MARTIN MARIETTA

ORNL/ER-36

ENVIRONMENTAL
RESTORATION
PROGRAM

SWSA 6 Interim Corrective Measures Environmental Monitoring: FY 1990 Results

T. L. Ashwood
B. P. Spalding

ENERGY SYSTEMS
ER

MANAGED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY
UCN-17560 (6 7-91)

ORNL/ER-36

Environmental Restoration Division
ORNL Environmental Restoration Program

SWSA 6 Interim Corrective Measures Environmental Monitoring: FY 1990 Results

T. L. Ashwood
B. P. Spalding

Manuscript Completed: November 1990
Date Issued—July 1991

Prepared by
Environmental Sciences Division
Oak Ridge National Laboratory
ESD Publication 3722

Prepared for
U.S. Department of Energy
Office of Environmental Restoration and Waste Management
under budget and reporting code EW 20

OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37831-6285
managed by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

Author Affiliations

T. L. Ashwood and B. P. Spalding are members of the Environmental Sciences Division, Oak Ridge National Laboratory, Martin Marietta Energy Systems, Inc.

CONTENTS

FIGURES

Figure | Page

TABLES

ACRONYMS

EPA	Environmental Protection Agency
ESD	Environmental Sciences Division
HDPE	High-density polyethylene
ICM	Interim corrective measure
ICP	Inductively coupled plasma (spectrometry)
LLW	Low-level waste
ORNL	Oak Ridge National Laboratory
PVC	Polyvinylchloride
RCRA	Resource Conservation and Recovery Act
SWSA	Solid Waste Storage Act
TARA	Test Area for Remedial Actions
TOC	Total organic carbon

EXECUTIVE SUMMARY

This report presents the results and conclusions from a multifaceted monitoring effort associated with the high-density polyethylene caps installed in Solid Waste Storage Area (SWSA) 6 as an interim corrective measure (ICM). The caps were installed between November 1988 and June 1989 to meet Resource Conservation and Recovery Act (RCRA) requirements for closure of those areas of SWSA 6 that had received RCRA-regulated wastes after November 1980. Three separate activities were undertaken to evaluate the performance of the caps: (1) wells were installed in trenches to be covered by the caps, and water levels in these intratrench wells were monitored periodically; (2) samples were taken of the leachate in the intratrench wells and were analyzed for a broad range of radiological and chemical contaminants; and (3) water levels in wells outside the trenches were monitored periodically. With the exception of the trench leachate sampling, each of these activities spanned the preconstruction, construction, and postconstruction periods. Findings of this study have important implications for the ongoing remedial investigation in SWSA 6 and for the design of other ICMs.

The intratrench wells were installed by driving wellpoints into the backfill material in the trench with a 140-lb hammer raised 30 in. This technique provides a standard measure of penetration resistance that can be related to stability of the backfill material. Our results indicate that the stability of the trenches is only about 35% that of the surrounding soil formation. Thus, significant differential land surface subsidence can be expected for unstabilized burial trenches in SWSA 6. The capacity of such unstabilized trenches to support infiltration barriers (e.g., composite caps) over the long term must be carefully evaluated.

Water-level measurements from intratrench wells indicate that the ICM caps have been effective in eliminating perched water from the trenches in only two areas (caps 2 and 8). Water in burial trenches primarily occurs as a perched water table when shallow storm flow enters the trench faster than it can flow out. Thus, caps are only successful in reducing the perched water table where the caps cover a significant portion of the recharge zone for such shallow storm flow. In other areas (caps 1, 5, and 6), the covered burial trenches apparently continue to receive storm flow from upslope recharge areas. No wells were available in trenches beneath caps 3, 4, and 7.

An important observation from the intratrench wells under cap 8 is the apparent hydrological connection between some trenches and White Oak Lake. Water levels in two trenches whose bottoms were well below the 100-year flood elevation followed the fluctuations in White Oak Lake elevations directly—even though cap 8 appears to be effective in eliminating storm flow from the trenches.

Water levels in the shallow aquifer beneath SWSA 6 were largely unaffected by installation of the caps. This lack of response is probably because the caps do not cover the primary recharge zone for the aquifer near the upper end of SWSA 6 and because the temporary perched water table that occurs in the trenches after a storm slowly percolates from the trenches and recharges the aquifer.

Previously, only limited data have been available on the chemical quality of trench leachates in SWSA 6. Although these leachates represent a direct measure of the source term for contamination from the burial trenches, sampling of the leachates was not part of the remedial investigation in SWSA 6. Our sample results indicate significant concentrations of several volatile organic compounds (approaching their solubility limits) in more than 70% of the samples. Tritium and elevated gross beta activity were observed in more than 90% of the samples. Many contaminants were found at concentrations that were much greater than previously reported.

Our results suggest that use of impermeable caps as interim corrective measures are effective only where they act to eliminate all recharge, including shallow storm flow, in the area of effect. Our results also suggest that final closure of SWSA 6 must address stabilization of the burial trenches and isolation of the trenches from the influence of White Oak Lake. Finally, the trench leachate chemistry suggests that volatile contaminants (organics and tritium) are widespread in the capped burial trenches and that other RCRA-regulated contaminants are present in much greater concentrations than previously recognized.

1. INTRODUCTION

Solid Waste Storage Area (SWSA) 6 is the only operating low-level waste (LLW) disposal site at Oak Ridge National Laboratory (ORNL). Located in Melton Valley southwest of the main plant area, SWSA 6 was opened in 1969 but was not used extensively until burial operations in SWSA 5 were terminated in 1973 (Boegly 1984). The fenced area within SWSA 6 covers 26.7 ha (66 acres), about a third of which is suitable for shallow land burial of LLW (Boegly et al. 1985).

SWSA 6 was closed in May 1986 when it was found that wastes regulated by the Resource Conservation and Recovery Act (RCRA) were being disposed of at the site. Following numerous changes in operations (including cessation of RCRA-regulated waste disposal) the site was reopened in July 1986. Those areas that received hazardous or mixed wastes after November 8, 1980, were designated as RCRA-regulated units, and closure of those units under 40 CFR 265 Subpart G was required to be initiated before November 1988.

Because closure of the entire SWSA was not feasible, high-density polyethylene (HDPE) covers were installed as an interim corrective measure (ICM) in eight areas believed to have been used for disposal of RCRA-regulated wastes (Fig. 1). The eight caps cover an area of ~4.2 ha (10.4 acres), or roughly 15% of the fenced area of SWSA 6. An ICM monitoring program was developed to determine the impact of the ICMs on groundwater, surface water, and sediment transport (Miller and Craig 1988).

Moore (1988, 1989) has suggested that less than 10% of the precipitation infiltrating past the ground surface during a rain event is available to recharge the aquifer. Most infiltrating precipitation is removed by evapotranspiration or flows rapidly toward the surface streams through a shallow (<2-m deep) highly permeable storm-flow zone. Trenches, whose backfill is usually much more permeable than the surrounding soil formation, may intercept the storm flow and develop a perched water table because water enters the trench faster than it can percolate out. Impermeable caps act to reduce infiltration and increase runoff. If the caps are successful in reducing infiltration, they would be expected to reduce shallow storm flow and thus lower the perched water table in trenches within their area of effect.

Two separate monitoring programs were instituted in late 1988 to test whether the caps had any effect on the aquifer or the trench water levels. As part of the ICM environmental monitoring program (Miller and Craig 1988), water levels in 25 existing wells outside of the trenches were measured periodically. Results from the first year of this monitoring program suggested that the caps had no measurable impact on water-level elevations in the aquifer under SWSA 6 (Miller et al. 1989). In FY 1990, responsibility for these monitoring activities was assumed by staff of the Environmental Sciences Division (ESD) as part of the Active Sites Environmental Monitoring Program (Ashwood et al. 1990). Results of the ICM environmental monitoring program are presented in Sect. 2.1.

In addition to the ICM environmental monitoring program, staff members of ESD installed drivepoint wells in trenches within the capped areas prior to cap construction (see Sect. 3.0). Water levels in these intratrench wells were monitored manually before, during, and after cap construction, and results are presented in Sect. 2.2. One round of samples was taken from the intratrench wells to assess the potential risk to personnel involved in monitoring water levels and to supplement the limited existing data on quality of trench leachate in SWSA 6 (see Sect. 4.0).
As part of the ICM monitoring program, Miller et al. (1989) collected 41 water samples and 64 sediment samples from surface drainages in SWSA 6. Elevated concentrations of ^{3}H (above the proposed Safe Drinking Water Act Primary Standard of 740 Bq/L) were found in water samples from all areas of the surface streams. Radioactive strontium concentrations in water ranged from below detection to 12 Bq/L. No elevated levels (above detection limits) of other fission-product

radionuclides were measured in any water samples, and low gross alpha values (<1 Bq/L) suggest that transuranics were not present in the water above detection limits. Sediments contained from 20 to 390 Bq/kg of unspecified gross alpha activity, up to 5300 Bq/kg of ^{90}Sr, up to 940 Bq/kg of ^{60}Co, and up to 21,000 Bq/kg of ^{137}Cs. Miller et al. (1989) looked for changes in these variables over time but concluded that cap construction did not significantly affect concentrations of radionuclides in either the surface water or sediments. Although their grain-size analysis of sediments suggested that fine material was being transported out of SWSA 6 during and immediately following cap construction, the lack of water flow data precluded any quantitative analysis of mass transport of either sediment or radionuclides (Miller et al. 1989).

Without information on water flow and sediment transport from SWSA 6, routine measurements of contaminant concentrations in sediment and water are of little value. For that reason, the limited water and sediment analyses conducted during FY 1990 are not included in this report.

2. WATER LEVELS

Sixteen wells outside the burial trenches (Fig. 1) and 25 wells within the trenches constitute the present SWSA 6 ICM groundwater monitoring system. Water levels were measured using an electronic tape in accordance with Energy Systems ESP 302-1 (Kimbrough et al. 1990). Depth-to-water measurements were recorded in a field notebook and later transferred to one of two computer programs. For wells outside trenches, depth-to-water data were entered into a data base that also included well construction data, from which water-level elevations were calculated. Data from intratrench wells were entered into a spreadsheet that calculated water-level elevations from information on top-of-casing elevations. During cap construction, casings were occasionally disturbed, and water-level elevations during this period are calculated by measuring the total depth of the well and the distance of water level from the bottom. Both the spreadsheet and the data base are summarized in Appendix A.

Throughout Sects. 2.1 and 2.2, water-level data are presented in well hydrographs that plot water-level elevation against time. For all but the 600-series wells, the abscissa of these hydrographs covers the period from August 1988 through October 1990, though not all wells have data for that entire period. The abscissa of the 600-series wells spans the period from January 1988 through October 1990. Large differences in well elevations precluded the use of a common ordinate scale, except for intratrench wells within the same cap area. In all hydrographs, the ordinate has been chosen to represent the depth of the well. Accordingly, all hydrographs depict the ground surface at the specific well. For the intratrench wells, the hydrographs also depict the bottom of the trench. Each hydrograph also contains a vertical line showing the approximate date (June 1, 1989) when construction was complete on all caps. For various operational reasons, water levels were measured less frequently during FY 1990 than in the preceding period.

To underscore the response, or lack of response, to precipitation in each well, each hydrograph is overlain with a hyetograph that presents the daily rainfall throughout the period of October 1988 through September 1990 (Table A.4, Appendix A). No units are shown in the hyetograph because only the pattern of rainfall is important and inclusion of the units would have made the charts extremely difficult to read.

2.1 WELLS OUTSIDE SWSA 6 BURIAL TRENCHES

Miller et al. (1989) analyzed historical water-level data in 6 wells outside the burial trenches, but within capped areas (wells 347, 368, 640, 647, 649, and 650B), and concluded that no evidence existed to indicate that the ICM caps had significantly reduced groundwater levels in the surrounding area of SWSA 6. Manual water-level monitoring in these wells and other ICM monitoring wells (Table A.1, Appendix A) has continued throughout FY 1990.

Data from 1988 and 1989 are included with the 1990 data in well hydrographs (Figs. 2 through 17) to provide an historical perspective. Well 650A, the shallow well in a cluster, was always dry throughout the monitoring period, and wells 649 and 650B were damaged or blocked during all or part of FY 1990. Hence, their hydrographs are not included in this report. Miller et al. (1989) include hydrographs of wells 649 and 650B for the period preceding FY 1990.

Miller et al. (1989) largely ignored data from the wells outside of capped areas in their analysis. This may have been prompted by the paucity of postcap data on such wells or by the expectation that these wells would be less affected by cap construction than those wells within the cap boundaries. We chose to include data from the outside wells to determine whether the caps were exerting any appreciable control on groundwater hydrology in SWSA 6.

Wells 276, 636, 642, and 654 are relatively distant from any capped areas and are on the opposite side of a surface stream from the closest caps (Fig. 1). Any increased runoff from the caps would be intercepted by the surface drainage and would not be expected to affect the water levels in these wells. Similarly, the surface stream probably serves as a divide between the shallow groundwater on either side. Thus, any reduction in recharge caused by the ICM caps would not be expected to affect water levels in wells 276, 636, 642, and 654. The hydrographs (Figs. 2 through 5) support these predictions, although it must be noted that the monitoring frequency was not great enough to observe short-term changes.

Well 656 is located at the topographic high point in SWSA 6, above the caps and other wells. Well 656 is also one of the deepest (~37 m) of the ICM monitoring wells. Moore (1988) suggests that less than 10% of the rainfall in SWSA 6 is available for recharge to the aquifer. Thus, it is not surprising that the hydrograph for well 656 does not show a response to individual rain events (Fig. 6).

Well 646 is above (topographically) cap 3 and is unlikely to be affected by cap 1 because of the surface divide between them. Postcap water-level elevations are similar to those throughout most of 1988 (Fig. 7). The high water levels during cap construction are also reflected to varying degrees in the hydrographs of each of the wells previously discussed.

Wells 318, 345, 356, 645, 648, and 655 are each topographically (and probably hydrologically) lower than one or more capped areas (Fig. 1). With the exception of well 318, the hydrographs for these wells show no discernible difference between precap and postcap water-level elevations (Figs. 8 through 13).

Well 318 appears to have largely dried out sometime after cap construction (Fig. 8). Those elevations that appear to be at the bottom of the well actually represent times at which there was no water in the well (Table A.1, Appendix A). Although there were dry measurements prior to cap construction, these were interspersed with measurements showing some water in the well. Further monitoring of well 318 coupled with review of the pre-1988 water-level history is needed in order to confirm that the apparent drying of this well is the result of cap construction not just fluctuations within the aquifer under SWSA 6.

Wells 640, 647, 368, and 347 lie within cap areas 1, 2, 3, and 5, respectively (Fig. 1). With the exception of well 347, each of these wells is deeper than 10 m, and they monitor the shallow groundwater aquifer below the burial trenches. Well 347 also monitors the shallow aquifer, which is closer to the surface in the area below cap 5.

Wells 640, 647, and 368 show relatively small fluctuations (≤2 m) in water levels over the entire period of the hydrographs (Figs. 14 through 16). There is no apparent difference in the water-level elevations after the caps were constructed for any of these wells (Figs. 14 through 16). Well 347, the shallowest of the under-cap wells shows a somewhat larger fluctuation (>3 m) and occasional artesian conditions prior to completion of cap construction (Fig. 17). Note that this period corresponds to the high-water-level period during cap construction that was evident in the wells outside the capped areas. Although the water level appears to fluctuate less (~1 m) after cap construction (Fig. 17), this may be an artifact of the reduced frequency of monitoring. The lower water-level elevations subsequent to cap construction are consistent with early 1988 elevations included in Miller et al. (1989), and they probably do not represent an effect of the cap.

2.2 WELLS INSIDE SWSA 6 BURIAL TRENCHES

Water levels in intratrench wells (Table A.2, Appendix A) have been monitored for almost 2 years. Results are presented graphically and discussed in the following subsections.

2.2.1 Cap Area 1 (0.28 ha)

Only two wells (T82 and T444) within cap area 1 (Fig. 18) contained measurable water during the monitoring period. Contamination of the water-level tape caused us to cease measuring water levels in cap area 1 after the first year.

Well T82 was sampled in April 1989 (Sect. 5). The drawdown associated with this sampling is reflected in the hydrograph (Fig. 19). The water level began to return toward its previous level after the sampling (Fig. 19); however, monitoring was terminated too early to determine whether the water level returned to its precap elevation. The apparent lack of water-level response to rainfall events suggests that trench 444 contains a more-or-less permanent pool of standing water—at least in the vicinity of the well.

Water levels in well T44 showed no significant change after cap construction (Fig. 20).

2.2.2 Cap Area 2 (0.79 ha)

In the early 1980s, an L-shaped French drain was installed along the northern and eastern sides of the 49-Trench Area in SWSA 6 (Fig. 1). This drain was effective in reducing water levels in 49-Trench-Area trenches within its zone of effect (Davis et al. 1985) and may have had some effect on the trenches that are now covered by cap area 2.

Wells T69, T363, and T397 were the only wells in cap area 2 (Fig. 21) that were not dry throughout the monitoring period. All three wells show evidence that cap construction reduced water levels to below the elevation of the trench bottom (Figs. 22 through 24) although occasional rain events still result in water within trench 363 (Fig. 23).

Topographically, cap 2 straddles a small ridge with surface drainages to the east and west (Fig. 1). One interpretation of the data from the trench wells is that the area covered by cap 2 is a recharge area and is not significantly affected by shallow storm flow from other areas. It is also possible that the French drain and cap act together to lower the shallow aquifer and shutoff storm flow—at least to the trenches (e.g., T69 and T397) within its zone of effect.

2.2.3 Cap Area 5 (0.38 ha)

All of the intratrench wells in cap area 5 (Fig. 25) had measurable water levels during at least some part of the FY 1990 monitoring period. With the exception of well T110, the hydrographs show no significant effect of the cap on either the fluctuation ranges or the elevations of water levels in these trenches (Figs. 26 through 33). Trench 110 appears to have dried out following construction of the cap (Fig. 30).

During the precap period, all trenches were subject to shallow storm flow infiltration from precipitation that falls on or upslope of the cap area. Topographically higher trenches may act to reduce the amount of upslope storm flow that reaches lower trenches. After installation of the cap, the only storm flow that can reach any covered trenches is that originating upgradient of the cap. In cap area 5, it appears that trench 92 may act to reduce upslope storm flow sufficiently to dry out trench 110. However, this effect is not seen on other trenches because sufficient storm flow reaches them from upgradient sources not affected by trench 110. If trench 92 acts to intercept upslope flow, this phenomenon may also account for trench 92's apparently greater response to individual precipitation events (Figs. 27 and 28) compared with other trenches both before and after cap construction.

2.2.4 Cap Area 6 (0.61 ha)

Four wells (T101, T315, T329, and T395) in cap area 6 (Fig. 34) had measurable water levels during FY 1990. Except for well T329, the water levels were generally at or below the bottom of the trenches except in response to significant precipitation events (Figs. 35 through 38). Well 329 generally had water above the bottom of the trench and responded only slowly to precipitation events (Fig. 37). None of the wells shows a discernible difference in water-level pattern after construction of the cap.

2.2.5 Cap Area 8 (0.93 ha)

Nine wells (T44, T60, T63, T180, T225, T237, T352, T367, and T453) in cap area 8 (Fig. 39) had measurable water levels prior to construction of the cap. With the exception of trenches 44 and 63, the construction of caps 7 and 8 appears to have completely dried out the trenches (Figs. 40-48). The combination of caps 7 and 8 probably covers the recharge area for the cap 8 trenches and eliminates shallow storm flow from this area.

The two trenches that have not completely dried out illustrate an important point. Peak monthly elevations of White Oak Lake (D. M. Borders, ORNL, personal communication, to T. L. Ashwood, ORNL, November 1990) have been plotted on the hydrographs for the cap area 8 wells. Those trenches where the trench bottom is above the highest lake level remain dry throughout the post-cap period. Water levels in trenches 44 and 63, however, fluctuate directly with the lake level (Figs. 40 and 42). Although other trenches are closer to White Oak Lake than trenches 44 and 63 (Fig. 39), the closer trenches are also shallower (Table A.2, Appendix A), and their bottoms are higher than the lake level.

3. PENETRATION RESISTANCE OF SWSA 6 BURIAL TRENCHES

As part of the technique for installing monitoring and sampling wells for the capped areas, information on the geotechnical stability of the burial trenches and their contents was obtained. A hole was prepared for insertion of well screen and casing by driving a pointed drill rod with a

140-lb safety hammer using a cathead hoist for lifting to a standard height of 30 in. The technique for driving the pointed drill rod is identical to the standard method for obtaining penetration resistance of soil with a split-spoon sampler (ASTM 1984). Details of operating procedures for this technique, as applied to ORNL SWSA 6 burial trenches, are given in Appendix B. By recording the number of blows of the hammer required to drive each foot of penetration, a measure of the penetration resistance (blows/ft) was obtained. Such penetration resistance measurements have been extensively used in other areas of SWSA 6 for evaluating effects of dynamic compaction and in situ grouting on burial trench stability (Spalding et al. 1989).

After withdrawing the drill rod from a burial trench test point, well screen and casing was inserted per the procedures outlined in Appendix B. Schedule-80, polyvinylchloride (PVC), flush-joint, threaded well screen and solid casing (Timco Manufacturing Co., Inc.) was used for construction of the capped area burial trench monitoring wells. Each well consisted of a 5-ft section of slotted (0.01 in.) screen fitted with a solid PVC well point. This standard screened section was coupled to sufficient solid casing, in 2- or 5-ft lengths, which extended to above the ground surface. Routinely, 1.5-in. (38-mm) inside diameter casing was used. Use of this diameter casing resulted in a snug fit in the residual test hole such that gentle tapping with the safety hammer was required to achieve insertion. Although the goal was to achieve a fully penetrating well to the bottom of each burial trench, many trenches required more than one penetration test site to attain this depth. Hard objects were regularly encountered during penetrations, which resulted in drill rod refusal. Refusal was defined as less than 1 ft of penetration following 100 blows. The blow counts for refusal (i.e., the bottom fraction of a foot) were not included in the tabulated results or calculations.

Between October 10 and 20, 1988, a total of 64 penetration tests were completed in 47 burial trenches in areas that were subsequently capped. A threaded joint in each well casing was placed at or near the ground surface to facilitate placing the surface cover over each capped area. Aboveground extensions of each casing were then reattached following cap placement and cutting of an opening. Sealed boots were later fabricated for all well-casing penetrations so that monitoring and sampling could be carried out after cap installation. However, several wells were lost during construction or damaged beyond repair and, therefore, abandoned.

Penetration tests were also conducted at an additional 25 locations in 9 burial trenches in the group of biological waste disposal trenches west of the tumulus pad. These penetration tests and resulting well locations are in chronically inundated burial trenches that are being used for demonstrations of dynamic compaction, in situ grouting, and trench leachate collection technologies. They have been included with the above penetration tests with capped area trenches because of their similar behavior and because they have provided much information on trench leachate chemical quality that is similar to the trench monitoring wells in capped areas. Most of these penetration tests and well installations were completed in February 1990, although three installations were completed on August 8, 1989. To provide a population of control sites for comparing burial trench penetration tests with stability of the host soil formation, a group of 26 penetration tests, completed in February 1990, have been included (Appendix B). These sites were in the soil formation surrounding trenches 13, 279, and 288 in the biological trench area west of the tumulus and trenches 151 and 170 in the 19-trench northeast section, the Test Area for Remedial Actions (TARA). These undisturbed soil formation test results have not been reported previously but are quite similar to those in the undisturbed soil formation in other locations at TARA (Spalding et al. 1989).

The average penetration resistance of test sites in burial trenches, compared with those in the undisturbed soil formation, is depicted in Fig. 49. After the first 2 ft of penetration, where the soil material in the trench covers behaved similar to that in the undisturbed formation, a dramatic decrease in the stability of the burial trenches can be seen. This instability of burial trenches is the primary cause of trench surface subsidence at SWSA 6 and poses a significant compromise to the integrity of any cover that might be placed over a group of burial trenches. Although instability had been demonstrated for a group of 19 trenches at the TARA site in SWSA 6 previously (Spalding et al. 1989), such instability has now been clearly established in all burial trenches in SWSA 6. The apparent rise in penetration resistance of burial trenches below 9 ft probably resulted from penetration into the soil formation below many trenches; many of the trenches in wetter areas of SWSA 6 (i.e., caps 5, 6, 8 and the area of biological trenches west of the tumulus) were constructed shallower than the nominal 15 ft of trenches on higher ground. However, because there was no method to verify or determine trench depths, results caused by penetration into the soil formation below the trench floor could not be excluded from the observations. Nonetheless, results still show significantly decreased average penetration resistance below 9 ft regardless of any such effects. Results from the dynamic compaction demonstration at TARA indicate that such differences in penetration resistance would correlate with ~1.3 ft of average surface subsidence over burial trenches compared with that of the surrounding soil formation (Spalding et al. 1989).

To quantify the difference in stability between burial trenches and their surrounding soil formation, cumulative penetration resistance vs depth depicts the difference more clearly (Fig. 50). Over a total depth of 15 ft, these burial trenches exhibited about 35% of the stability of the soil formation. By plotting the ratio of cumulative penetration resistance of the soil formation to that of burial trenches (Fig. 51), it can be seen that stability reaches a minimum about 8 to 9 ft beneath the ground surface, where the ratio is about 0.25. Not surprisingly, the stability ratio in the top 2 ft of the trench cover is relatively constant. The rising ratio below about 9 ft probably results from an increasing number of tests penetrating into soil below the bottom of shallower trenches. Thus, it is clear that burial trenches in all areas of SWSA 6 are inherently unstable. Stabilization of these trenches prior to capping for infiltration protection will be required to prevent cap compromise.

4. SAMPLES FROM MONITORING WELLS IN SWSA 6 BURIAL TRENCHES

The primary objective of well installation in burial trenches in capped areas was to monitor the response of both seasonally and chronically inundated trenches to the infiltration protection provided by the interim caps. To assess the potential chemical exposures of personnel performing the water-level monitoring in these areas and to supplement the existing information on the quality of leachate in SWSA 6 burial trenches (Solomon et al. 1988), sampling and analyses of trench leachates were initiated. Notably, the entire site characterization of SWSA 6 has avoided actual trench leachate sampling because of concerns over potential hazards to field workers (BNI 1990). However, the value of such leachate chemical quality information in defining source terms and locations for environmental releases is demonstrated by the frequent reference to the previous work of Solomon et al. (1988) in the site characterization report (BNI 1990). In addition to the sampling of wells with standing water in the capped areas, sampling of wells at TARA in burial trenches with transient perched water has been carried out intermittently since 1987. Sampling has also been carried out in nine chronically inundated trenches in the area west of the tumulus in 1989 and 1990. All of the leachate quality data have been assembled here to provide a unified source of this information as a supplement to the site characterization effort.

Sampling of wells in burial trenches in capped areas (trenches 44, 57, 60, 63, 69, 82, 85, 92, 101, 105, 110, 112, 180, 225, 237, 318, 329, 363, 367, 395, 414, and 453) was carried out between April 5 and 10, 1989 after completion of the interim caps. Samples were withdrawn from the well with teflon tubing using a vacuum to pull the sample into a precleaned 1-gal glass jug. Less than 1 gal of sample was obtained from several wells; as a result not all analyses could be completed on all samples. The vacuum was supplied by an electric vacuum pump fitted with a trap between the sample bottle and the pump. No bailing of standing water in the well casings was attempted prior to sampling because of the facile hydraulic connection between standing water and wells in burial trenches (Spalding et al. 1989). Samples were stored at <4°C prior to filtration and submittal for analyses to ORNL Analytical Chemistry Services. Approximately 400 mL of each sample was transferred to a precleaned polypropylene bottle for analyses of routine gross chemical parameters—pH, electrical conductivity, hardness, alkalinity, dissolved solids, total solids, and gross alpha and beta activities (APHA 1989). After prefiltration through glass wool to remove the frequently occurring suspended solids, the bulk sample was filtered in several batches through 0.22-μm Millipore filters. A 1-L subsample of the filtered leachate was placed in a precleaned polypropylene bottle and adjusted to pH<2 with Ultrex nitric acid; this aliquot was submitted for analysis of inorganic elements by inductively coupled plasma (ICP) emission spectroscopy (EPA Method 200.7), and supplemental atomic adsorption spectroscopy was used for analysis of Hg, K, and Na (EPA Methods SW846-7479M, SW846-7610, and SW846-7770, respectively). A second 1-L aliquot, also stabilized with Ultrex nitric acid, was submitted for radiochemical analyses including gross alpha and beta, tritium, ^{14}C, ^{90}Sr, and gamma spectroscopy for quantitation of ^{137}Cs and ^{60}Co (EPA Methods 900.0, 906.0, 905.0, and 901.1, respectively). A 1-L sample of unfiltered leachate was submitted for analyses of volatile and semivolatile organic contaminants (EPA Methods 8240 and 8250, respectively). A 100-mL aliquot of filtered but unpreserved leachate was analyzed for inorganic anions (chloride, fluoride, bromide, phosphate, sulfate, and nitrate) via ion chromatography (EPA Method 300.0), and for total organic carbon (TOC) (EPA Method SW846-9060). A portion of the unfiltered leachate was analyzed for acrylamide (EPA Method 8015).

Sampling of TARA transient burial trench leachates was achieved by a similar technique but employed a hand vacuum pump to collect sample into either a 250- or 125-mL precleaned glass vial. Sampling was carried out at various times between 1987 and 1989 (Appendix D). Only one sample from trench 5 on February 26, 1988, exhibited a large gross alpha activity and, therefore, was submitted for alpha spectroscopy to identify its radionuclide composition. Sampling of burial trenches in the area west of the tumulus (trenches 11, 13, 16, 252, 275, 279, 284, 285, and 288) was carried out in 1989 and 1990 using a similar sampling technique.

Results of all the chemical analyses are tabulated in Appendix D, and a summary is presented in Table 1. The summary results have been grouped into five categories: organic analyses, ICP elements, inorganic anions, radionuclides, and gross chemical characteristics. Within each category, species have been ranked by the highest maximum value observed. The frequency of positive findings for a particular species is also listed based on the number of positive findings divided by the number of analyses attempted.

Among the organics, the positively identified compounds were qualitatively the same as those previously identified in trench leachates (Solomon et al. 1988) and in groundwater (BNI 1990). However, the concentrations of ethylbenzene, toluene, and xylene are several orders of magnitude greater than those previously reported. The maximum concentration of ethylbenzene, which was observed in the current population of samples, was greater than its reported water solubility at room temperature (Table 2). The maximal concentrations of xylene and toluene were also within an order of magnitude of their reported water solubilities. All other identified organic compounds were found at concentrations far below their water solubilities. Thus, it appears that concentrations of ethylbenzene, xylene, and toluene may be maintained by the presence of excess solvent in several burial trenches in SWSA 6, although no two-phase samples were observed in the current study. The presence of such aromatic compounds as xylene, toluene, and ethylbenzene (as well as benzene, naphthalene, and microbial breakdown intermediates such as phenol, 4-methylphenol, 2,4- dimethylphenol, and benzoic acid) probably originates from solvents in liquid scintillation cocktail mixtures, which were disposed of in SWSA 6 along with the radioactive solid waste. Similar compounds are also present in petroleum fuels; however, the absence of significant amounts of aliphatic compounds would make a fuel-derived origin unlikely. TOC in the trench leachates was also quite elevated over what would be expected for groundwater in SWSA 6. In general, the sum of identified organic species does not account for a substantial fraction of the TOC, except in the high-ethylbenzene, high-toluene, and high-xylene samples. Much of this TOC is probably derived from humified organic matter from the decomposition of the paper and wood products included in the SWSA 6 solid waste.

The presence of acrylamide was also found in 4 of 22 samples examined. It should be pointed out that none of these samples was taken from areas near burial trenches receiving polyacrylamide grout that were used as demonstrations of in situ grouting technology (Spalding et al. 1989). The possibility of any acrylamide contamination resulting from these demonstrations is remote because the 22 samples of leachate were taken from trenches in capped areas prior to the initiation of in situ grouting with polyacrylamide in August 1989. Thus, either the direct injection gas chromatographic method of analysis (EPA Method 8015) produces false positives, or acrylamide is actually present in several trenches in SWSA 6. The latter possibility is plausible because of the potential disposal of polyacrylamide gels, used for electrophoresis analyses in biochemical research, or incidental amounts of chemicals (acrylamide) used in their preparation. At the time of these analyses, the more sensitive and less ambiguous method for acrylamide (EPA Method 8032) was not available.

Whereas, the previous sampling of SWSA 6 leachates produced 16 samples from 8 burial trenches, the present group of 42 samples from 26 burial trenches provides a large enough population to allow use of frequency of occurrence of particular compounds to assess the source term of SWSA 6 contamination. Compounds that occur in greater than 70% of the samples can be regarded as frequently occurring (Table 1). Organic compounds, including toluene, xylene, acetone, and methylene chloride fall in this frequently occurring category and, thus, merit special attention for potential groundwater remediation or burial trench leachate collection in SWSA 6.

Among the inorganic elements, low concentrations of heavy metals, particularly mercury, were frequently found. Although one anomalously high concentration of phosphorus and one of potassium were encountered, the bulk chemical properties of the trench leachates were generally similar to groundwater in SWSA 6. The average chemical composition of burial trench leachate was similar to that expected for groundwater in contact with limestone (i.e., a calcium and magnesium bicarbonate solution). Occasionally, dissolved iron and manganese were significant contributors to total dissolved cations, presumably resulting from reducing conditions in several of the inundated trenches. Interestingly, lead was always below its detection limit (30 ppb) in all samples analyzed even though lead is generally regarded as a major component of the hazardous substances that have been disposed of in SWSA 6. The solubility of lead, even under the reducing conditions evident in several trenches, must be extremely low.

The radioactivity in burial trench leachates demonstrates the most unique characteristics of SWSA 6 leachates. Tritium and gross beta activity were almost ubiquitously distributed in SWSA 6 burial trench leachates. Occasionally significant gross alpha activity was also observed. In one trench, this gross alpha activity was quite high, 4500 Bq/L, mostly contributed by ^{233}U (Table 1).

Among the gross chemical properties, no significant perturbations in pH, electrical conductivity, dissolved solids, hardness, or alkalinity were observed. Thus, significant quantities of water-soluble inorganic chemicals (e.g., acids, bases, and salts) are not present in SWSA 6 burial trench leachates. Suspended solids varied significantly, but because of the presence of loose soil backfill in the trenches, this was not surprising. However, the presence of significant amounts of suspended solids must be recognized as a problem for any leachate collection and treatment technique planned for SWSA 6 closure.

