



Dam Safety Section

INTEROFFICE MEMORANDUM

TO: Lyle Swank, Eastern Region Office Manager
CC: Steve Bosworth, James Cefalo, Pam Skaggs
FROM: John Falk, Dam Safety Manager
DATE: March 16, 2015
SUBJECT: Reservoir Storage Capacity

Deep Creek Dam (15-2077)

Attached are three graphs/figures which contain data that has been used historically to report reservoir storage capacity impounded by the referenced dam. Based on my research of IDWR Dam Safety files, the dam was constructed in two (2) phases; the first completed in 1949 and the second in the fall/winter of 1951/52. Significant rehabilitation has also occurred since: 1979 (outlet extension), 1983 (outlet valving), 1987 (stability berm), 1990 (outlet relining), and 1994 (increased freeboard). However, these later modifications are reported to not have affected the existing reservoir storage capacity.

Reservoir storage capacity has been variously reported over the years absent good documentation as to how the values were obtained. The purpose for this memo is to summarize my file research and to offer a single value that is appropriate and recommended for future use, to describe the estimated storage capacity of the reservoir impounded by Deep Creek Dam. Note the spillway crest elevation corresponds to elevation 5186.6 feet (USGS-NAVD 1929) and a hydraulic height equal to 81 feet.

Figure 1. Graphical results of most recent level-line survey as performed by IDWR Dam Safety (2002). The reservoir area was measured using 2011 aerial photos and Arc-Map tools; from which the following equation is used to obtain estimated reservoir storage capacity at or near full-pool conditions:

→ 81 feet (hydraulic height) x 171.9 acres (surface area) x 0.4 (shape factor) = 5,537 acre-feet

Recommendation: Until such time an area/capacity survey is submitted by a licensed professional and accepted/approved by IDWR, the physical volume of water impounded by Deep Creek Dam measured @ the spillway crest is presumed to be **5,537 acre-feet**.

Figure 2. Reprint of Area Capacity Diagram prepared by W.H. Smith, Engineer; T.L. Bunge and L. Swensen, Surveyors. The plans and specifications were approved for construction on 10/11/1948 by Mark R. Kulp, State Reclamation Engineer. Cross sections define the maximum water surface elevation @ 5205.0 feet, with corresponding reservoir storage approximately 5400 acre-feet. This water surface elevation does not coincide with USGS (NGVD 1929) datum, which indicates the pool level is approximately 5186.6 feet. Due to asbuilts not submitted/received by IDWR (and apparently non-existing), the design information contained herein cannot be used at face value.

Recommendation: Do not use.

Figure 3. Reprint from *Phase I Inspection Report* (January 1982). The diagram represents a capacity curve for the referenced dam based on a USDA-SCS survey (Nov-1976). As shown, the hydraulic height is 56.6' (blue arrow) vs. 81.0' that was measured by IDWR Dam Safety on 7/25/2002 (see Figure 3). Therefore, the storage capacity illustrated in the Phase I Report likely is not a valid representation of water storage at full pool.

Recommendation: Do not use.

