



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION IV
URANIUM RECOVERY FIELD OFFICE
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DENVER, COLORADO 80225

Return to URFO 467-SS
Docket 40-1341
PDR

MAR 25 1983

URFO:TLJ
Docket No. 40-1341

MEMORANDUM FOR: Docket File No. 40-1341
FROM: T. L. Johnson
Licensing Branch I
Uranium Recovery Field Office
Region IV
SUBJECT: REVIEW OF NEED FOR ADDITIONAL MONITOR WELLS -
EDGEMONT MILL

Background

In the "Final Environmental Statement (FES) Related to the Decommissioning of the Edgemont Uranium Mill", the NRC staff determined the following:

"Because of concerns that flow of contaminated groundwater to the northeast of the mill site and towards Cottonwood community might be encouraged by decommissioning activities, the installation of additional monitor wells in these areas will be required unless the licensee provides adequate technical justification that this will not occur. The need for these wells (and their locations, if needed) will be determined by the staff following a review of additional information".

The above concerns were discussed on several occasions with TVA. TVA indicated that there seemed to be no need for the monitoring, because no increase in the flow of contaminated groundwater could be envisioned in this area. The NRC staff requested Oak Ridge National Laboratory (ORNL) to independently evaluate the rationale for imposing a license condition requiring monitoring of groundwater in this area.

Discussion

By letter dated August 18, 1982 from J. S. Baldwin to M. J. Kelly, the ORNL review of the proposed license condition was documented. In that review, ORNL concluded that monitoring would not be required in the area

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northeast of the mill site. ORNL predicted that there would be no increase in groundwater flows toward the Cheyenne River, and there would in fact, probably be a decrease due to the construction of the diversion channel for Cottonwood Creek. Based on an analysis of groundwater gradients in this area, ORNL also concluded that decommissioning activities would have little or no effect on groundwater flow.

Based on our review of ORNL's analyses, we agree that decommissioning activities should have no adverse effects on groundwater in the area northeast of the mill.

ORNL recommended that Pond 10 be lined and groundwater be monitored only if groundwater is used in the Cottonwood community. Based on an increase in hydraulic head in Pond 10 due to collection of surface runoff and excess dewatering flows, ORNL predicted a possible increase in seepage toward the Cottonwood community area, if Pond 10 is not totally lined. ORNL predicted that seepage could migrate laterally and increase the potential for contamination of groundwater supplies in the Cottonwood community area. ORNL recommended that a line of monitor wells be installed such that seepage could be detected, intercepted, and pumped back, if members of the Cottonwood community withdraw and use groundwater and Pond 10 is not totally lined.

On November 2, 1982, TVA provided information which confirmed that groundwater was not used in the Cottonwood community. TVA indicated that future use of groundwater was also unlikely, since every new household is required by local ordinance to use water supplied by the City of Edgemont, and it would be unlikely that anyone would construct a well to obtain a supply of poor-quality groundwater. Also, TVA will be required by license condition to submit periodic reports regarding any changes in land and water use. These reports will provide information on any future use of groundwater in the area. In addition, the quality of the groundwater is relatively poor (FES Section 3.6.2.4) and there is not likely to be any future use.

The staff will carefully review the results of a soil boring and test program to be required of the licensee to determine the permeability of the materials in Pond 10. If the test results indicate that the materials are not sufficiently impermeable to acceptably retard seepage, TVA will be required to line the bottom and/or sides of the pond. TVA has committed to line the pond, as necessary (FES p. 2-23).

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Based on the fact that there are no users of groundwater in the Cottonwood Community, the fact that it is unlikely that there will be any future users, the fact that the groundwater quality is already very poor, and the fact that Pond 10 will be lined unless natural materials meet specific criteria on impermeability, I recommend that the draft license condition requiring groundwater monitoring in the area be deleted.



T. L. Johnson
Licensing Branch I
Uranium Recovery Field Office
Region IV

Enclosure:
As Stated

CC: R. Brich, South Dakota Dept
of Water & Natural Resources

JL

INTRA-LABORATORY CORRESPONDENCE

OAK RIDGE NATIONAL LABORATORY

August 18, 1982

TO: M. J. Kelly

FROM: J. S. Baldwin (6-7642)

SUBJECT: ORNL Review of Draft License Condition No. 27 Related to the Decommissioning of the Edgemont Uranium Mill

This memo is in response to a request by the NRC to evaluate the rationale for imposing the proposed license condition Number 27 on the TVA (the licensee) related to the decommissioning and long-term stabilization of the Edgemont uranium mill site.