Table 1. Summary of chemical analyses of SWSA 6 burial trench leachate samples

Compound	Units	Number of positive findings	Number of samples	Concentration: Average value	Concentration: Maximum value	Concentration: Minimum value	Frequency of positives
Ethylbenzene	ppb	15	42	13,559.7	170,000	41	0.36
Toluene	ppb	35	42	10,881.5	150,000	2	0.83
Xylene (Total)	ppb	32	42	10,071.5	77,000	1	0.76
Acetone	ppb	37	42	3,750.2	50,000	1	0.88
Naphthalene	ppb	20	33	1,719.9	8,800	18	0.61
4-Methylphenol	ppb	14	33	1,173.6	4,600	16	0.42
Acrylamide	ppb	4	22	1,745	3,800	90	0.18
Methylene chloride	ppb	30	42	320.8	2,900	3	0.71
Benzoic acid	ppb	10	33	460.1	2,400	4	0.3
Phenol	ppb	11	33	323.5	1,800	2	0.33
Carbon disulfide	ppb	3	42	297.1	890	0.6	0.07
Chloroform	ppb	11	42	58.9	560	0.6	0.26
2-Methylnaphthalene	ppb	2	33	222	420	24	0.06
Nitrobenzene	ppb	1	33	410	410	410	0.03
2,4-Dimethylphenol	ppb	8	33	136.8	380	17	0.24
Benzene	ppb	12	42	38	240	0.6	0.29
2-Methylphenol	ppb	7	33	55.7	200	15	0.21
2-Butanone	ppb	5	42	30.5	95	0.5	0.12
Trichloroethene	ppb	5	42	13	36	4	0.12
Styrene	ppb	1	42	23	23	23	0.02
Diethylphthalate	ppb	1	33	12	12	12	0.03
Di-n-butylphthalate	ppb	5	33	2.4	5	1	0.15
4-Methyl-2-pentanone	ppb	1	42	3	3	3	0.02
1,2-Dichloroethane	ppb	1	42	3	3	3	0.02
Hexachlorobutadiene	ppb	0	33	<10			0
2,4,5-Trichlorophenol	ppb	0	33	<50			0
2-Chloronaphthalene	ppb	0	33	<10			0
trans-1,3-Dichloropropene	ppb	0	42	<5			0
2-Nitroaniline	ppb	0	33	<50			0
Tetrachloroethene	ppb	0	42	<5			0
Dimethylphthalate	ppb	0	33	<10			0
1,1,1-Trichloroethane	ppb	0	42	<5			0
Acenaphthylene	ppb	0	33	<10			0
1,1,2-Trichloroethane	ppb	0	42	<5			0
2,6-Dinitrotoluene	ppb	0	33	<10			0
cis-1,3-Dichloropropene	ppb	0	42	<5			0
3-Nitroaniline	ppb	0	33	<50			0
bis(2-Chloroethyl)ether	ppb	0	33	<10			0
Acenaphthene	ppb	0	33	<10			0
1,3-Dichlorobenzene	ppb	0	33	<10			0
2,4-Dinitrophenol	ppb	0	33	<50			0
Benzyl alcohol	ppb	0	33	<10			0
4-Nitrophenol	ppb	0	33	<50			0
1,2-Dichloropropane	ppb	0	42	<5			0
Dibenzofuran	ppb	0	33	<10			0
1,1-Dichloroethane	ppb	0	42	<5			0

Table 1 (continued) Summary of chemical analyses of SWSA 6 burial trench leachate samples

Compound	Units	Number of positive findings	Number of samples	Concentration: Average value	Maximum value	Minimum value	Frequency of positives
2,4-Dinitrotoluene	ppb	0	33	<10			0
Hexachloroethane	ppb	0	33	<10			0
Bromodichloromethane	ppb	0	42	<5			0
Isophorone	ppb	0	33	<10			0
4-Chlorophenyl-phenylether	ppb	0	33	<10			0
Chloromethane	ppb	0	42	<10			0
Fluorene	ppb	0	33	<10			0
bis(2-chloroethoxy)methane	ppb	0	33	<10			0
4-Nitroaniline	ppb	0	33	<50			0
1,2,4-Trichlorobenzene	ppb	0	33	<10			0
4,6-Dinitro-2-methylphenol	ppb	0	33	<50			0
4-chloroaniline	ppb	0	33	<10			0
N-nitrosodiphenylamine	ppb	0	33	<10			0
4-Chloro-3-methylphenol	ppb	0	33	<10			0
4-bromophenyl-phenylether	ppb	0	33	<10			0
Hexachlorocyclopentadiene	ppb	0	33	<10			0
Hexachlorobenzene	ppb	0	33	<10			0
Bromoform	ppb	0	42	<5			0
Pentachlorophenol	ppb	0	33	<50			0
1,1,2,2-tetrachloroethane	ppb	0	42	<5			0
Phenanthrene	ppb	0	33	<10			0
Dibromochloromethane	ppb	0	42	<5			0
Anthracene	ppb	0	33	<10			0
2-Chlorophenol	ppb	0	33	<10			0
Vinyl acetate	ppb	0	42	<10			0
1,2-Dichlorobenzene	ppb	0	33	<10			0
Fluoranthene	ppb	0	33	<10			0
N-nitroso-di-n-propylamine	ppb	0	33	<10			0
Pyrene	ppb	0	33	<10			0
2-Nitrophenol	ppb	0	33	<10			0
Butylbenzylphthalate	ppb	0	33	<10			0
2,4-Dichlorophenol	ppb	0	33	<10			0
3,3'-Dichlorobenzidene	ppb	0	33	<20			0
Carbon tetrachloride	ppb	0	42	<5			0
Benzo(a)anthracene	ppb	0	33	<10			0
2,4,6-Trichlorophenol	ppb	0	33	<10			0
Chrysene	ppb	0	33	<10			0
Chlorobenzene	ppb	0	42	<5			0
bis(2-Ethylhexyl)phthalate	ppb	0	33	<10			0
1,4-Dichlorobenzene	ppb	0	33	<10			0
Di-n-Octylphthalate	ppb	0	33	<10			0
1,1-Dichloroethene	ppb	0	42	<5			0
Benzo(b)fluoranthene	ppb	0	33	<10			0
Vinyl Chloride	ppb	0	42	<10			0
Benzo(k)fluoranthene	ppb	0	33	<10			0
2-Hexanone	ppb	0	42	<10			0

Table 1 (continued) Summary of chemical analyses of SWSA 6 burial trench leachate samples

Compound	Units	Number of positive findings	Number of samples	Concentration: Average value	Concentration: Maximum value	Concentration: Minimum value	Frequency of positives
Benzo(a)pyrene	ppb	0	33	<10			0
bis(2-Chloroisopropyl)ether	ppb	0	33	<10			0
Indeno(1,2,3-cd)pyrene	ppb	0	33	<10			0
Bromomethane	ppb	0	42	<10			0
Chloroethane	ppb	0	42	<10			0
1,2-Dichloroethene (total)	ppb	0	42	<5			0
Dibenz(a,h)anthracene	ppb	0	33	<10			0
Benzo(g,h,i)perylene	ppb	0	33	<10			0
Phosphorus	ppb	2	30	93,500	140,000	47,000	0.07
Calcium	ppb	30	30	72,066.7	140,000	20,000	1
Potassium	ppb	28	30	8,504.6	110,000	530	0.93
Silicon	ppb	30	30	5,629.3	67,000	410	1
Sodium	ppb	26	30	9,508.8	50,200	1,040	0.87
Magnesium	ppb	30	30	17,500	40,000	4,500	1
Iron	ppb	23	30	8,929.9	40,000	10	0.77
Manganese	ppb	30	30	6,741.1	36,000	11	1
Mercury	ppb	19	30	112.5	2,120	0.1	0.63
Nickel	ppb	2	30	645	1,100	190	0.07
Zinc	ppb	15	30	148.9	560	8	0.5
Barium	ppb	30	30	228.4	550	61	1
Aluminum	ppb	14	30	292.9	510	130	0.47
Cadmium	ppb	2	30	147.5	290	5	0.07
Strontium	ppb	30	30	126.2	210	41	1
Boron	ppb	1	30	160	160	160	0.03
Antimony	ppb	4	30	70.5	100	51	0.13
Arsenic	ppb	8	30	67.9	87	54	0.27
Selenium	ppb	2	30	70	81	59	0.07
Cobalt	ppb	23	30	22.9	49	4	0.77
Chromium	ppb	28	30	11.8	43	3	0.93
Copper	ppb	7	30	22.4	29	13	0.23
Silver	ppb	16	30	9.9	15	5	0.53
Tin	ppb	0	30	<50			0
Titanium	ppb	0	30	<20			0
Vanadium	ppb	0	30	<4			0
Lithium	ppb	0	30	<15,000			0
Molybdenum	ppb	0	30	<40			0
Lead	ppb	0	30	<30			0
Beryllium	ppb	0	30	<0.4			0
Zirconium	ppb	0	30	<20			0
Total organic carbon	ppb	30	30	82,150	615,000	1,400	1
Phosphate	ppb	6	30	60,111.7	294,000	60	0.2
Fluoride	ppb	25	30	6,861.2	63,300	140	0.83
Sulfate	ppb	30	30	12,447.7	61,900	280	1
Chloride	ppb	30	30	12,063.3	51,700	1,150	1
Nitrate	ppb	28	30	902.1	6,690	60	0.93
Bromide	ppb	8	30	96.3	170	60	0.27

Table 1 (continued). Summary of chemical analyses of SWSA 6 burial trench leachate samples

Compound	Units	Number of positive findings	Number of samples	Concentration Average value	Maximum value	Minimum value	Frequency of positives
Tritium	Bq/L	41	42	22,283.1	850,000	32	0.98
Gross Beta	Bq/L	44	46	8,450.7	346,736	0.01	0.96
Gross Alpha	Bq/L	29	46	282.5	4,500	0.029	0.63
Uranium-233	Bq/L	1	1	3,700	3,700	3,700	1
Strontium-90	Bq/L	24	24	30.4	660	0.01	1
Uranium-232	Bq/L	1	1	58	58	58	1
Carbon-14	Bq/L	20	24	10.5	38	1	0.83
Cesium-137	Bq/L	14	24	7.9	36	0.2	0.58
Cobalt-60	Bq/L	6	24	0.8	1.6	0.1	0.25
Americium-241	Bq/L	1	1	1.1	1.1	1.1	1
Plutonium-239	Bq/L	1	1	0.8	0.8	0.8	1
Curium-244	Bq/L	0	1	<0.1			0
pH	-log(H+)	58	58	7.3	8.55	5.5	1
Electrical conductivity	dS/m	58	58	787.7	8,580	55	1
Dissolved solids	mg/L	59	59	521.9	6,360	20	1
Total solids	mg/L	34	34	3,702.4	26,020	100	1
Suspended solids	mg/L	34	34	3,252	25,820	<1	1
Hardness	mg/L	58	58	347	5,220	16	1
Alkalinity	mg/L	58	58	461.1	6,511	21	1

Table 2. Water solubilities of organic compounds in SWSA 6 burial trench leachate samples[a]

Compound	CAS No.	Water solubility (ppb)
Chloromethane	74-87-3	not found
Bromomethane	74-83-9	900,000
Vinyl Chloride	75-01-4	1,100
Chloroethane	75-00-3	5,740,000
Methylene chloride	75-09-2	20,000,000
Acetone	67-64-1	miscible
Miscible Carbon disulfide	75-15-0	2,300,000
1,1-Dichloroethene	75-35-4	2,640,000
1,1-Dichloroethane	75-34-3	5,500,000
1,2-Dichloroethene (total)	540-59-0	800,000
Chloroform	67-66-3	9,300,000
1,2-Dichloroethane	107-06-2	8,690,000
2-Butanone	78-93-3	350,000,000
1,1,1-Trichloroethane	71-55-6	4,400,000
Carbon tetrachloride	56-23-5	1,160,000

Table 2 (continued) Water solubilities of organic compounds in SWSA 6 burial trench leachate samples[a]

Compound	CAS No.	Water solubility (ppb)
Vinyl acetate	108-05-4	25,000,000
Bromodichloromethane	75-27-4	not found
1,2-Dichloropropane	78-87-5	2,700,000
cis-1,3-Dichloropropene	10061-01-5	2,700,000
Trichloroethene	79-01-6	1,100,000
Dibromochloromethane	124-48-1	not found
1,1,2-Trichloroethane	79-00-5	4,500,000
Benzene	71-43-2	1,780,000
trans-1,3-Dichloropropene	10061-02-06	2,800,000
Bromoform	75-25-2	3,190,000
4-Methyl-2-pentanone	108-10-1	17,000,000
2-Hexanone	591-78-6	35,000,000
Tetrachloroethene	127-18-4	150,000
1,1,2,2-tetrachloroethane	79-34-5	2,900,000
Toluene	108-88-3	515,000
Chlorobenzene	108-90-7	500,000
Ethylbenzene	100-41-4	152,000
Styrene	100-42-5	300,000
Xylene (Total)	1330-20-7	198,000
Phenol	108-95-2	82,000,000
bis(2-Chloroethyl)ether	111-44-4	10,200,000
2-Chlorophenol	95-57-8	28,500,000
1,3-Dichlorobenzene	541-73-1	123,000
1,4-Dichlorobenzene	106-46-7	79,000
Benzyl alcohol	100-51-6	35,000,000
1,2-Dichlorobenzene	95-50-1	100,000
2-Methylphenol	95-48-7	31,000,000
bis(2-Chloroisopropyl)ether	108-60-1	1,700,000
4-Methylphenol	106-44-5	24,000,000
N-nitroso-di-n-propylamine	621-64-7	not found
Hexachloroethane	67-72-1	50,000
Nitrobenzene	98-95-3	1,900,000
Isophorone	78-59-1	12,000,000
2-Nitrophenol	88-75-5	2,100,000
2,4-Dimethylphenol	105-67-9	>500,000
Benzoic acid	65-85-0	2,900,000
bis(2-chloroethoxy)methane	111-91-1	not found
2,4-Dichlorophenol	120-83-2	4,600,000
1,2,4-Trichlorobenzene	120-82-1	19,000
Naphthalene	91-20-3	34,000
4-chloroaniline	106-47-8	340,000
Hexachlorobutadiene	87-68-3	2,000
4-Chloro-3-methylphenol	59-50-7	3,846,000
2-Methylnaphthalene	91-57-6	12
Hexachlorocyclopentadiene	77-47-4	not found

Table 2 (cont.). Water solubilities of organic compounds in SWSA 6 burial trench leachate samples[a]

Compound	CAS No.	Water solubility (ppb)
2,4,6-Trichlorophenol	88-06-2	800,000
2,4,5-Trichlorophenol	95-95-4	1,190,000
2-Chloronaphthalene	91-58-7	not found
2-Nitroaniline	88-74-4	890,000
Dimethylphthalate	131-11-3	5,000,000
Acenaphthylene	208-96-8	3,930
2,6-Dinitrotoluene	606-20-2	not found
3-Nitroaniline	99-09-2	890,000
Acenaphthene	83-32-9	not found
2,4-Dinitrophenol	51-28-5	5,600,000
4-Nitrophenol	100-02-7	16,000,000
Dibenzofuran	132-64-9	not found
2,4-Dinitrotoluene	121-14-2	270,000
Diethylphthalate	84-66-2	210,000
4-Chlorophenyl-phenylether	7005-72-3	not found
Fluorene	86-73-7	1,900
4-Nitroaniline	100-01-6	800,000
4,6-Dinitro-2-methylphenol	534-52-1	>100,000
N-nitrosodiphenylamine	86-30-6	not found
4-bromophenyl-phenylether	101-55-3	not found
Hexachlorobenzene	118-74-1	110
Pentachlorophenol	87-86-5	14,000
Phenanthrene	85-01-8	816
Anthracene	120-12-7	1,290
Di-n-butylphthalate	84-74-2	400,000
Fluoranthene	206-44-0	265
Pyrene	129-00-0	160
Butylbenzylphthalate	85-68-7	2,900
3,3'-Dichlorobenzidene	91-94-1	3,990
Benzo(a)anthracene	56-55-3	44
Chrysene	218-01-9	6
bis(2-Ethylhexyl)phthalate	117-81-7	285
Di-n-Octylphthalate	117-84-0	285
Benzo(b)fluoranthene	205-99-2	not found
Benzo(k)fluoranthene	207-08-9	not found
Benzo(a)pyrene	50-32-8	3
Indeno(1,2,3-cd)pyrene	193-39-5	not found
Dibenz(a,h)anthracene	53-70-3	not found
Benzo(g,h,i)perylene	191-24-2	0.26

[a] Data from Verschueren (1983).

5. CONCLUSIONS

The evaluations of water-level changes in this report have been semiquantitative because of the relatively low frequency of observations and the lack of data to quantitatively evaluate changes in the water budget for SWSA 6 (i.e., no measurement of surface water discharge and no measurement of direct groundwater discharge to White Oak Lake). Nevertheless, within the constraints of a semiquantitative evaluation, it is possible to infer several important conclusions. These conclusions can have a significant impact on the choice of remedial actions and strategies for closure of SWSA 6. In those cases in which readers feel that uncertainties or gaps in our data are too great to provide unequivocal support for the conclusions, they may want to obtain additional data.

The ICM caps have apparently had very little, if any, observable effect on groundwater levels outside the capped areas. Only well 318, which is west and down slope of cap area 2, shows any noticeable difference between precap and postcap water-level patterns. It is possible that cap 2 covers a large portion of the recharge zone for shallow storm flow to well 318. Additional review of early water-level data from this well and additional monitoring are needed to clearly ascertain whether it is the cap or another hydrologic process that is causing the change in well 318.

It is not surprising that the caps have had little effect on the wells outside their boundaries. Some of the wells are in locations that would not be expected to be affected by the caps. Those wells within the possible zone of influence of the caps are typically measuring water levels in the aquifer below SWSA 6. Recharge of this aquifer is apparently not significantly affected by the caps, probably because they do not cover a significant portion of the recharge zone.

With the possible exception of well 347 under cap 5, none of the groundwater wells beneath caps showed any discernible impact from cap construction. As with the wells outside the caps, these under-cap wells are primarily measuring fluctuations in the aquifer, which appears to be largely unaffected by the caps.

Another reason that the aquifer below SWSA 6 does not appear to be affected by the caps may be that water accumulating in the trenches as a result of shallow storm flow (i.e., bathtubbing trenches) can slowly percolate out of the trenches and recharge the aquifer. Only cap areas 2 and 8 appear to have reduced this bathtubbing effect significantly. Trenches in other capped areas still provide a path for shallow storm flow to recharge the aquifer. Given the poor chemical quality of trench leachates, this source of recharge is also a source of contamination to the aquifer.

Caps 2 and 8 appear to have been successful in reducing the perched water within the trenches beneath them. In both areas, the caps probably cover a major portion of the recharge zone for shallow storm flow. Caps 1, 5, and 6 have had no observable impact on water levels within their associated trenches. No data are available for trenches under caps 3 and 7.

Two trenches under cap 8 are responding directly to fluctuations in White Oak Lake levels. When the lake elevation is above the bottom of these trenches, water enters the trenches. The 100-year flood elevation is ~230 m (754 ft) (BNI 1988). This level is higher than the bottom of most trenches under cap 8 and possibly other areas of SWSA 6. The implications of this phenomenon for closure of SWSA 6 are significant because it means that an effective cap alone may not prevent groundwater from interacting with buried wastes in areas below the elevation of White Oak Lake. Some means of isolating these trenches from the lake may be necessary.

The stability of the SWSA 6 burial trenches was found to be only 35% that of the surrounding soil formation. This conclusion is based on penetration resistance tests performed at 89 locations within 56 SWSA 6 burial trenches. Thus, significant differential land surface subsidence can be expected for unstabilized burial trenches in SWSA 6, and their capacity to support infiltration barriers over the long term must be carefully evaluated.

Significant concentrations of ethylbenzene, toluene, and xylene (approaching their water solubilities) were measured in several leachate samples from SWSA 6 burial trenches. Toluene, xylene, acetone, and methylene chloride were detected in more than 70% of the 42 trench leachates sampled. Tritium and gross beta activity were observed in more than 90% of the leachate samples. Many concentrations of contaminants were significantly higher, in some cases by several orders of magnitude, than those reported in previous limited sampling of SWSA 6 leachates. This new data on leachate chemical quality should aid in determining source term characteristics for performance modeling of SWSA 6.

6. ACKNOWLEDGMENTS

We would like to thank Gregory Miller and others at Environmental Consulting Engineers, Inc., who initiated a portion of this program and helped in the transition of data collection and reporting responsibilities. David Farmer and Della Marshall measured water levels and collected samples. Mike Morrissey provided rainfall data. Dennis Borders provided data on White Oak Lake elevations. Ed Davis did much of the early field work as well as the surveying and computer mapping of the intratrench wells. Dale Huff and Chet Francis provided valuable comments on a draft of this report.

7. REFERENCES

American Public Health Association (APHA). 1989. Standard Methods for the Examination of Water and Wastewater. American Public Health Association, Washington, D. C.

American Society for Testing Materials (ASTM). 1984. Standard Method for Penetration Test and Split-Barrel Sampling of Soils. D 1586-84. Philadelphia, Pa.

Ashwood, T. L., D. S. Wickliff, and C. M. Morrissey. 1990. Active sites environmental monitoring program: program plan. ORNL/M-1197. Oak Ridge National Laboratory, Oak Ridge, Tenn.

Bechtel National, Inc. (BNI). 1988. Closure plan for solid waste storage area 6. ORNL/RAP/Sub-87/99053/9&V1. Oak Ridge National Laboratory, Oak Ridge, Tenn.

Bechtel National, Inc. (BNI) 1990. ORNL WAG 6 Site Characterization Summary. Volume I. Main Report. ORNL/ER-11/V1&D1. Oak Ridge National Laboratory, Oak Ridge, Tenn.

Boegly, W. J. 1984. Site characterization data for Solid Waste Storage Area 6. ORNL/TM-9442. Oak Ridge National Laboratory, Oak Ridge, Tenn.

Boegly, W. J., R. B. Dreier, D. D. Huff, A. D. Kelmers, D. C. Kocher, S. Y. Lee, F. R. O'Donnell, F. G. Pin, and E. D. Smith. 1985. Characterization plan for Solid Waste Storage Area 6. ORNL/TM-9877. Oak Ridge National Laboratory, Oak Ridge, Tenn.

Davis, E. C., R. G. Stansfield, L. A. Melroy, and D. D. Huff. 1985. Water diversion at low-level waste disposal sites. J. Environ. Eng. 111(5):714-29.

Hook, L. A., L. D. Voorhees, M. J. Gentry, M. A. Faulkner, J. A. Shaakir-Ali, K. A. Newman, R. A. McCord, L. F. Goins, and P. T. Owen. 1990. Database management activities for the remedial action program at ORNL: Calendar year 1989. ORNL/ER-16. Oak Ridge National Laboratory, Oak Ridge, Tenn.

Kimbrough, C. W., L. W. Long, and L. W. McMahon. 1990. Environmental Surveillance Procedures Quality Control Program. ESH/Sub/87-21706/1 Rev. 1. Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.

Miller, G. P., and P. M. Craig. 1988. Solid Waste Storage Area 6 interim corrective measures environmental monitoring plan. ECE-88-022. Environmental Consulting Engineers, Inc., Knoxville, Tenn.

Miller, G. P., K. C. Black, and P. M. Craig. 1989. SWSA-6 interim corrective measures environmental monitoring summary report. ECE-89-017. Environmental Consulting Engineers, Inc., Knoxville, Tenn.

Moore, G. K. 1988. Concepts of groundwater occurrence and flow near Oak Ridge National Laboratory, Tennessee. ORNL/TM-10969. Oak Ridge National Laboratory, Oak Ridge, Tenn.

Moore, G. K. 1989. Groundwater parameters and flow systems near Oak Ridge National Laboratory. ORNL/TM-11368. Oak Ridge National Laboratory, Oak Ridge, Tenn.

Solomon, D. K., R. C. Haese, T. V. Dinsmore, A. D. Kelmers. 1988. Sampling and Analysis of SWSA 6 trench leachates and groundwaters. ORNL/TM-10813. Oak Ridge National Laboratory, Oak Ridge, Tenn.

Spalding, B. P., G. K. Jacobs, and E. C. Davis. 1989. Demonstrations of technology for remediation and closure of Oak Ridge National Laboratory Waste Disposal Sites. ORNL/TM-11286. Oak Ridge National Laboratory, Oak Ridge, Tenn.

Verschueren, K. 1983. Handbook of Environmental Data on Organic Chemicals. 2nd Ed. VanNostrand Reinhold Publishers, New York.

ORNL-DWG 91-9038

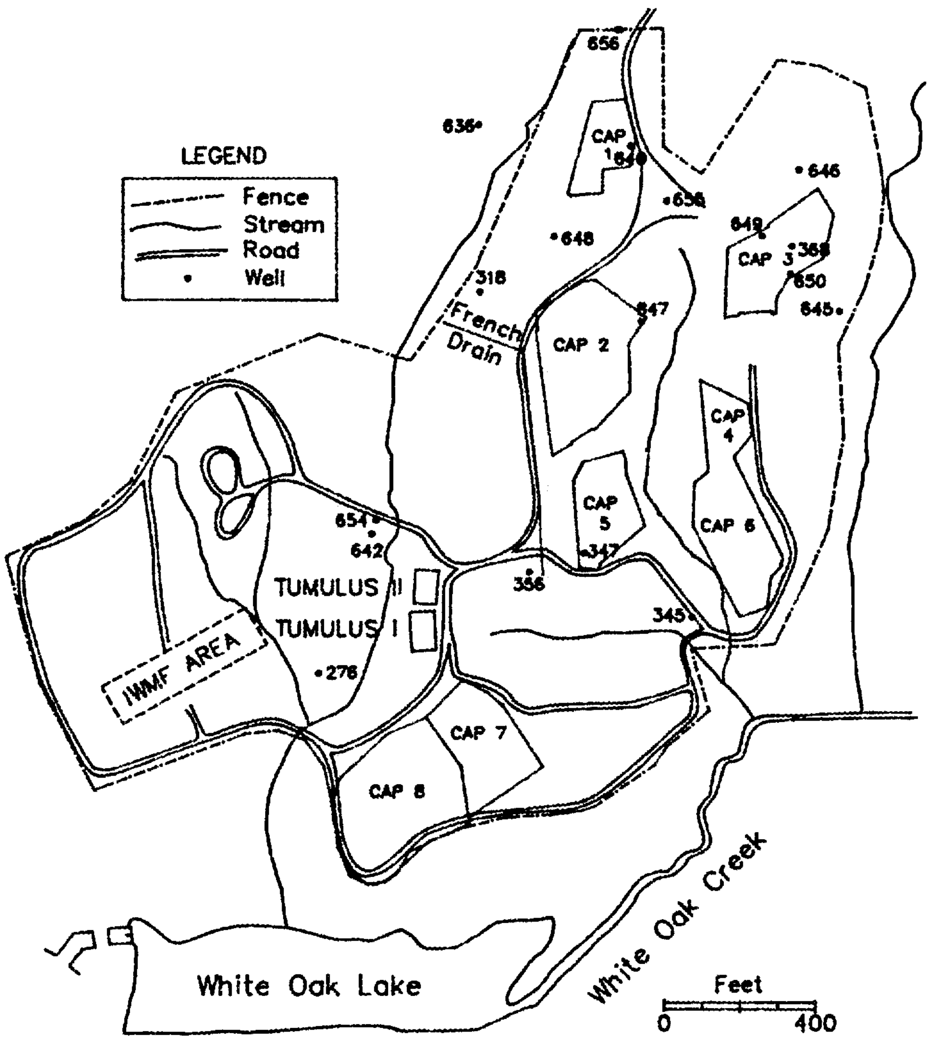

Fig. 1. Solid Waste Storage Area 6 showing interim corrective measures capped areas, French drain, monitoring wells outside burial trenches, and major low-level waste disposal areas.

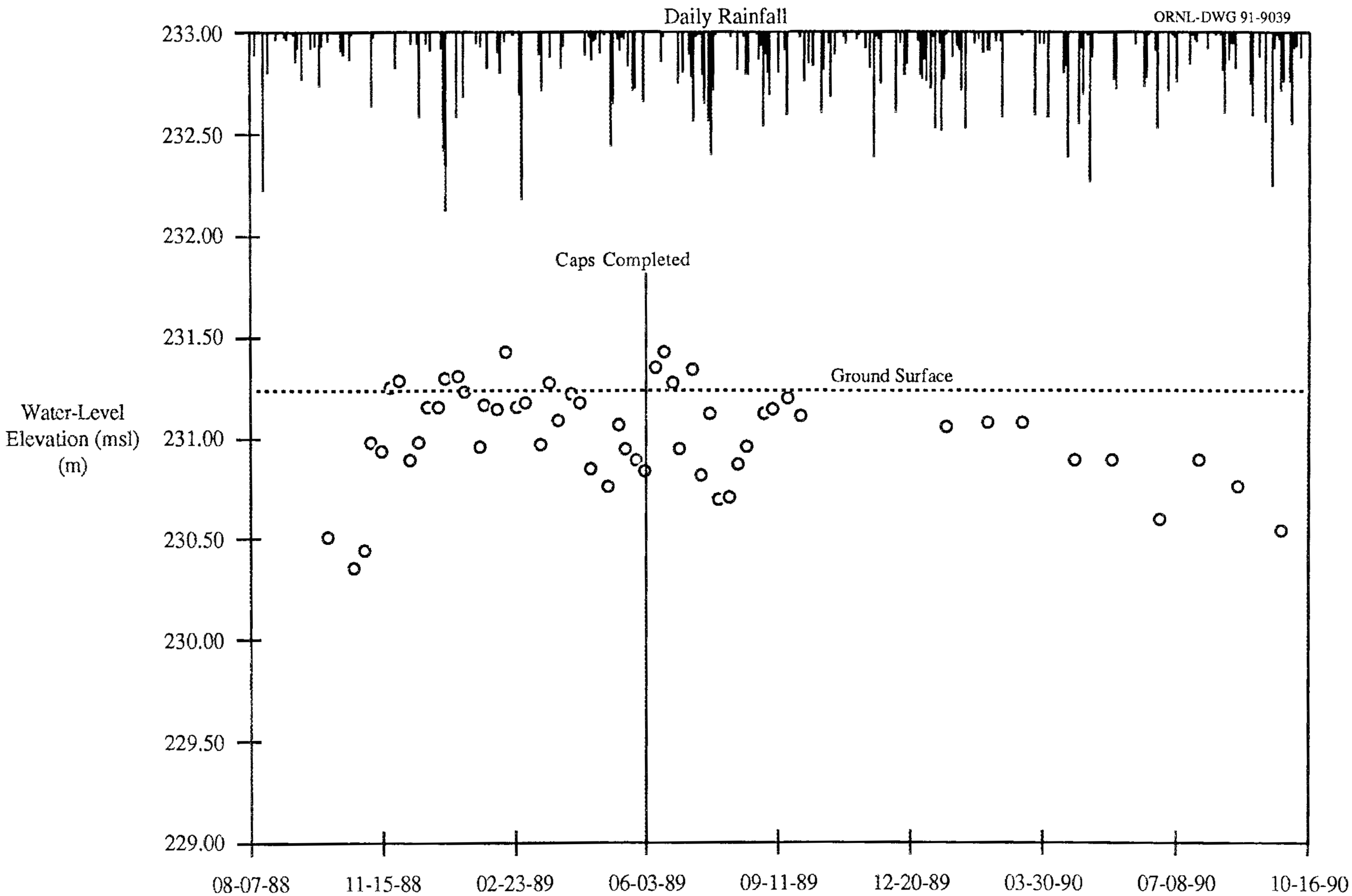

Fig. 2. Hydrograph and associated hyetograph for ICM monitoring well 276.

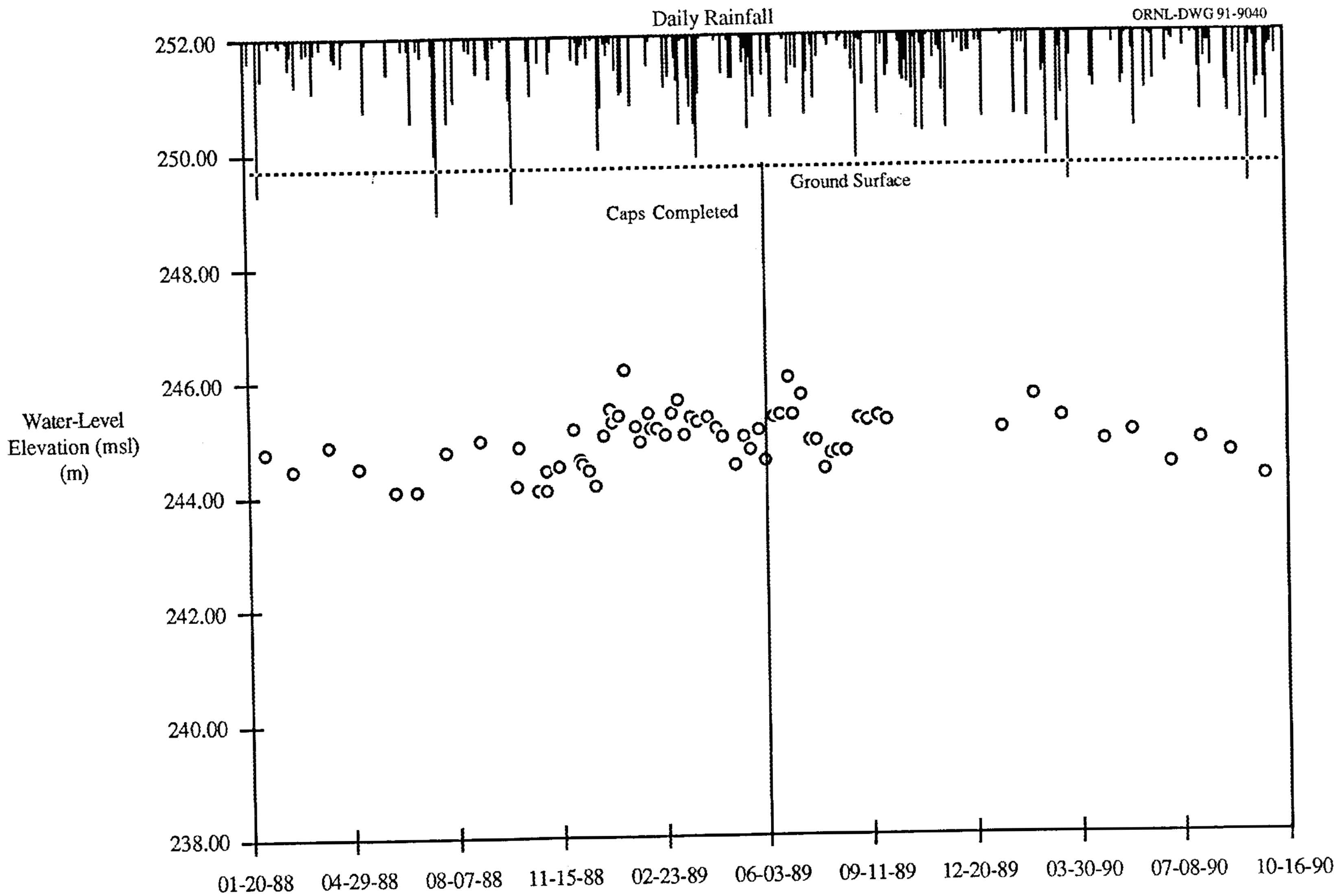

Fig. 3. Hydrograph and associated hyetograph for ICM monitoring well 636.

