Attn: NRC-2018-0052 Holtec - SE, NMex

Comment A – Some hydrologic considerations for storage of High-Level nuclear waste at the Holtec Site in Lea County, New Mexico

There are significant risks associated with present storage of spent, high-level (H/L) nuclear waste on the premises of the nuclear power-generating facilities that generated it, particularly when they are located in densely populated areas (this risk is significant and a solution is urgently needed). The Holtec plan to use a 1000-acre site in western Lea County, New Mexico as temporary storage for such waste in preparation for removal to a permanent storage site has merit, but neither Holtec nor the Nuclear Regulatory Commission (NRC) has guaranteed that such removal will take place. It seems feasible that after as much as 85,000 tons of H/L waste (estimated total now stored at generating-facility locations (NRC, 2009)) has been moved to this low-population, low-rainfall site and placed in shallow storage crypts, much of the national concern over the present storage problem would abate, and nothing further would be done to move the waste to secure, permanent, safe storage elsewhere (specifically, to WIPP 15 miles to the SSW – Figure 1).

WIPP is not currently authorized for storage of H/L waste, but if it can be re-authorized for such use, the following conditions are proposed to force NRC to base Commissioning of the HS on a guarantee of waste removal to WIPP within a **reasonable time frame**. However, until WIPP is so re-authorized, the HS commissioning should be postponed or abandoned. It is worth noting that the U S House of Representatives has recently passed a bill to re-start the process of building the Yucca Mountain Nuclear storage facility in Nevada (the Senate has not yet passed this bill). The bill would also fund the Department of Energy (DOE) to license a temporary nearby site to store spent waste while the project is being finished.

Conditions for Commissioning the Holtec Site in Lea County

The NRC must guarantee that a move of spent nuclear fuel from HS to permanent storage at WIPP will be started within the first 20 years after commissioning has taken place and finished before 50 years from commissioning. The 50-year time line is suggested to limit the amount of time that waste is kept at HS, and to provide assurance of the on-going integrity of NRC-approved packaging for this temporary storage. If such a guarantee is not obtained, storage at the Site should not be started until Holtec proves through rigorous scientific study similar to what took place in warranting Yucca Mountain as safe, that no long-lived radionuclides from the Site would travel and be found within the Accessible Environment (AE) during a 10,000-year period after burial. As an aside, after placement at the HS, should storage of spent-fuel radionuclides be allowed to become long-term, there is an open question as to whether the NRC would automatically be in violation of existing Rules - that is, the presence of high-level waste within shallow mounds that could be interpreted as part of the Accessible Environment.

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If long-term storage is attempted at the HS, it seems hypothetically possible within 10,000 years for containment vessels and their concrete housings to fail, after which contained radionuclides could be released to travel downward with rain-generated recharge events as multiple contaminant fronts. Examples of three possible paths of contaminant transport are presented here to illustrate the complexity and danger inherent in long-term storage at HS. These scenarios were generated largely from web-based sources of information, and without review from local NM State or Federal-Agency personnel. It is strongly recommended that the US Geological Survey (USGS), the DOE, the Union of Concerned Scientists, and the Texas Water Development Board review the geo-hydrologic and geochemical analyses in this document.

A) Isolated aquifer – Figure 2 shows the location of 7 playa lakes located near HS. A survey of playas in New Mexico (Playa Lakes, Joint Venture, 2016) indicates that these lakes all contain saline water. Satellite photos were used to outline a bleached zone around these lakes comprising a sizable area underlain by unconsolidated sediment where surficial vegetation has been affected (?) by saline waters within a Playa Area, (PA - the PA and its lakes may be associated with deep dissolution of the salt section by upwelling waters from the underlying Capitan Reef aquifer (Bachman, 1987)). These same photos were also used to establish the location of surface channels outside the PA along which rain-generated runoff could carry water into the PA allowing downward infiltration to the water table but also causing run off downslope out of this area to the SW into Nash Draw (Figure 1 - the land surface around HS slopes to the SW - Figure 3, Corbet, 1996). It is probable that an isolated water-table aquifer now exists within the PA (Holtec has documented shallow water levels within unconsolidated sediment below HS and they report that depth to water was often less that 15 feet.). Over longer time frames, random rain-generated surface-water inflows into the PA accompanied by infiltration into the underlying aquifer could cause (periodic ?) downslope ground water flow through this aquifer from NE to SW. Such ground water flow could carry contaminants from any cask leakage that travelled down into such sediments out of the PA and into the Accessible Environment (AE) down gradient to the SW, including into lakes within the PA, and into shallow flow in Nash Draw. This potential problem could be rectified by moving the HS away from the PA to nearby bedrock (Triassic fine-grained outcrops with their cation exchange capacities ?), but risks associated with a new location should be fully re-evaluated.