The first paragraph of the proposed license condition Number 27 states:

By October 1, 1982, the licensee shall install monitor wells in the area northeast of the mill site and sample them as described in Sect. 4.2.2.2 of the FES unless the licensee can provide adequate justification that decommissioning operations will not encourage flow of contaminated groundwater towards this area.

After evaluating data germane to the paragraph above, our staff has not been able to develop plausible scenarios that would either increase the flow of or concentration of identified contaminants in groundwater in the northeast portion of the mill site due to decommissioning activities. In the short run, we believe that groundwater flow towards the Cheyenne River from the northeastern portion of the mill site may in fact be reduced due to the diversion channel (see Fig. 2.7) that will be constructed on the eastern edge of the mill site. This diversion channel will intercept and divert natural ephemeral drainage that normally recharged the alluvium in this area to Pond 10 (see Fig. 2.11). Also, TVA will be required to place dewatering sumps in all ponds containing excess surface water throughout the decommissioning period. Removal of this excess surface water would decrease the chances of increasing the groundwater flow beneath the ponds and of increasing the concentration of identified contaminants. Decommissioning of the site will proceed from the northwest to Pond 10. Therefore tailings piles and ponds located in the northeast corner of the mill site will be removed following removal of those tailings piles and ponds located to the northwest of Cottonwood Creek. This means that removal of the tailings piles and ponds in the area will probably start in the third year of decommissioning. Additionally, if monitor wells were installed, analysis from these wells would probably only substantiate what is already known. Substantial increases in the concentration of any of the identified contaminants may be difficult to correlate with decommissioning activities.

For the reasons given above our staff believes that the placement of additional monitor wells in the northeast corner of the mill site would not provide useful additional information for making optimal decisions with regard to decommissioning activities.

The second paragraph of the proposed license condition Number 27 states:

The licensee shall conduct a survey in the Cottonwood community to determine if groundwater has been contaminated by tailings leachate. The licensee shall also evaluate the potential for decommissioning activities to cause flow of contaminated groundwater from the millsite into the Cottonwood community area. Based on the information gathered, the licensee shall develop and submit for NRC review and approval a monitoring program to document water quality in the Cottonwood community.

After review of the data pertinent to this paragraph our staff believes that it is essential to find out if any members of the Cottonwood community withdraw and use, for any purpose, groundwater from the alluvium underlying this area.

If members of the Cottonwood community withdraw and use groundwater for any purpose then we recommend that a line of monitoring wells be emplaced between the Cottonwood community and Ponds 7 and 10. If monitor wells are installed, we also recommend that they be designed and constructed in such a manner that they may be incorporated as part of a pump back feed system in the event that seepage occurs from Pond 10. Reasons for making these recommendations are given below.

Pond 10 is located hydraulically up gradient from the Cottonwood community (see Fig. 2.12) and will be used as a holding and solar evaporation pond for approximately five years or until the final stages of decommissioning. Pond 10 will receive water from the diversion channel, excess surface water from dewatering sumps located in various parts of the site, the median drain from between the haul roads, and water that is decanted from the proposed tailings disposal site. This implies that the head in Pond 10 may increase substantially over short or possibly extended intervals of time. An increase in head could induce seepage in either the vertical or horizontal directions.

The draft copy of the FES states (Page 2-23):

"...TVA has committed to line Pond 10 to prevent further seepage. However, it may be that the shale forming the base of the pond is sufficiently impermeable, and if this proves to be the case, a liner would not be required."

If a sufficient shale base underlies Pond 10 this will retard seepage in only the vertical direction. With respect to Cottonwood community we are concerned primarily with seepage that occurs in a horizontal direction. There is also good reason to suspect that an impermeable shale base does not underly the entirety of Pond 10. In the Ford, Bacon & Davis engineering assessment (May 1978) of the mill site the following observations were made (page 2-14):

Off-site and on-site runoff collection in the tailings ponds or behind dikes has occurred along the southern margin of pond 9, the eastern side of pond 7, at the intersection with ponds 9 and 7, and further south at pond 10. At some of these interceptions, water is seeping through the dikes into the tailings ponds or beneath the dikes via buried drainage channels. As an example, a series of catchment areas exist toward the southeastern border of pond 10. (See figure 2-11). Note that immediately north of and within the dike a pond has formed which is being recharged by the infiltrating runoff waters.