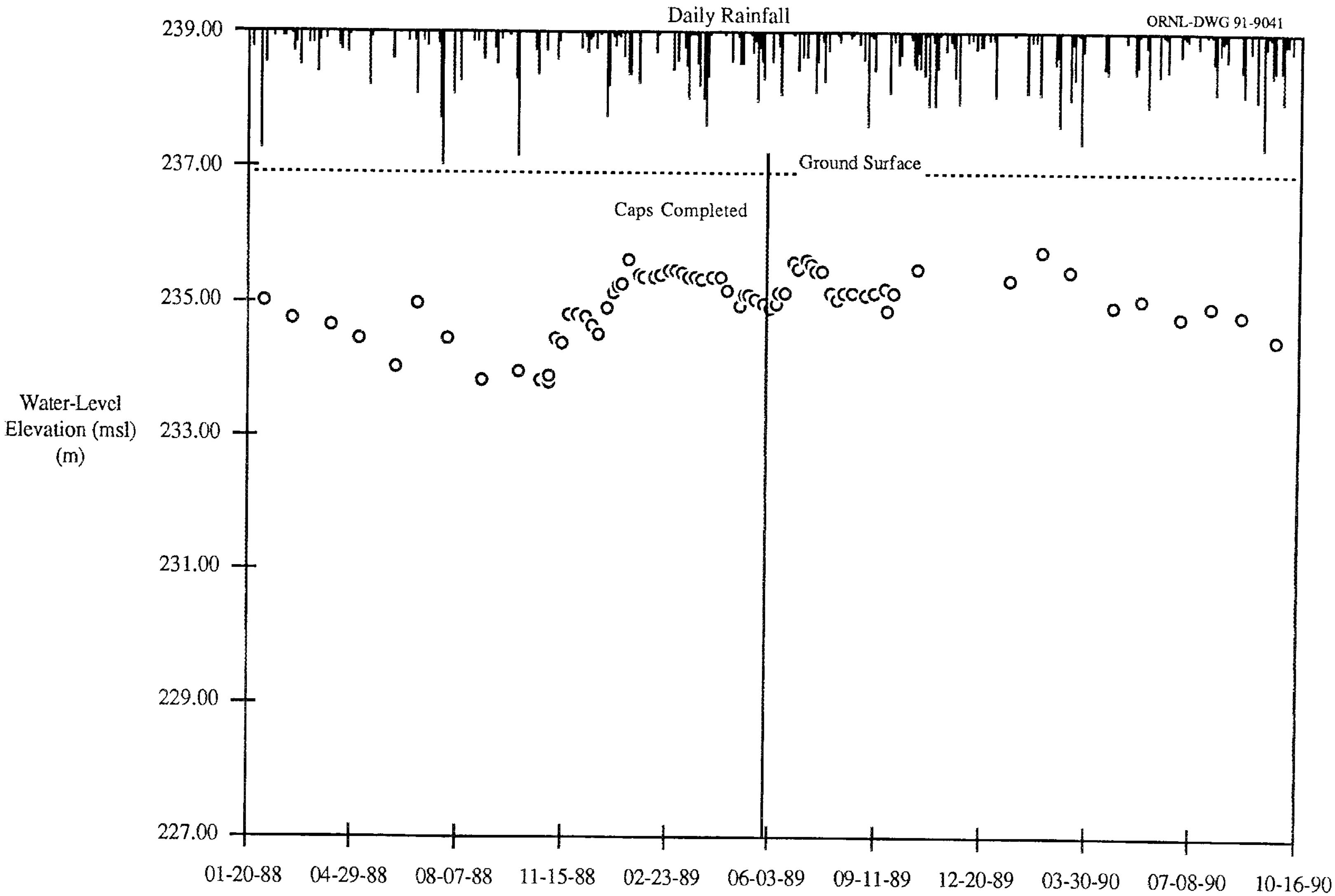

Fig. 4. Hydrograph and associated hyetograph for ICM monitoring well 642.

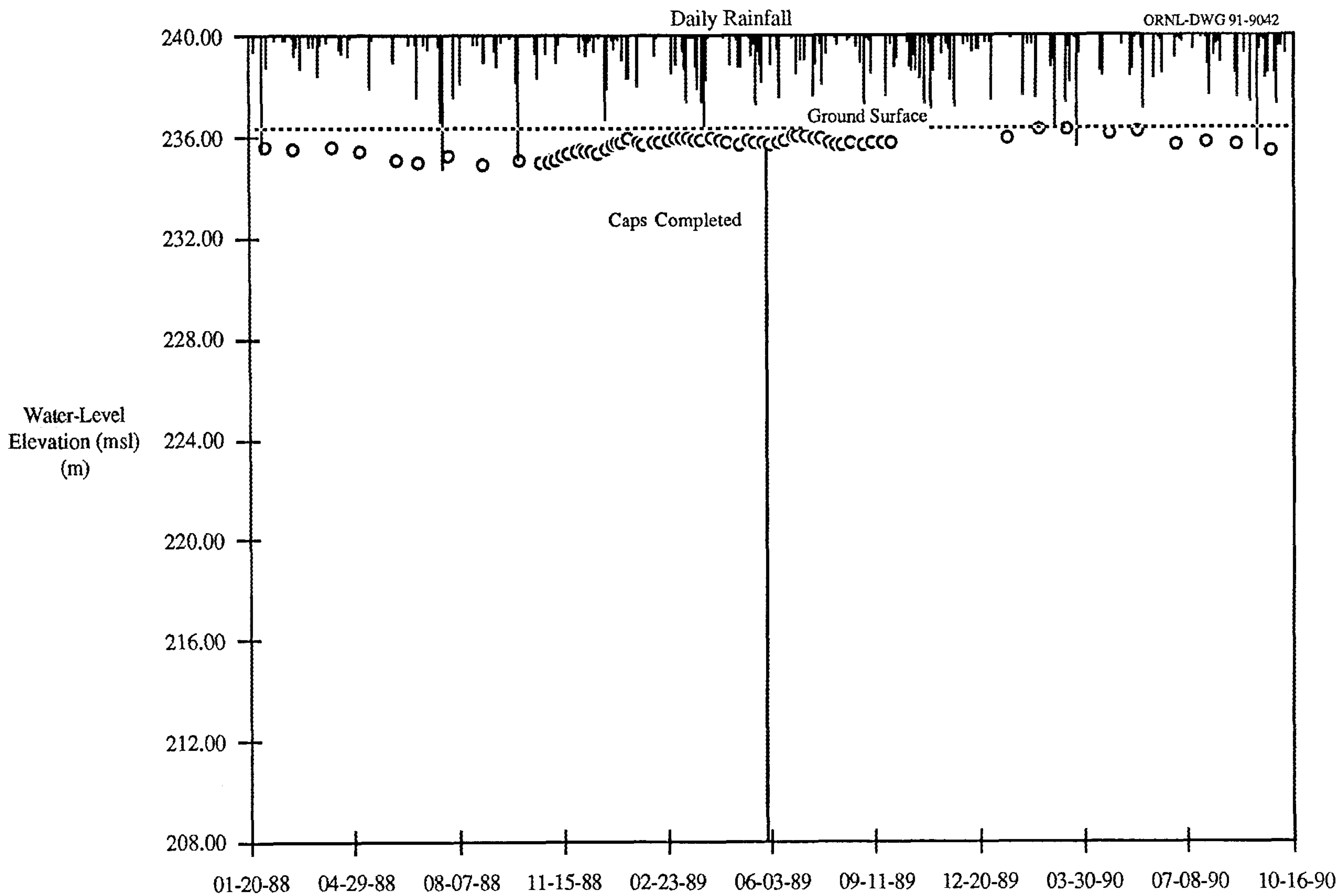

Fig. 5. Hydrograph and associated hyetograph for ICM monitoring well 654.

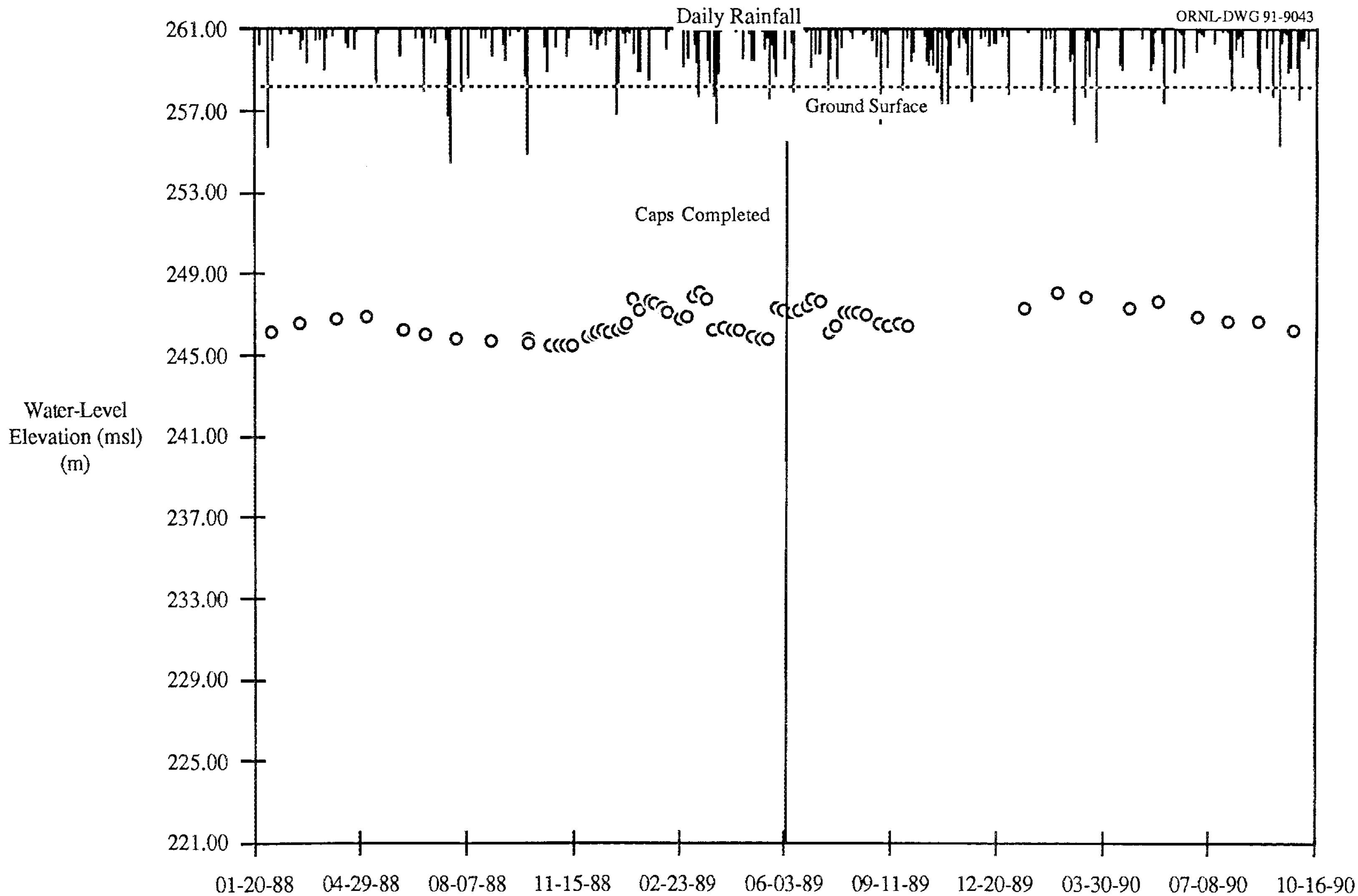

Fig. 6. Hydrograph and associated hyetograph for ICM monitoring well 656.

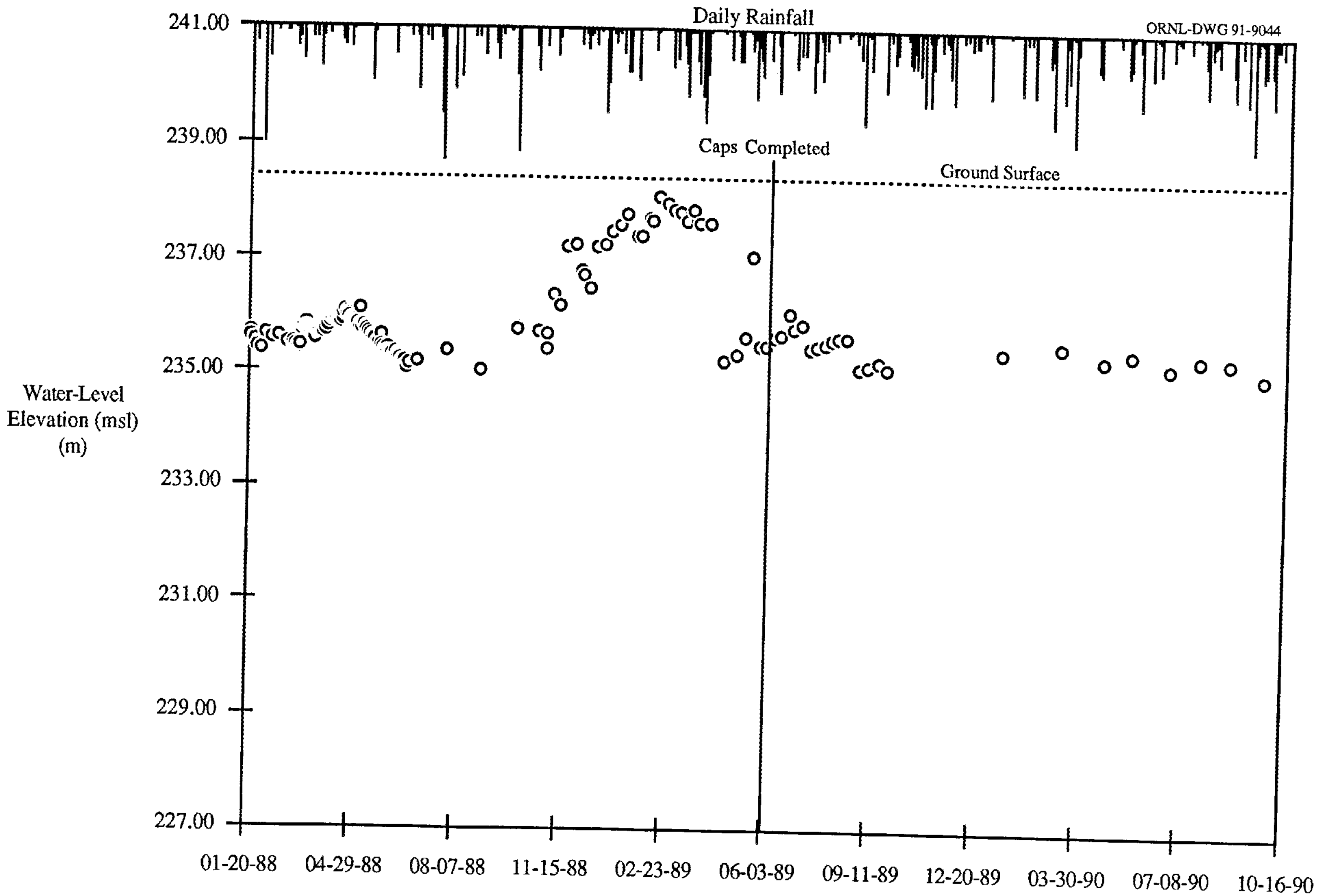

Fig. 7. Hydrograph and associated hyetograph for ICM monitoring well 646.

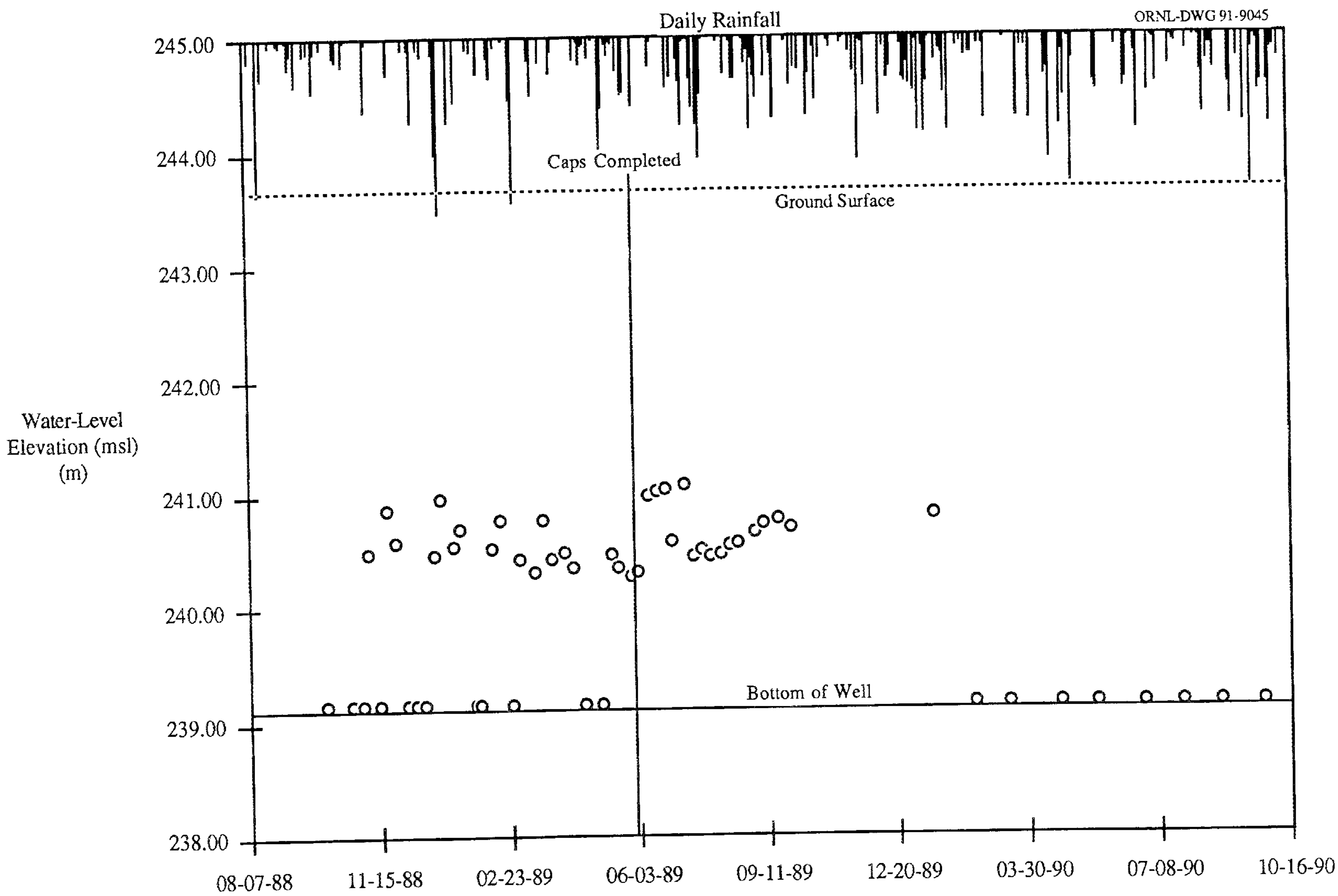

Fig. 8. Hydrograph and associated hyetograph for ICM monitoring well 318.

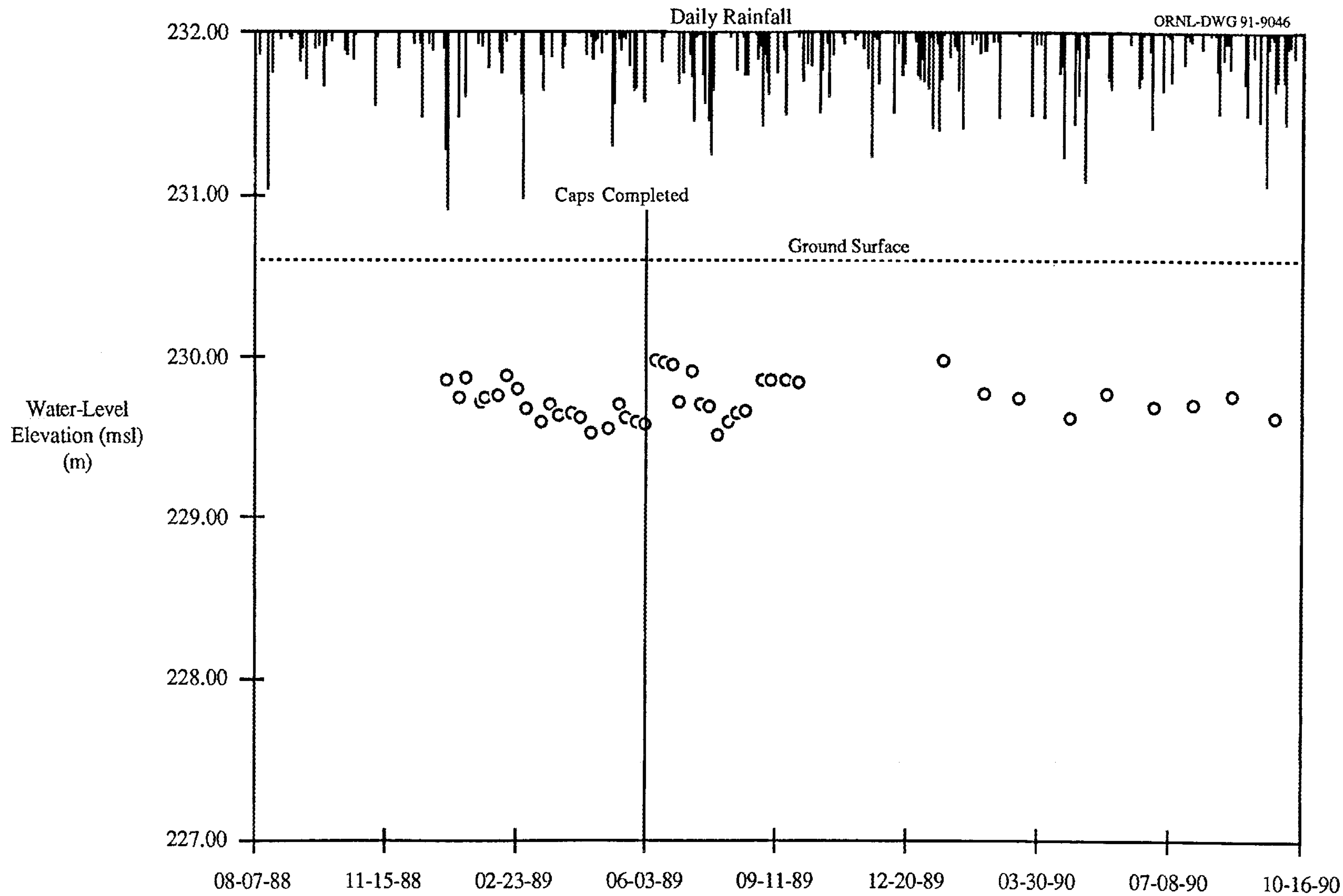

Fig. 9. Hydrograph and associated hyetograph for ICM monitoring well 345.

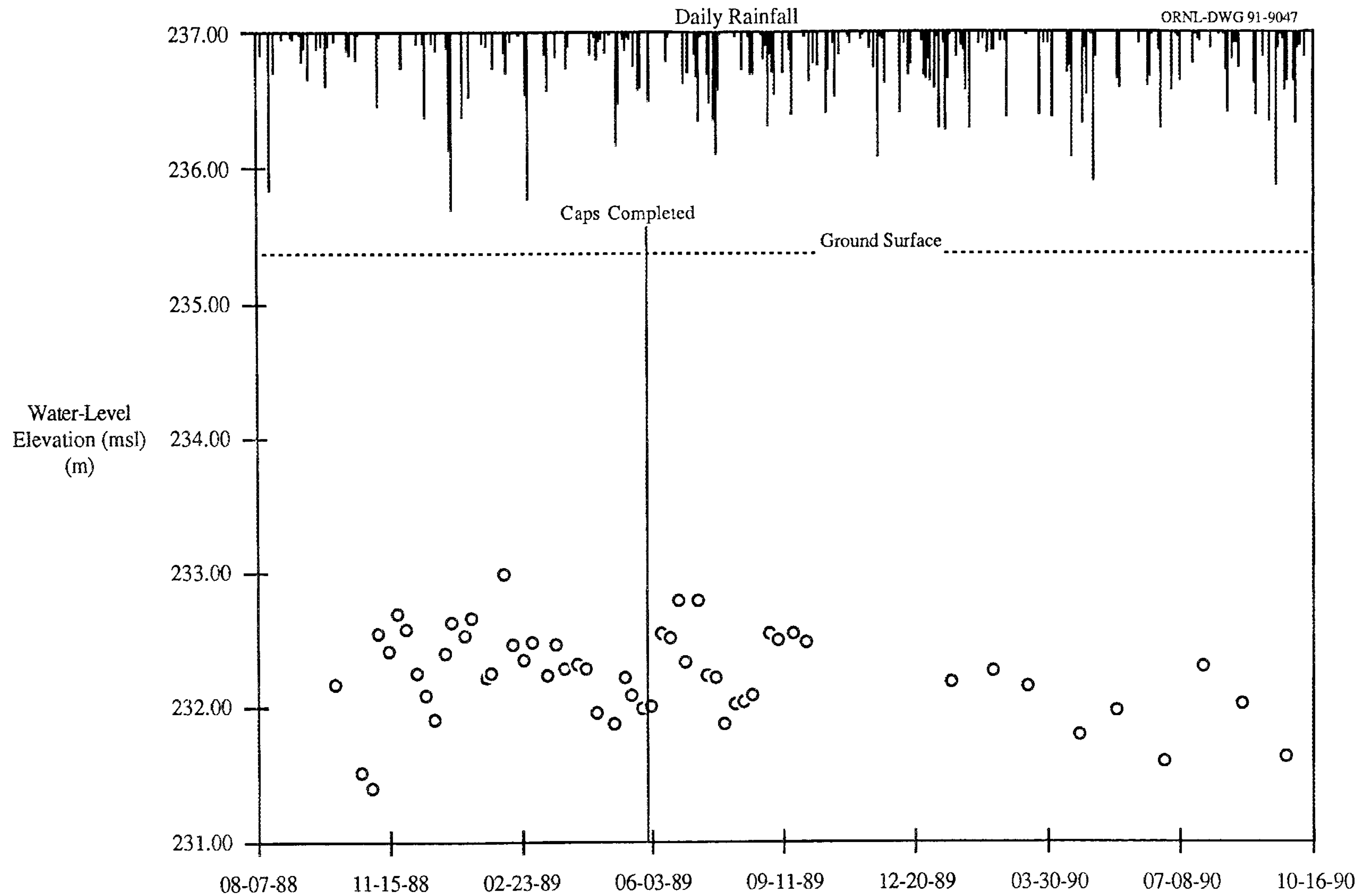

Fig. 10. Hydrograph and associated hyetograph for ICM monitoring well 356.

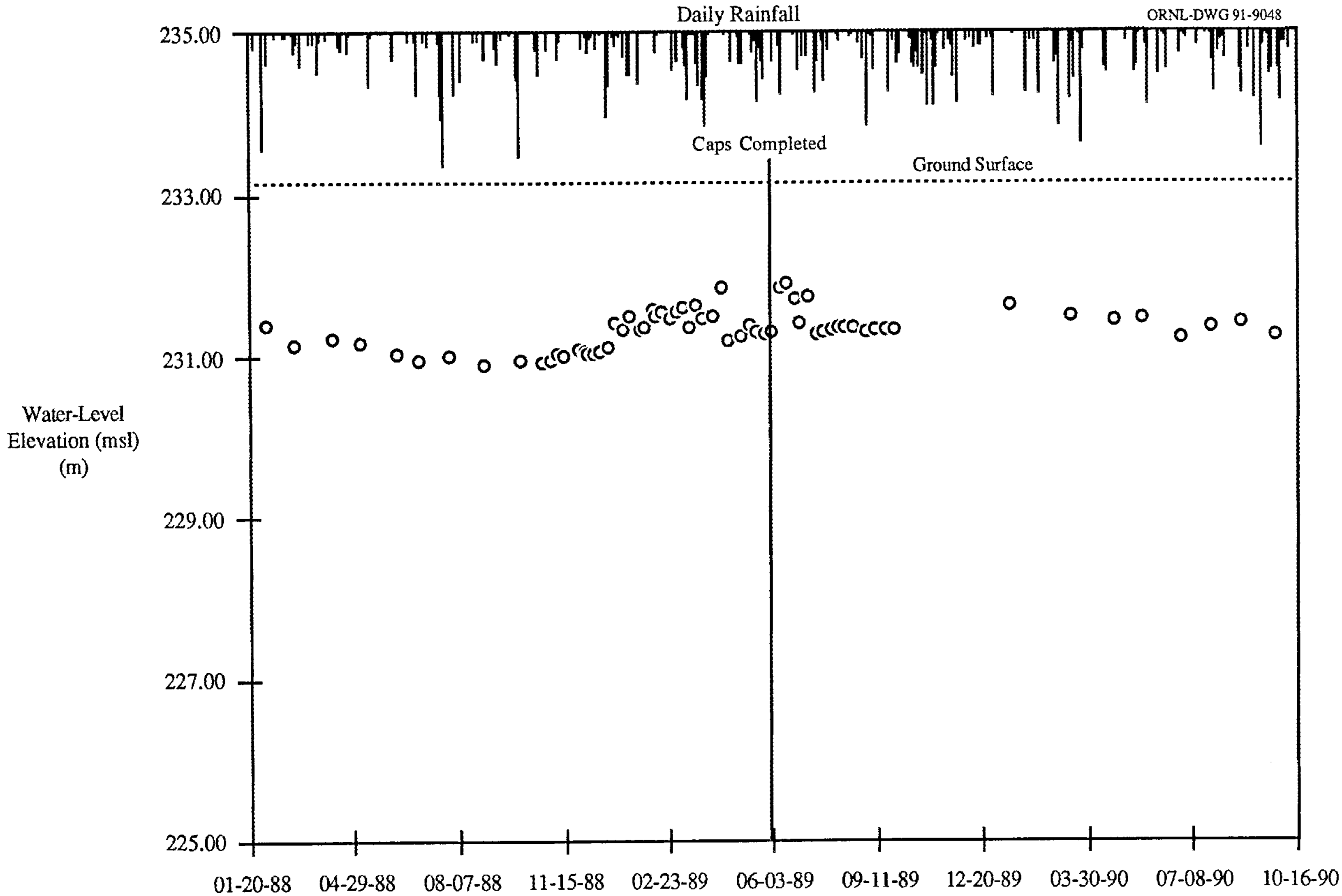

Fig. 11. Hydrograph and associated hyetograph for ICM monitoring well 645.

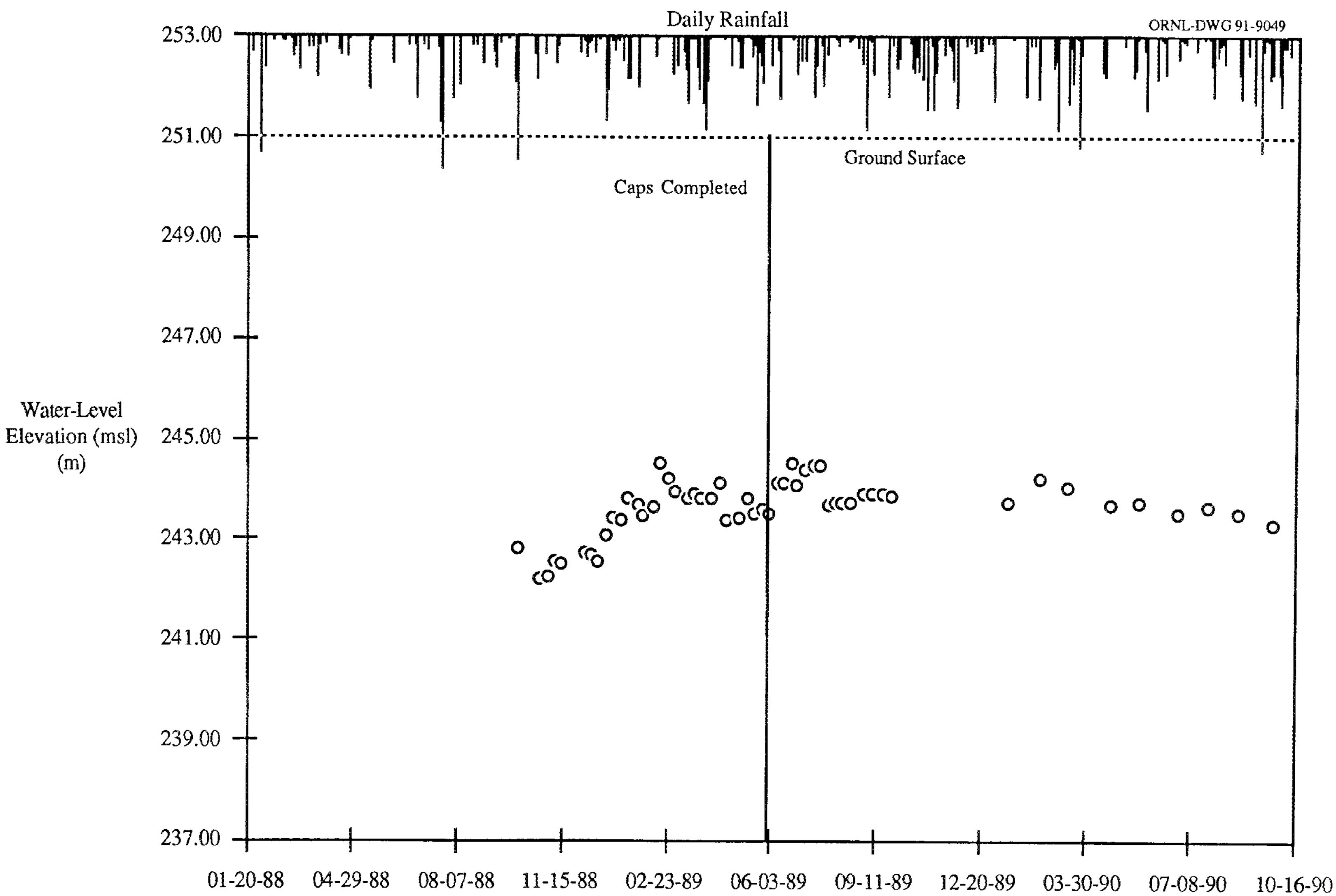

Fig. 12. Hydrograph and associated hyetograph for ICM monitoring well 648.

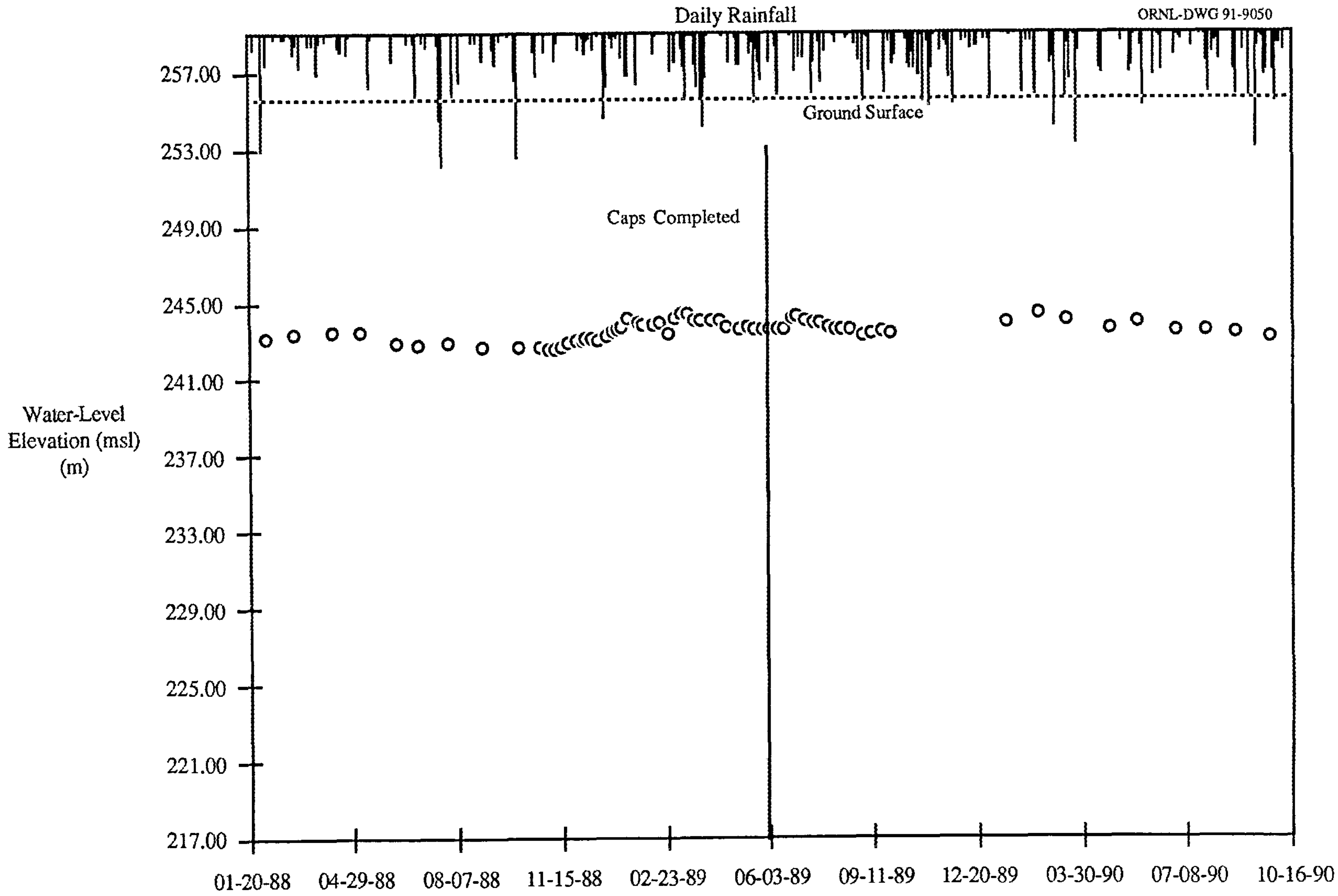

Fig. 13. Hydrograph and associated hyetograph for ICM monitoring well 655.