B) – Dockum Aquifer - Upper Triassic outcrops are found to the immediate north, west, and south of HS (Bachman, 1987 (Figure 4) and N M Bureau of Geology, 2003, geologic maps) and it is possible that older Triassic Dockum strata (including its basal aquifer) could be found beneath the HS. If basal sand aquifers within the Dockum are present below the HS, downward

traveling contaminant fronts from HS could be entrained in ground-water flow within this aquifer and transported to the south and southeast towards commercial pumping centers (accessible environment) in southern Lea County, NM and Winkler County, TX (Ewing, 2008 – water-level map (Figure 5), flow lines, and pumpage map - Figure 6)), or possibly flow directly into the Pecos River in Ward County, Texas (Figure 5) and from there into the Rio Grande. Until subsurface work is done to check on the presence or absence of the Dockum aquifer below HS (or below a new location if the HS is moved), this problem is only a potential hazard. If geologic work is done to investigate this issue, it should be reviewed by independent agencies such as the USGS, the N M Bureau of Geology, and the NM .

C) - Rustler Aquifer - the Permian Rustler Formation and its aquifers lie beneath the HS (Bachman, 1987, Map of Rustler Fm – Figure 7). Deeper vertical contaminant transport through and below the Triassic within the bounds of HS could reach the Rustler Formation and there, contaminants could be transported southward in ground-water flow within this confined aquifer, and eventually taken into the Pecos River itself (Corbet, 1996, water-level map with flow lines – Figure 8) – and once again, eventually into the Rio Grande.. Hale (1945) suggested that saline waters within the Rustler Aquifer did flow into the Pecos River within New Mexico in the reach between Malaga Bend and the Texas State line (Figure 7). Within their modeled area (Figure 7), Corbet and Knupp (1996) describe the Rustler close to the Pecos River as grading into a permeable collapse breccia through which Rustler aquifer water within the modeled area flows into the Pecos River.

It is not known for any of the three scenarios whether such transport of contaminants from the HS could reach accessible environments (AE) within the EPA/NRC-mandated 10,000-year limit (some routes would reach the AE faster than others). It should be incumbent on Holtec and the NRC to fully evaluate these and related questions with field work, contaminant transport evaluation/modeling, and with associated (existing?) ground-water flow modeling for these three and other related aquifer systems (with critical review by USGS and DOE personnel) before approving the HS and allowing the Holtec storage to become long-term.

The NRC should be encouraged to limit the amount of spent-fuel storage at the Holtec Site to no more than 1/2 of the total available at the time of Commissioning. This will force use of at least one other permanent burial site besides WIPP (e.g., Nevada's Yucca Mountain) in order to keep the risk of burial from being placed on just one State or one type geo-hydrologic system.

References

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New Mexico Bureau of Geology, 2003, Geologic map of New Mexico

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FROM: ANONYMOUS
Roswell - NM

