

0011



United States Department of the Interior
OFFICE OF SURFACE MINING
Reclamation and Enforcement
BROOKS TOWERS
1020 15TH STREET
DENVER, COLORADO 80202

*Orig Mine plan
cc file
DPA*

RECEIVED

JAN 22 1985

JAN 28 1985

Dr. Dianne Nielson
Utah Division of Oil, Gas and Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

DIVISION OF OIL
GAS & MINING

*ACT/015/015
#2*

Dear Dr. Nielson:

Enclosed are the diagrams produced as a result of our computer modeling of aquifer drawdown at the Emery Deep Mine. The Office of Surface Mining (OSM) will now begin preparation of an environmental analysis (EA) as part of the Federal decision package. Upon completion of the EA, we will make a final determination of significance of potential impacts resulting from the proposed mining, and establish whether or not an environmental impact statement (EIS) is necessary. At this time, based on our interpretation of these results, we do not feel that an EIS will be required.

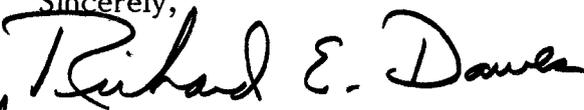
The last technical analysis (TA) and State decision package which we received from your office was transmitted to us on June 20, 1984. On July 25, 1984, OSM Project Leader Louis Hamm transmitted to Susan Linner a copy of the Division's TA and decision package annotated with comments from OSM's Washington, D.C., Headquarters review staff. At that time, in addition to the comments from Headquarters, OSM's Western Technical Center felt that the TA was deficient in that it did not discuss the requirements of UMC 817.126(b) regarding mining associated with a public water supply aquifer. Since the Emery Mine is situated within the Ferron aquifer system, the potential impacts to the aquifer represent a significant issue which OSM feels must be fully addressed in the Emery decision package.

In order to expedite the Emery decision process, OSM staff have prepared addendum portions of the TA for the Division's review and use as necessary. The addendum information is enclosed along with the results of our computer modeling study.

Please review the Division's final TA and decision package with regard to OSM's previous comments, the enclosures of this letter, and the Division's current policies. In this manner a final decision on the Emery Deep Mine can be completed.

If you or any of your staff has any questions regarding the model results or OSM's previous comments regarding the Emery TA and decision package, please call either Louis Hamm or Walter Swain at (303) 844-3806.

Sincerely,


for Allen D. Klein
Administrator
Western Technical Center

Enclosure

cc: Robert Hagen, OSM - Albuquerque Field Office
Susan Linner, DOGM
Ron Daniels, DOGM

This section would be inserted into and replace all of the Underground Mine section of the CHIA beginning on page 3, and the Projected Impacts section of the TA beginning on page 19 through the first full paragraph on page 20.

The Office of Surface Mining (OSM) Western Technical Center conducted a complete modeling analysis (results attached) of the effect that mining will have on both the upper and lower Ferron aquifers over the life of the mine. The model results predict the following ground-water impacts over the life of the mine (25 years):

1. Dewatering of the Upper Ferron aquifer over the mine and permit area.
2. Drawdown of 400 feet in the upper Ferron aquifer potentiometric surface as far north as the Town of Emery and up to 1½ miles south of the permit area.
3. Drawdown of 130 feet in the lower Ferron aquifer potentiometric surface at the Emery municipal well.

Other potential ground-water impacts include:

1. Downward migration of saline Bluegate Shale waters into the upper Ferron aquifer due to a reversal of hydraulic pressure gradients and fracturing of up to 300 feet of mine cover.

2. Diminution of 0.2 cfs of subsurface outflow collectively to Quitcupah Creek and Christiansen Wash via mine interception.
3. Diminution of spring flow to three appropriated springs (Anderson, Jensen, and Christiansen springs). Two of these springs issue from the terrace gravels overlying the Bluegate Shale. One spring issues from the Upper Ferron Sandstone at the head of Miller Canyon.
4. Subsidence resulting from dewatering the upper Ferron reducing artesian pressure in the subsurface.

The OSM ground-water model simulated the effect of mining on the Ferron aquifer system over the 25-year life of the mine; however, the applicant's proposed monitoring system will provide factual information regarding effects on the ground-water system as mining proceeds. Any changes in interpretation of impacts resulting from the increase in data over time will be factored into mining plan changes, mitigation efforts as necessary, and future permitting approvals.

Replaces the last sentence of the second paragraph on page 6 of the CHIA

OSM's ground-water prediction model indicates that the upper Ferron aquifer will be essentially dewatered in the vicinity of the underground mine, and that there will be no additional effect on the aquifer system from the proposed surface mine. Because the applicant has already achieved a mitigation agreement with the owners of the wells which may be impacted by this dewatering, the impact is

considered insignificant.

The OSM model further indicates that drawdown in the static piezometric level of the lower Ferron aquifer will eventually reach up to 140 feet. Although this amount may seem significant, the current static level of potentiometric head confined in the lower Ferron corresponds to a level approximately 1,200 feet above the Ferron sandstone member in the subsurface. Therefore, a reduction of 140 feet in the piezometric head would still leave the equivalent water level well above the Ferron sandstone. Drawdown in the piezometric head at the Emery municipal well is predicted to be approximately 130 feet. A reduction of 130 to 140 feet in the artesian piezometric head which currently exists amounts to a decrease of 11 to 12 percent in the total piezometric level. A piezometric reduction is not considered significant until it reaches a minimum of 25 percent of the current level. The greatest impact of the predicted decrease would be at the Emery municipal well where slightly more electricity will be required to pump the water from a lower level in the well.

Once mining is completed, the Ferron aquifer system will begin recovery of its pre-mining water levels.

Replaces the second paragraph under Compliance on page 22 of the TA

The applicant prepared the estimate of ground-water level decline and mine-water inflow using their own computer model identified as CONOSIM. The CONOSIM model input and results were examined and found to be flawed. Subsequently, the

OSM Western Technical Center modeled the effects of mining on the Ferron aquifer system using OSM's own computer system. The results are attached to the CHIA.

Replaces the last paragraph on page 43 of the TA.

Renewable resources and structures exists in the vicinity of the mine. The I-J mining zone is situated between the upper and lower Ferron aquifers. Both are good quality aquifers with the lower Ferron providing a municipal water source to the town of Emery, located 2 miles north of the permit boundary. The upper Ferron provides primarily local irrigation and stock water. Portions of the surface above the mine are extensively farmed using flood irrigation practices. Irrigation ditches cross over much of the mine area.