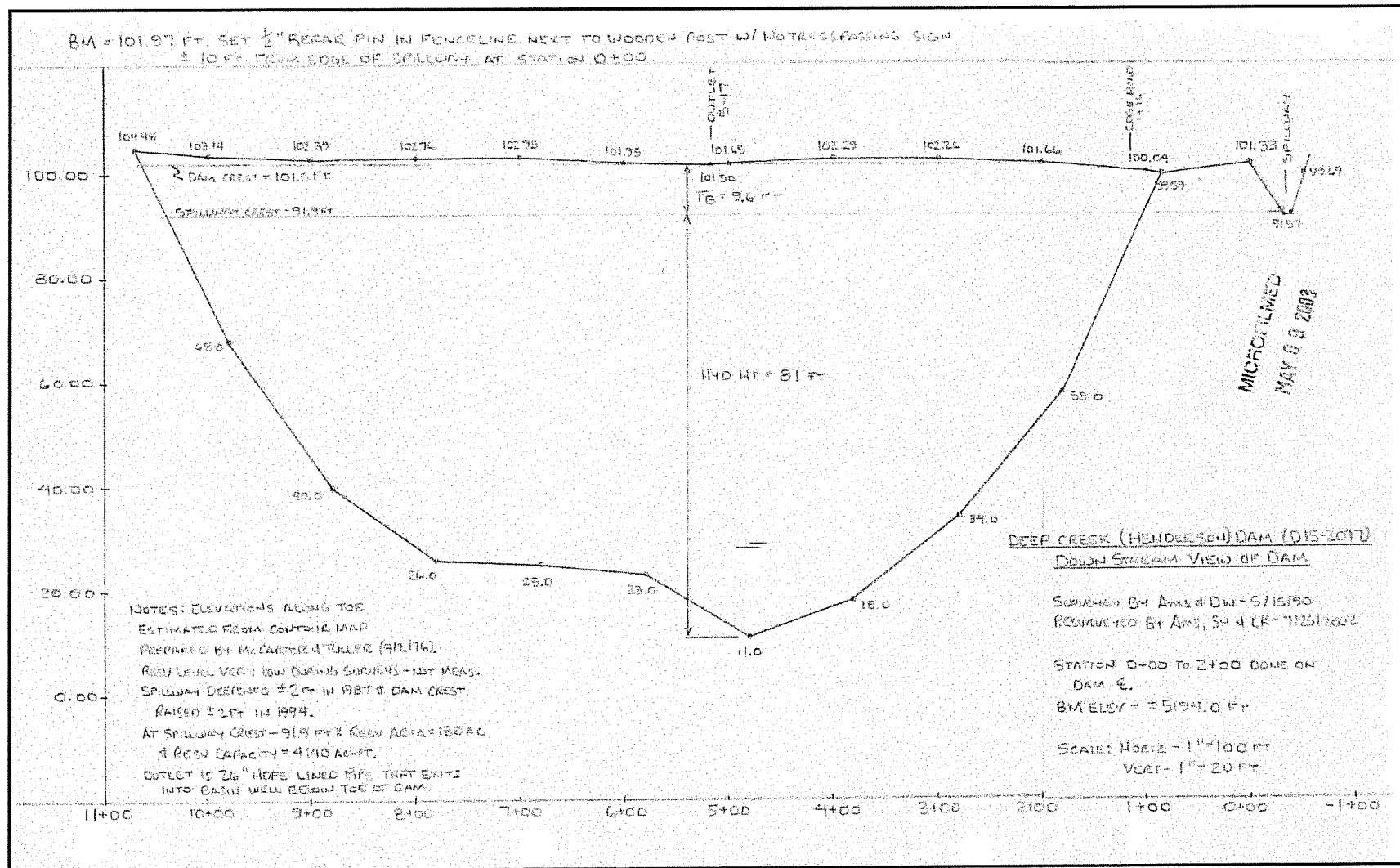


Figure 1 – Graphical results of most recent level-line survey performed by IDWR Dam Safety (2002).

The view is looking upstream at the embankment's downstream exposure. The reservoir area was measured using 2011 aerial photographs and Arc-Map tools, and the following equation applied to obtain estimated reservoir storage capacity at or near full-pool conditions:

$$\rightarrow 81.0 \text{ feet (hydraulic height)} \times 170.9 \text{ acres (surface area)} \times 0.4 \text{ (shape factor)} = 5,537 \text{ acre-feet}$$

NOTE: Until such time an area/capacity survey is submitted by a licensed professional and accepted/approved by IDWR Dam Safety, the presumed value for total volume of water impounded by Deep Creek Dam measured @ the spillway crest is **5,537 acre-feet**.