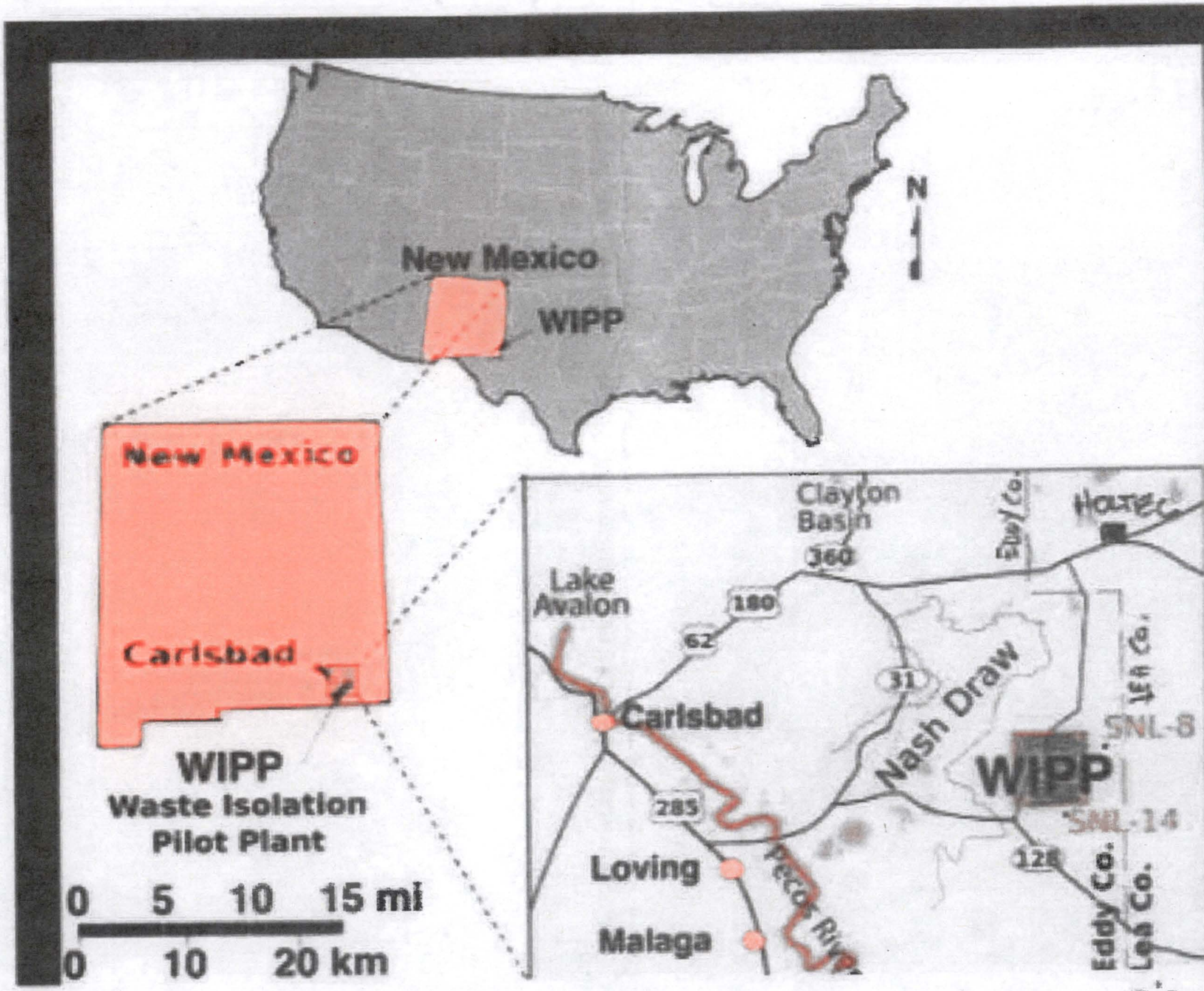

FIGURE 1 – LOCATION MAP FOR WIPP AND HOLTEC SITES

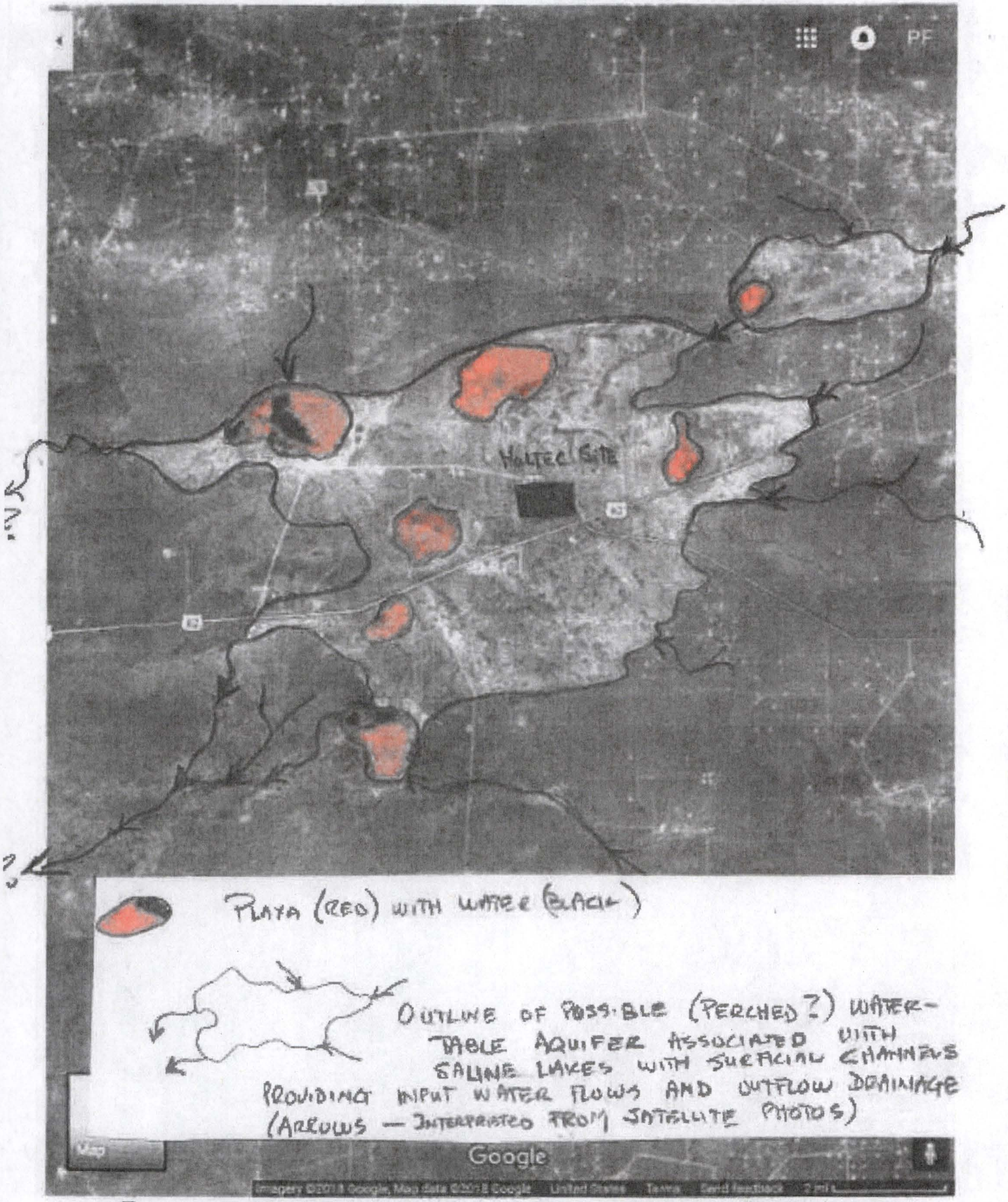

FIGURE 2 - SATELLITE PHOTOGRAPH OF SALINE PLAYA LAKES IN THE VICINITY OF THE HOLTEC SITE

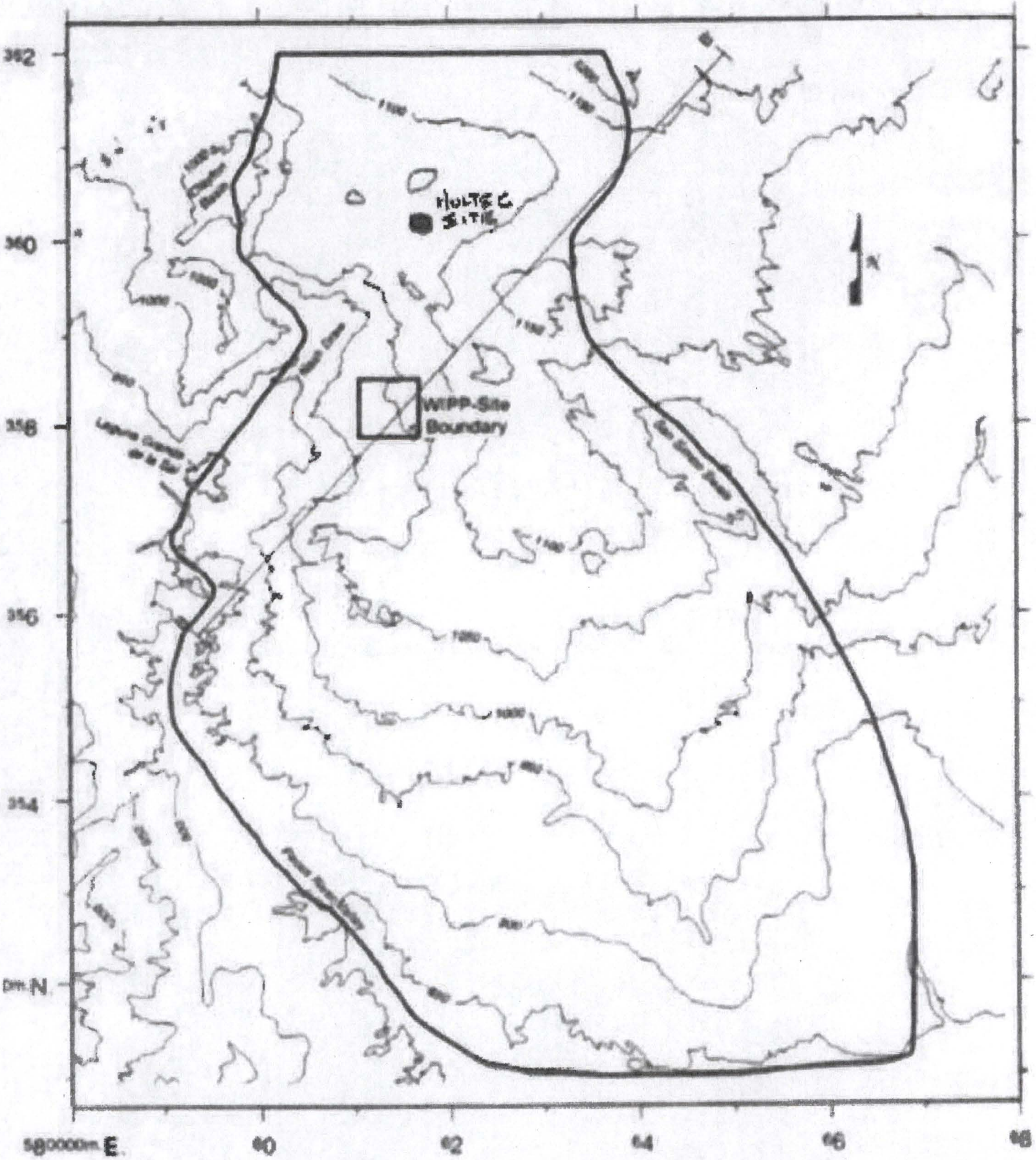

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FIGURE 3- MAP OF TOPOGRAPHY IN THE WIPP AREA
(FROM CORBET, 1996)

2-2. Outline of the numerical model on a topographic map. The contour interval is 50 meter
The model boundary follows major hydrologic divides.