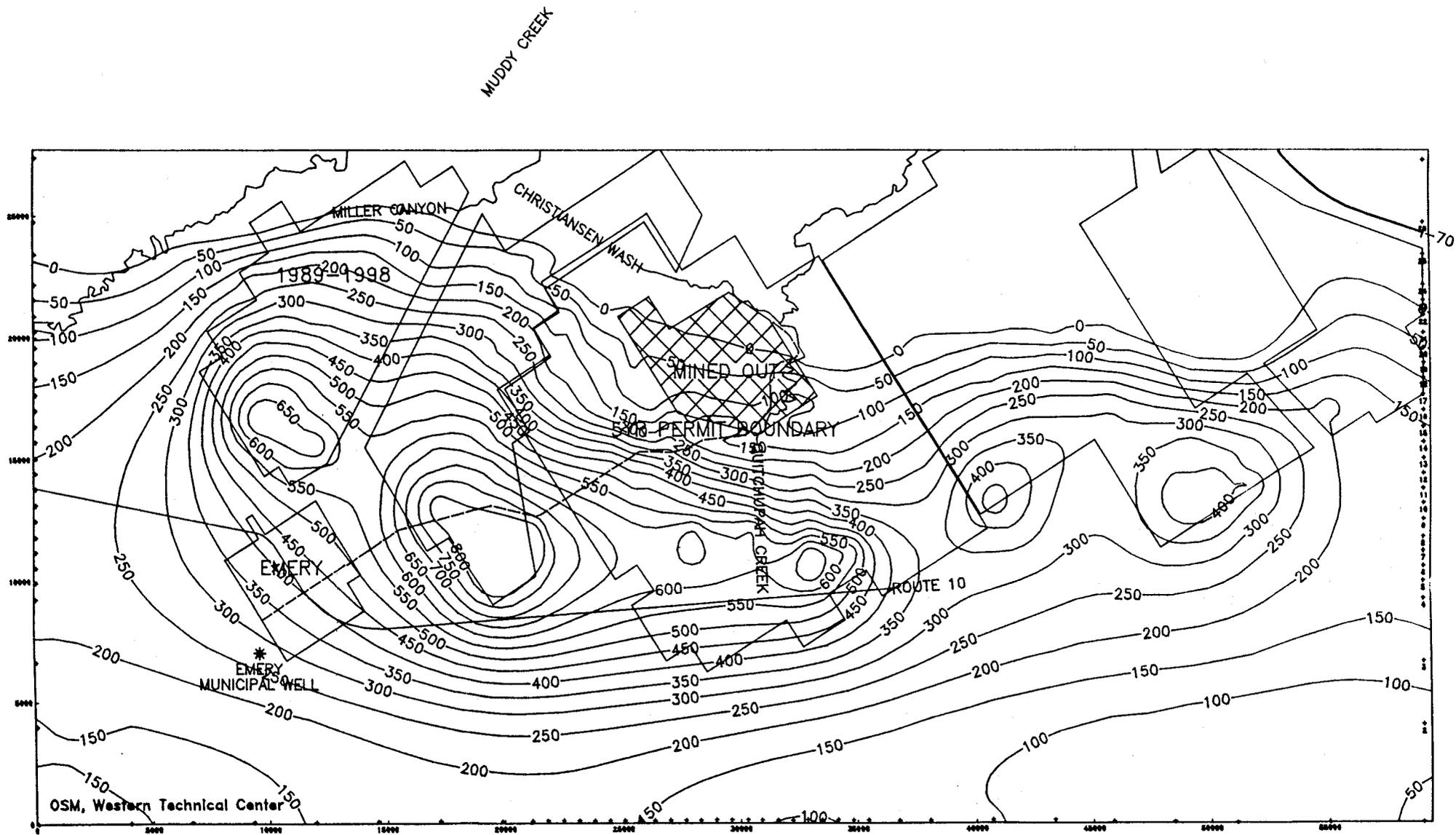
The following discussion should be added to the top of page 48 of the TA.

OSM's ground-water model (see CHIA and CHIA attachment) predicts that the upper Ferron will be essentially dewatered in the vicinity of the underground mine, and that there will be no effect on the aquifer system from the proposed surface mine. The applicant has achieved a water replacement and mitigation agreement with the owners of the wells which may be impacted by this dewatering; therefore, the impact to the upper Ferron is considered insignificant. The applicant's monitoring program commitments will provide a guage for other impacts and

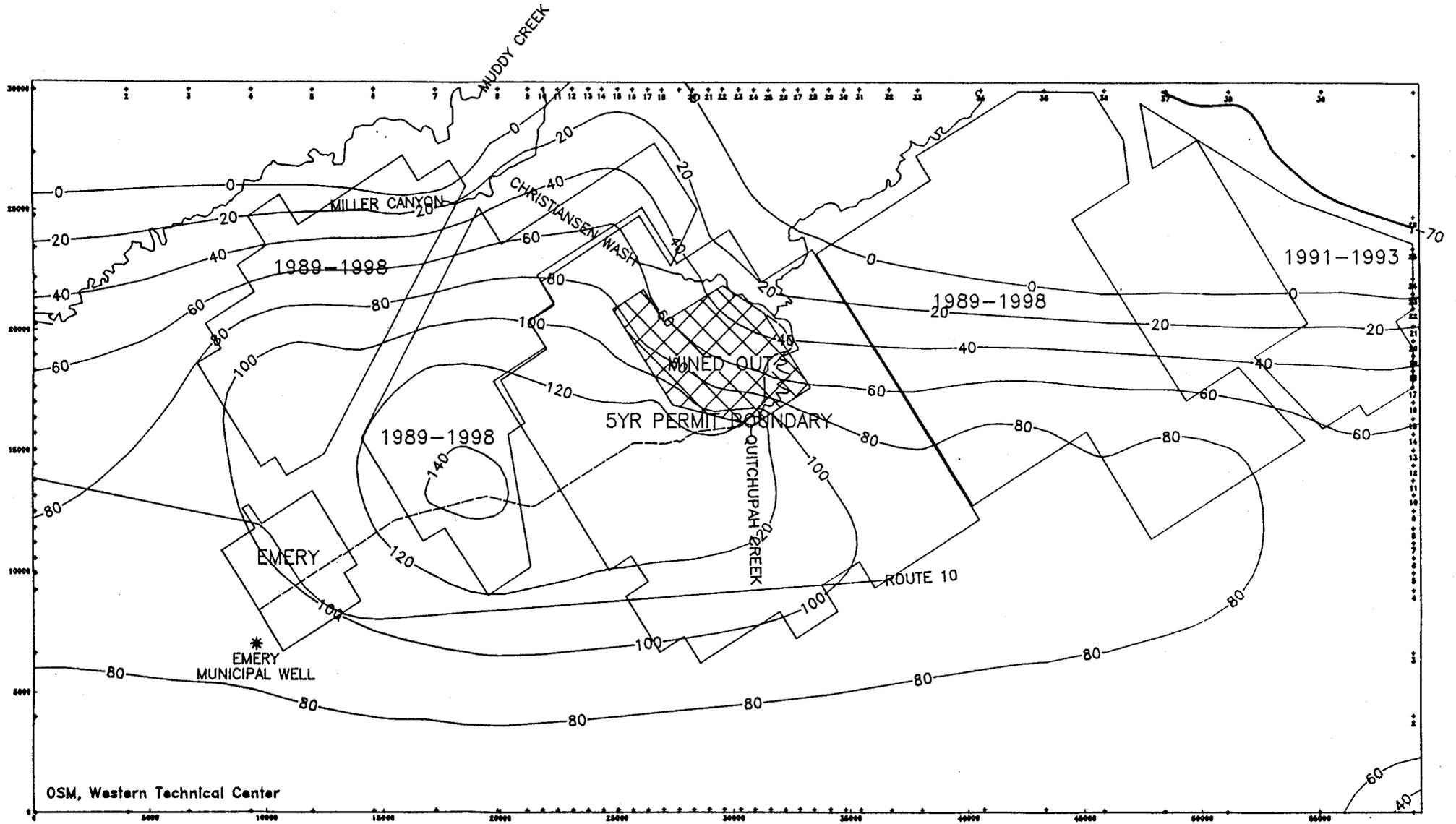
appropriate mitigation if they occur.