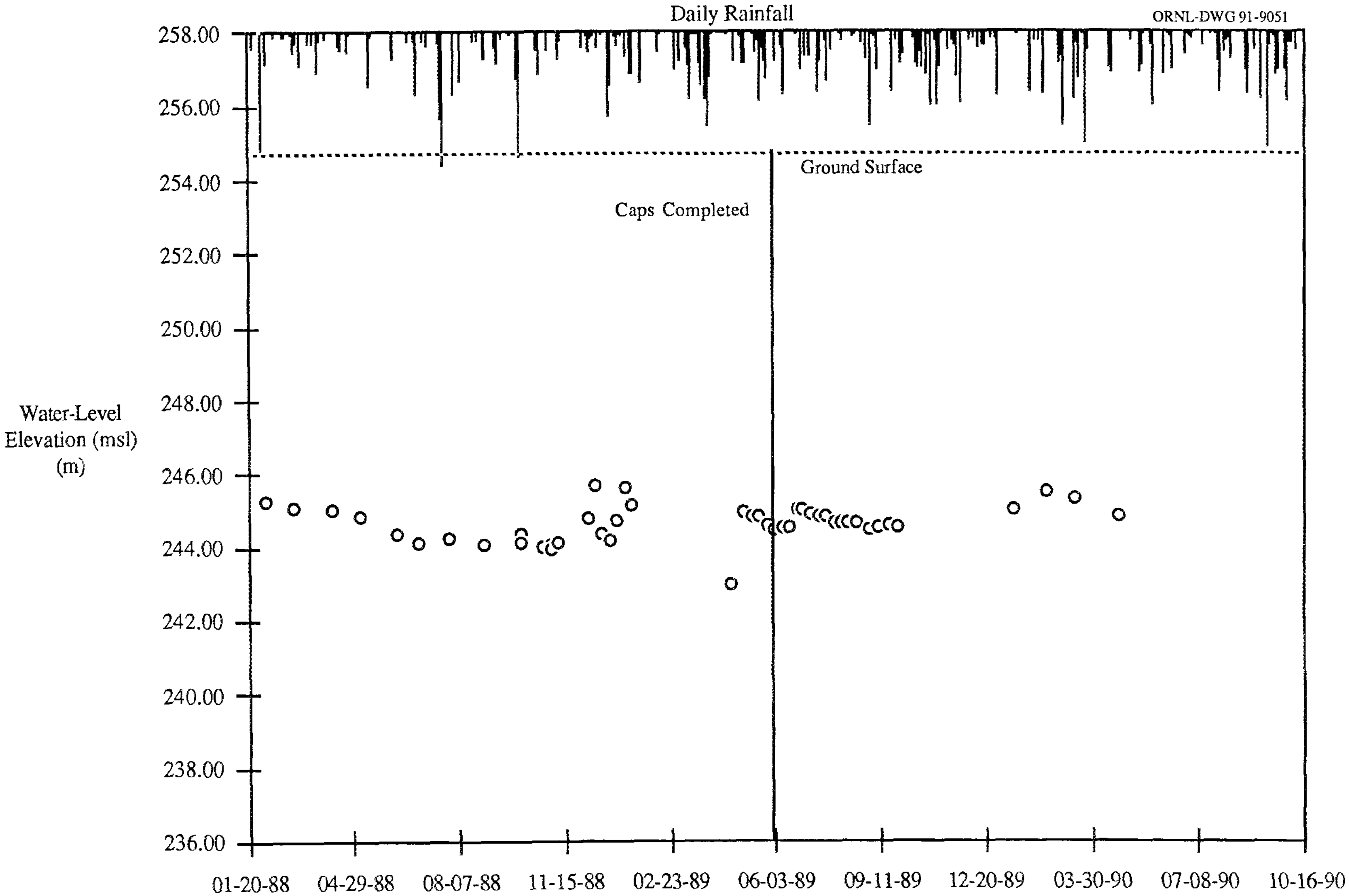

Fig. 14. Hydrograph and associated hyetograph for ICM monitoring well 640.

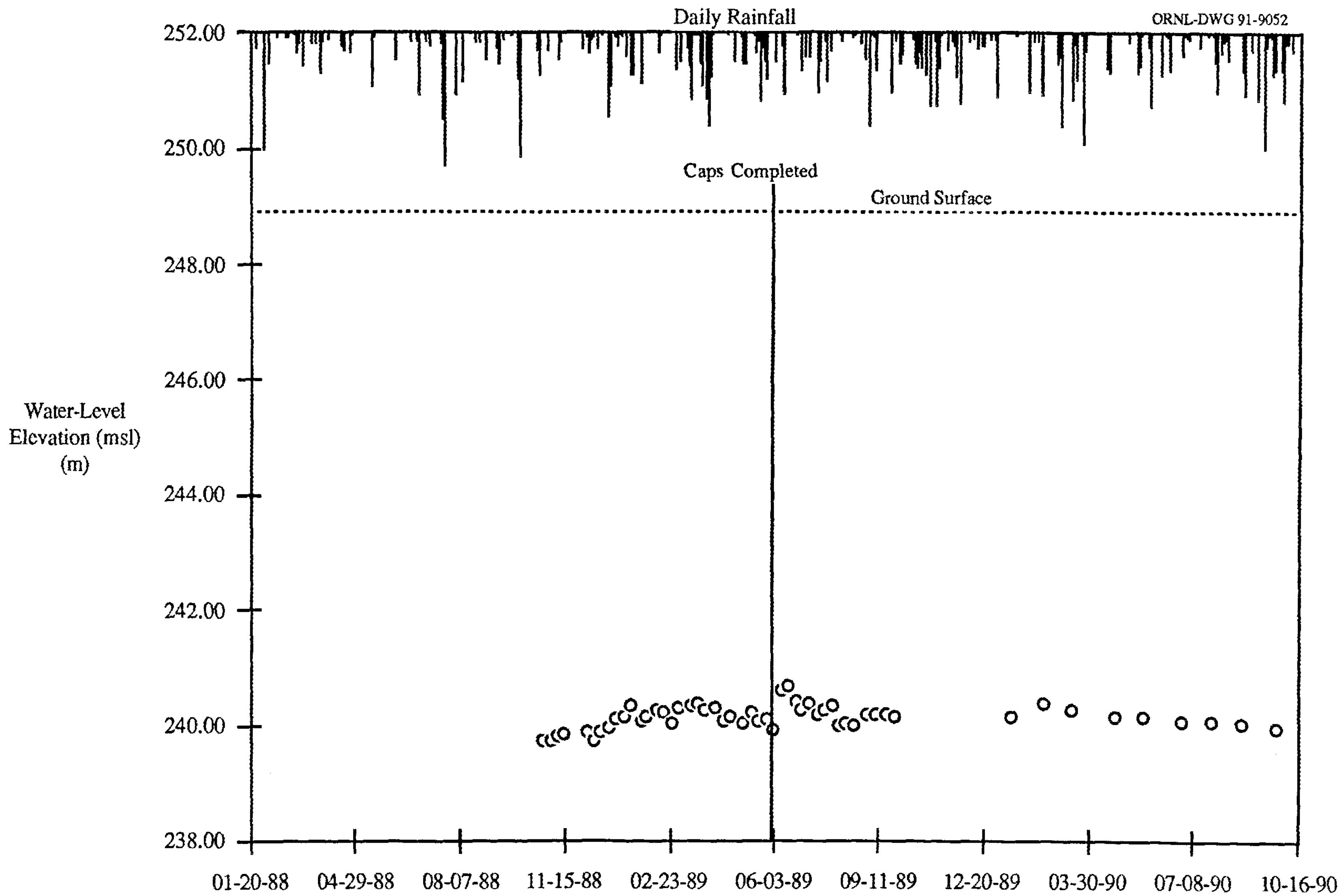

Fig. 15. Hydrograph and associated hyetograph for ICM monitoring well 647.

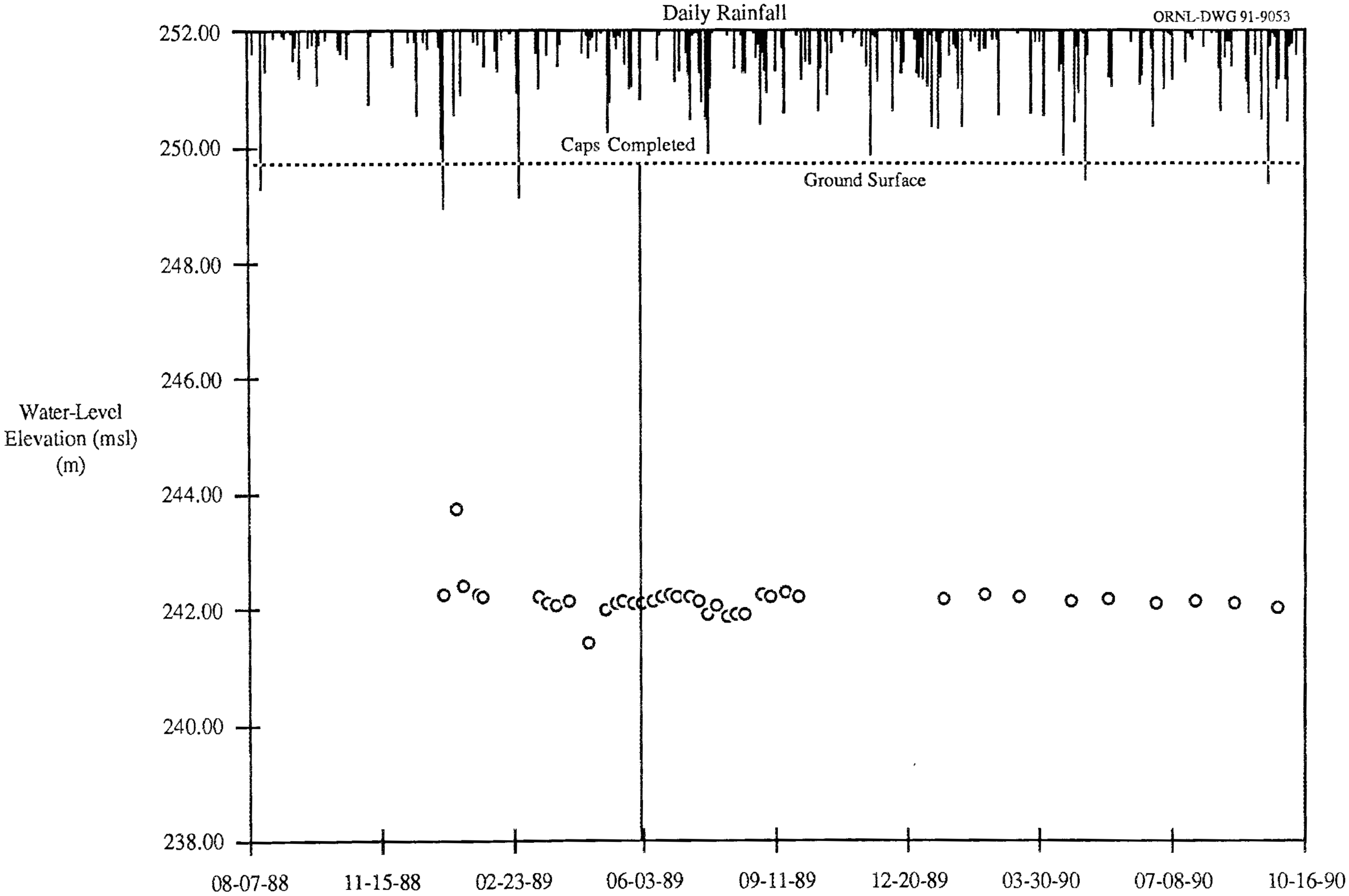

Fig. 16. Hydrograph and associated hyetograph for ICM monitoring well 368.

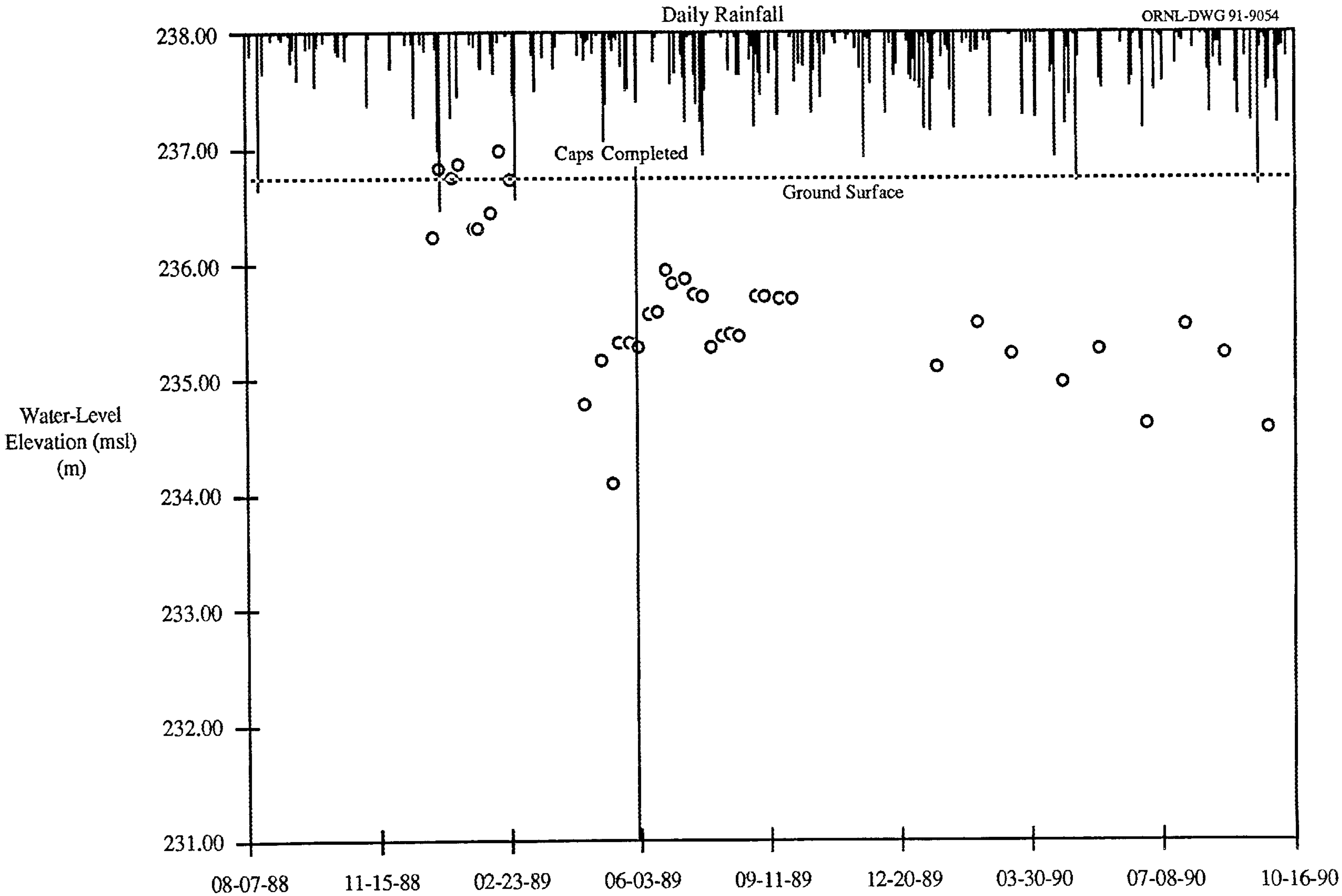

Fig. 17. Hydrograph and associated hyetograph for ICM monitoring well 347.

ORNL-DWG 91-9055

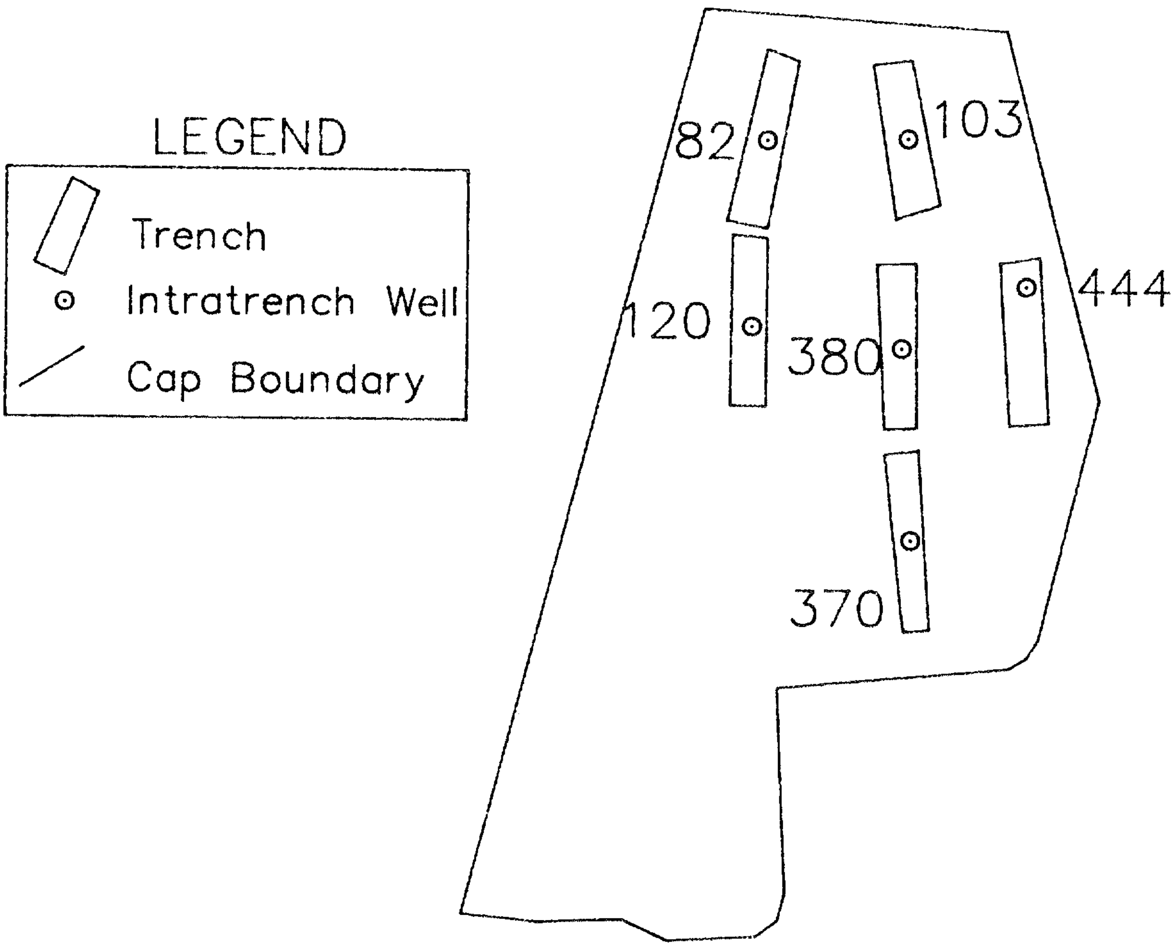

Fig. 18. Burial trench and well locations within cap area 1.

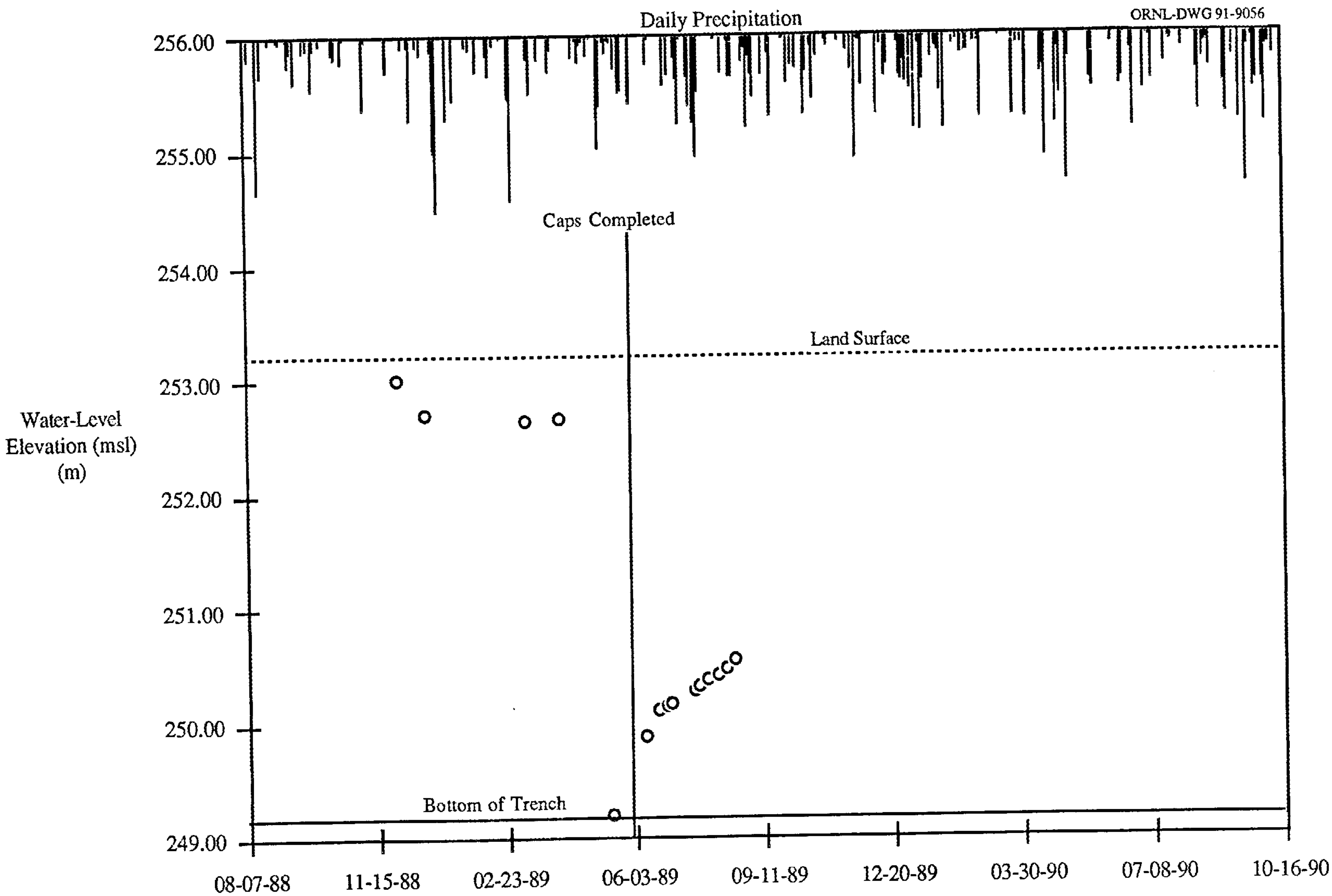

Fig. 19. Hydrograph and associated hyetograph for cap area 1 well T82.

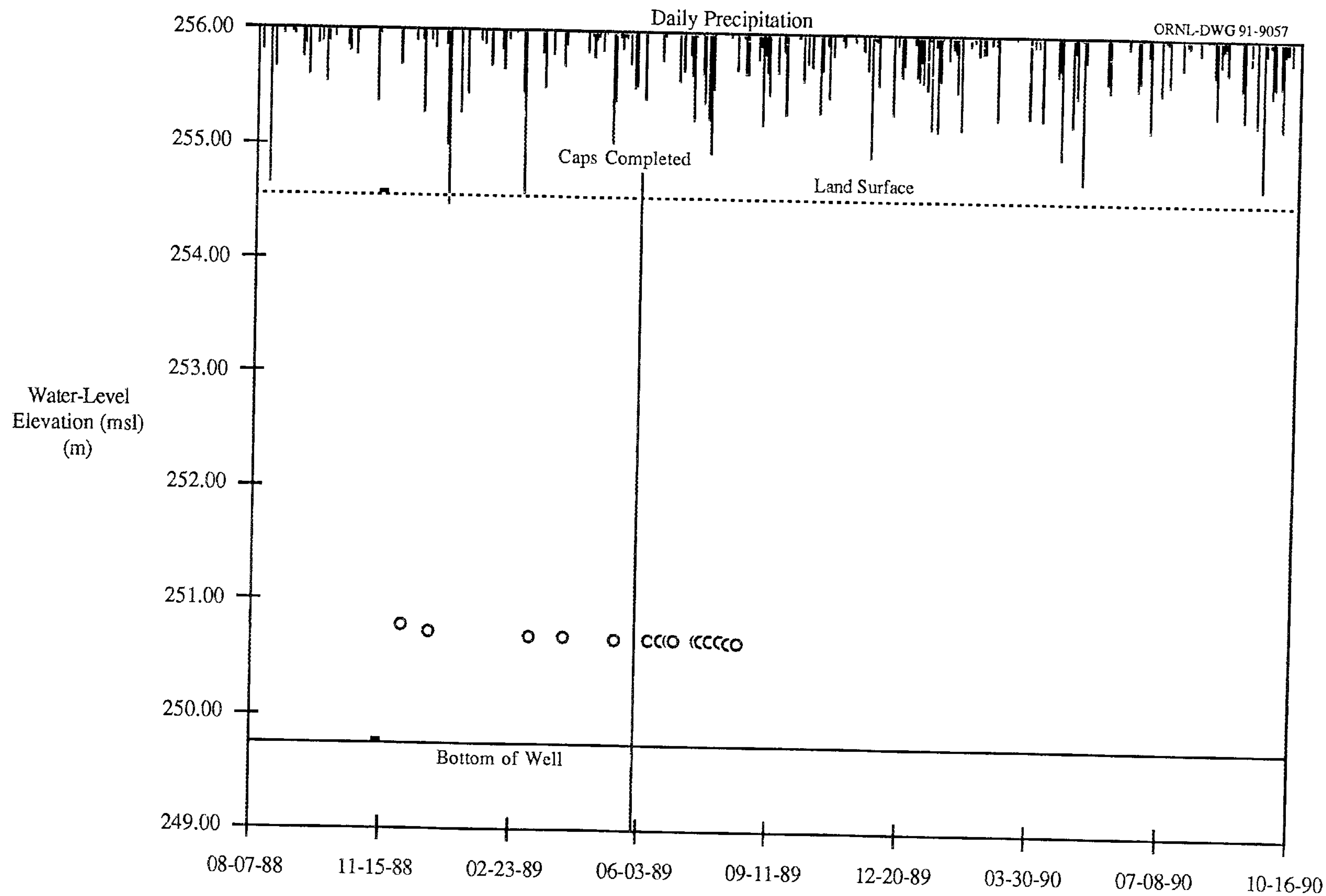

Fig. 20. Hydrograph and associated hyetograph for cap area 1 well T444.

ORNL-DWG 91-9058

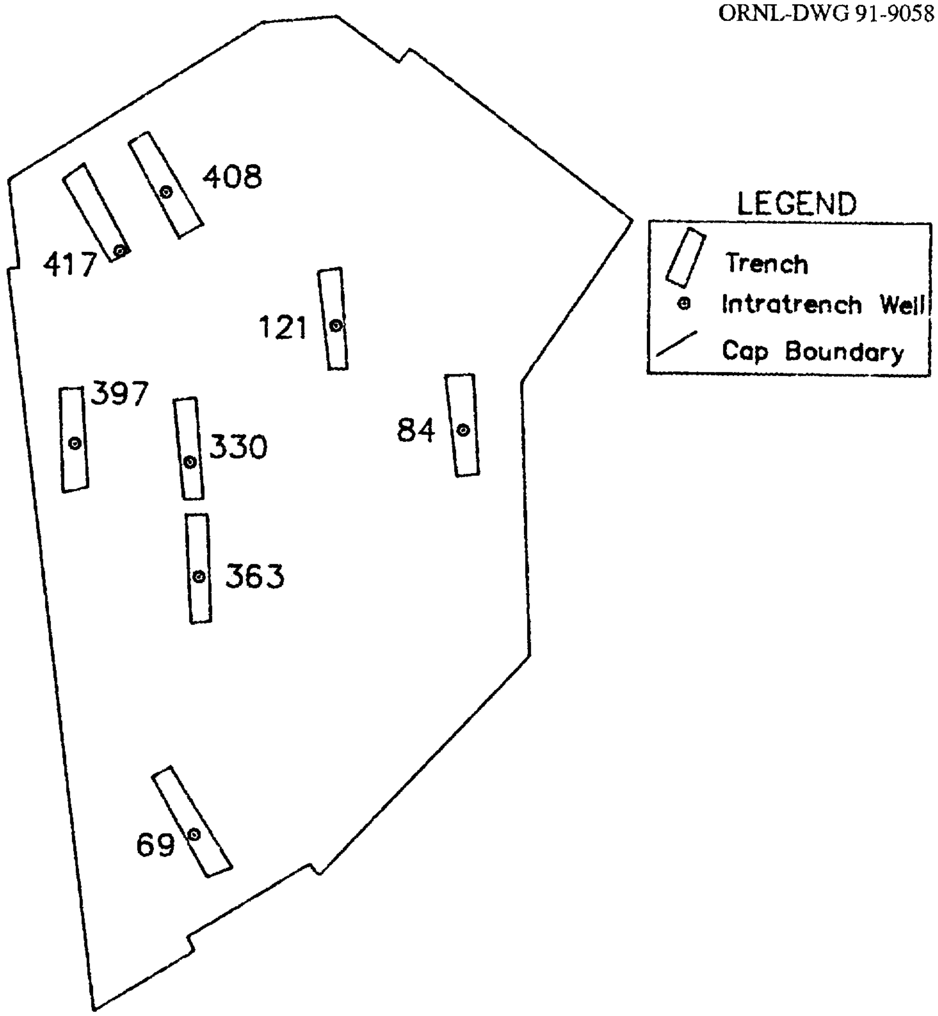

Fig. 21. Burial trench and well locations within cap area 2.

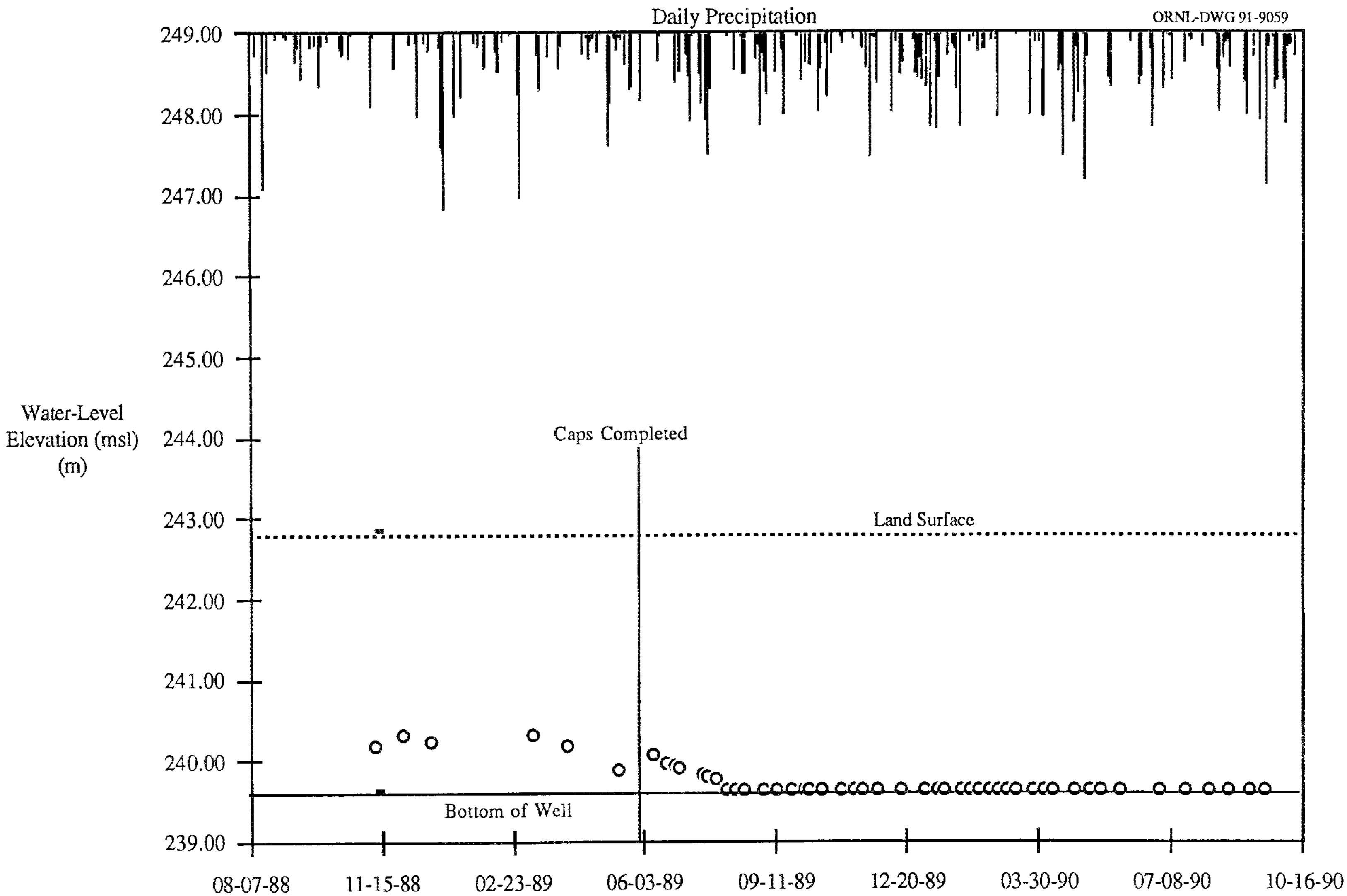

Fig. 22. Hydrograph and associated hyetograph for cap area 2 well T69.

