM	2212708.9	595388.9	6936.65	8/2/2012	185.85	6750.8
MU-104	KM	2212008.9	595501.5	6939.13	7/31/2012	194.38	6744.75
MU-105	KM	2212163.3	596087.5	6951.39	8/2/2012	203.65	6747.74
MU-106	KM	2211481.7	595972.4	6943.07	8/2/2012	197.7	6745.37
MU-107	KM	2210979.9	595811.3	6937.38	8/2/2012	194.06	6743.32
MU-109	KM	2210943.6	595230.2	6934.08	8/2/2012	193.15	6740.93
MU-110	KM	2210164.9	595647.4	6940.54	8/2/2012	201.9	6738.64
MU-111	KM	2209929.6	595357.6	6938.36	8/2/2012	200.35	6738.01
MU-112	KM	2209567.0	595538.0	6938.08	8/2/2012	200.61	6737.47
MU-113	KM	2209842.1	594950.9	6925.05	8/2/2012	188.36	6736.69
UKMP-101	KM	2212412.9	595642.0	6941.74	8/2/2012	192.82	6748.92
M-KM4A	KM	2217802.9	591042.7	6896.63	10/3/2013	162.7	6733.96
M-KM5A	KM	2218600.0	591006.5	6905.03	9/18/2013	169.6	6735.42
M-KM6	KM	2214768.0	590941.9	6892.36	9/19/2013	161.9	6730.50
M-KM7	KM	2225536.9	598334.4	6999.20	9/18/2013	152.1	6847.07
M-KM8	KM	2226776.1	601981.0	7046.20	10/10/2013	159.7	6886.52
M-KM9	KM	2229995.2	604036.9	7093.17	10/10/2013	145.6	6947.58
M-KM10	KM	2229803.6	608598.1	7149.02	9/19/2013	152.9	6996.17
M-KM11A	KM	2218050.3	593783.9	6928.90	4/4/2014	175.1	6753.82

Table OP-3 Aquifer Characteristics for Drawdown Computation

Mining Sequence	Mining Horizon	Project Area	Formation Transmissivity (ft^2/d)	Formation Thickness (ft.)	Hydraulic Conductivity (ft./d)	Formation Storativity	Location of Pumping Centroid		Production / Restortion Life (days)	Average Net Consumptive Use (gpm)	†Computed Drawdown at:	
							Easting	Northing			2 miles ft.	3 miles ft.
MU1	HJ	LC	80	120	0.67	1.1×10^{-4}	2,211,666.87	595,489.20	1,361	39.8	35.0	18.3
MU2	HJ	LC	80	120	0.67	1.1×10^{-4}	2,206,608.70	594,139.05	1,369	45.0	52.5	24.9
MU5	HJ	LC	80	120	0.67	1.1×10^{-4}	2,216,303.19	596,233.19	1,270	23.1	19.3	4.8
MU4	HJ	LC	80	120	0.67	1.1×10^{-4}	2,201,523.78	594,457.18	912	18.2	7.2	2.6
MU8	KM	LCE	86	110	0.78	2.3×10^{-4}	2,217,421.85	592,346.10	1,271	22.0	3.8	0.3
MU3	KM	LC	86	110	0.78	2.3×10^{-4}	2,213,942.10	595,962.82	1,004	31.3	5.5	2.8
MU7	HJ	LCE	80	120	0.67	1.1×10^{-4}	2,217,011.39	592,241.47	1,992	38.0	45.4	10.3
MU10	KM	LCE	86	110	0.78	2.3×10^{-4}	2,225,648.42	597,503.05	912	17.1	2.2	1.0
MU11	KM	LCE	86	110	0.78	2.3×10^{-4}	2,229,136.43	606,179.22	810	15.7	2.1	1.0
MU12	KM	LC	86	110	0.78	2.3×10^{-4}	2,205,780.24	594,466.40	1,270	22.9	4.1	2.4
MU9	HJ	LCE	80	120	0.67	1.1×10^{-4}	2,223,159.26	596,462.85	912	16.8	3.6	2.4

† = Computed drawdown at end of RO phase
LC = Lost Creek Project Area
LCE = Lost Creek East Project Area
ft. = feet
d = day
gpm = gallons per minute