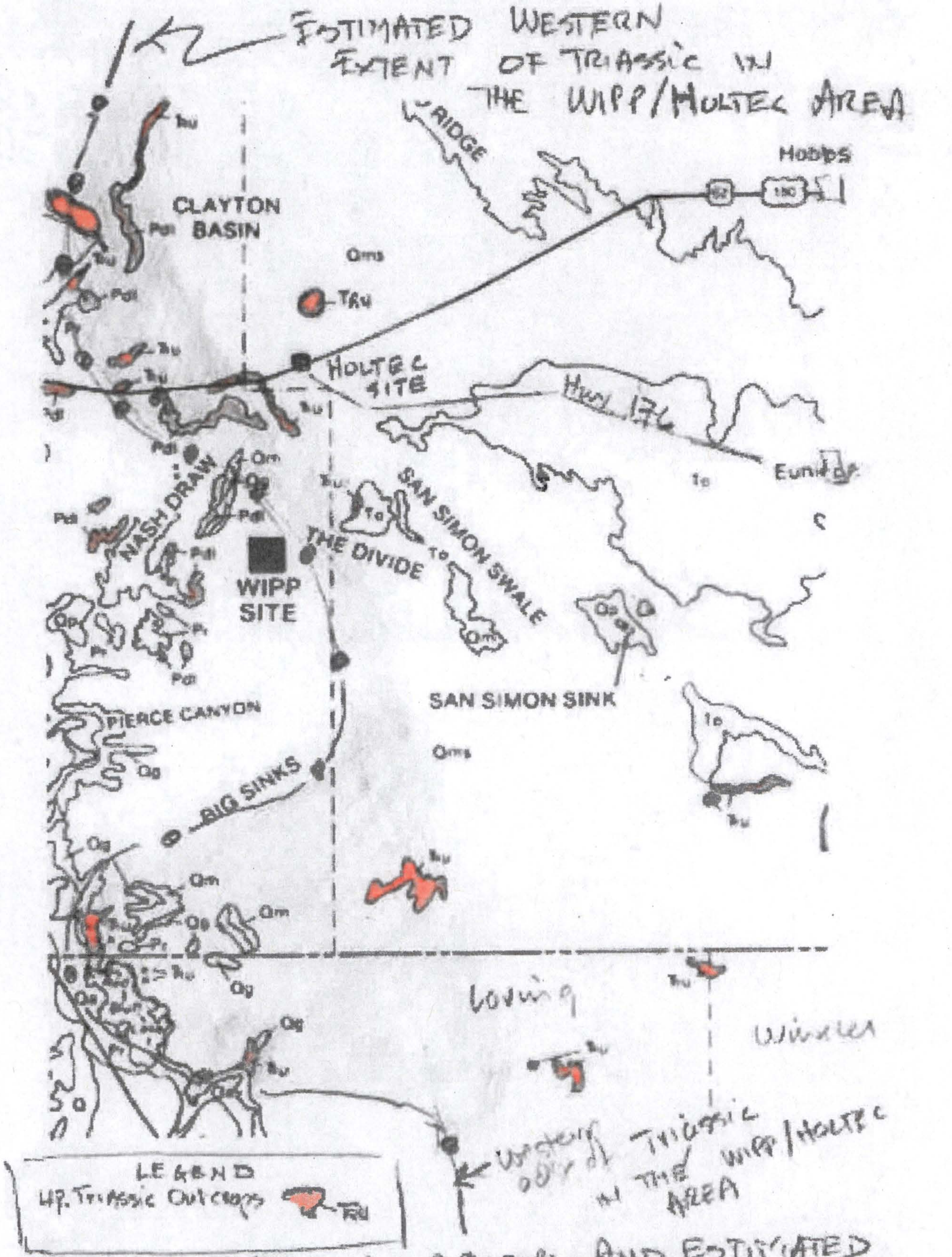
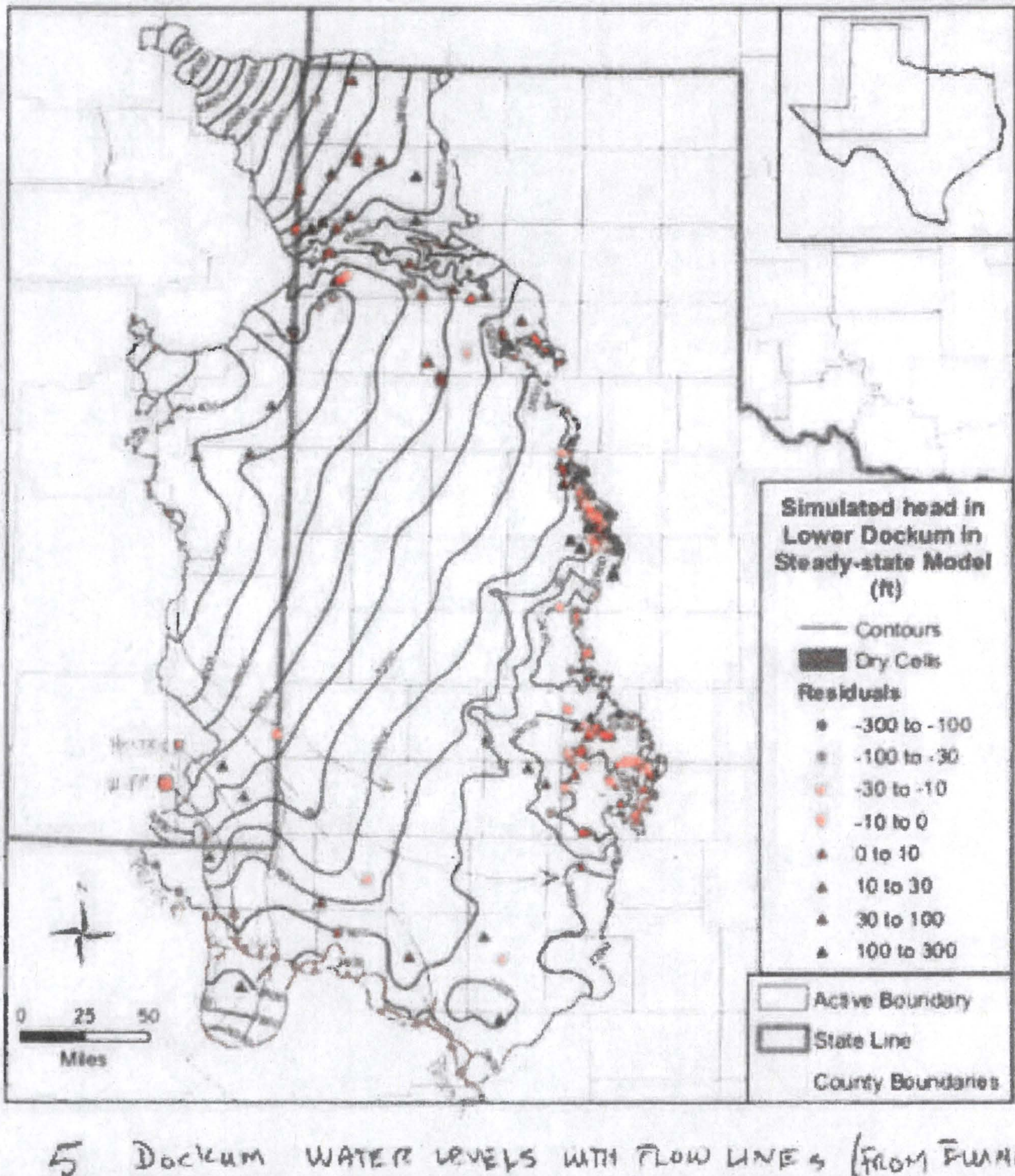