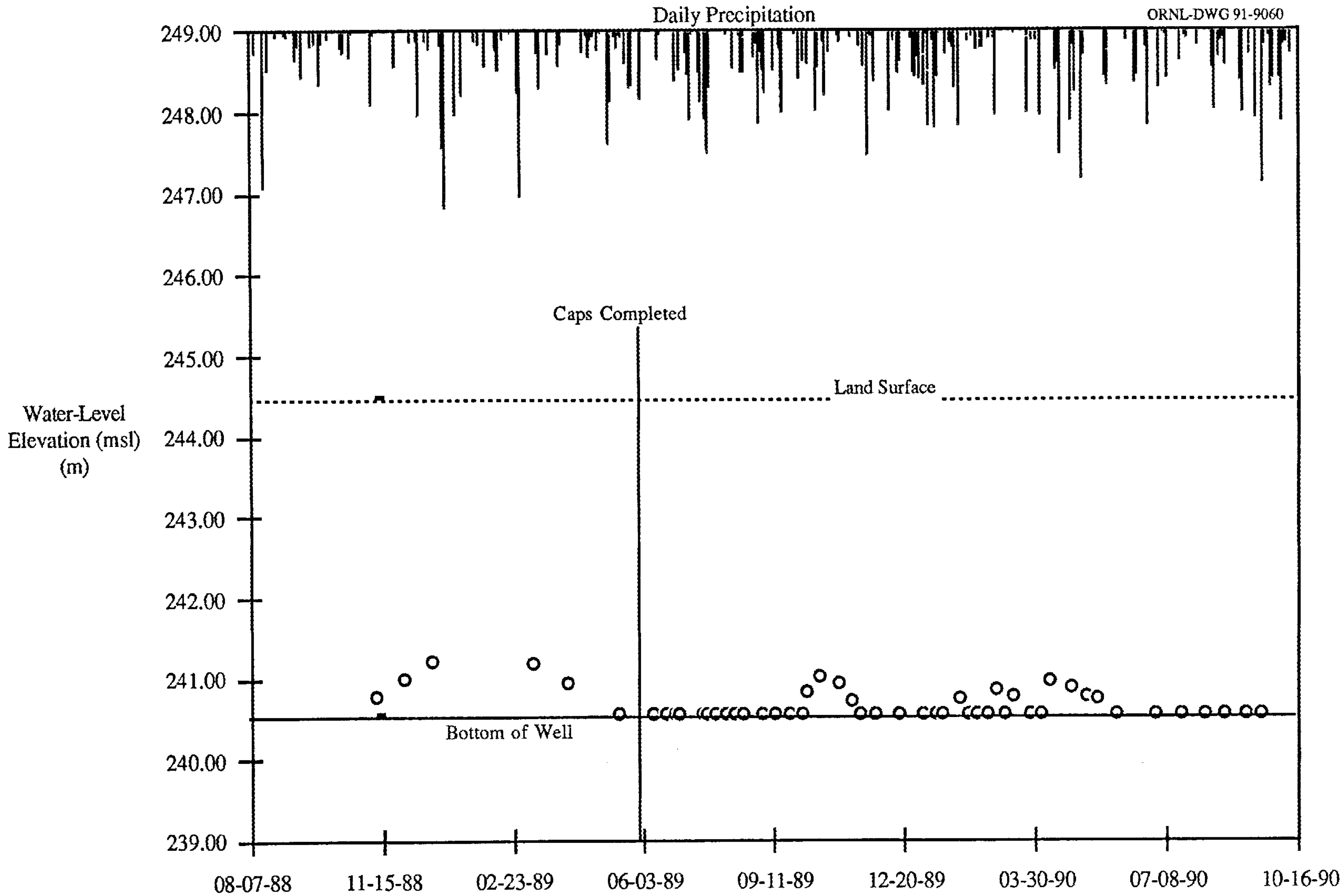

Fig. 23. Hydrograph and associated hyetograph for cap area 2 well T363.

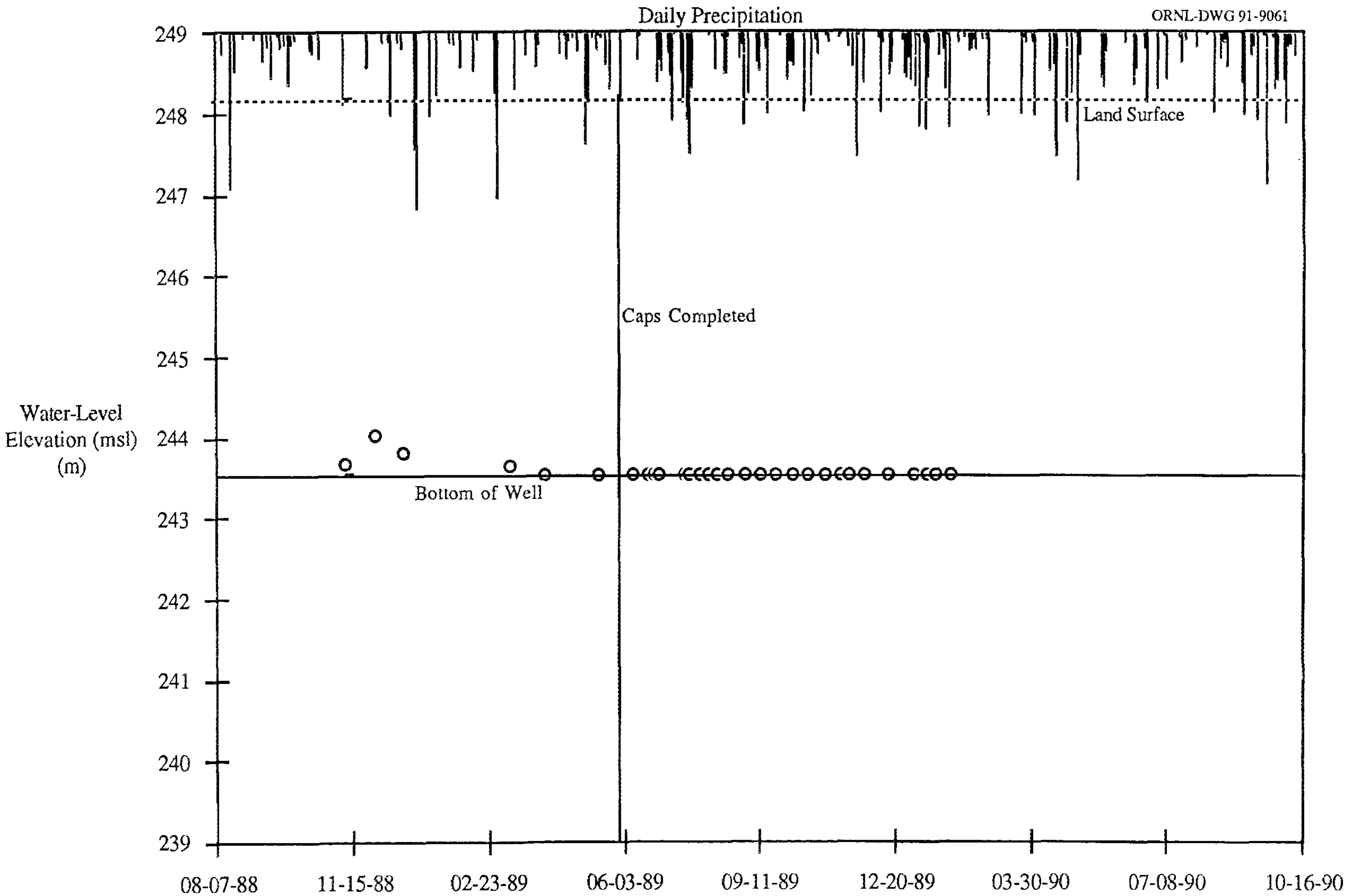

Fig. 24. Hydrograph and associated hyetograph for cap area 2 well T397.

ORNL-DWG 91-9062

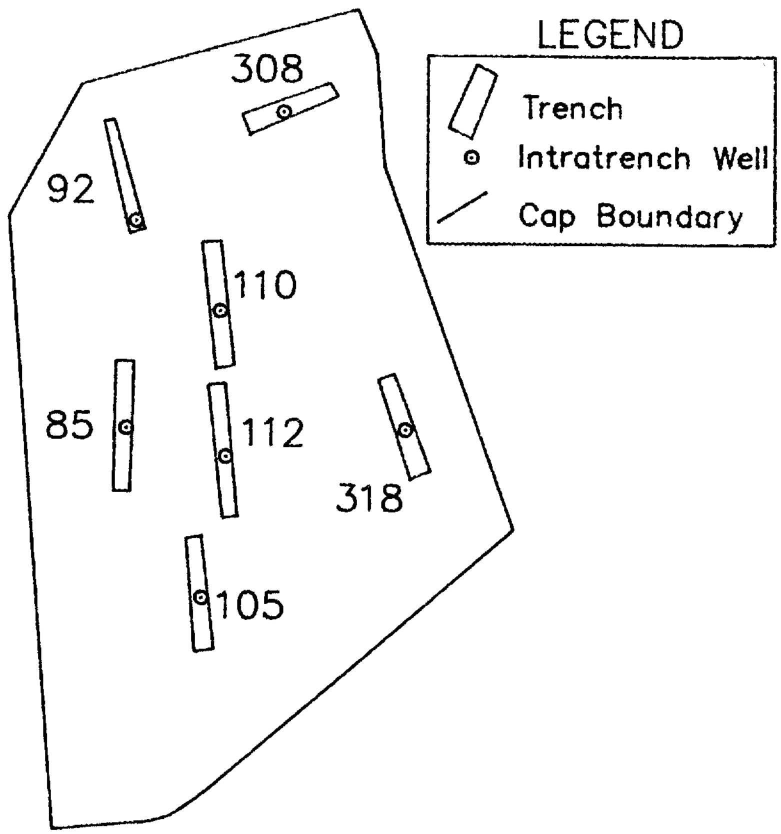

Fig. 25. Burial trench and well locations within cap area 5.

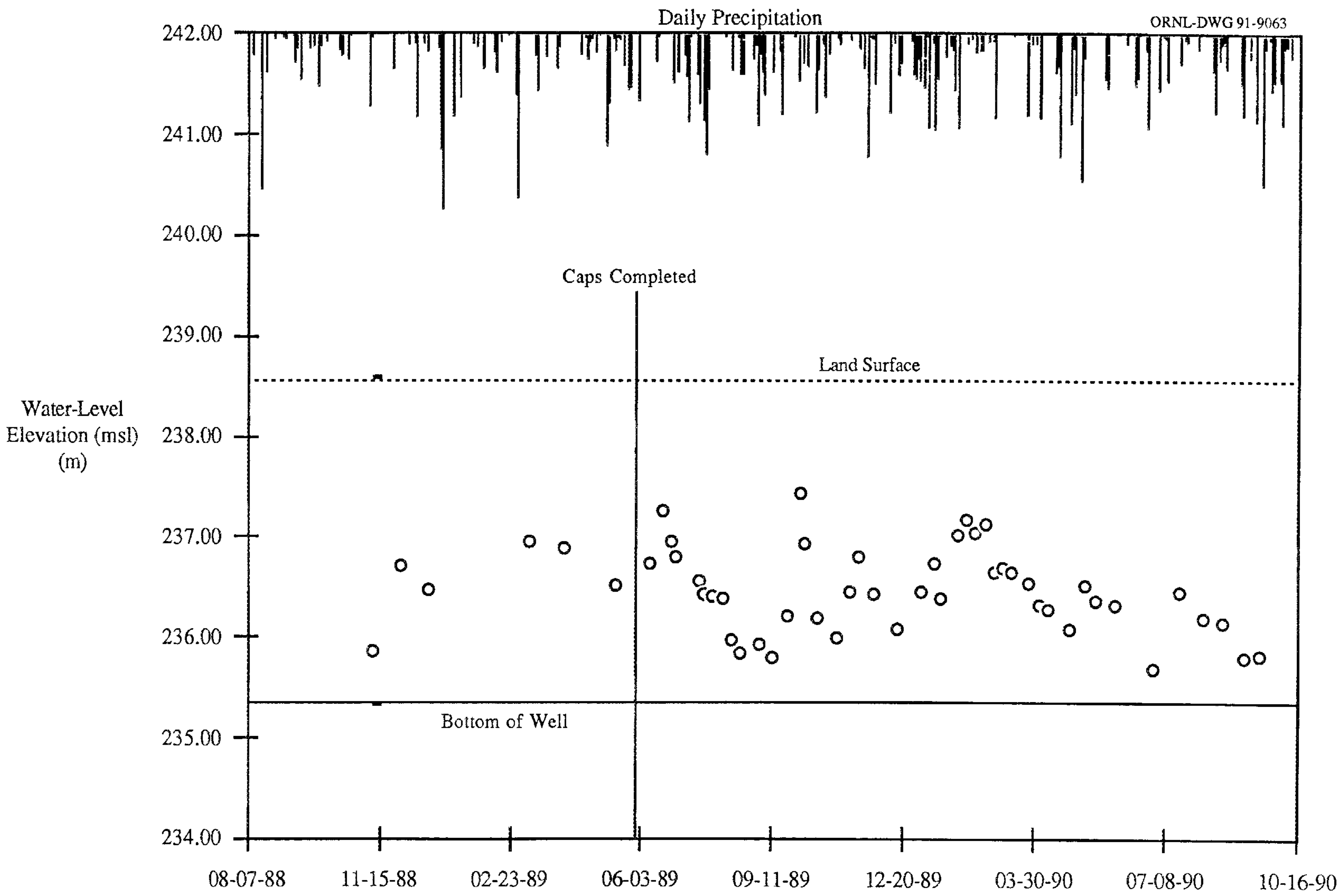

Fig. 26. Hydrograph and associated hyetograph for cap area 5 well T85.

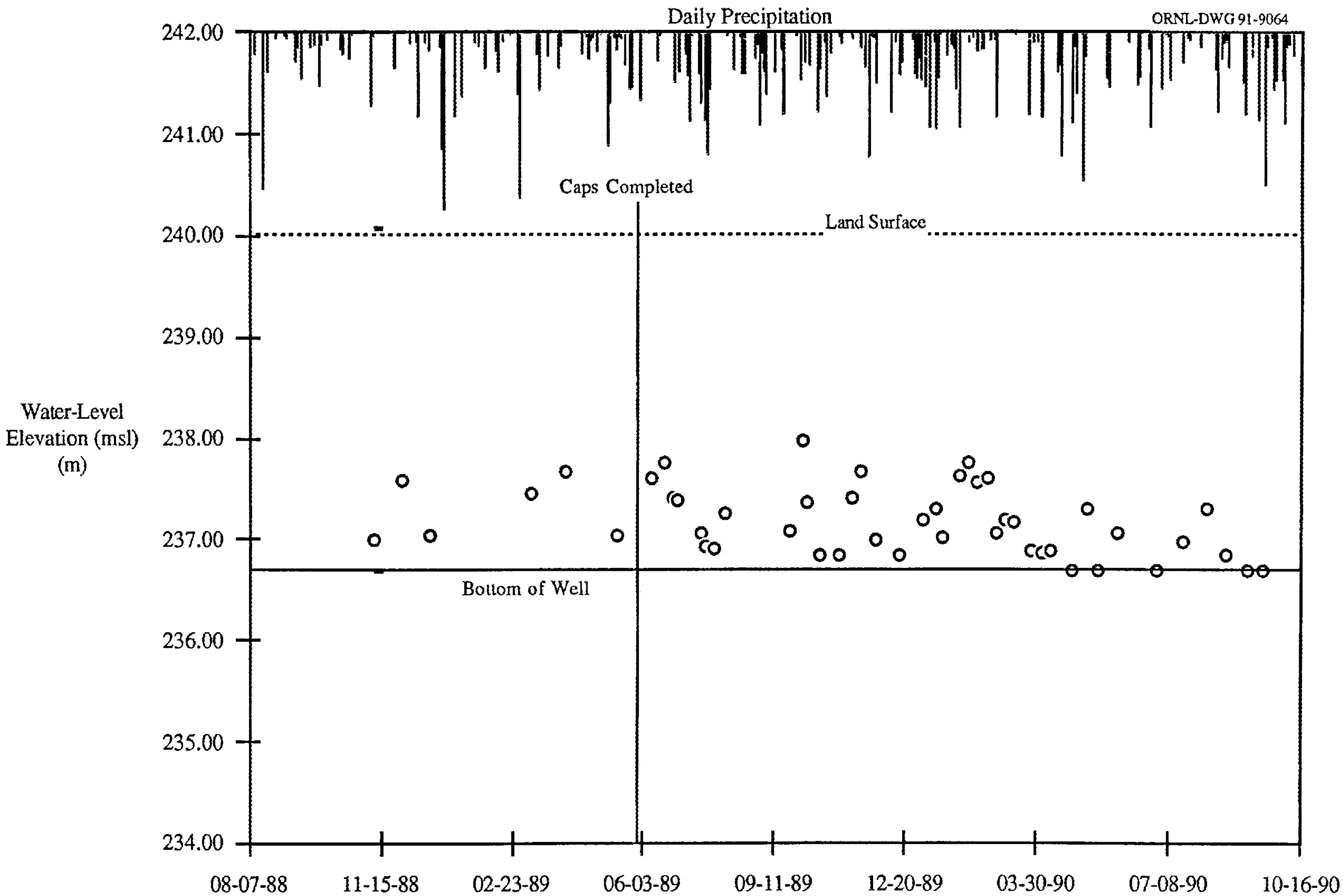

Fig. 27. Hydrograph and associated hyetograph for cap area 5 well T92-1.

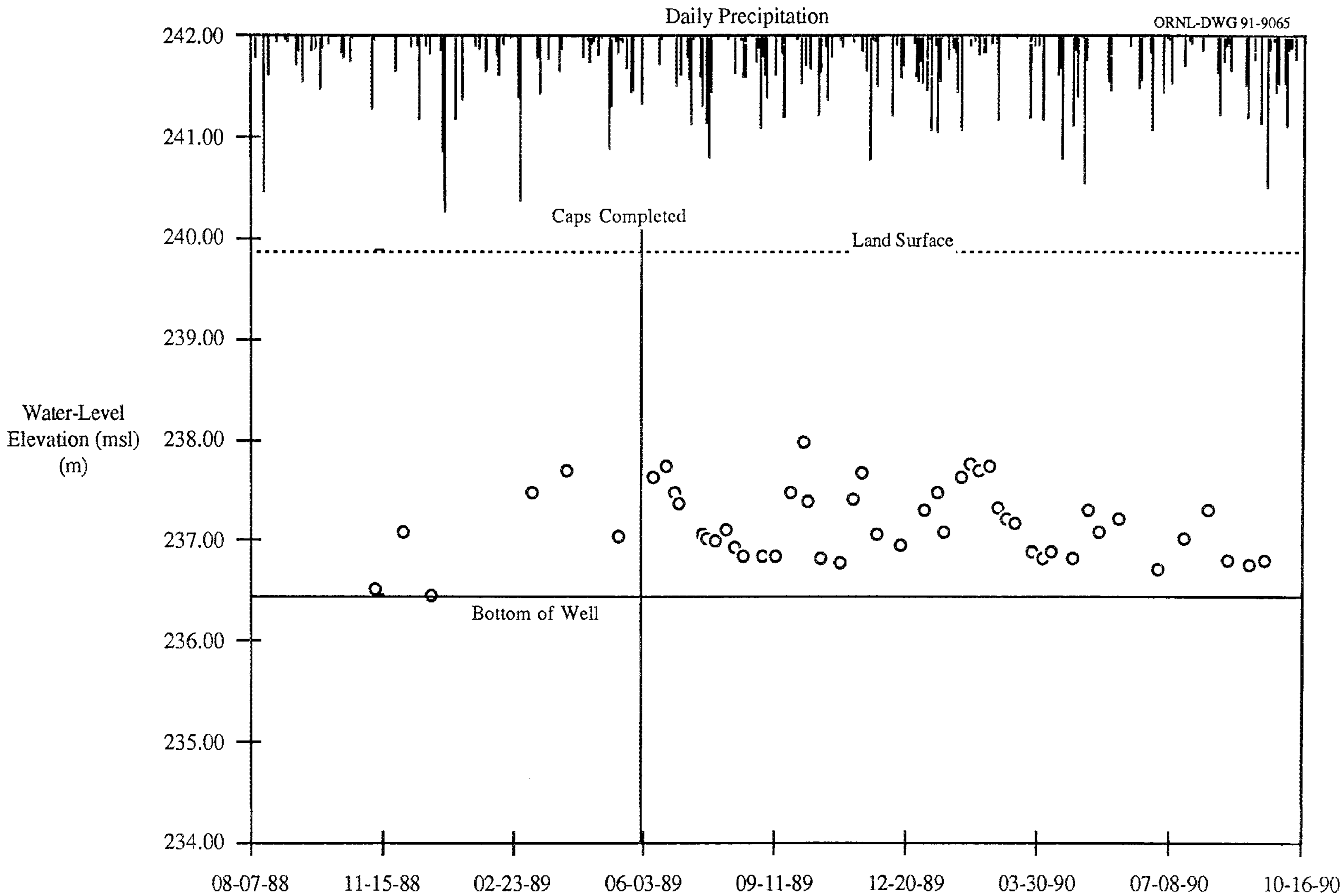

Fig. 28. Hydrograph and associated hyetograph for cap area 5 well T92-2.

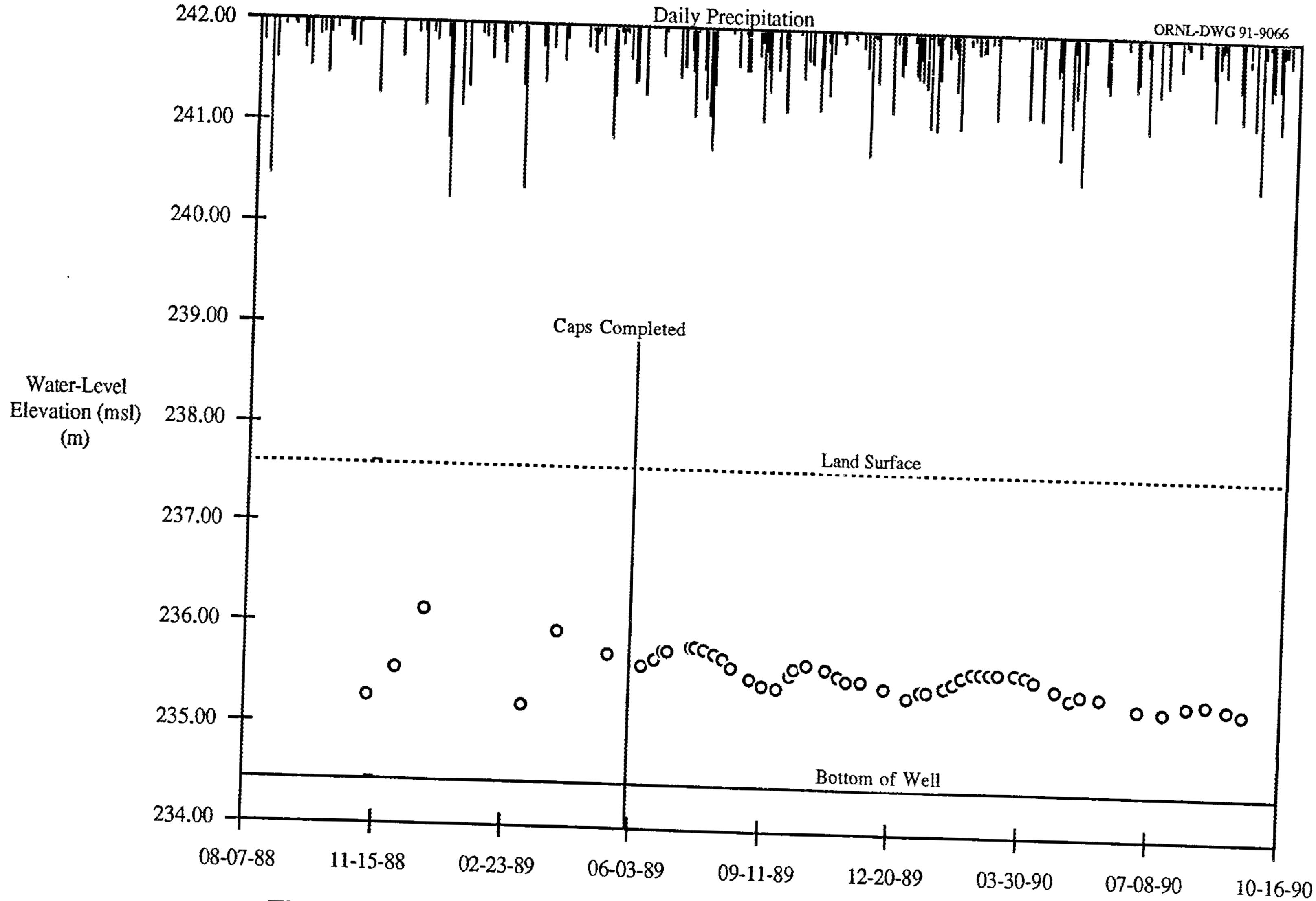

Fig. 29. Hydrograph and associated hyetograph for cap area 5 well T105.

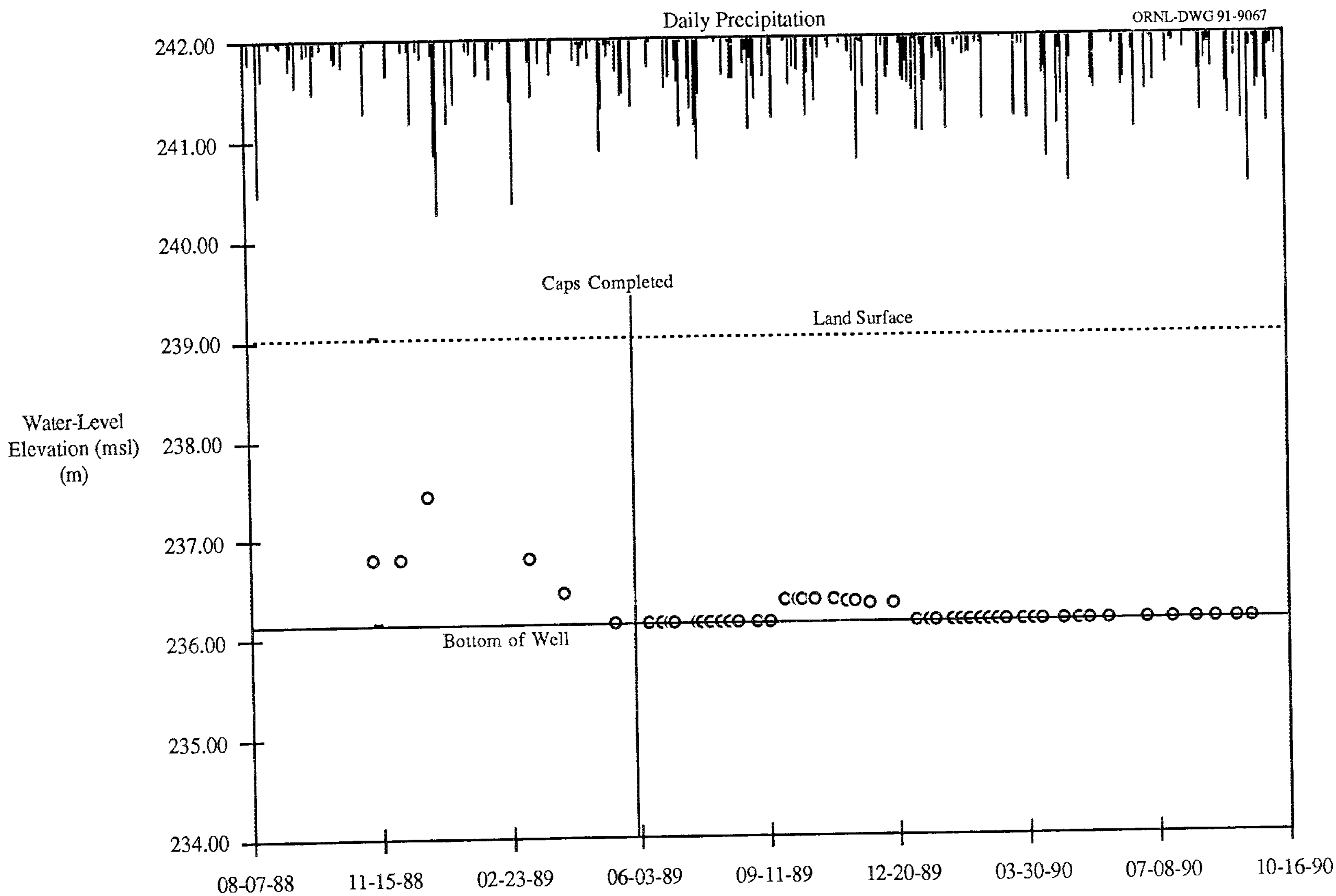

Fig. 30. Hydrograph and associated hyetograph for cap area 5 well T110.

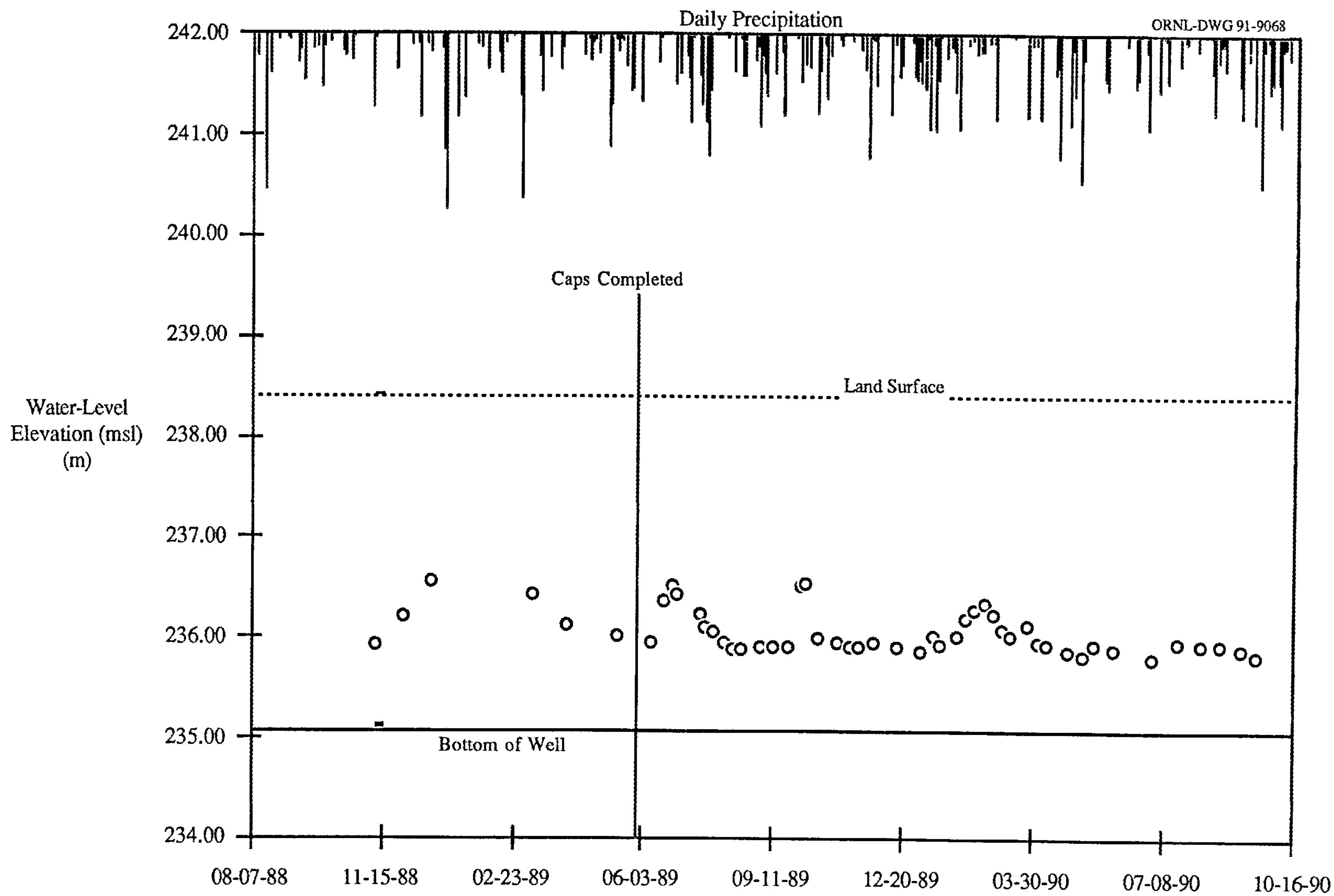

Fig. 31. Hydrograph and associated hyetograph for cap area 5 well T112.

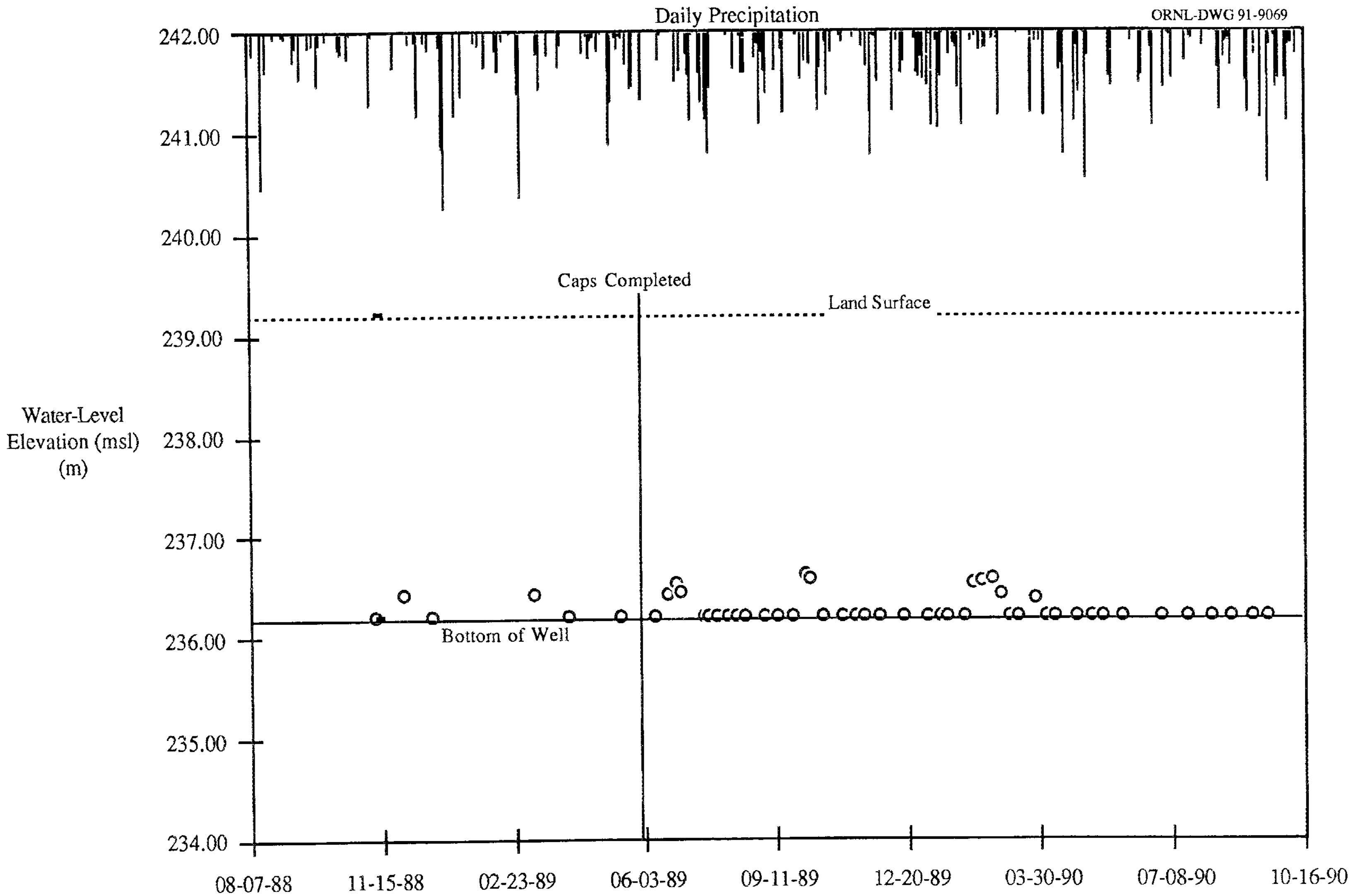

Fig. 32. Hydrograph and associated hyetograph for cap area 5 well T308.