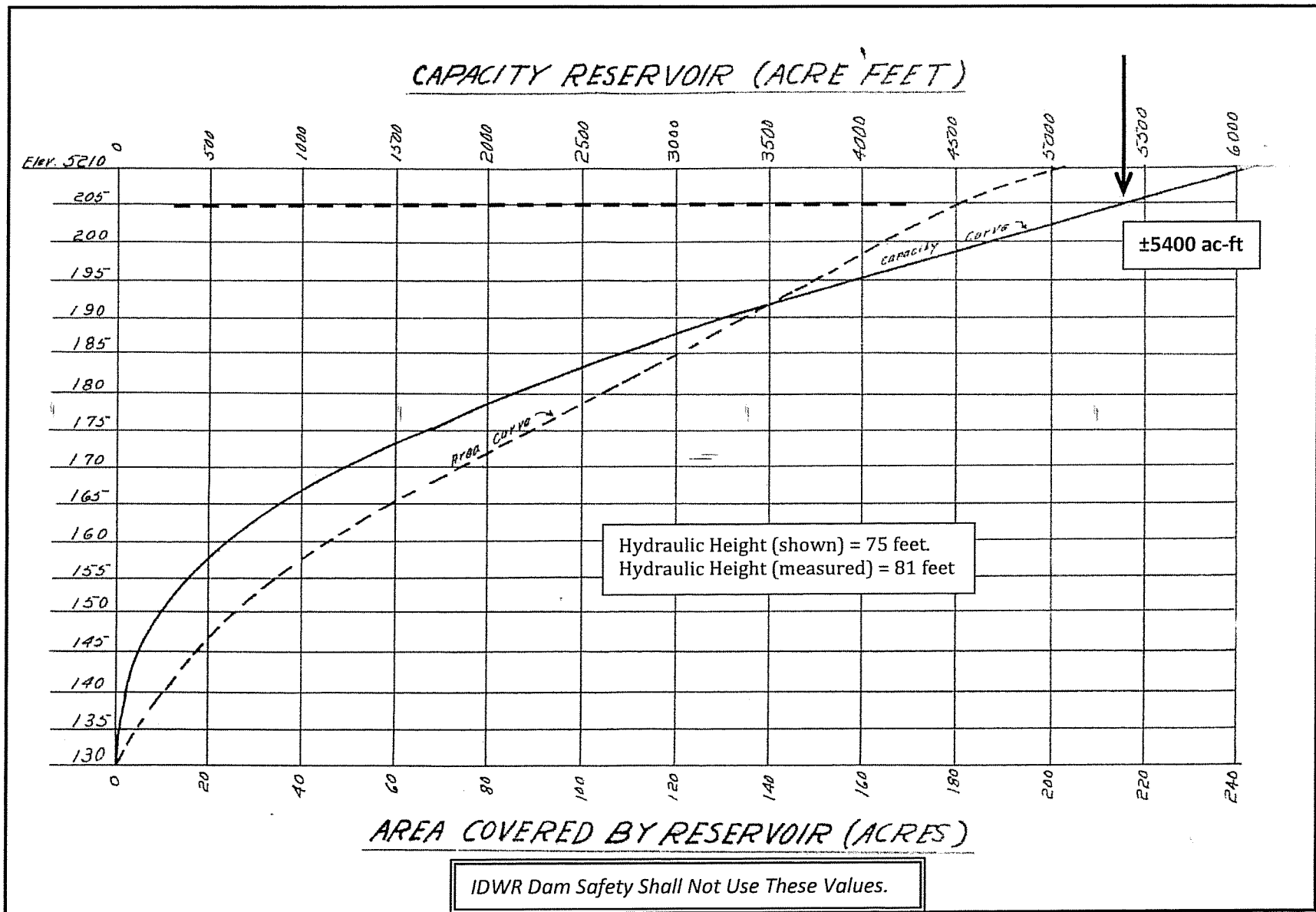


Figure 2 – Reprint of Area Capacity Diagram prepared by W.H. Smith, Engineer; T.L. Bunge and L. Swensen, Surveyors (Sheet 2/4). The plans and specifications were approved for construction on 10/11/1948 by Mark R. Kulp, State Reclamation Engineer. Cross sections define the maximum water surface elevation @ 5205.0 feet and reservoir storage approximately 5400 acre-feet (blue arrow) corresponding to the spillway crest. Note this does not coincide with USGS (NGVD-1929) datum.