The OSM model also indicates that drawdown in the static piezometric level of the lower Ferron will eventually reach up to 140 feet. This represents a reduction of 12 percent in current piezometric levels. A piezometric reduction is not considered significant until it reaches at least 25 percent. The greatest impact of the predicted drawdown will be at the Emery municipal well where slightly more electrical power will be required to pump water from a lower level in the well.

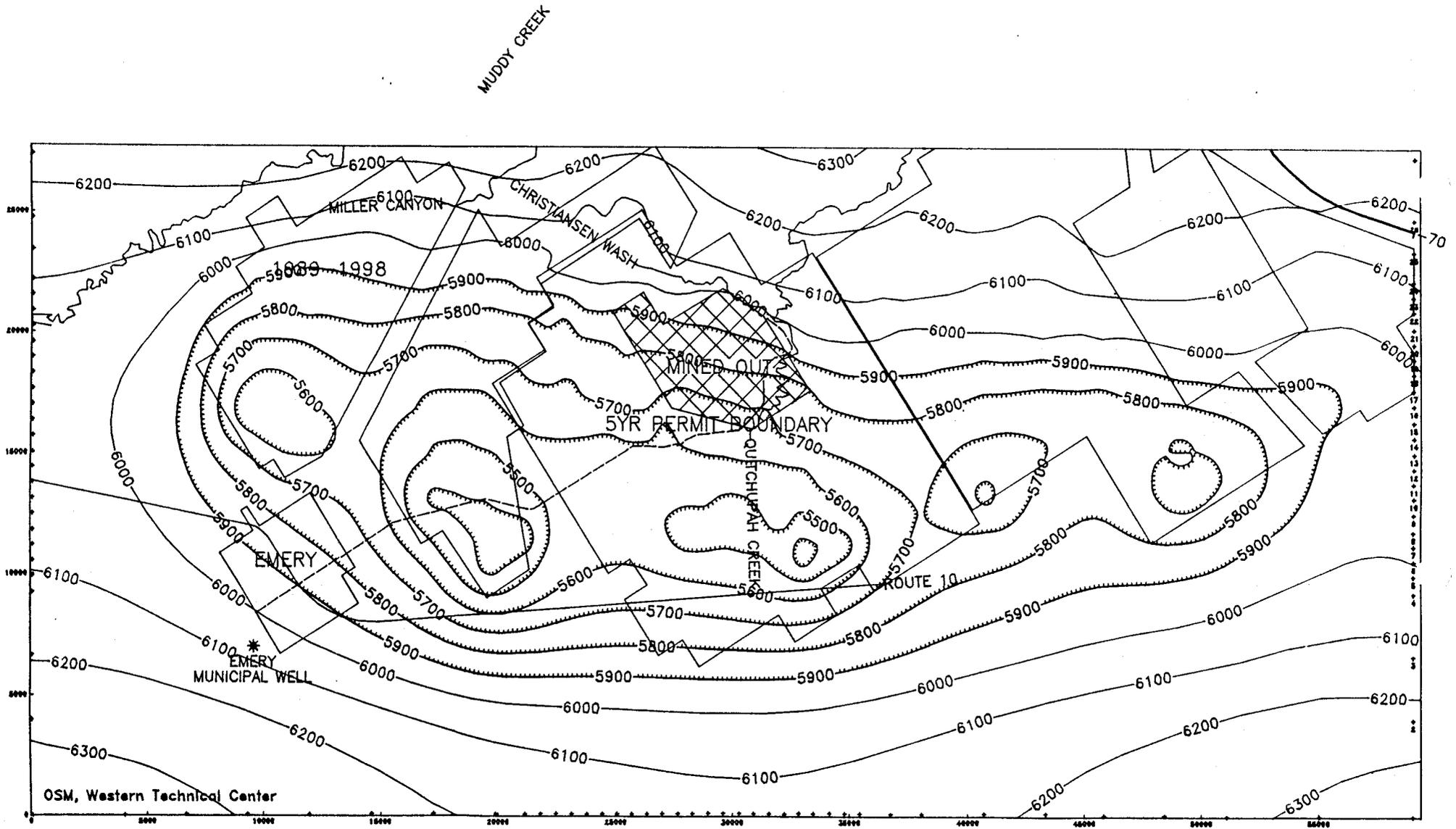
Emery Deep Mine Drawdown Upper Ferron Aquifer 1998