Examination of Fig. 2.11 indicates that there may exist one and portions of two other buried stream channels beneath Pond 10. These buried stream channels or portions of their remnants could act as high permeability conduits for the migration of contaminants resulting from any seepage that might occur from Pond 10. If these high permeability conduits exist, seepage could be directed towards the Cottonwood community. Additionally, the Ford, Bacon, & Davis report indicates that seepage may be occurring through the beams of Pond 10. If these observations prove to be correct then our staff recommends that both the bottom and the sides of the beams of Pond 10 be lined.

If further elaboration or information is required please contact R. B. McLean, J. S. Baldwin, or M. J. Kelly.

JSB:mo

cc: R. B. McLean

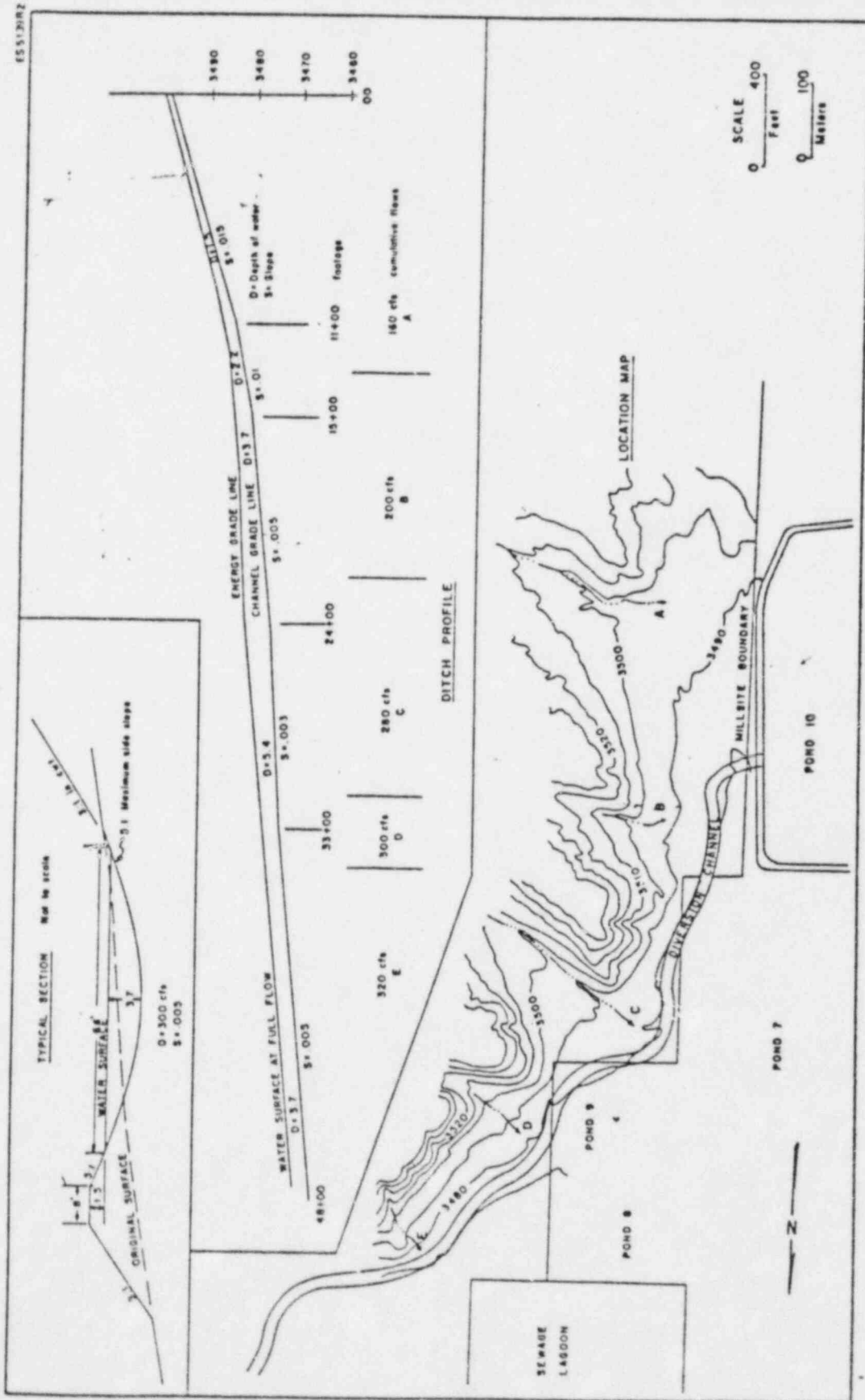


Fig. 2.7. Conceptual design of diversion channel along eastern perimeter of mill site. Source: Modified from ER, rev. 1, Fig. 3.5-1.