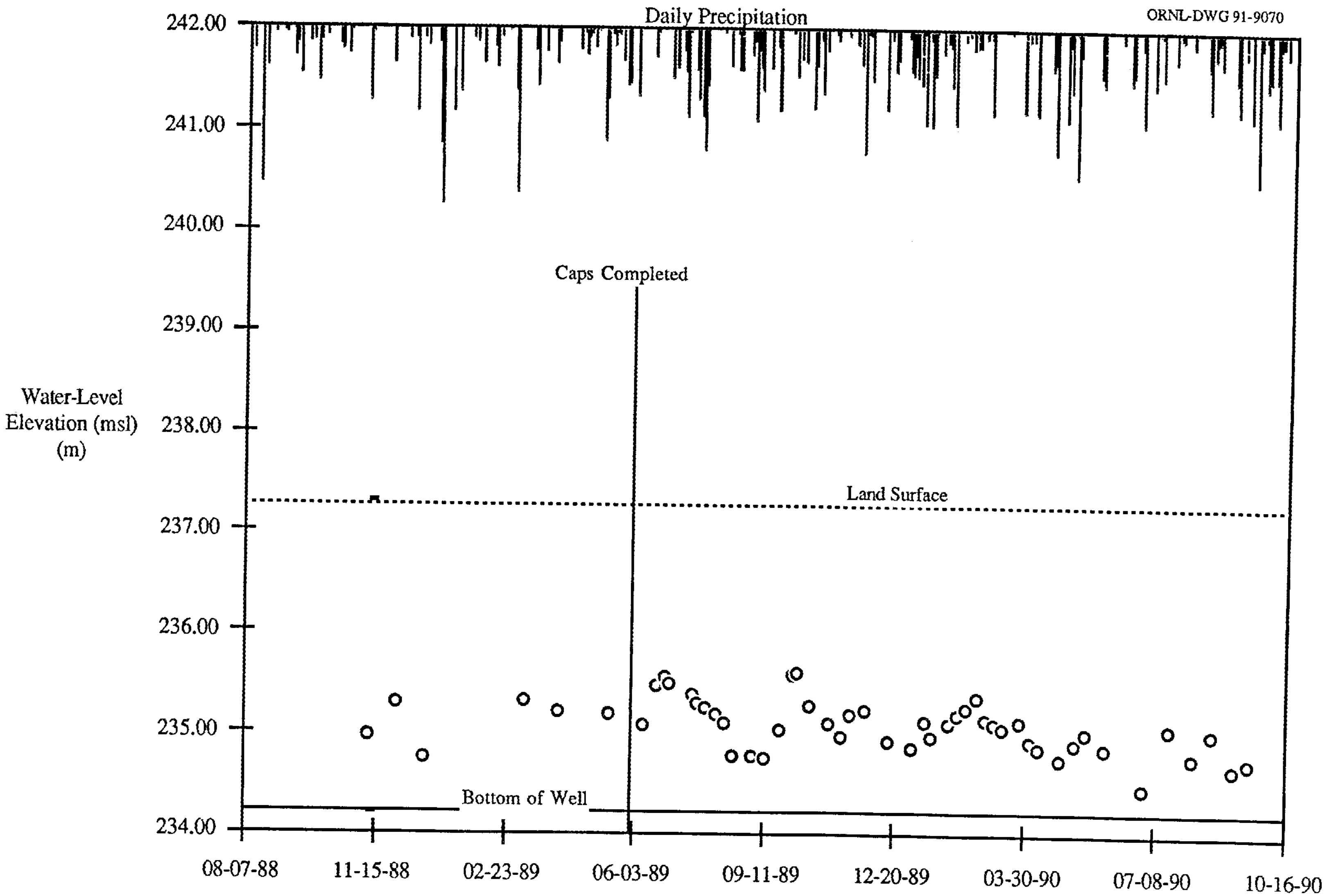

Fig. 33. Hydrograph and associated hyetograph for cap area 5 well T318.

ORNL-DWG 91-9071

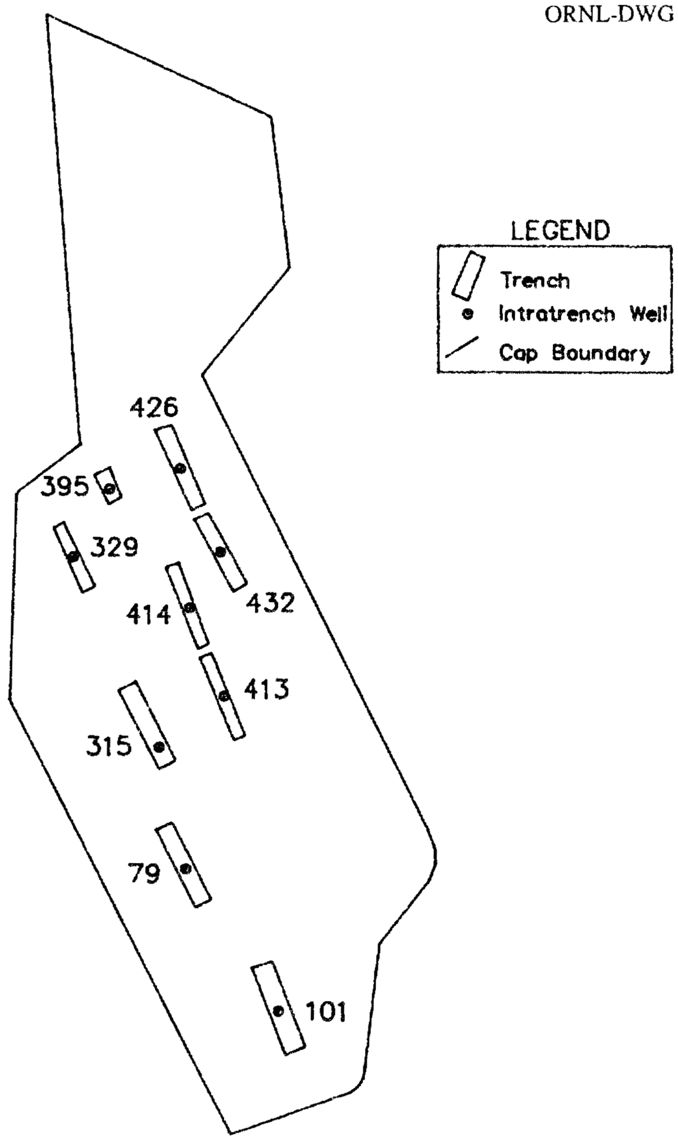

Fig. 34. Burial trench and well locations within cap area 6.

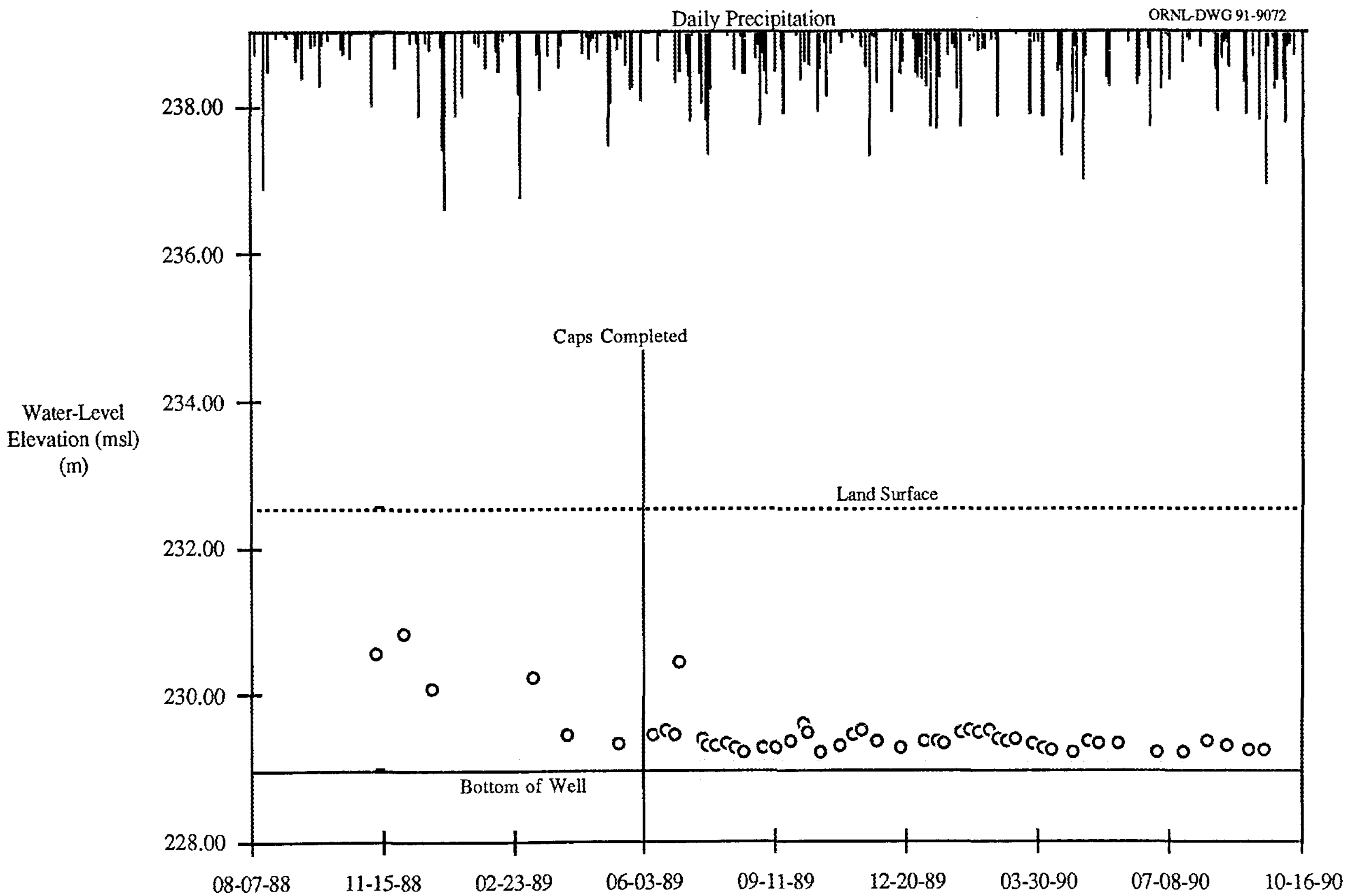

Fig. 35. Hydrograph and associated hyetograph for cap area 6 well T101

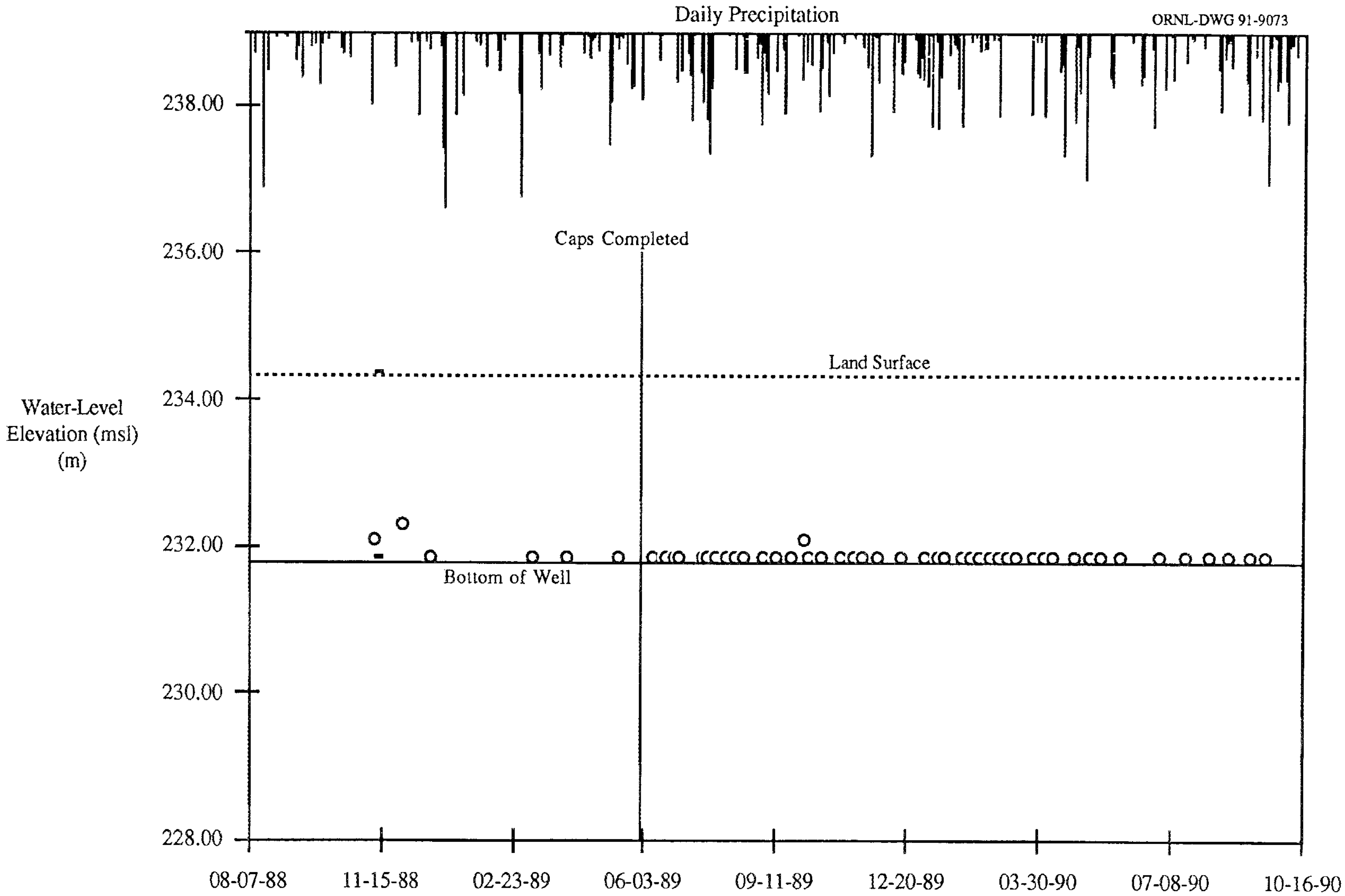

Fig. 36. Hydrograph and associated hyetograph for cap area 6 well T315.

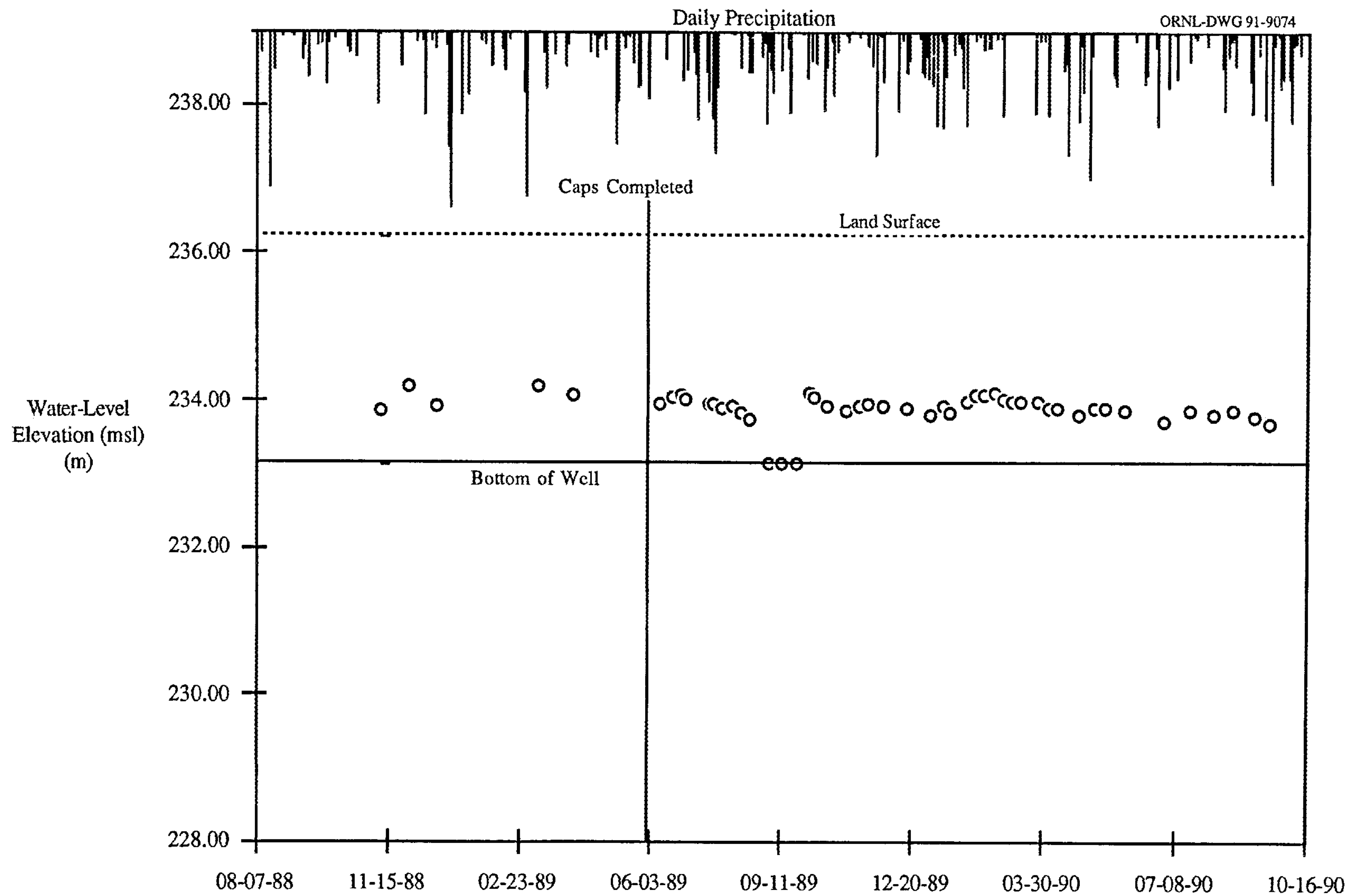

Fig. 37. Hydrograph and associated hyetograph for cap area 6 well T329.

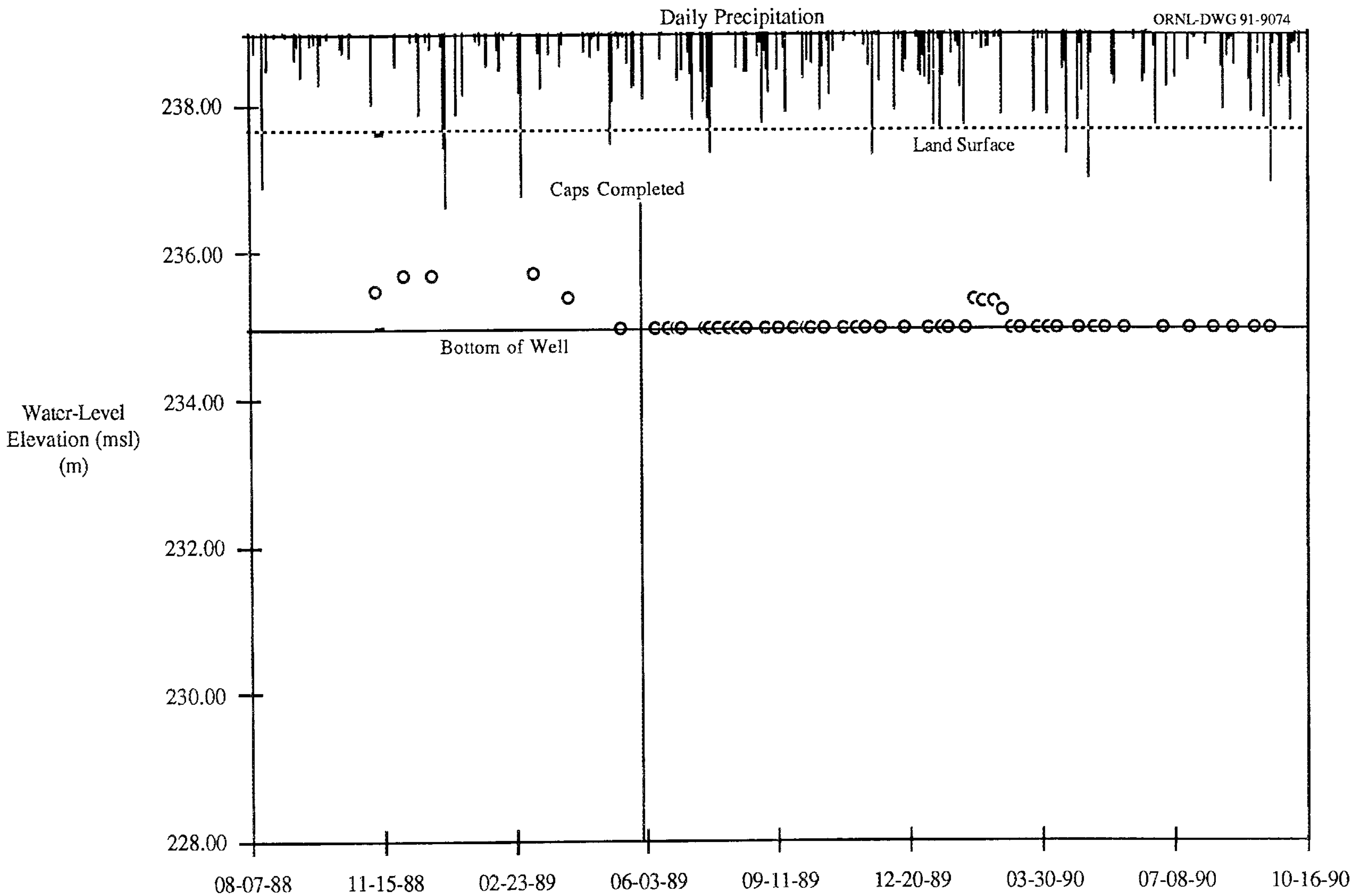

Fig. 38. Hydrograph and associated hyetograph for cap area 6 well T395.

ORNL-DWG 91-9076

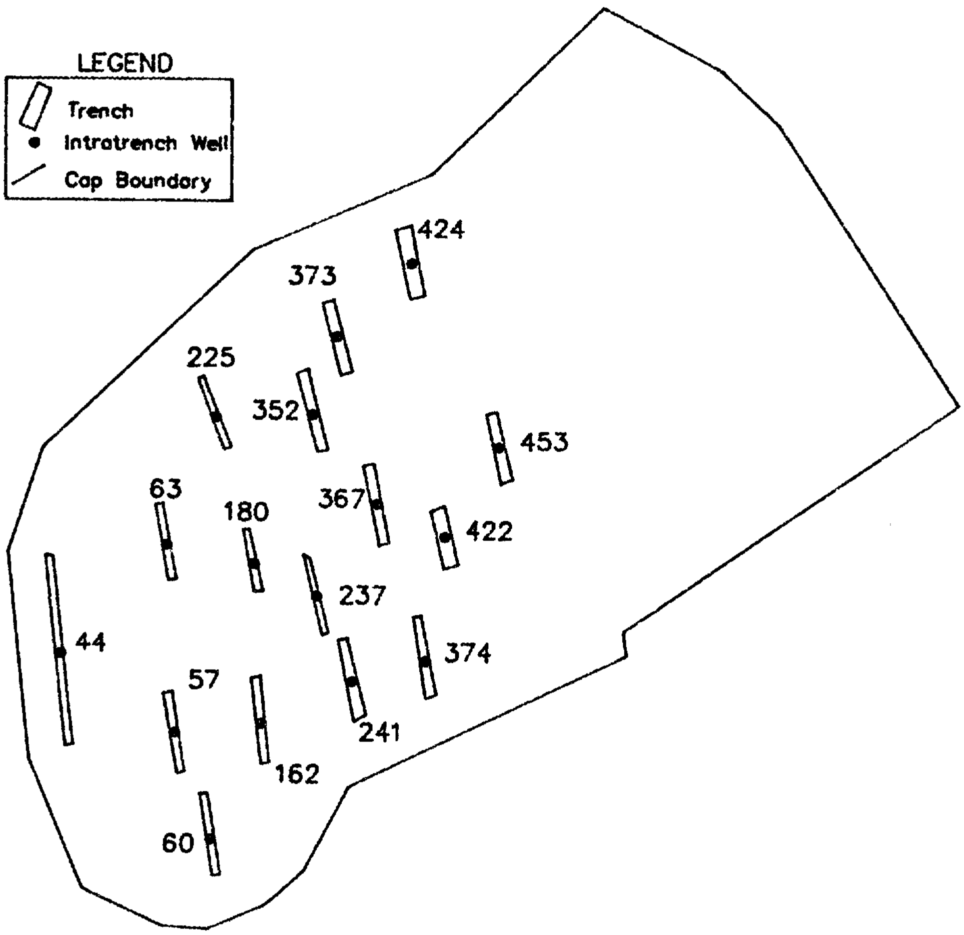

Fig. 39. Burial trench and well locations within cap area 8.

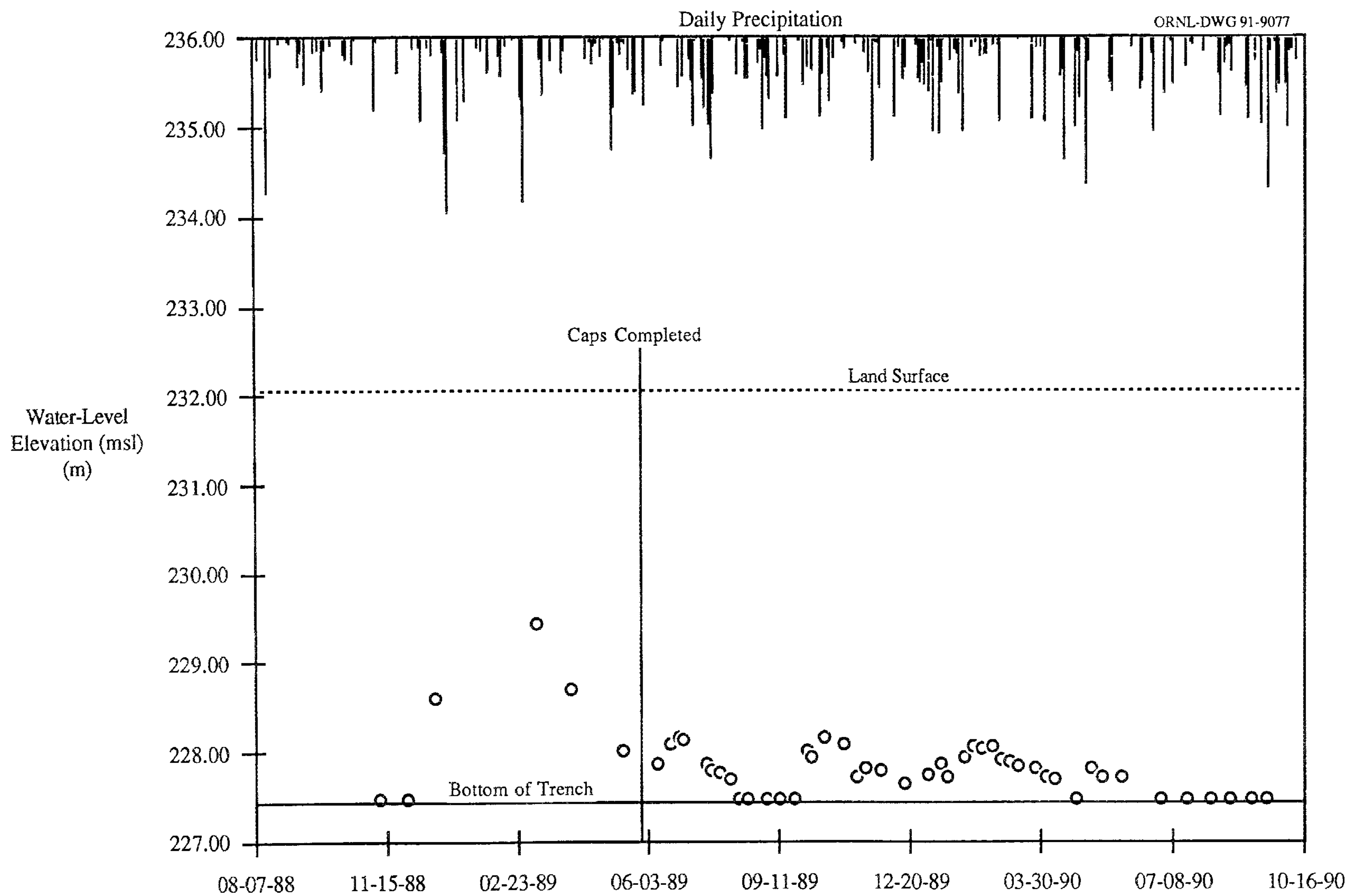

Fig. 40. Hydrograph and associated hyetograph for cap area 8 well T44.

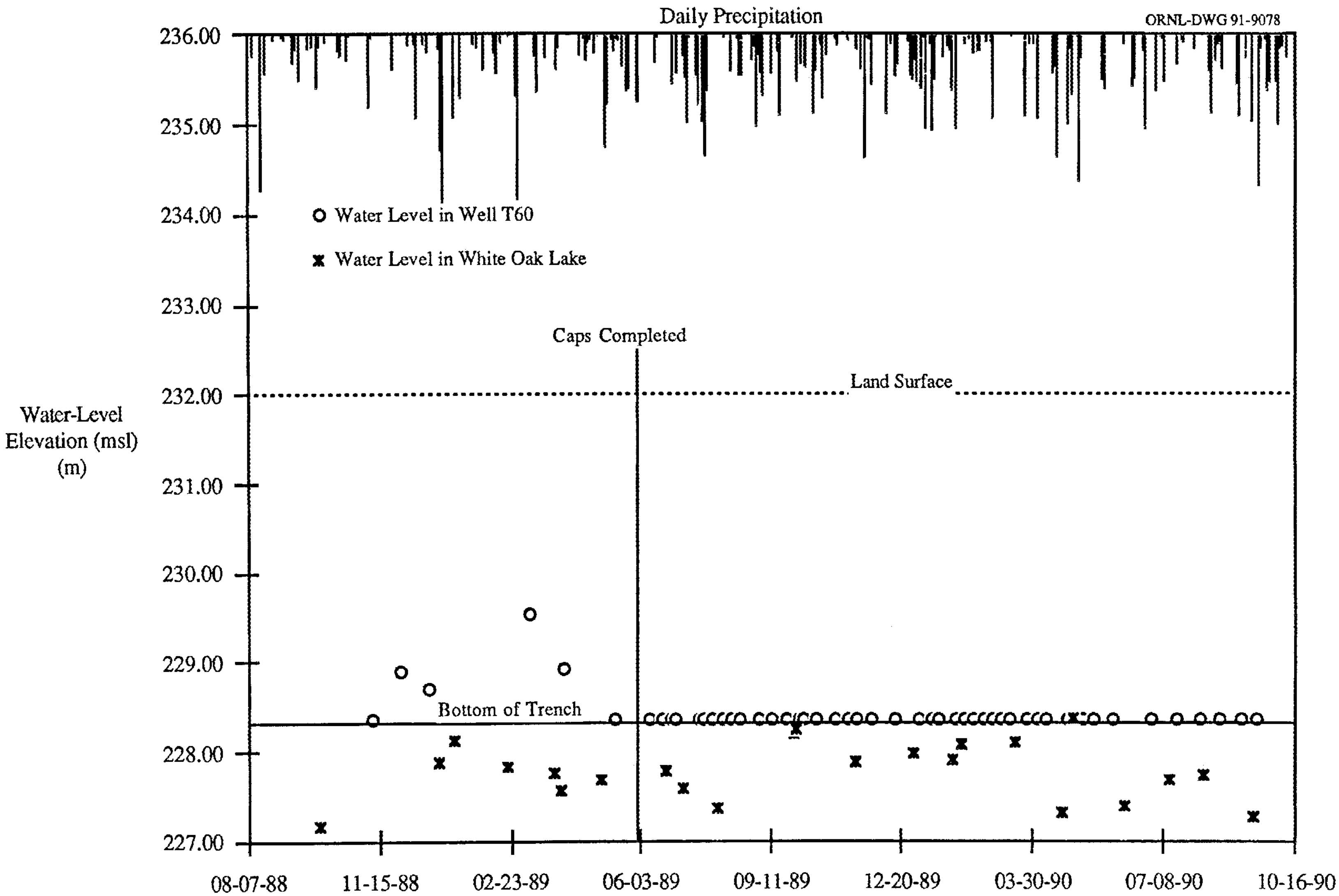

Fig. 41. Hydrograph and associated hyetograph for cap area 8 well T60.

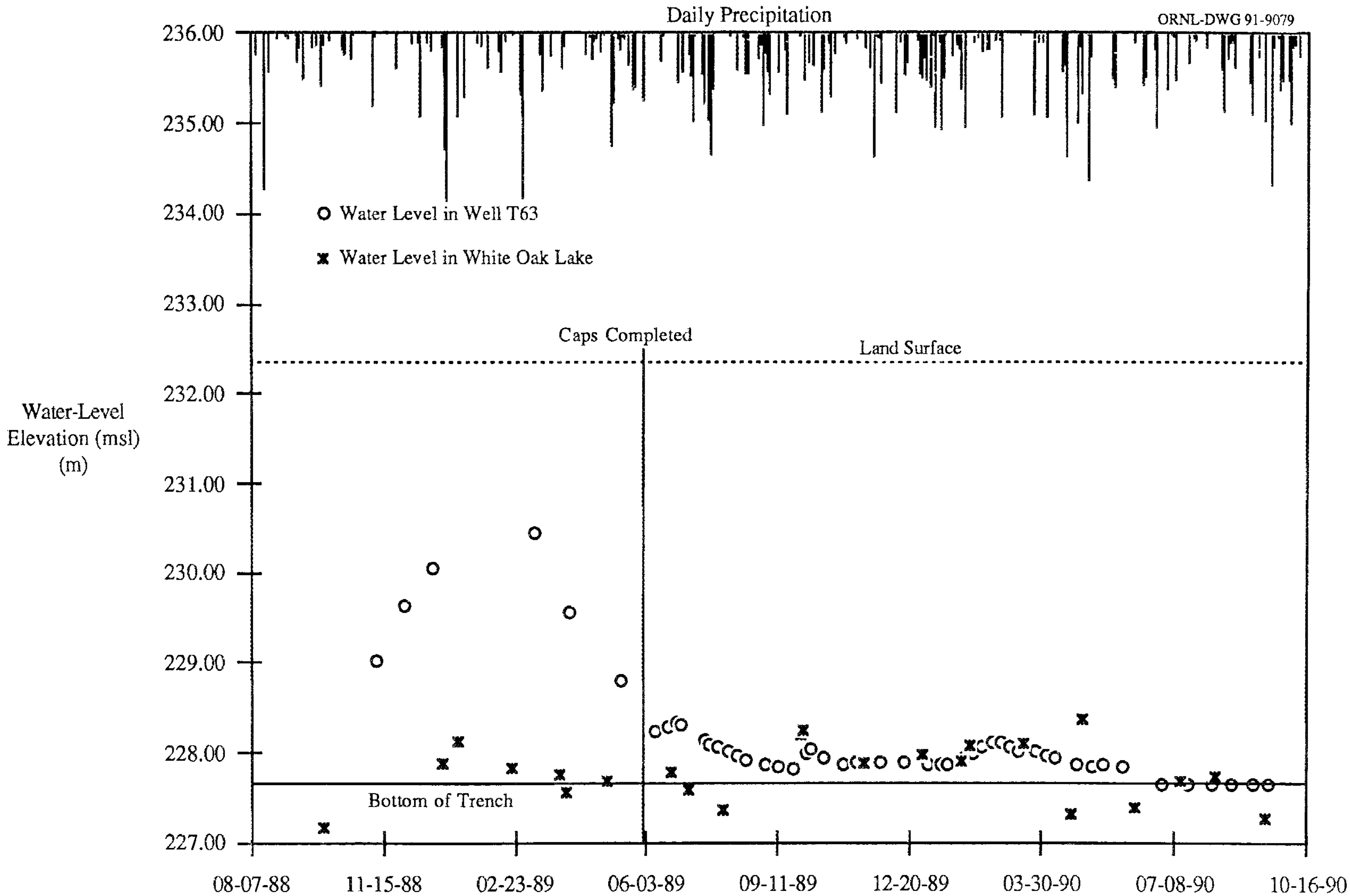

Fig. 42. Hydrograph and associated hyetograph for cap area 8 well T63.