Emery Deep Mine Drawdown Lower Ferron Aquifer 1998

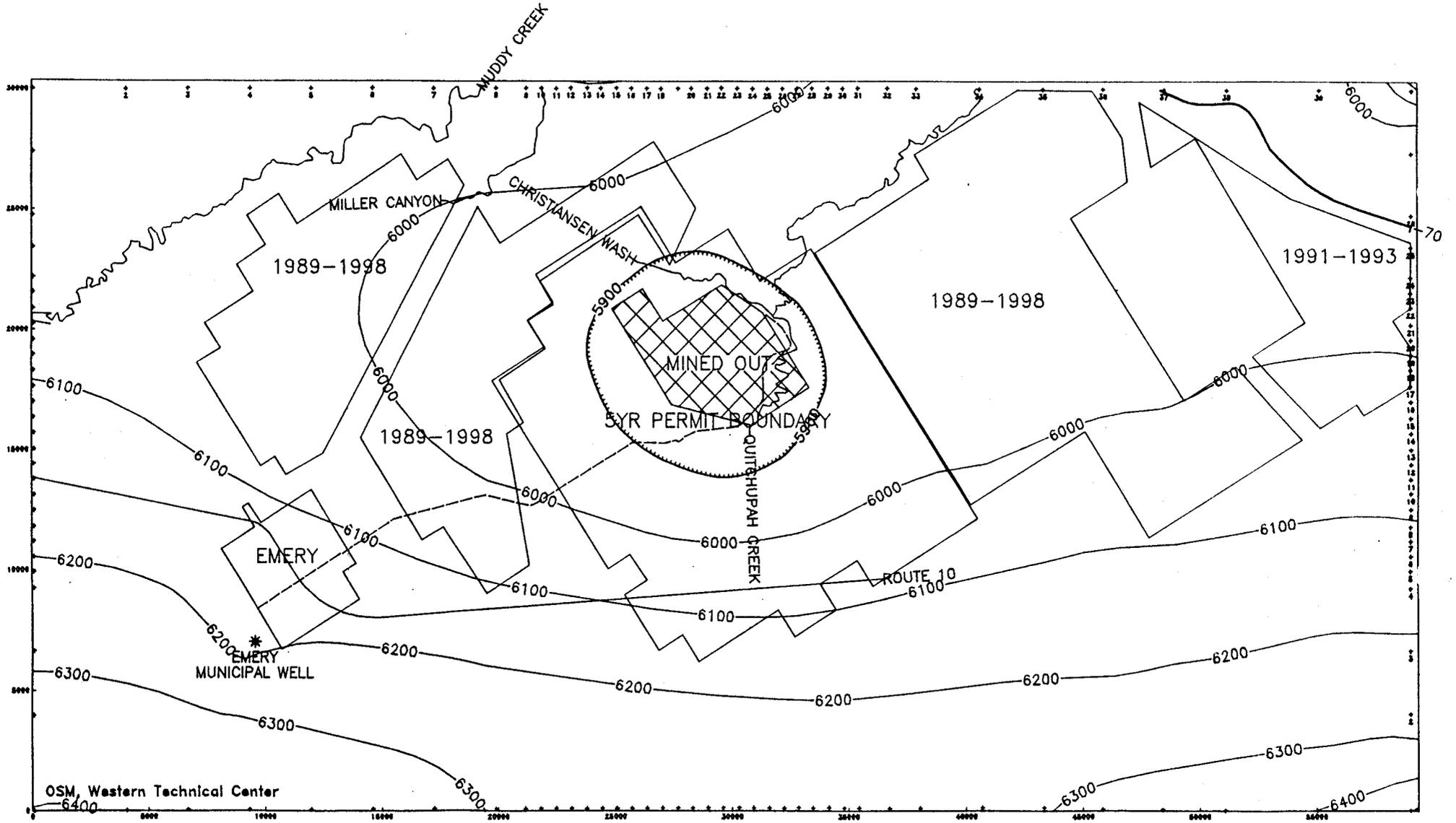


Emery Deep Mine Potentiometric Surface Upper Ferron Aquifer 1998

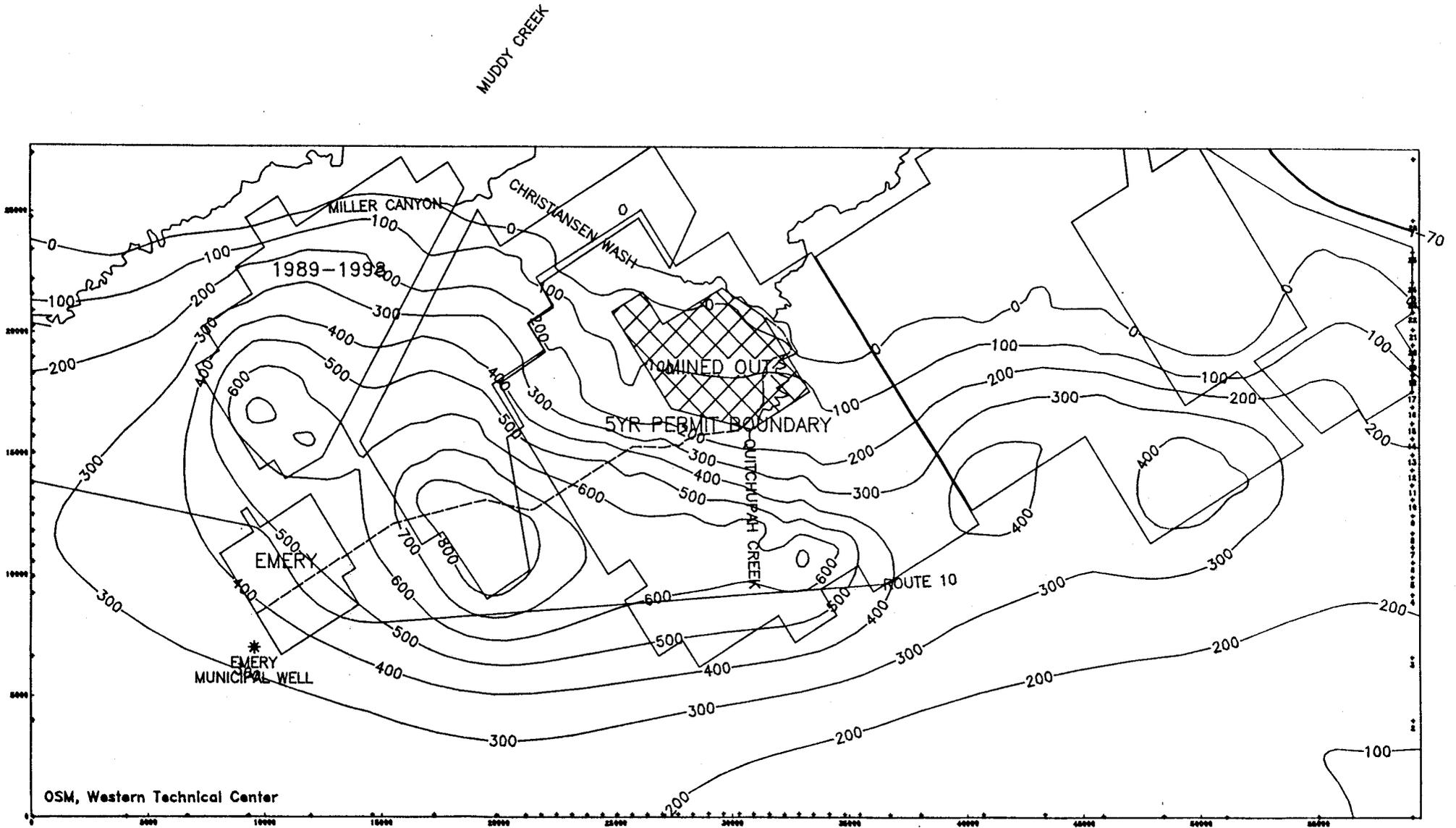


Emery Deep Mine

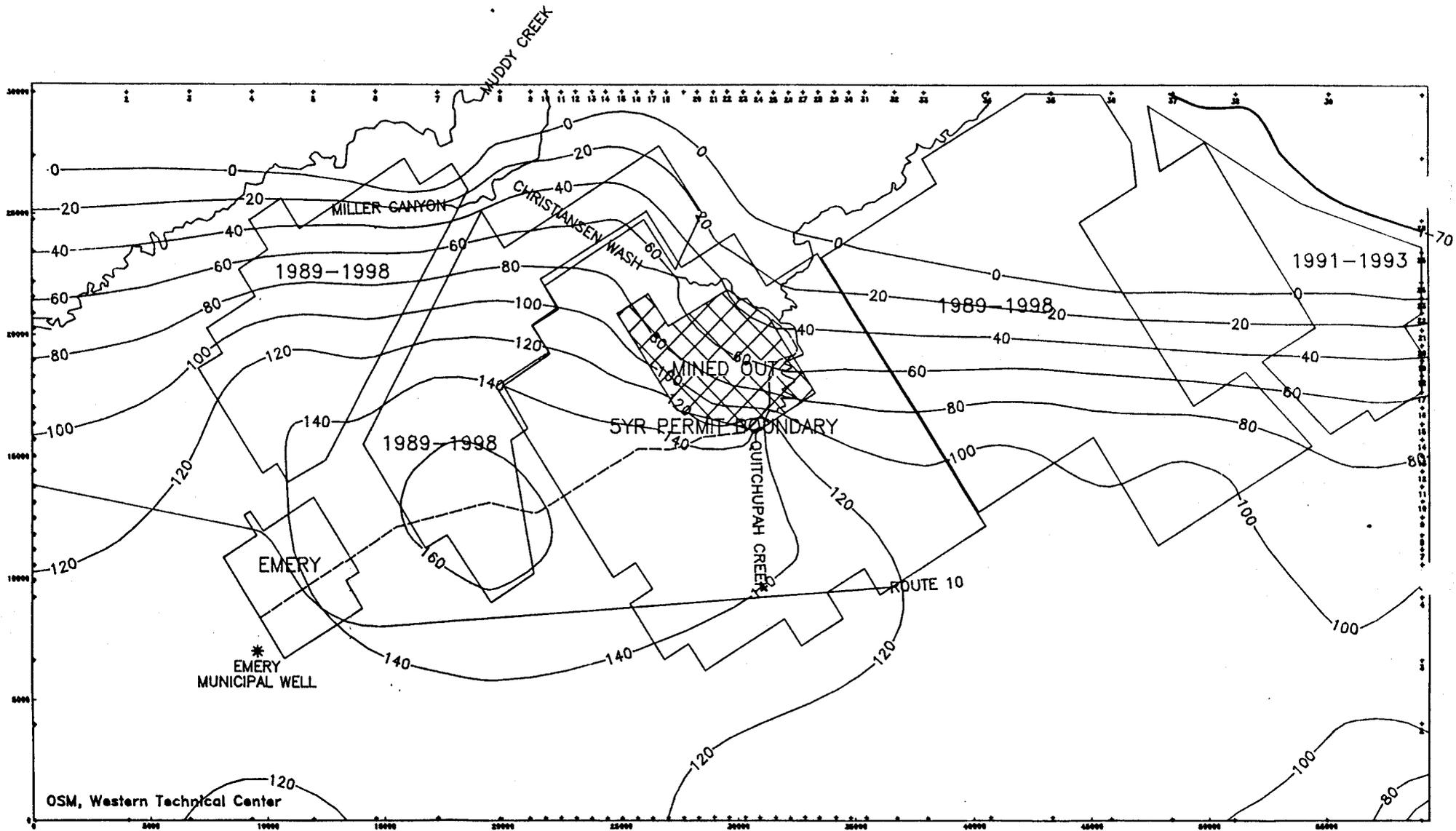
Potentiometric Surface Lower Ferron Aquifer 1998