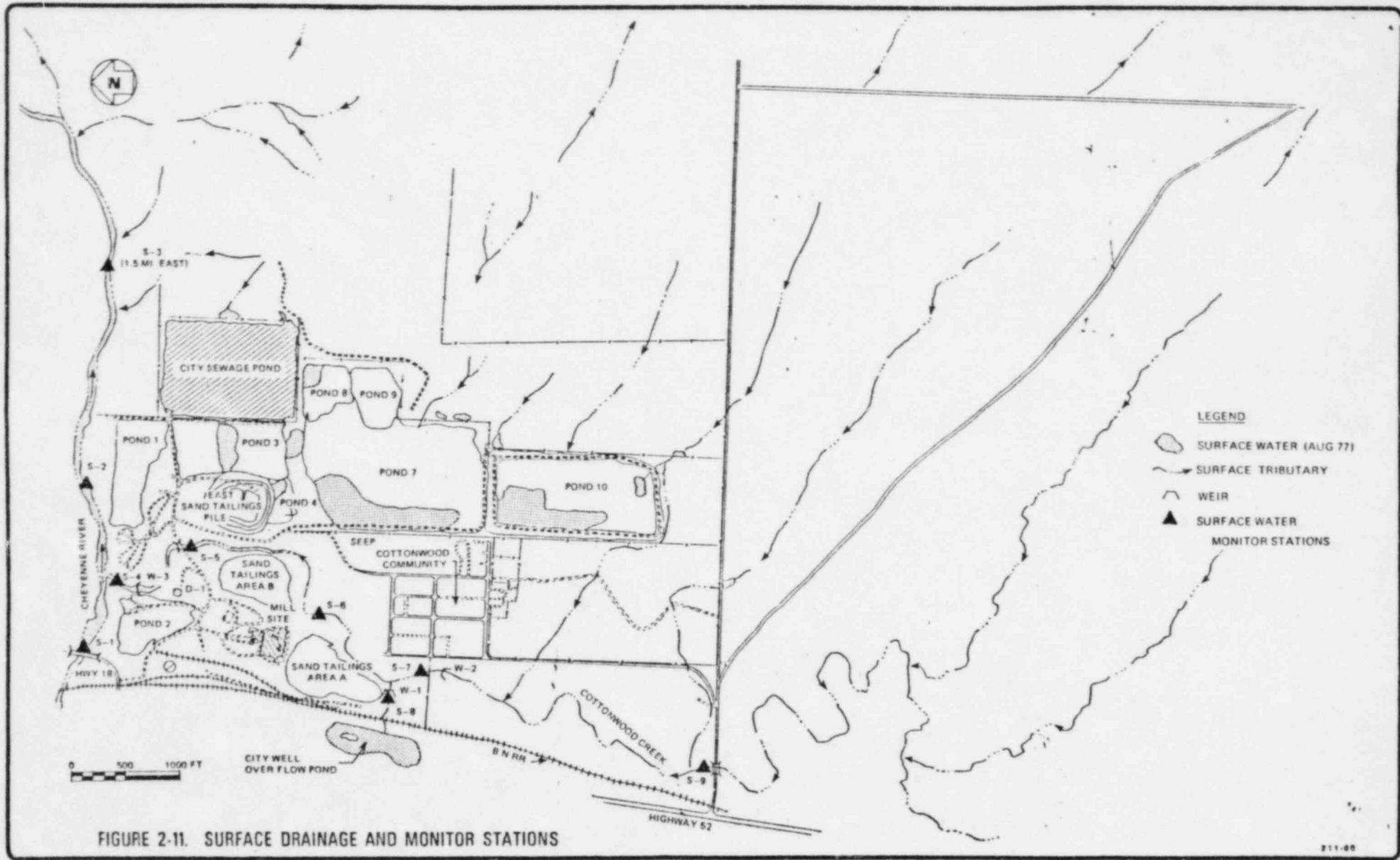
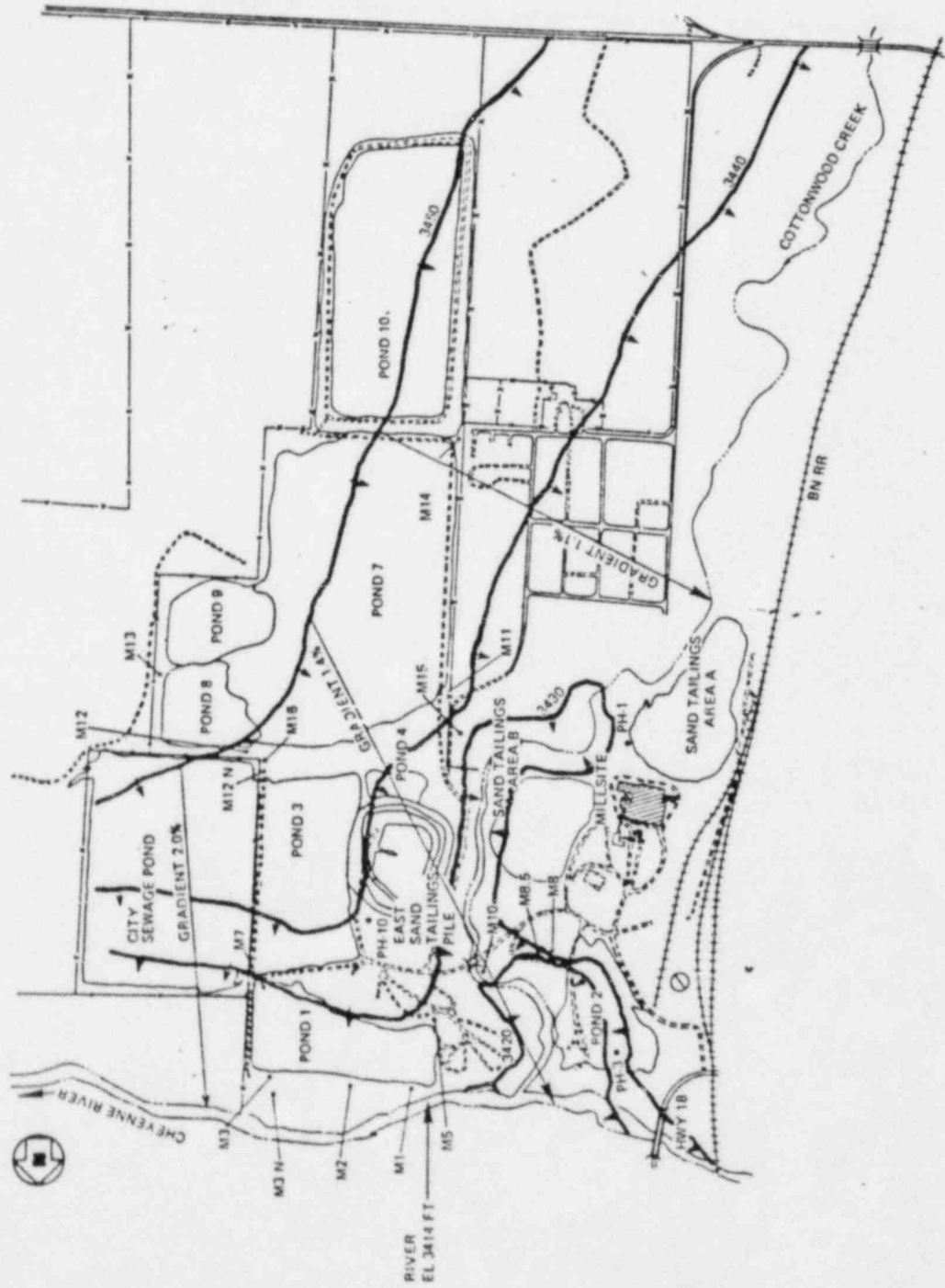
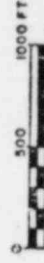


FIGURE 2-11. SURFACE DRAINAGE AND MONITOR STATIONS

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LEGEND
 WATER LEVEL CONTOUR/FLOW DIRECTION
 MONITOR WELL



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FIGURE 2-12. GROUND WATER LEVEL CONTOUR AND FLOW DIRECTION MAP