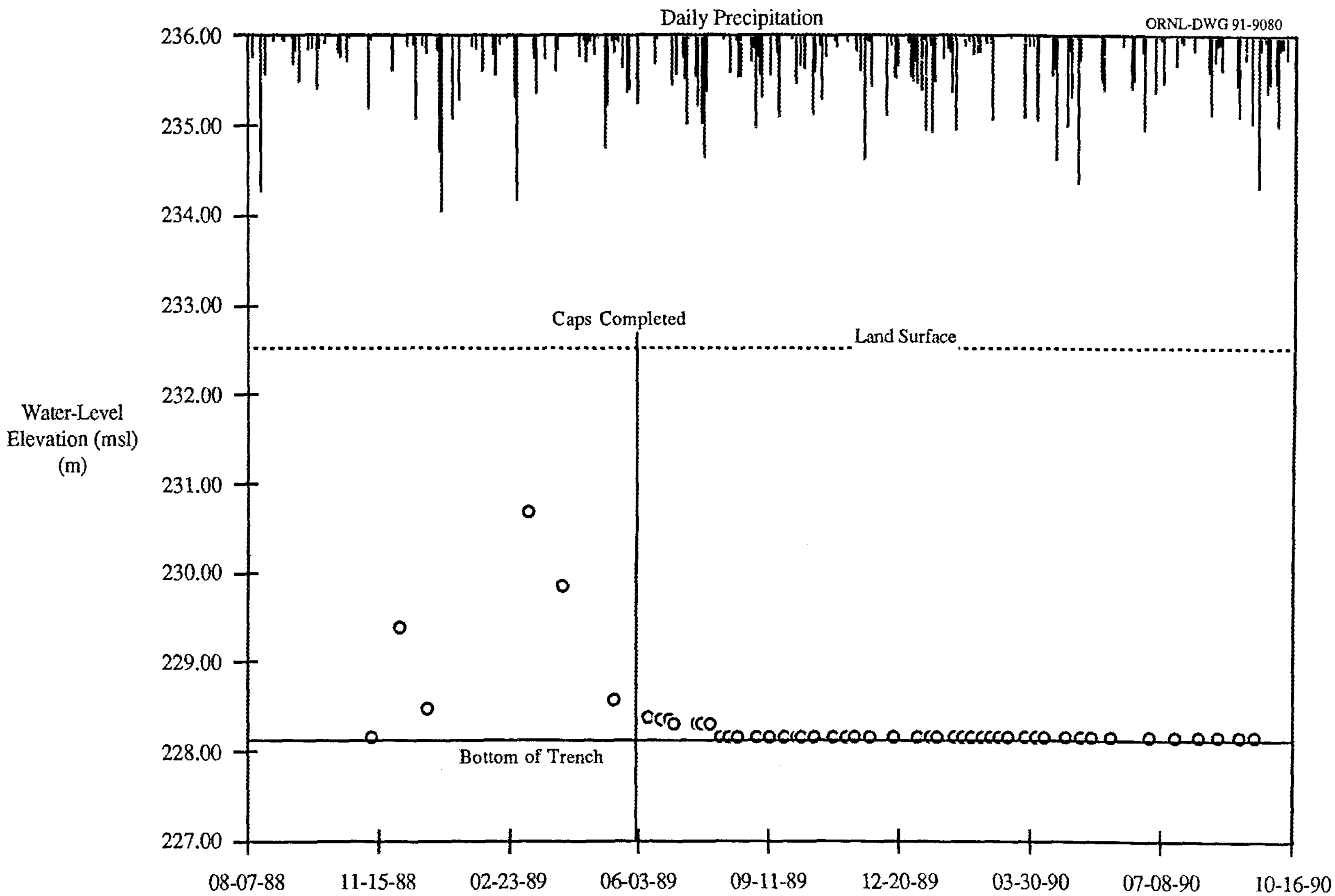

Fig. 43. Hydrograph and associated hyetograph for cap area 8 well T180.

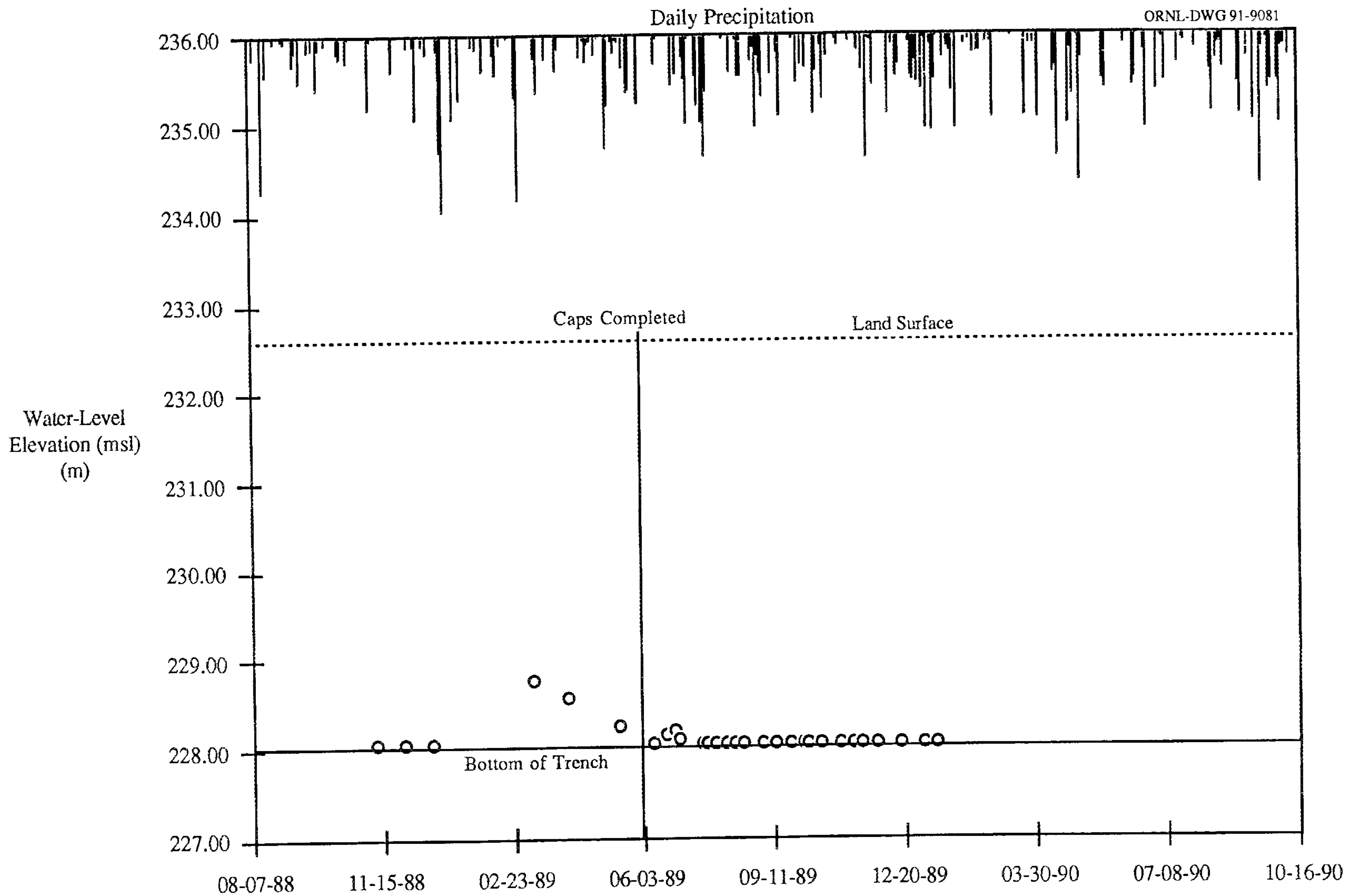

Fig. 44. Hydrograph and associated hyetograph for cap area 8 well T225.

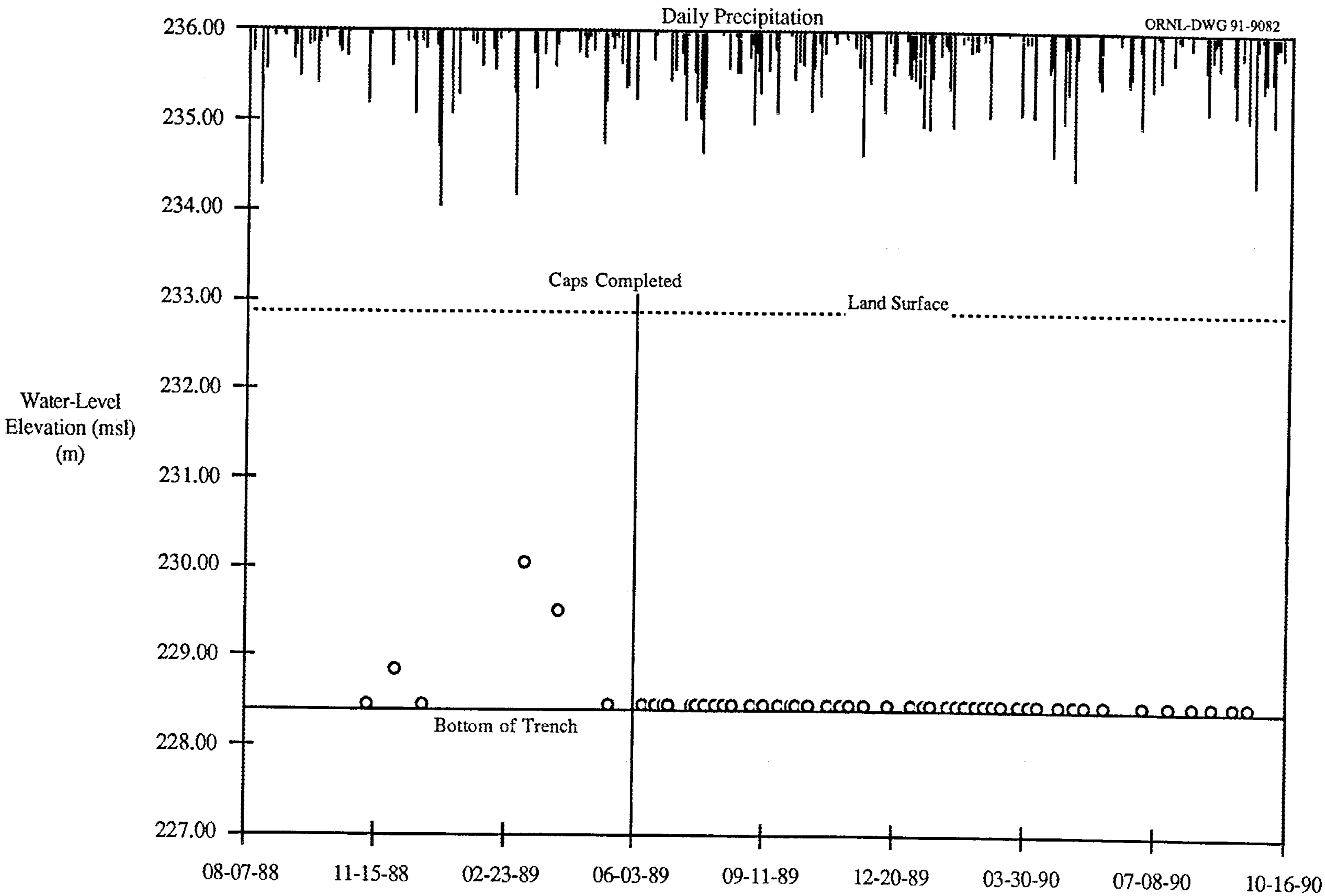

Fig. 45. Hydrograph and associated hyetograph for cap area 8 well T237.

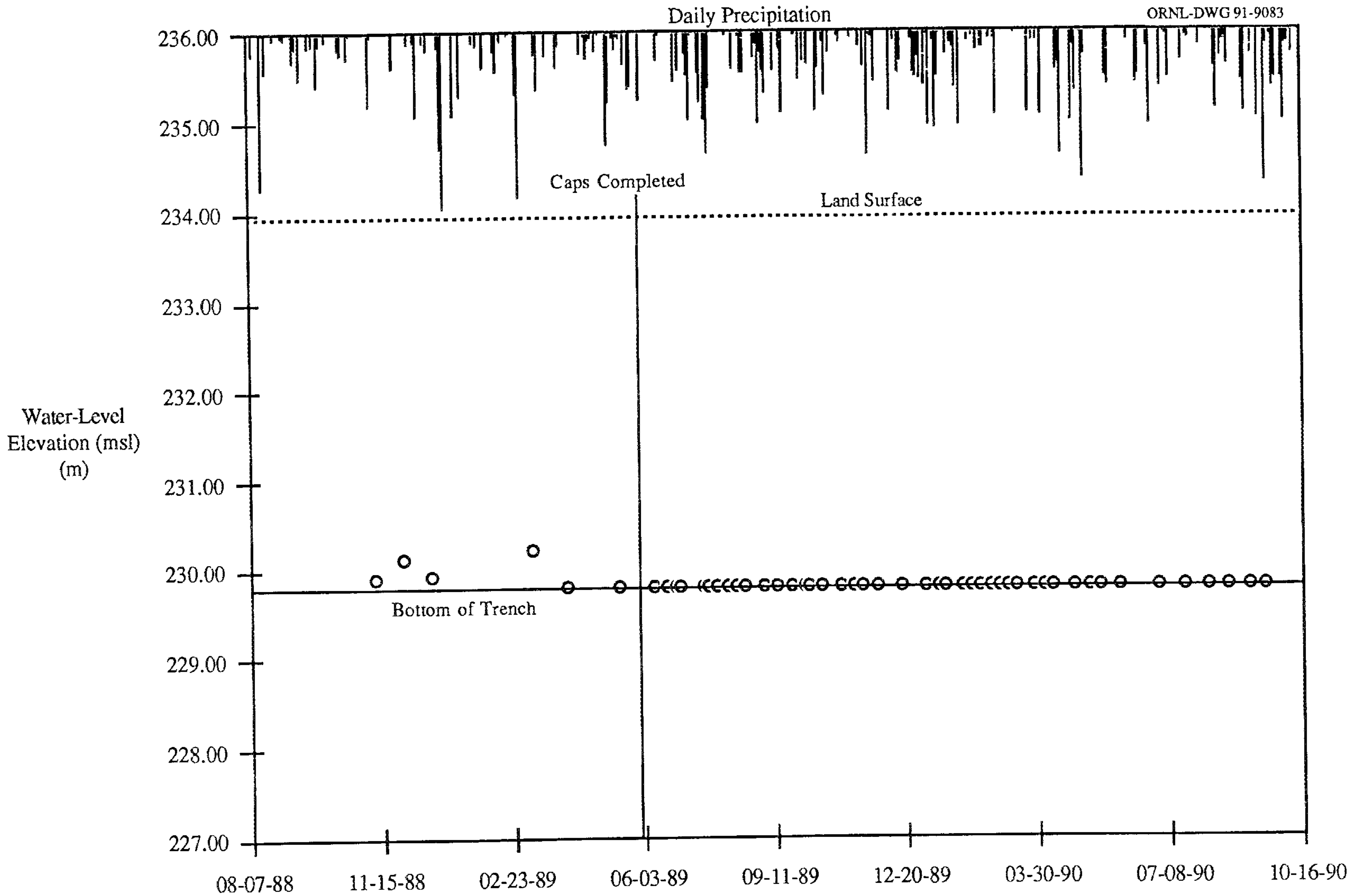

Fig. 46. Hydrograph and associated hyetograph for cap area 8 well T352.

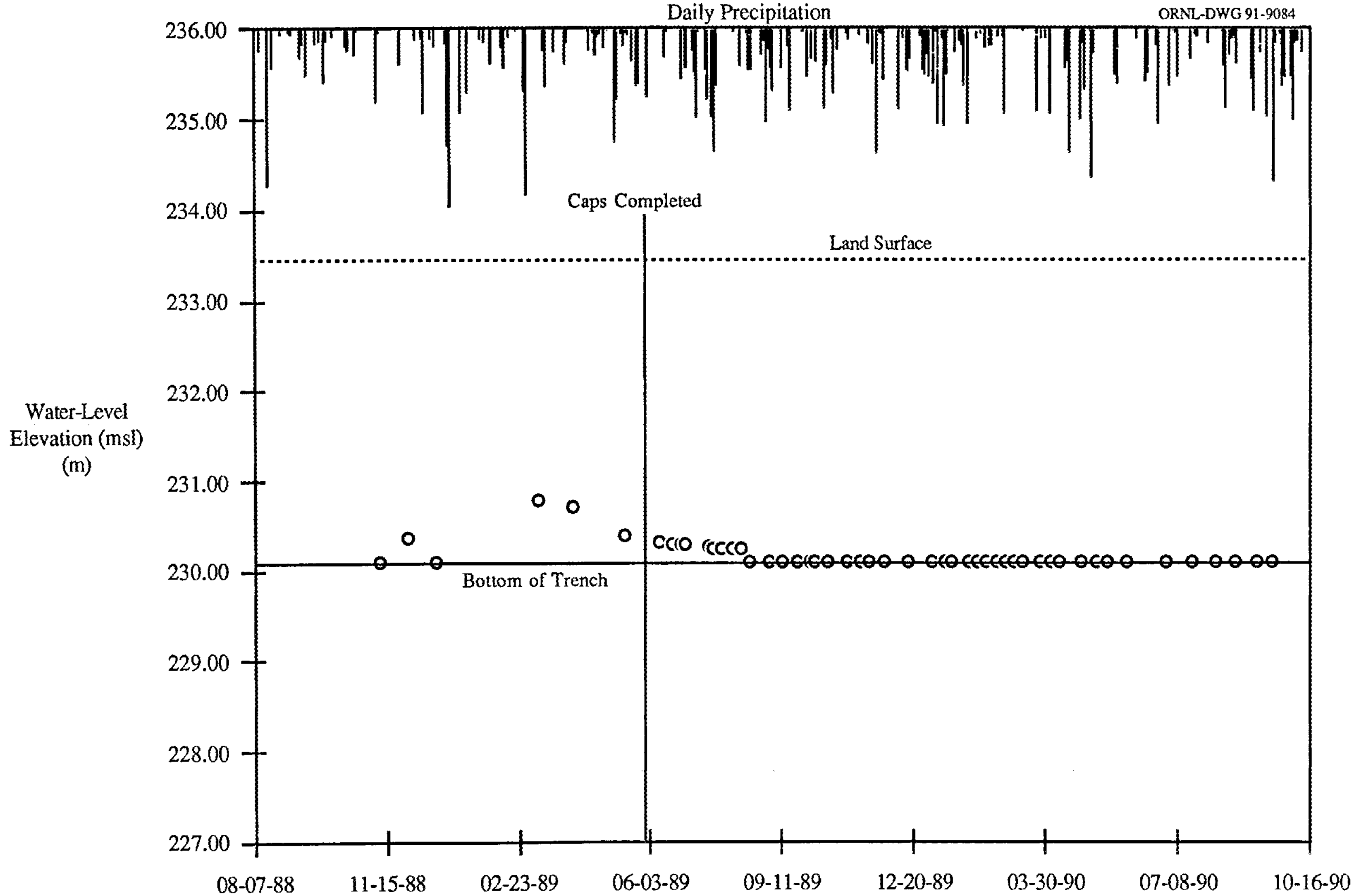

Fig. 47. Hydrograph and associated hyetograph for cap area 8 well T367.

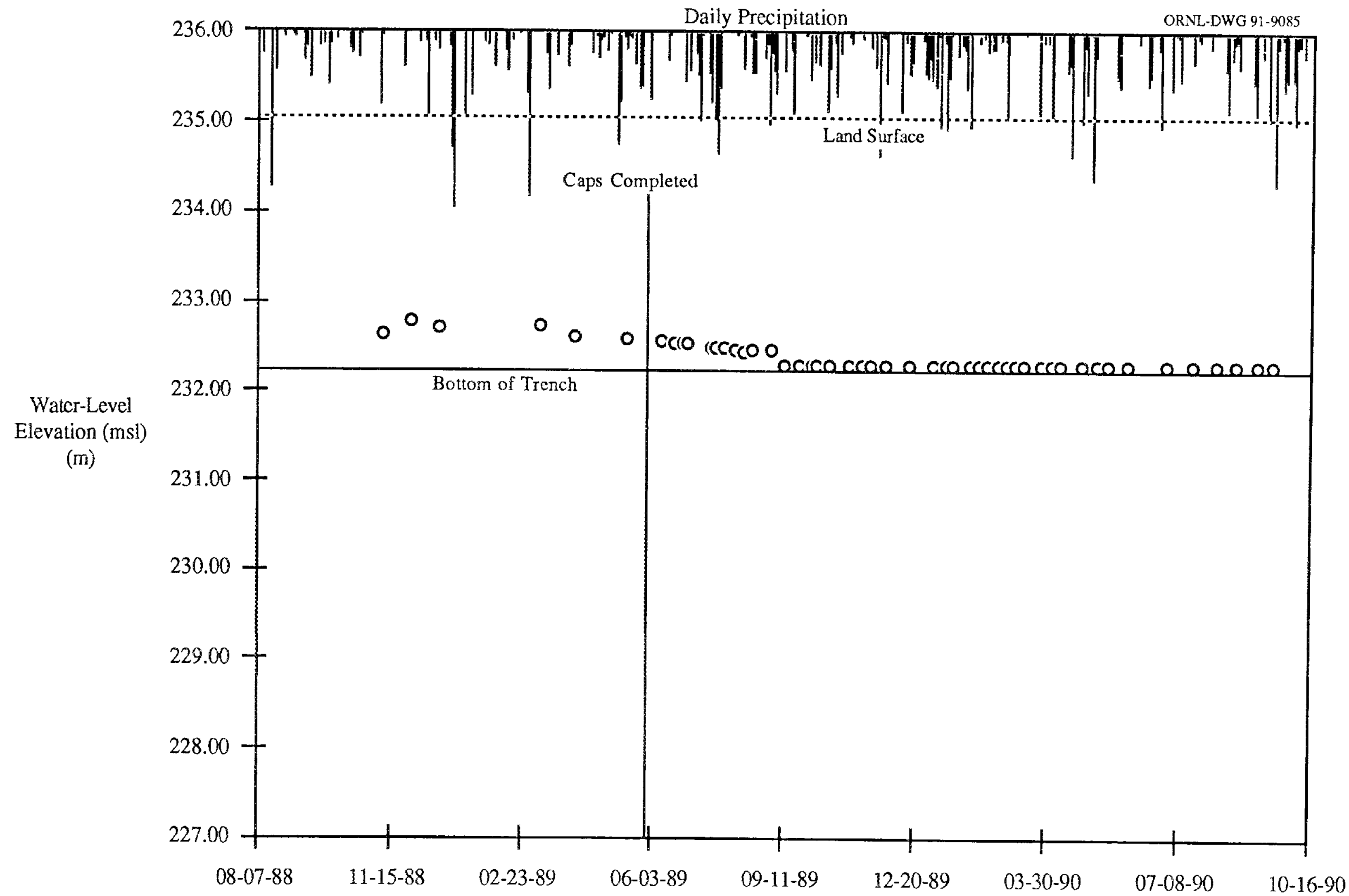

Fig. 48. Hydrograph and associated hyetograph for cap area 8 well T453.

ORNL-DWG 91-9086

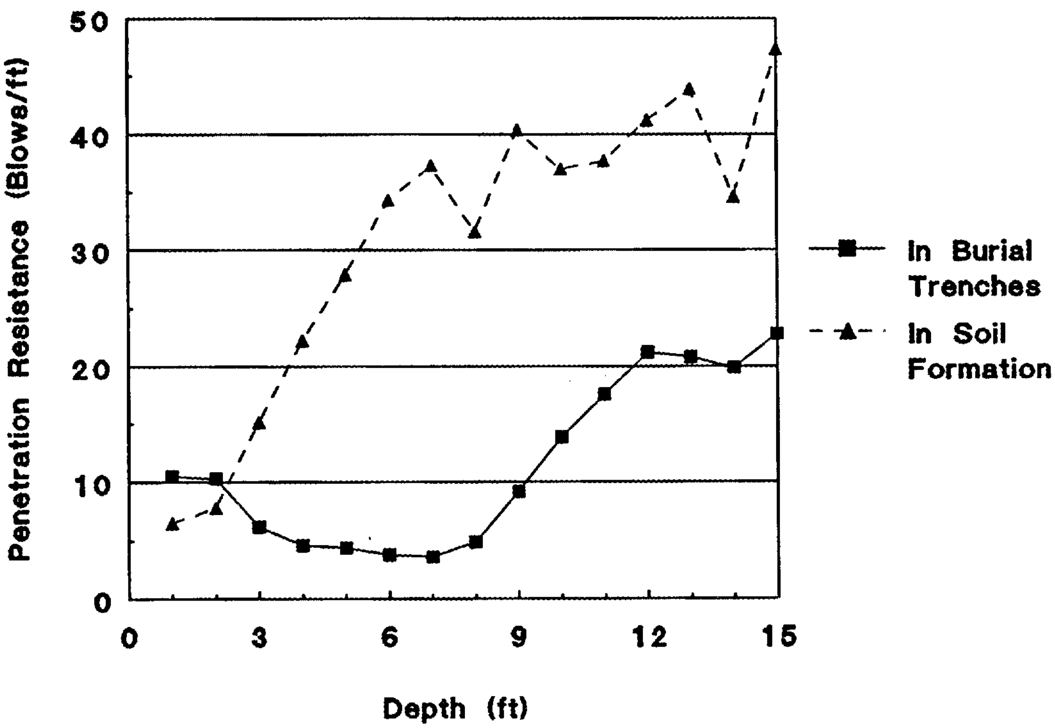

Fig. 49. Average penetration resistance of SWSA 6 burial trenches compared with the surrounding soil formation.

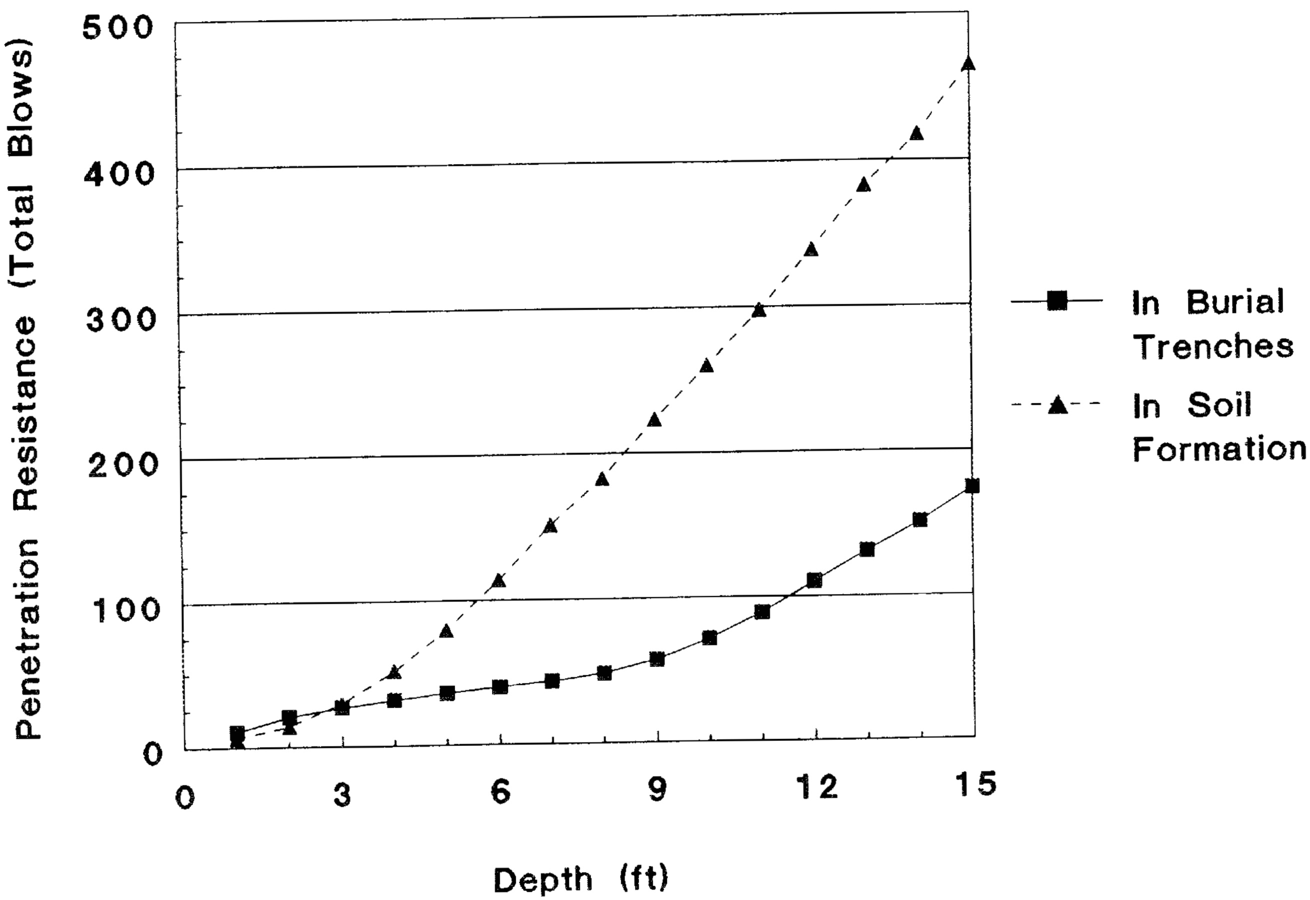

Fig. 50. Cumulative penetration resistance of SWSA 6 burial trenches compared with the surrounding soil formation.

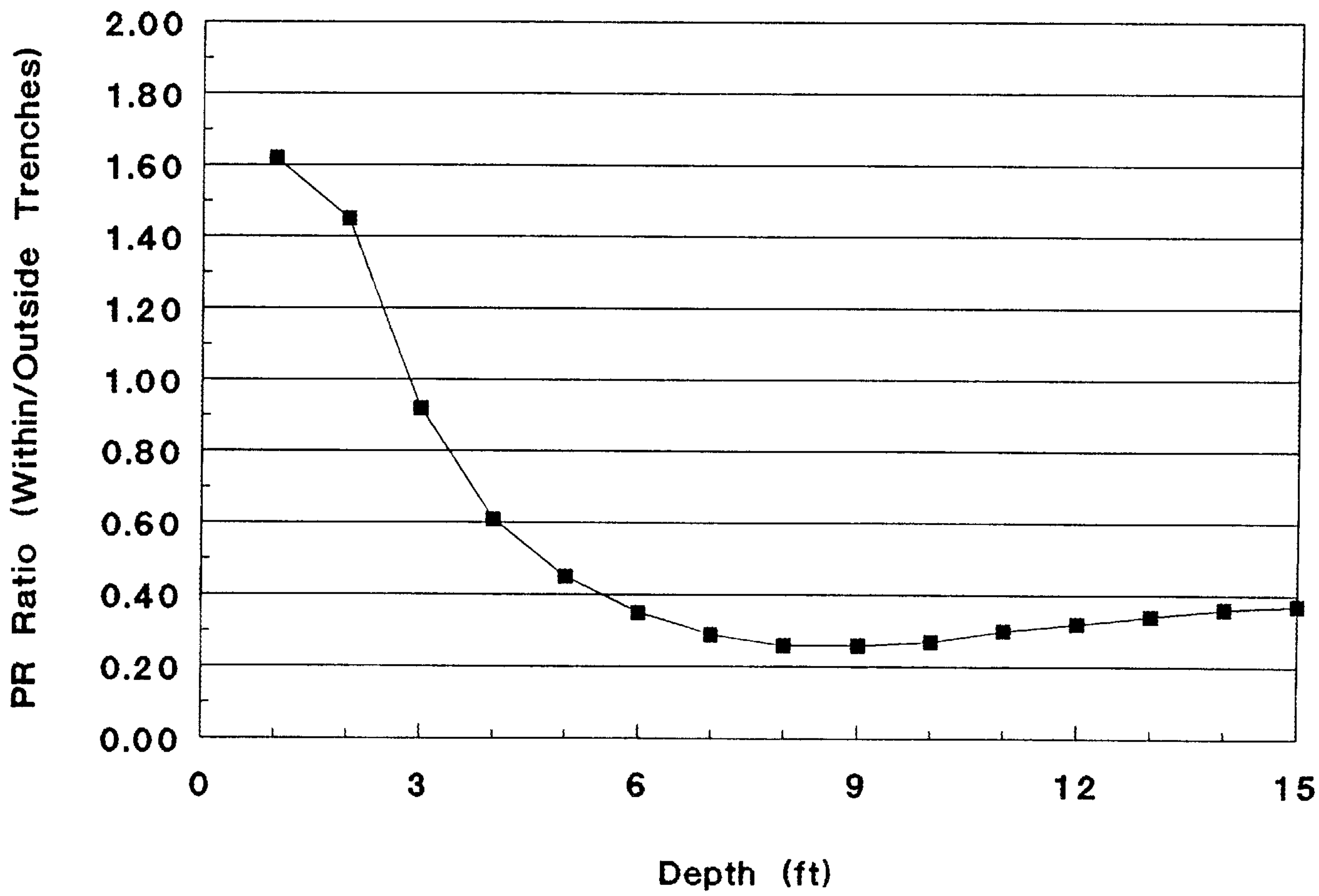

Fig. 51. Ratio of penetration resistance of SWSA 6 burial trenches to surrounding soil formation as a function of depth.