Emery Deep Mine Drawdown Upper Ferron Aquifer 2009

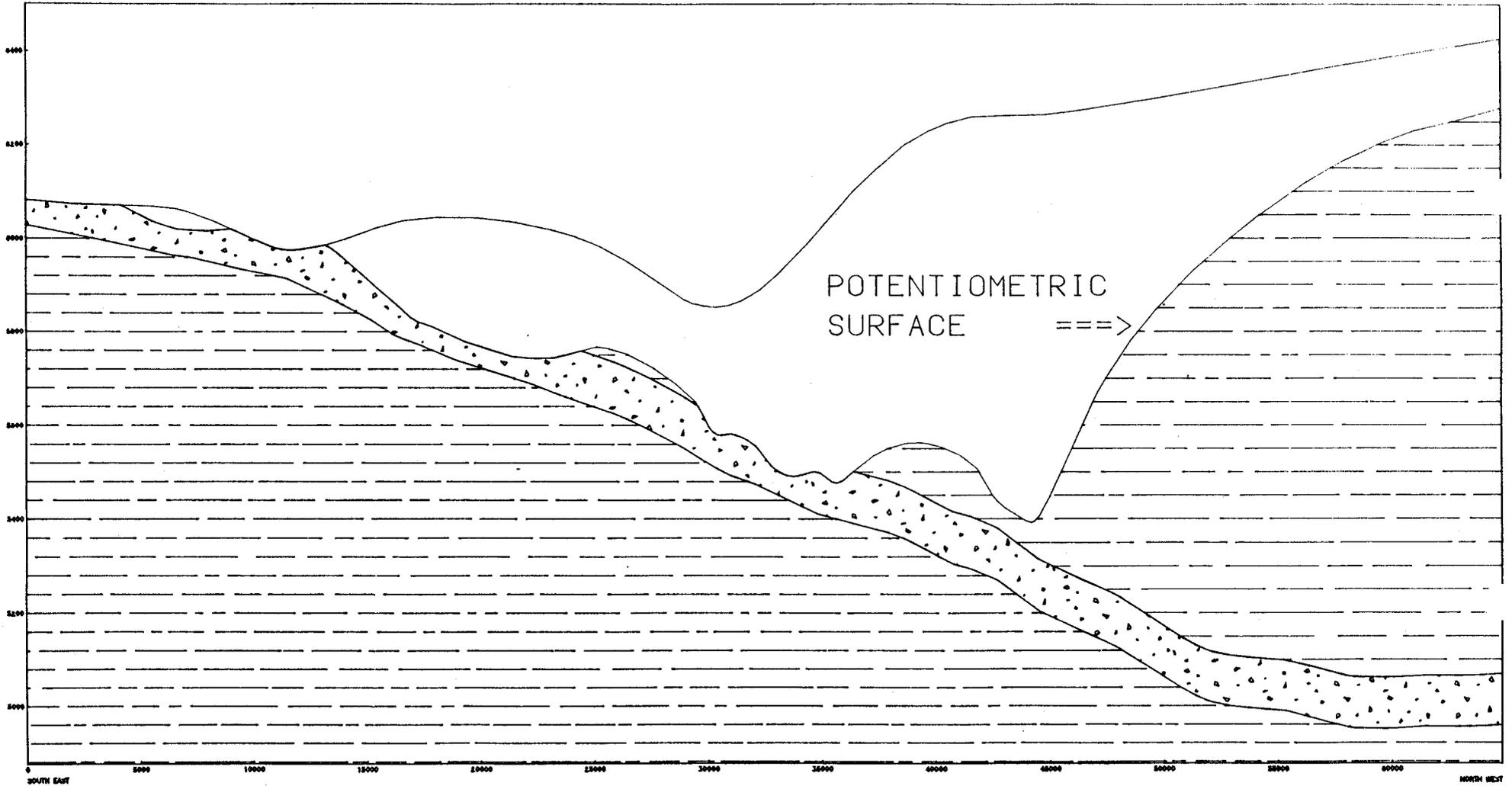


Emery Deep Mine Drawdown Lower Ferron Aquifer 2009



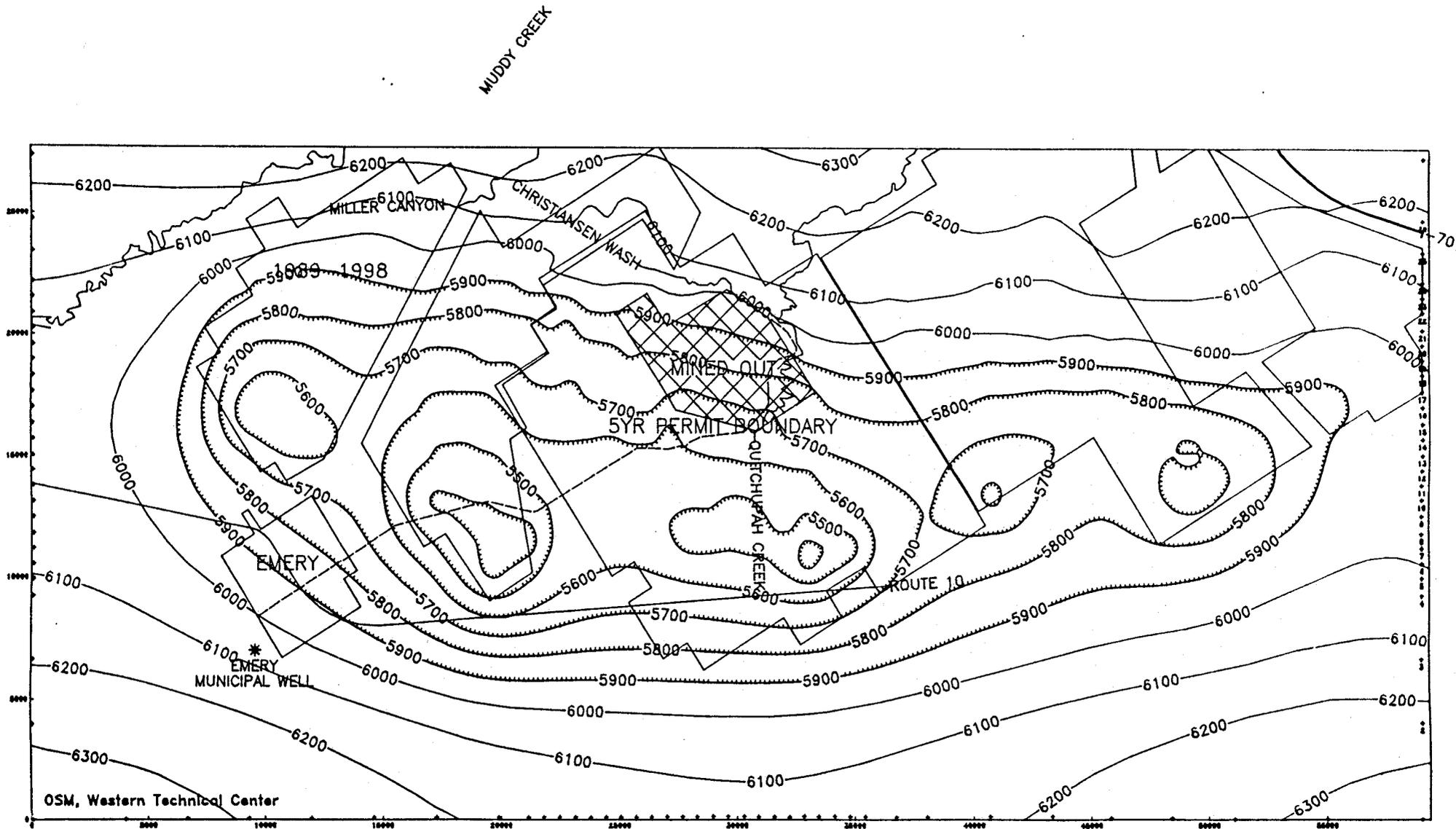
UPPER FERRON AQUIFER