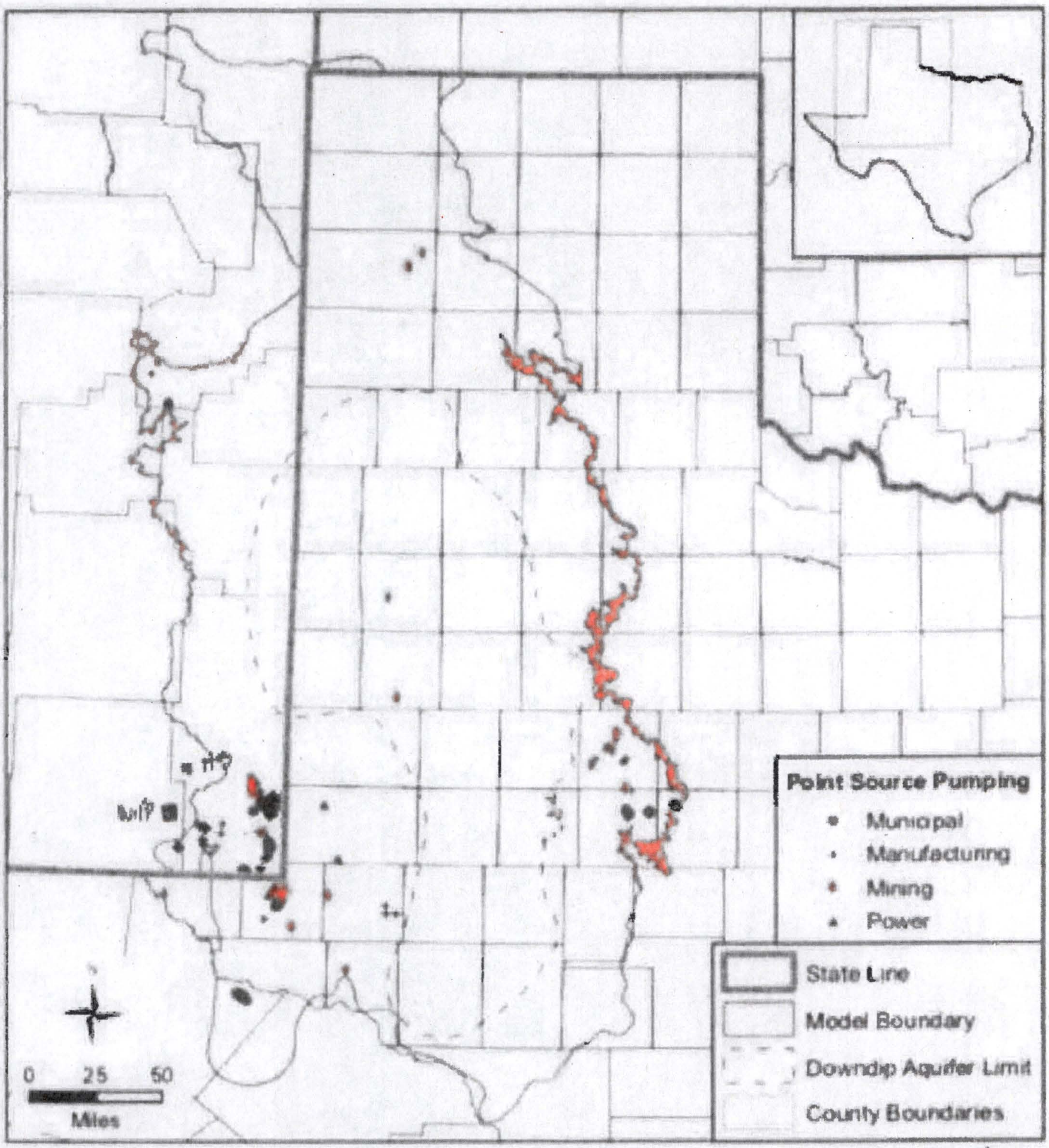