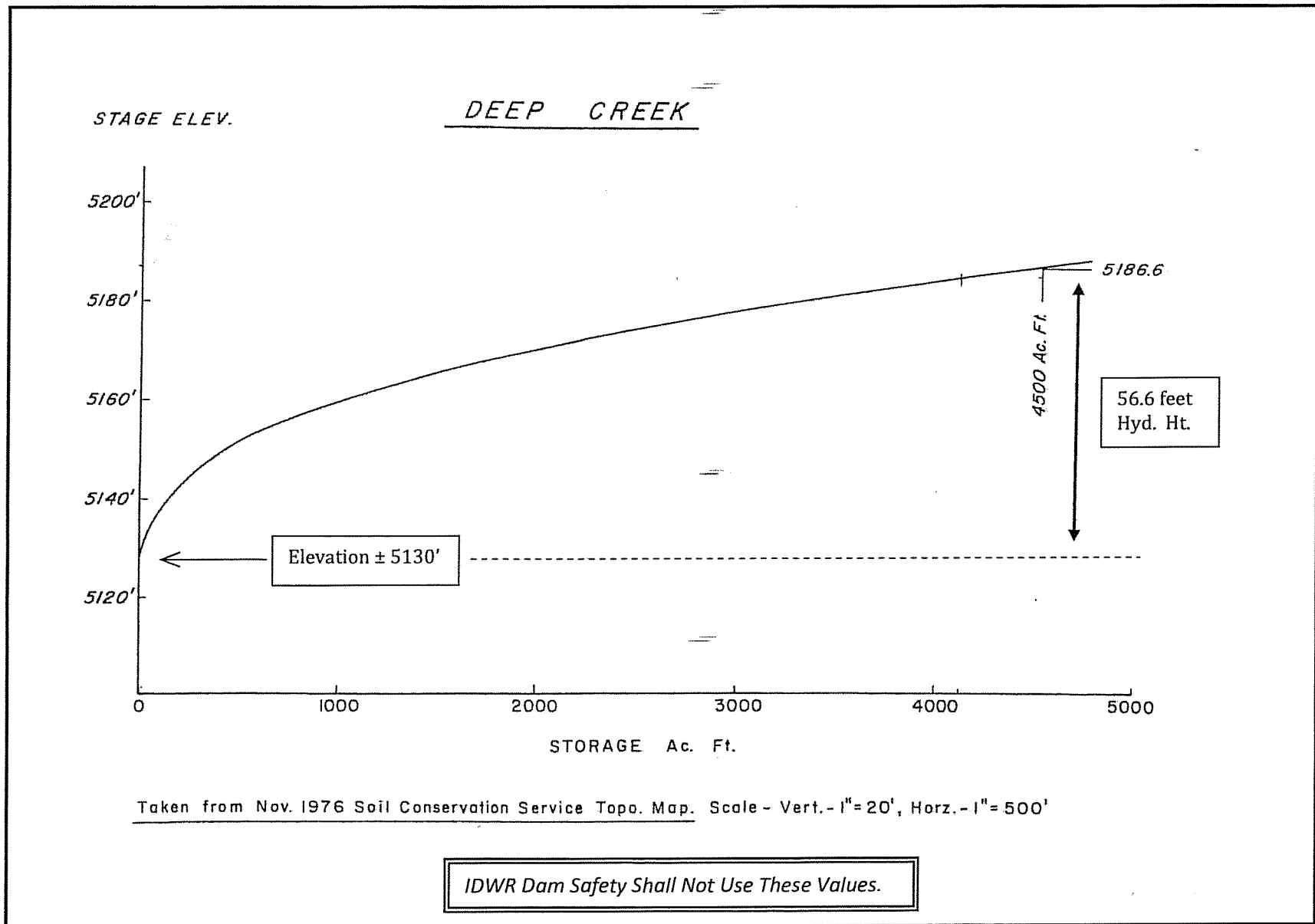


Figure 3 – Reprint from *Phase I Inspection Report* (January 1982).

The diagram represents a second existing capacity curve for the referenced dam; from a USDA-SCS survey (Nov-1976). As shown, the hydraulic height is 56.6' (blue arrow) vs. 81.0' that was measured by IDWR Dam Safety on 7/25/2002 (see Figure 3). Therefore, this storage capacity as illustrated in the Phase I Report likely is not a valid representation of water storage at full pool conditions.