CROSS SECTION EMERY DEEP MINE PROJECT
1998 END OF MINING

MUNICIPAL
WELL



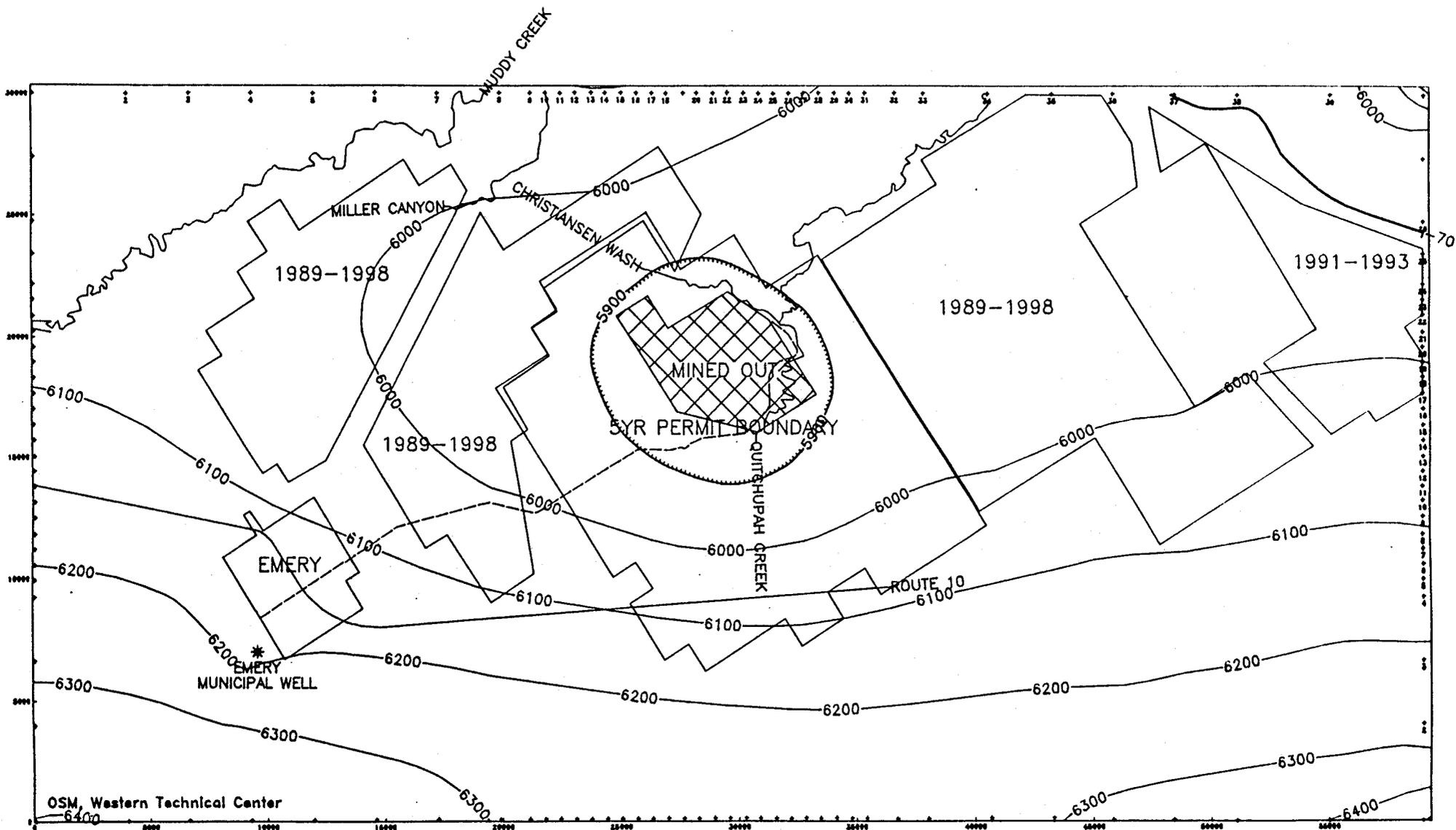
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Emery Deep Mine Potentiometric Surface Upper Ferron Aquifer 1998