FIGURE 4 – UPPER TRIASSIC OUTCROPS AND ESTIMATED EXTENT IN WIPP/HOLTEC AREA (FROM BACHMAN, 1987 WITH CORRECTIONS FROM NM BUR. GEOL, 2003)



5 DOCKUM WATER LEVELS WITH FLOW LINES (FROM FUANG, 2008)

Figure-4.24 Simulated steady-state water levels and residuals in feet for the lower portion of the Dockum Aquifer. — (GENERALIZED FLOW LINES DRAWN IN RED



6 DOCKUM PUMPAGE STES (FROM EWING, 2008)

Figure 4.5.1 Locations of pumping point sources in the active model area.

Hand drawn Corbet Model Boundary - 1996

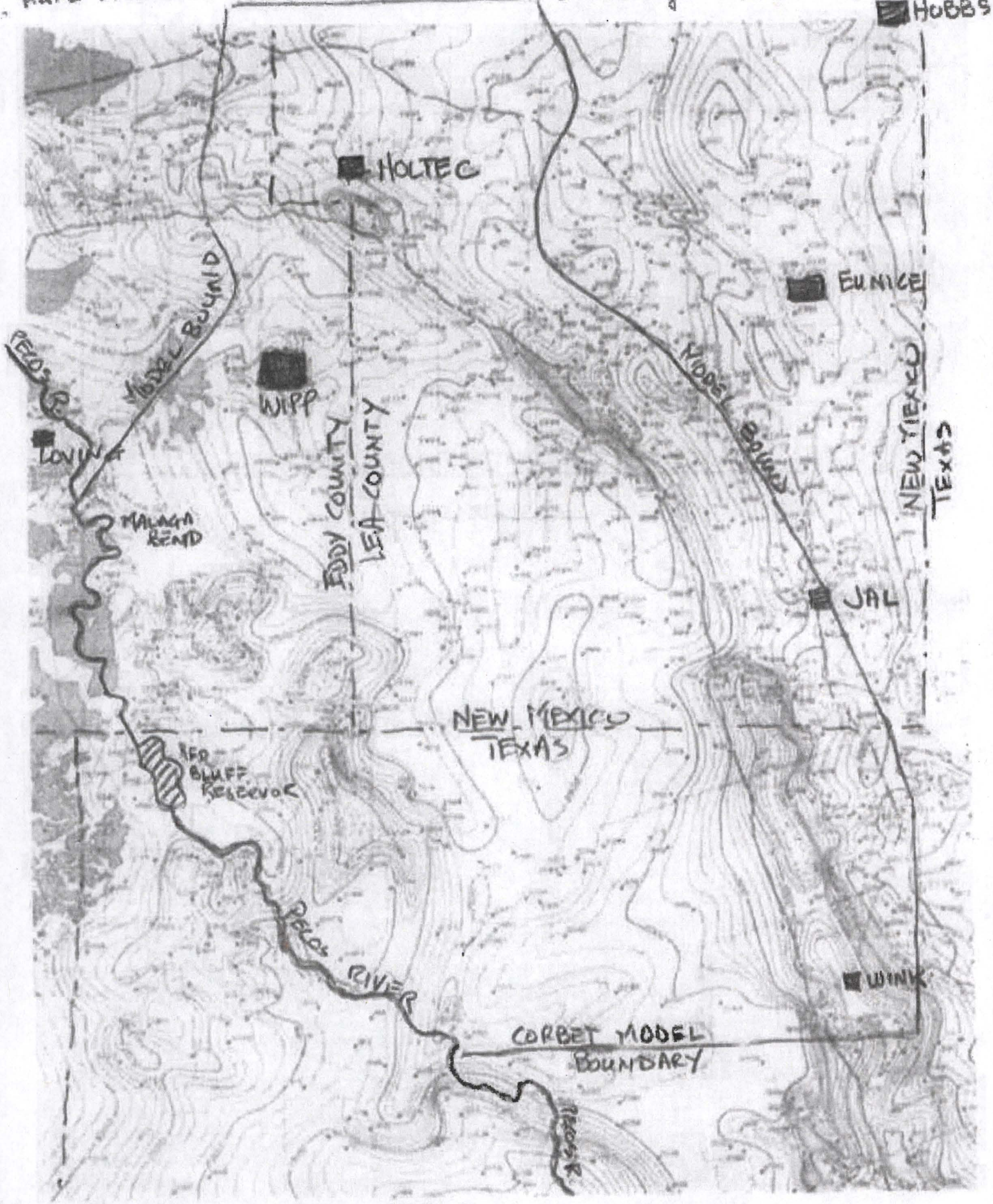


FIGURE 7 - GENERAL LOCATION MAP AND CORBET MODEL BOUNDARIES DRAWN ON BACHMAN (1987) MAP OF RUSTLER FM.

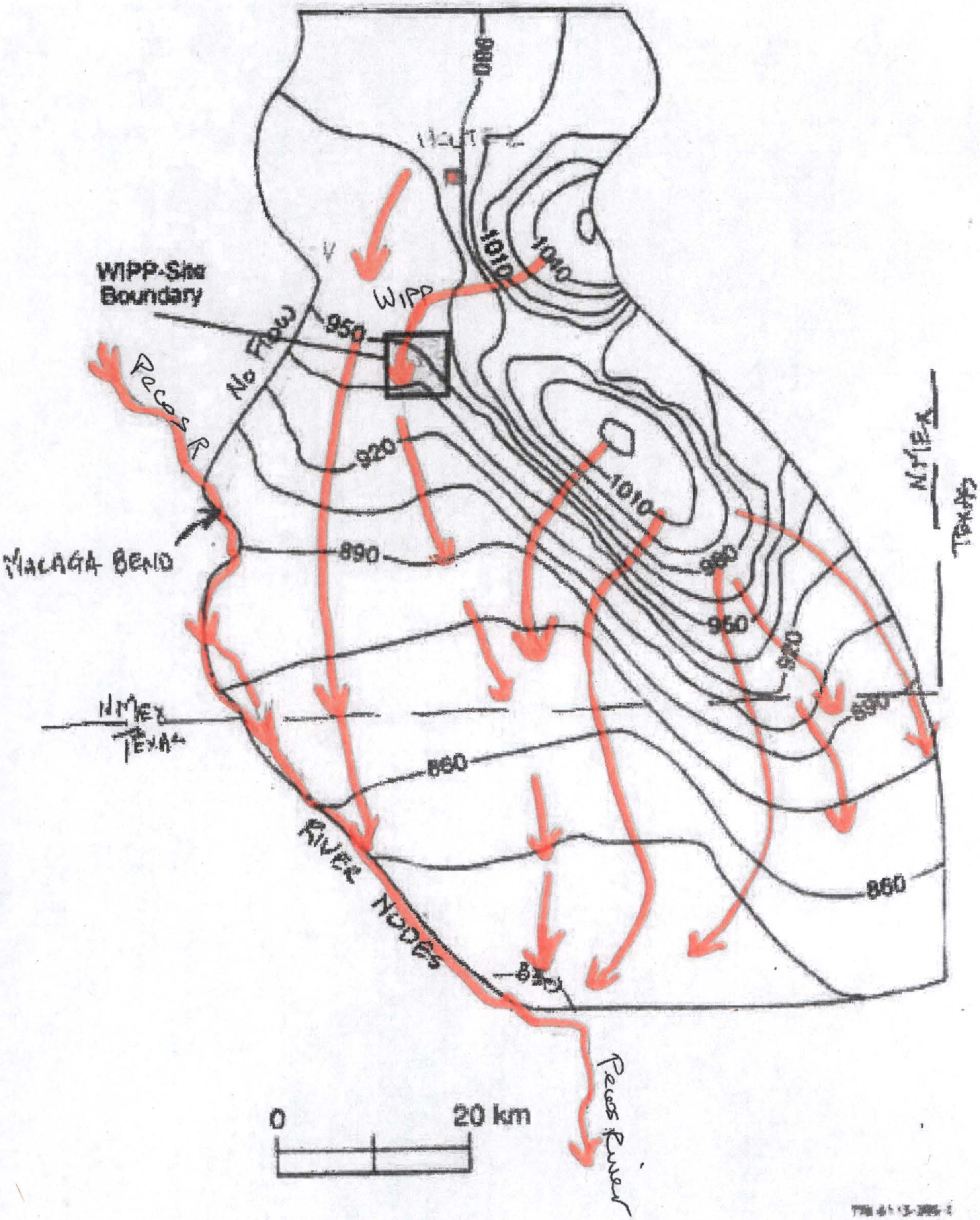


FIGURE 8 — RUSTLER WATER LEVELS AND FLOW LINES (FROM EWING, 2012)

~~[illegible]0~~. Head distribution in the ~~Culebra~~ Rustler at the present time for the base-case simulation. The contour interval is 15 m. Red Lines are Generalized Flow Lines