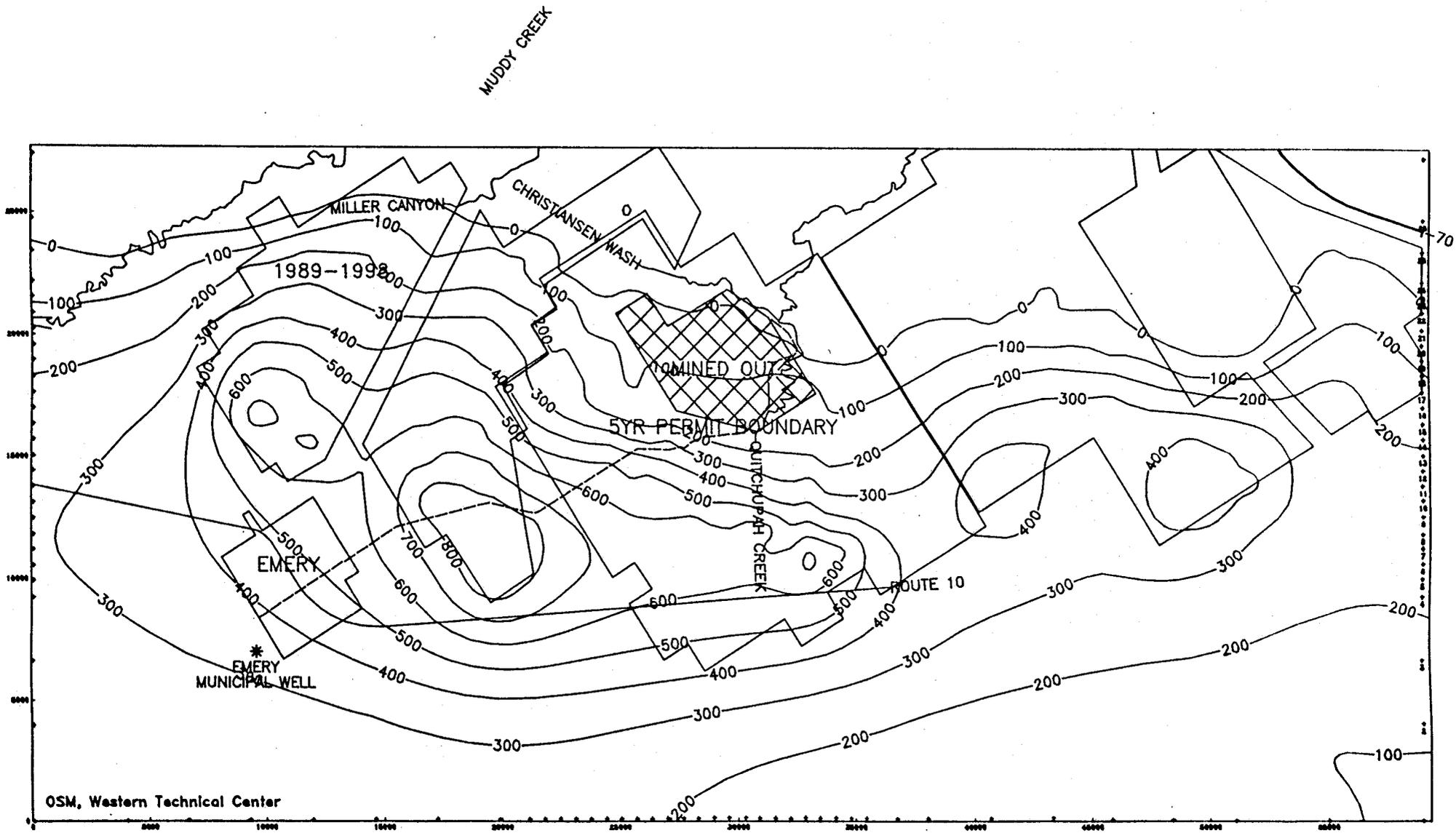


Emery Deep Mine

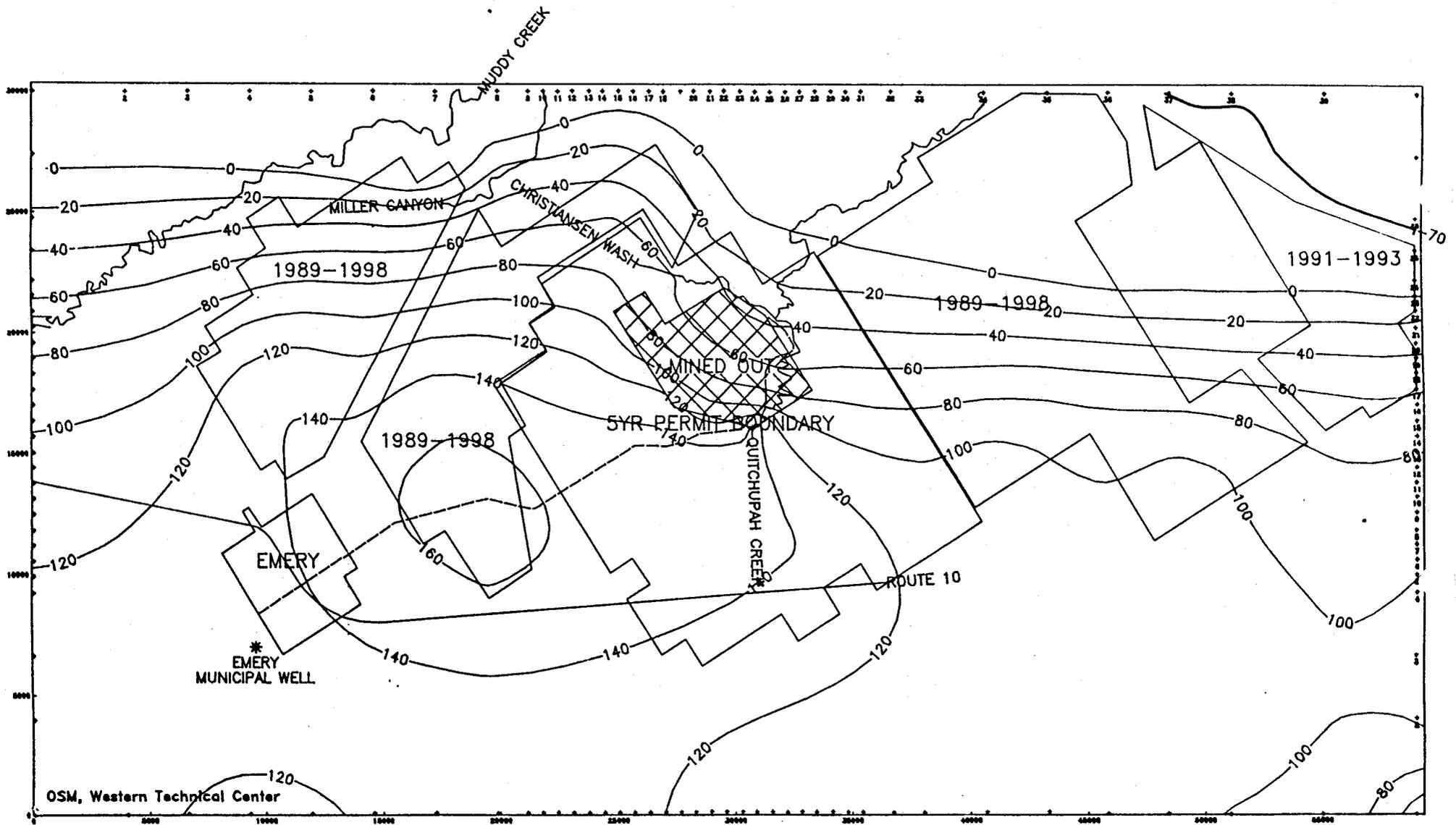
Potentiometric Surface Lower Ferron Aquifer 1998



Emery Deep Mine Drawdown Upper Ferron Aquifer 2009



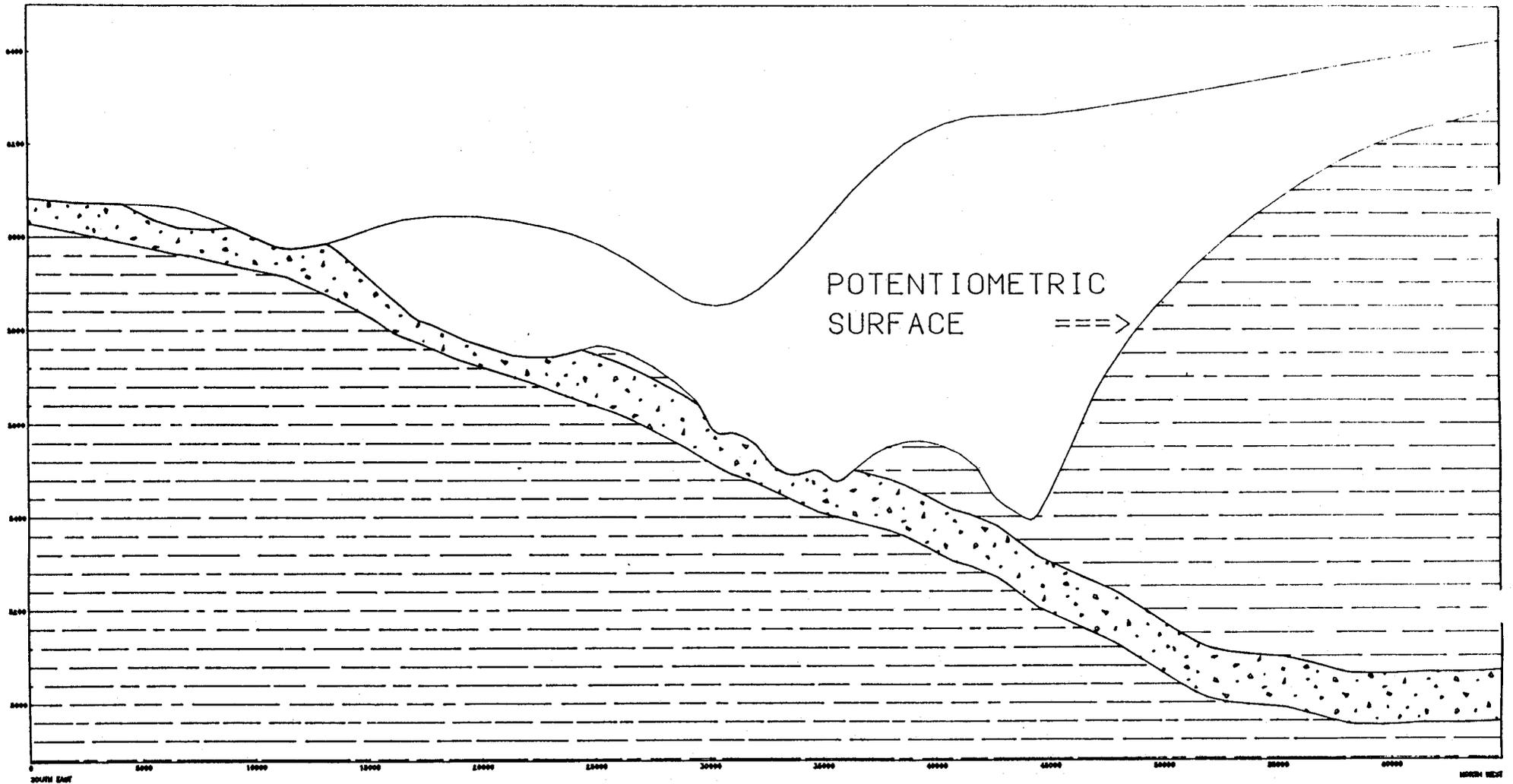
Emery Deep Mine Drawdown Lower Ferron Aquifer 2009



OSM, Western Technical Center

UPPER FERRON AQUIFER
CROSS SECTION EMERY DEEP MINE PROJECT
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