APPENDIX A: Water-level Data From Wells in and Around ICM Caps, Rainfall Data from SWSA 6, and Peak Monthly Elevations of White Oak Lake

Table A.1. Depth to water and water-level elevations for ICM monitoring wells outside of burial trenches in SWSA 6

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
276	10-04-88	0.99	230.51
276	10-24-88	1.15	230.35
276	11-01-88	1.06	230.45
276	11-07-88	0.52	230.98
276	11-14-88	0.57	230.94
276	11-21-88	0.25	231.25
276	11-28-88	0.22	231.29
276	12-06-88	0.61	230.89
276	12-12-88	0.52	230.98
276	12-20-88	0.34	231.16
276	12-27-88	0.34	231.16
276	01-02-89	0.20	231.30
276	01-11-89	0.19	231.31
276	01-17-89	0.27	231.23
276	01-27-89	0.55	230.96
276	01-31-89	0.34	231.16
276	02-10-89	0.36	231.15
276	02-17-89	0.08	231.43
276	02-24-89	0.34	231.16
276	03-03-89	0.33	231.17
276	03-15-89	0.53	230.97
276	03-22-89	0.23	231.27
276	03-28-89	0.41	231.09
276	04-07-89	0.28	231.22
276	04-14-89	0.33	231.17
276	04-22-89	0.66	230.84
276	05-04-89	0.74	230.77
276	05-12-89	0.44	231.06
276	05-17-89	0.56	230.95
276	05-26-89	0.61	230.89
276	06-01-89	0.66	230.84
276	06-09-89	0.15	231.35
276	06-16-89	0.08	231.43
276	06-23-89	0.23	231.27
276	06-28-89	0.56	230.95
276	07-07-89	0.16	231.34
276	07-14-89	0.69	230.82
276	07-21-89	0.38	231.12
276	07-28-89	0.80	230.70
276	08-04-89	0.80	230.71
276	08-11-89	0.63	230.87
276	08-18-89	0.55	230.96
276	08-30-89	0.38	231.12
276	09-07-89	0.36	231.15
276	09-18-89	0.30	231.20
276	09-27-89	0.40	231.11
276	01-15-90	0.45	231.05
276	02-15-90	0.42	231.08
276	03-14-90	0.43	231.08
276	04-23-90	0.61	230.89
276	05-21-90	0.61	230.89
276	06-26-90	0.90	230.60
276	07-25-90	0.61	230.89
276	08-23-90	0.74	230.77
276	09-25-90	0.96	230.54
318	10-04-88	Dry	239.16
318	10-24-88	Dry	239.16

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
318	11-01-88	Dry	239.16
318	11-07-88	3.43	240.49
318	11-14-88	Dry	239.16
318	11-21-88	3.05	240.87
318	11-28-88	3.33	240.59
318	12-06-88	Dry	239.16
318	12-12-88	Dry	239.16
318	12-20-88	Dry	239.16
318	12-27-88	3.44	240.48
318	01-02-89	2.95	240.97
318	01-11-89	3.38	240.54
318	01-17-89	3.23	240.70
318	01-27-89	Dry	239.16
318	01-31-89	Dry	239.16
318	02-10-89	3.39	240.53
318	02-17-89	3.15	240.77
318	02-24-89	Dry	239.16
318	03-03-89	3.49	240.43
318	03-15-89	3.61	240.31
318	03-22-89	3.14	240.78
318	03-28-89	3.48	240.44
318	04-07-89	3.44	240.48
318	04-14-89	3.57	240.35
318	04-22-89	Dry	239.16
318	05-04-89	Dry	239.16
318	05-12-89	3.45	240.47
318	05-17-89	3.57	240.35
318	05-28-89	3.63	240.29
318	06-01-89	3.61	240.31
318	06-09-89	2.94	240.98
318	06-16-89	2.90	241.02
318	06-23-89	2.88	241.04
318	06-28-89	3.34	240.58
318	07-07-89	2.84	241.08
318	07-14-89	3.47	240.45
318	07-21-89	3.41	240.52
318	07-28-89	3.47	240.45
318	08-04-89	3.44	240.48
318	08-11-89	3.38	240.54
318	08-18-89	3.35	240.57
318	08-30-89	3.27	240.66
318	09-07-89	3.19	240.73
318	09-18-89	3.15	240.77
318	09-27-89	3.21	240.71
318	01-15-90	3.10	240.82
318	02-15-90	Dry	239.16
318	03-14-90	Dry	239.16
318	04-23-90	Dry	239.16
318	05-21-90	Dry	239.16
318	06-26-90	Dry	239.16
318	07-25-90	Dry	239.16
318	08-23-90	Dry	239.16
318	09-25-90	Dry	239.16
345	01-02-89	1.01	229.86
345	01-11-89	1.12	229.75
345	01-17-89	1.00	229.87
345	01-27-89	1.15	229.72
345	01-31-89	1.12	229.75

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
345	02-10-89	1.11	229.77
345	02-17-89	0.99	229.88
345	02-24-89	1.07	229.80
345	03-03-89	1.20	229.68
345	03-15-89	1.27	229.60
345	03-22-89	1.17	229.70
345	03-28-89	1.23	229.64
345	04-07-89	1.22	229.65
345	04-14-89	1.24	229.63
345	04-22-89	1.34	229.54
345	05-04-89	1.31	229.56
345	05-12-89	1.17	229.70
345	05-17-89	1.24	229.63
345	05-26-89	1.27	229.60
345	06-01-89	1.28	229.59
345	06-09-89	0.89	229.98
345	06-16-89	0.90	229.97
345	06-23-89	0.91	229.96
345	06-28-89	1.16	229.72
345	07-07-89	0.95	229.92
345	07-14-89	1.17	229.70
345	07-21-89	1.17	229.70
345	07-28-89	1.36	229.51
345	08-04-89	1.27	229.60
345	08-11-89	1.22	229.65
345	08-18-89	1.20	229.67
345	08-30-89	1.02	229.86
345	09-07-89	1.02	229.85
345	09-18-89	1.02	229.86
345	09-27-89	1.02	229.85
345	01-15-90	0.89	229.98
345	02-15-90	1.09	229.78
345	03-14-90	1.13	229.74
345	04-23-90	1.25	229.62
345	05-21-90	1.09	229.78
345	06-26-90	1.17	229.70
345	07-25-90	1.16	229.71
345	08-23-90	1.11	229.76
345	09-25-90	1.25	229.62
347	12-27-88	0.82	236.24
347	01-02-89	0.23	236.83
347	01-11-89	0.30	236.76
347	01-17-89	0.19	236.87
347	01-27-89	0.75	236.31
347	01-31-89	0.74	236.32
347	02-10-89	0.61	236.45
347	02-17-89	0.08	236.98
347	02-24-89	0.33	236.73
347	04-22-89	2.27	234.79
347	05-04-89	2.13	235.16
347	05-12-89	3.20	234.10
347	05-17-89	1.97	235.33
347	05-26-89	1.98	235.32
347	06-01-89	2.01	235.29
347	06-09-89	1.73	235.57
347	06-16-89	1.71	235.59
347	06-23-89	1.35	235.95

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
347	06-28-89	1.46	235.84
347	07-07-89	1.41	235.89
347	07-14-89	1.55	235.75
347	07-21-89	1.56	235.73
347	07-28-89	2.01	235.29
347	08-04-89	1.92	235.38
347	08-11-89	1.91	235.39
347	08-18-89	1.91	235.39
347	08-30-89	1.58	235.72
347	09-07-89	1.56	235.73
347	09-18-89	1.59	235.71
347	09-27-89	1.59	235.71
347	01-15-90	2.19	235.11
347	02-15-90	1.80	235.50
347	03-14-90	2.06	235.23
347	04-23-90	2.33	234.97
347	05-21-90	2.03	235.27
347	06-26-90	2.67	234.63
347	07-25-90	1.81	235.48
347	08-23-90	2.08	235.22
347	09-25-90	2.71	234.59
356	10-04-88	3.42	232.17
356	10-24-88	4.09	231.51
356	11-01-88	4.19	231.40
356	11-07-88	3.05	232.55
356	11-14-88	3.18	232.42
356	11-21-88	2.91	232.69
356	11-28-88	3.01	232.58
356	12-06-88	3.34	232.26
356	12-12-88	3.51	232.09
356	12-20-88	3.68	231.91
356	12-27-88	3.20	232.39
356	01-02-89	2.97	232.63
356	01-11-89	3.06	232.53
356	01-17-89	2.94	232.66
356	01-27-89	3.38	232.22
356	01-31-89	3.34	232.25
356	02-10-89	2.60	232.99
356	02-17-89	3.13	232.47
356	02-24-89	3.24	232.36
356	03-03-89	3.12	232.48
356	03-15-89	3.36	232.23
356	03-22-89	3.14	232.46
356	03-28-89	3.30	232.29
356	04-07-89	3.28	232.31
356	04-14-89	3.30	232.29
356	04-22-89	3.63	231.96
356	05-04-89	3.71	231.88
356	05-12-89	3.38	232.22
356	05-17-89	3.51	232.09
356	05-26-89	3.61	231.99
356	06-01-89	3.58	232.01
356	06-09-89	3.05	232.55
356	06-16-89	3.07	232.52
356	06-23-89	2.80	232.80
356	06-28-89	3.25	232.34
356	07-07-89	2.80	232.80
356	07-14-89	3.35	232.24

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
356	07-21-89	3.38	232.22
356	07-28-89	3.71	231.88
356	08-04-89	3.57	232.02
356	08-11-89	3.56	232.04
356	08-18-89	3.51	232.09
356	08-30-89	3.05	232.55
356	09-07-89	3.10	232.49
356	09-18-89	3.05	232.55
356	09-27-89	3.11	232.48
356	01-15-90	3.41	232.18
356	02-15-90	3.33	232.26
356	03-14-90	3.44	232.16
356	04-23-90	3.79	231.80
356	05-21-90	3.62	231.97
356	06-26-90	3.99	231.60
356	07-25-90	3.29	232.31
356	08-23-90	3.58	232.02
356	09-25-90	3.96	231.63
368	01-02-89	7.60	242.25
368	01-11-89	6.10	243.75
368	01-17-89	7.44	242.41
368	01-27-89	7.60	242.25
368	01-31-89	7.65	242.20
368	03-15-89	7.62	242.23
368	03-22-89	7.75	242.09
368	03-28-89	7.79	242.06
368	04-07-89	7.70	242.14
368	04-22-89	8.42	241.42
368	05-04-89	8.46	241.98
368	05-12-89	8.33	242.11
368	05-17-89	8.28	242.16
368	05-26-89	8.35	242.10
368	06-01-89	8.33	242.12
368	06-09-89	8.28	242.16
368	06-16-89	8.21	242.23
368	06-23-89	8.18	242.27
368	06-28-89	8.22	242.23
368	07-07-89	8.22	242.23
368	07-14-89	8.31	242.14
368	07-21-89	8.54	241.91
368	07-28-89	8.40	242.05
368	08-04-89	8.56	241.89
368	08-11-89	8.54	241.91
368	08-18-89	8.52	241.93
368	08-30-89	8.18	242.27
368	09-07-89	8.21	242.24
368	09-18-89	8.14	242.30
368	09-27-89	8.22	242.23
368	01-15-90	8.25	242.19
368	02-15-90	8.17	242.27
368	03-14-90	8.23	242.21
368	04-23-90	8.30	242.14
368	05-21-90	8.27	242.17
368	06-26-90	8.34	242.11
368	07-25-90	8.30	242.14
368	08-23-90	8.33	242.12
368	09-25-90	8.40	242.05
636	01-12-88	10.12	244.36

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
636	02-04-88	9.72	244.76
636	03-03-88	10.01	244.48
636	04-07-88	9.57	244.91
636	05-05-88	9.98	244.51
636	06-09-88	10.39	244.09
636	06-29-88	10.40	244.08
636	07-28-88	9.70	244.79
636	08-31-88	9.52	244.97
636	10-04-88	10.27	244.22
636	10-04-88	10.31	244.17
636	10-07-88	9.62	244.86
636	10-24-88	10.40	244.09
636	11-01-88	10.03	244.45
636	11-01-88	10.41	244.08
636	11-14-88	9.98	244.50
636	11-28-88	9.34	245.15
636	12-05-88	9.84	244.64
636	12-06-88	9.92	244.56
636	12-12-88	10.06	244.42
636	12-20-88	10.30	244.18
636	12-27-88	9.45	245.03
636	01-02-89	8.97	245.51
636	01-05-89	9.21	245.28
636	01-11-89	9.09	245.40
636	01-17-89	8.30	246.19
636	01-27-89	9.30	245.19
636	01-31-89	9.54	244.95
636	02-08-89	9.07	245.42
636	02-10-89	9.32	245.16
636	02-17-89	9.33	245.15
636	02-24-89	9.45	245.03
636	03-03-89	9.07	245.41
636	03-09-89	8.84	245.64
636	03-15-89	9.45	245.03
636	03-22-89	9.15	245.34
636	03-28-89	9.20	245.29
636	04-07-89	9.15	245.34
636	04-14-89	9.31	245.17
636	04-22-89	9.48	245.01
636	05-04-89	9.96	244.52
636	05-12-89	9.48	245.01
636	05-17-89	9.70	244.78
636	05-26-89	9.38	245.11
636	06-01-89	9.88	244.60
636	06-09-89	9.13	245.35
636	06-16-89	9.08	245.40
636	06-23-89	8.44	246.05
636	06-28-89	9.11	245.38
636	07-07-89	8.77	245.72
636	07-14-89	9.55	244.93
636	07-21-89	9.54	244.95
636	07-28-89	10.07	244.42
636	08-04-89	9.78	244.70
636	08-11-89	9.76	244.73
636	08-18-89	9.76	244.73
636	08-30-89	9.17	245.31
636	09-07-89	9.20	245.29
636	09-18-89	9.15	245.34

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
636	09-27-89	9.22	245.26
636	01-15-90	9.36	245.12
636	02-15-90	8.78	245.70
636	03-14-90	9.18	245.30
636	04-23-90	9.60	244.88
636	05-21-90	9.44	245.04
636	06-26-90	10.00	244.48
636	07-25-90	9.59	244.90
636	08-23-90	9.83	244.65
636	09-25-90	10.24	244.24
640	01-15-88	10.57	244.24
640	02-04-88	9.55	245.26
640	03-03-88	9.74	245.08
640	04-08-88	9.77	245.05
640	05-05-88	9.97	244.84
640	06-09-88	10.45	244.37
640	06-29-88	10.67	244.14
640	07-28-88	10.54	244.27
640	08-31-88	10.75	244.07
640	10-04-88	10.46	244.35
640	10-05-88	10.70	244.12
640	10-24-88	10.81	244.00
640	11-01-88	10.73	244.09
640	11-01-88	10.87	243.95
640	11-07-88	10.67	244.14
640	12-06-88	10.02	244.79
640	12-12-88	9.15	245.67
640	12-20-88	10.43	244.38
640	12-27-88	10.64	244.17
640	01-02-89	10.09	244.72
640	01-11-89	9.17	245.64
640	01-17-89	9.68	245.13
640	04-22-89	11.83	242.99
640	05-04-89	10.27	244.95
640	05-12-89	10.37	244.85
640	05-17-89	10.39	244.83
640	05-26-89	10.59	244.63
640	06-01-89	10.75	244.47
640	06-09-89	10.65	244.57
640	06-16-89	10.66	244.56
640	06-23-89	10.19	245.03
640	06-28-89	10.19	245.03
640	07-07-89	10.29	244.93
640	07-14-89	10.35	244.87
640	07-21-89	10.34	244.88
640	07-28-89	10.53	244.69
640	08-04-89	10.57	244.65
640	08-11-89	10.54	244.68
640	08-18-89	10.52	244.70
640	08-30-89	10.71	244.51
640	09-07-89	10.67	244.55
640	09-18-89	10.63	244.59
640	09-27-89	10.68	244.54
640	01-15-90	10.17	245.05
640	02-15-90	9.70	245.52
640	03-14-90	9.89	245.33
640	04-23-90	10.35	244.87
640	05-21-90	Blocked	

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
640	06-26-90	Blocked	
640	07-25-90	Blocked	
640	08-23-90	Blocked	
640	09-25-90	Blocked	
642	01-15-88	2.46	234.41
642	02-04-88	1.88	235.00
642	03-03-88	2.15	234.73
642	04-08-88	2.23	234.65
642	05-05-88	2.42	234.46
642	06-09-88	2.87	234.01
642	06-29-88	1.92	234.96
642	07-28-88	2.45	234.43
642	08-31-88	3.06	233.82
642	10-05-88	2.92	233.95
642	10-24-88	3.05	233.83
642	11-01-88	3.08	233.80
642	11-01-88	2.99	233.89
642	11-07-88	2.44	234.44
642	11-14-88	2.49	234.39
642	11-21-88	2.07	234.81
642	11-28-88	2.06	234.82
642	12-05-88	2.11	234.77
642	12-06-88	2.10	234.78
642	12-12-88	2.22	234.66
642	12-20-88	2.38	234.50
642	12-27-88	1.96	234.92
642	01-02-89	1.73	235.15
642	01-06-89	1.66	235.22
642	01-11-89	1.61	235.27
642	01-17-89	1.24	235.64
642	01-27-89	1.49	235.39
642	01-31-89	1.51	235.37
642	02-08-89	1.50	235.38
642	02-10-89	1.51	235.37
642	02-17-89	1.47	235.41
642	02-24-89	1.42	235.45
642	03-03-89	1.42	235.45
642	03-09-89	1.46	235.41
642	03-15-89	1.50	235.38
642	03-22-89	1.50	235.38
642	03-28-89	1.54	235.34
642	04-07-89	1.48	235.39
642	04-07-89	1.50	235.38
642	04-14-89	1.52	235.36
642	04-22-89	1.72	235.16
642	05-04-89	1.94	234.94
642	05-08-89	1.77	235.10
642	05-12-89	1.78	235.09
642	05-17-89	1.83	235.05
642	05-26-89	1.91	234.97
642	06-01-89	1.96	234.92
642	06-08-89	1.90	234.98
642	06-09-89	1.74	235.14
642	06-16-89	1.73	235.15
642	06-23-89	1.30	235.58
642	06-28-89	1.40	235.48
642	07-07-89	1.24	235.63
642	07-10-89	1.33	235.55

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
642	07-14-89	1.42	235.45
642	07-21-89	1.41	235.47
642	07-28-89	1.74	235.14
642	08-03-89	1.80	235.08
642	08-04-89	1.83	235.05
642	08-11-89	1.75	235.13
642	08-18-89	1.73	235.15
642	08-30-89	1.77	235.11
642	09-07-89	1.73	235.15
642	09-18-89	1.68	235.20
642	09-20-89	2.02	234.86
642	09-27-89	1.74	235.13
642	10-18-89	1.38	235.50
642	01-15-90	1.54	235.34
642	02-15-90	1.13	235.75
642	03-14-90	1.43	235.45
642	04-23-90	1.95	234.93
642	05-21-90	1.83	235.05
642	06-26-90	2.10	234.78
642	07-25-90	1.94	234.94
642	08-23-90	2.09	234.79
642	09-25-90	2.42	234.45
645	01-12-88	2.66	230.97
645	02-04-88	2.24	231.39
645	03-03-88	2.48	231.15
645	04-08-88	2.38	231.25
645	05-05-88	2.46	231.17
645	06-09-88	2.60	231.03
645	06-29-88	2.66	230.97
645	07-28-88	2.63	231.00
645	08-31-88	2.73	230.90
645	10-04-88	2.66	230.97
645	10-05-88	2.67	230.96
645	10-24-88	2.70	230.93
645	11-01-88	2.66	230.97
645	11-01-88	2.67	230.96
645	11-07-88	2.59	231.04
645	11-14-88	2.62	231.01
645	11-28-88	2.53	231.10
645	12-05-88	2.55	231.08
645	12-06-88	2.59	231.05
645	12-12-88	2.58	231.05
645	12-20-88	2.55	231.08
645	12-27-88	2.50	231.13
645	01-02-89	2.20	231.43
645	01-11-89	2.26	231.37
645	01-11-89	2.29	231.34
645	01-17-89	2.12	231.51
645	01-27-89	2.29	231.34
645	01-31-89	2.27	231.36
645	02-08-89	2.05	231.58
645	02-10-89	2.13	231.50
645	02-17-89	2.07	231.56
645	02-24-89	2.16	231.47
645	03-03-89	2.07	231.56
645	03-09-89	2.02	231.61
645	03-15-89	2.25	231.38
645	03-22-89	1.99	231.64

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
645	03-28-89	2.16	231.47
645	04-07-89	2.13	231.50
645	04-14-89	1.78	231.85
645	04-22-89	2.44	231.19
645	05-04-89	2.38	231.26
645	05-12-89	2.22	231.41
645	05-17-89	2.31	231.32
645	05-26-89	2.35	231.28
645	06-01-89	2.31	231.32
645	06-09-89	1.78	231.85
645	06-16-89	1.73	231.90
645	06-23-89	1.92	231.71
645	06-28-89	2.21	231.42
645	07-07-89	1.89	231.74
645	07-14-89	2.34	231.29
645	07-21-89	2.31	231.32
645	07-28-89	2.28	231.35
645	08-04-89	2.26	231.37
645	08-11-89	2.27	231.36
645	08-18-89	2.26	231.37
645	08-30-89	2.33	231.30
645	09-07-89	2.29	231.34
645	09-18-89	2.29	231.34
645	09-27-89	2.30	231.33
645	01-15-90	1.99	231.64
645	03-14-90	2.13	231.50
645	04-23-90	2.17	231.46
645	05-21-90	2.15	231.48
645	06-26-90	2.39	231.24
645	07-25-90	2.25	231.38
645	08-23-90	2.20	231.44
645	09-25-90	2.38	231.25
646	01-04-88	4.59	235.32
646	01-08-88	4.73	235.18
646	01-12-88	4.91	235.00
646	01-14-88	4.85	235.06
646	01-21-88	4.23	235.68
646	01-22-88	4.30	235.61
646	01-25-88	4.36	235.55
646	01-28-88	4.48	235.43
646	02-01-88	4.53	235.38
646	02-04-88	4.26	235.65
646	02-11-88	4.33	235.58
646	02-18-88	4.29	235.62
646	02-26-88	4.40	235.51
646	03-03-88	4.46	235.45
646	03-03-88	4.41	235.50
646	03-04-88	4.45	235.46
646	03-05-88	4.47	235.44
646	03-06-88	4.48	235.43
646	03-07-88	4.50	235.41
646	03-08-88	4.48	235.43
646	03-09-88	4.49	235.42
646	03-09-88	4.46	235.45
646	03-10-88	4.19	235.73
646	03-11-88	4.10	235.81
646	03-12-88	4.14	235.77
646	03-13-88	4.11	235.80

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
646	03-14-88	4.08	235.83
646	03-15-88	4.15	235.77
646	03-16-88	4.17	235.74
646	03-16-88	4.19	235.73
646	03-17-88	4.20	235.71
646	03-18-88	4.22	235.70
646	03-19-88	4.23	235.68
646	03-20-88	4.26	235.65
646	03-21-88	4.28	235.63
646	03-22-88	4.30	235.61
646	03-23-88	4.31	235.60
646	03-24-88	4.32	235.59
646	03-25-88	4.23	235.69
646	03-26-88	4.20	235.71
646	03-27-88	4.19	235.72
646	03-28-88	4.18	235.73
646	03-28-88	4.20	235.72
646	03-29-88	4.17	235.74
646	03-30-88	4.20	235.71
646	03-31-88	4.19	235.72
646	04-01-88	4.21	235.70
646	04-02-88	4.13	235.78
646	04-03-88	4.17	235.74
646	04-04-88	4.10	235.81
646	04-04-88	4.09	235.82
646	04-05-88	4.11	235.80
646	04-06-88	4.02	235.90
646	04-07-88	3.95	235.96
646	04-08-88	3.94	235.97
646	04-08-88	3.98	235.94
646	04-09-88	4.00	235.91
646	04-10-88	3.98	235.93
646	04-11-88	3.98	235.94
646	04-12-88	3.98	235.93
646	04-13-88	3.98	235.93
646	04-14-88	4.01	235.90
646	04-15-88	4.04	235.87
646	04-16-88	4.04	235.88
646	04-17-88	4.05	235.87
646	04-18-88	3.98	235.93
646	04-19-88	3.87	236.04
646	04-20-88	3.85	236.06
646	04-21-88	3.83	236.09
646	04-22-88	3.85	236.06
646	04-23-88	3.88	236.03
646	04-24-88	3.91	236.00
646	04-25-88	3.93	235.98
646	04-26-88	3.95	235.96
646	04-27-88	3.98	235.93
646	04-28-88	4.02	235.89
646	04-29-88	4.03	235.88
646	04-30-88	4.06	235.85
646	05-01-88	4.08	235.83
646	05-02-88	4.10	235.81
646	05-03-88	4.10	235.81
646	05-03-88	4.12	235.79
646	05-04-88	4.08	235.83
646	05-05-88	4.11	235.80

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
646	05-05-88	3.79	236.12
646	05-06-88	4.15	235.77
646	05-07-88	4.17	235.74
646	05-08-88	4.16	235.75
646	05-09-88	4.10	235.81
646	05-10-88	4.10	235.81
646	05-11-88	4.16	235.75
646	05-12-88	4.14	235.77
646	05-12-88	4.20	235.71
646	05-13-88	4.22	235.69
646	05-14-88	4.24	235.67
646	05-15-88	4.26	235.66
646	05-16-88	4.27	235.64
646	05-17-88	4.31	235.60
646	05-18-88	4.33	235.58
646	05-19-88	4.33	235.58
646	05-20-88	4.37	235.54
646	05-20-88	4.35	235.56
646	05-21-88	4.40	235.51
646	05-22-88	4.41	235.50
646	05-23-88	4.43	235.48
646	05-24-88	4.41	235.50
646	05-25-88	4.28	235.63
646	05-26-88	4.46	235.45
646	05-26-88	4.44	235.47
646	05-27-88	4.49	235.42
646	05-28-88	4.51	235.40
646	05-29-88	4.52	235.39
646	05-30-88	4.54	235.37
646	05-31-88	4.54	235.37
646	06-01-88	4.55	235.37
646	06-02-88	4.50	235.41
646	06-02-88	4.55	235.36
646	06-03-88	4.57	235.34
646	06-04-88	4.59	235.32
646	06-05-88	4.61	235.30
646	06-06-88	4.62	235.29
646	06-07-88	4.63	235.28
646	06-08-88	4.64	235.27
646	06-09-88	4.64	235.27
646	06-09-88	4.60	235.31
646	06-09-88	4.63	235.28
646	06-10-88	4.57	235.34
646	06-11-88	4.63	235.29
646	06-12-88	4.64	235.27
646	06-13-88	4.66	235.26
646	06-14-88	4.69	235.22
646	06-15-88	4.71	235.20
646	06-16-88	4.72	235.19
646	06-17-88	4.73	235.18
646	06-18-88	4.82	235.09
646	06-19-88	4.83	235.09
646	06-20-88	4.82	235.09
646	06-21-88	4.77	235.14
646	06-29-88	4.73	235.19
646	07-28-88	4.51	235.40
646	08-31-88	4.87	235.05
646	10-04-88	4.11	235.80

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
646	10-05-88	4.15	235.77
646	10-24-88	4.17	235.74
646	11-01-88	4.48	235.43
646	11-01-88	4.23	235.68
646	11-07-88	3.55	236.37
646	11-14-88	3.72	236.19
646	11-21-88	2.71	237.20
646	11-28-88	2.64	237.27
646	12-05-88	3.13	236.78
646	12-06-88	3.21	236.70
646	12-12-88	3.41	236.51
646	12-20-88	2.71	237.20
646	12-27-88	2.66	237.26
646	01-02-89	2.41	237.50
646	01-11-89	2.28	237.63
646	01-11-89	2.32	237.59
646	01-17-89	2.13	237.78
646	01-27-89	2.52	237.40
646	01-31-89	2.49	237.42
646	02-08-89	2.20	237.72
646	02-10-89	2.22	237.69
646	02-17-89	1.83	238.08
646	02-24-89	1.92	237.99
646	03-03-89	2.05	237.87
646	03-09-89	2.07	237.84
646	03-15-89	2.26	237.66
646	03-22-89	2.06	237.85
646	03-28-89	2.28	237.63
646	04-07-89	2.27	237.65
646	04-22-89	4.70	235.21
646	05-04-89	4.57	235.34
646	05-12-89	4.26	235.66
646	05-17-89	2.84	237.07
646	05-26-89	4.42	235.49
646	06-01-89	4.41	235.50
646	06-09-89	4.26	235.66
646	06-16-89	4.22	235.69
646	06-23-89	3.84	236.08
646	06-28-89	4.12	235.80
646	07-07-89	4.03	235.88
646	07-14-89	4.46	235.45
646	07-21-89	4.42	235.49
646	07-28-89	4.36	235.55
646	08-04-89	4.32	235.59
646	08-11-89	4.28	235.63
646	08-18-89	4.27	235.64
646	08-30-89	4.79	235.12
646	09-07-89	4.78	235.13
646	09-18-89	4.67	235.24
646	09-27-89	4.80	235.12
646	01-15-90	4.50	235.41
646	03-14-90	4.39	235.52
646	04-23-90	4.61	235.30
646	05-21-90	4.49	235.42
646	06-26-90	4.73	235.19
646	07-25-90	4.56	235.35
646	08-23-90	4.59	235.32
646	09-25-90	4.86	235.05

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
647	10-24-88	10.35	239.75
647	11-01-88	10.37	239.74
647	11-07-88	10.30	239.81
647	11-14-88	10.27	239.84
647	12-06-88	10.21	239.90
647	12-12-88	10.38	239.72
647	12-20-88	10.22	239.88
647	12-27-88	10.14	239.96
647	01-02-89	9.99	240.11
647	01-11-89	9.93	240.17
647	01-17-89	9.76	240.35
647	01-27-89	10.02	240.08
647	01-31-89	9.94	240.16
647	02-10-89	9.82	240.29
647	02-17-89	9.88	240.22
647	02-24-89	10.07	240.03
647	03-03-89	9.80	240.31
647	03-15-89	9.78	240.33
647	03-22-89	9.70	240.40
647	03-28-89	9.83	240.27
647	04-07-89	9.78	240.33
647	04-14-89	10.00	240.09
647	04-22-89	9.95	240.14
647	05-04-89	10.06	240.03
647	05-12-89	9.86	240.23
647	05-17-89	9.99	240.10
647	05-26-89	9.97	240.12
647	06-01-89	10.16	239.93
647	06-09-89	9.46	240.63
647	06-16-89	9.39	240.70
647	06-23-89	9.66	240.44
647	06-28-89	9.82	240.27
647	07-07-89	9.72	240.37
647	07-14-89	9.91	240.18
647	07-21-89	9.81	240.28
647	07-28-89	9.76	240.34
647	08-04-89	10.07	240.02
647	08-11-89	10.06	240.03
647	08-18-89	10.09	240.01
647	08-30-89	9.90	240.20
647	09-07-89	9.91	240.18
647	09-18-89	9.91	240.18
647	09-27-89	9.92	240.17
647	01-15-90	9.93	240.16
647	02-15-90	9.71	240.38
647	03-14-90	9.81	240.28
647	04-23-90	9.94	240.15
647	05-21-90	9.92	240.17
647	06-26-90	10.02	240.08
647	07-25-90	10.00	240.09
647	08-23-90	10.03	240.06
647	09-25-90	10.12	239.97
648	10-04-88	8.63	242.82
648	10-24-88	9.24	242.20
648	11-01-88	9.17	242.27
648	11-07-88	8.87	242.58
648	11-14-88	8.94	242.50
648	12-06-88	8.70	242.74

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
648	12-12-88	8.75	242.69
648	12-20-88	8.89	242.55
648	12-27-88	8.35	243.09
648	01-02-89	8.01	243.43
648	01-11-89	8.05	243.39
648	01-17-89	7.62	243.82
648	01-27-89	7.76	243.68
648	01-31-89	7.95	243.49
648	02-10-89	7.80	243.64
648	02-17-89	6.92	244.52
648	02-24-89	7.23	244.21
648	03-03-89	7.49	243.95
648	03-15-89	7.62	243.82
648	03-22-89	7.51	243.93
648	03-28-89	7.62	243.82
648	04-07-89	7.62	243.82
648	04-14-89	7.32	244.13
648	04-22-89	8.03	243.41
648	05-04-89	8.00	243.44
648	05-12-89	7.62	243.82
648	05-17-89	7.93	243.52
648	05-26-89	7.84	243.60
648	06-01-89	7.90	243.54
648	06-09-89	7.32	244.13
648	06-16-89	7.30	244.14
648	06-23-89	6.92	244.52
648	06-28-89	7.37	244.07
648	07-07-89	7.04	244.41
648	07-14-89	6.96	244.48
648	07-21-89	6.94	244.50
648	07-28-89	7.75	243.69
648	08-04-89	7.70	243.74
648	08-11-89	7.70	243.74
648	08-18-89	7.70	243.74
648	08-30-89	7.52	243.92
648	09-07-89	7.52	243.92
648	09-18-89	7.55	243.90
648	09-27-89	7.57	243.87
648	01-15-90	7.71	243.73
648	02-15-90	7.23	244.21
648	03-14-90	7.40	244.04
648	04-23-90	7.74	243.70
648	05-21-90	7.68	243.76
648	06-26-90	7.92	243.52
648	07-25-90	7.77	243.67
648	08-23-90	7.91	243.53
648	09-25-90	8.16	243.29
649	02-04-88	8.32	242.11
649	03-03-88	8.29	242.13
649	04-08-88	8.21	242.21
649	05-05-88	8.30	242.13
649	06-09-88	8.43	242.00
649	06-29-88	8.49	241.94
649	10-04-88	8.54	241.89
649	10-24-88	8.54	241.89
649	11-28-88	8.21	242.22
649	12-06-88	8.23	242.20
649	12-27-88	8.19	242.24

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
649	01-02-89	7.99	242.44
649	01-11-89	7.95	242.48
649	01-17-89	7.74	242.69
649	01-27-89	7.99	242.44
649	01-31-89	8.02	242.40
649	02-10-89	7.90	242.52
649	02-17-89	7.88	242.55
649	02-24-89	7.98	242.45
649	03-03-89	8.08	242.35
649	03-15-89	8.03	242.40
649	03-22-89	7.89	242.54
649	03-28-89	8.05	242.37
649	04-07-89	8.00	242.42
649	05-04-89	8.70	242.27
649	05-12-89	8.69	242.28
649	05-17-89	8.61	242.35
649	05-26-89	8.64	242.33
649	06-01-89	8.61	242.35
649	06-09-89	8.58	242.39
649	06-16-89	8.52	242.45
649	06-23-89	8.35	242.62
649	06-28-89	8.47	242.49
649	07-07-89	8.48	242.48
649	07-14-89	8.61	242.35
649	07-21-89	8.63	242.34
649	07-28-89	8.76	242.21
649	08-04-89	8.93	242.04
649	08-11-89	8.87	242.10
649	08-18-89	8.84	242.13
649	08-30-89	8.69	242.28
649	09-07-89	8.70	242.27
649	09-18-89	8.69	242.28
649	09-27-89	8.72	242.24
650A	10-04-88	Dry	
650A	10-24-88	Dry	
650A	11-01-88	Dry	
650A	11-07-88	Dry	
650A	11-14-88	Dry	
650A	11-21-88	Dry	
650A	11-28-88	Dry	
650A	12-06-88	Dry	
650A	12-12-88	Dry	
650A	12-20-88	Dry	
650A	12-27-88	Dry	
650A	01-02-89	Dry	
650A	01-11-89	Dry	
650A	01-17-89	Dry	
650A	01-27-89	Dry	
650A	01-31-89	Dry	
650A	02-10-89	Dry	
650A	02-17-89	Dry	
650A	02-24-89	Dry	
650A	03-03-89	Dry	
650A	03-15-89	Dry	
650A	03-22-89	Dry	
650A	03-28-89	Dry	
650A	04-07-89	Dry	
650A	04-14-89	Dry	

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
650A	04-22-89	Dry	
650A	05-04-89	Dry	
650A	05-12-89	Dry	
650A	05-17-89	Dry	
650A	05-26-89	Dry	
650A	06-01-89	Dry	
650A	06-09-89	Dry	
650A	06-16-89	Dry	
650A	06-23-89	Dry	
650A	06-28-89	Dry	
650A	07-07-89	Dry	
650A	07-14-89	Dry	
650A	07-21-89	Dry	
650A	07-28-89	Dry	
650A	08-04-89	Dry	
650A	08-11-89	Dry	
650A	08-18-89	Dry	
650A	08-30-89	Dry	
650A	09-07-89	Dry	
650A	09-18-89	Dry	
650A	09-27-89	Dry	
650A	01-15-90	Dry	
650A	02-15-90	Dry	
650A	03-14-90	Dry	
650A	04-23-90	Dry	
650A	05-21-90	Dry	
650A	06-26-90	Dry	
650A	07-25-90	Dry	
650A	08-23-90	Dry	
650A	09-25-90	Dry	
650B	01-12-88	Dry	
650B	02-04-88	12.18	237.86
650B	03-03-88	12.06	237.98
650B	04-08-88	11.96	238.08
650B	05-05-88	12.02	238.02
650B	06-09-88	12.16	237.88
650B	06-29-88	12.22	237.82
650B	11-14-88	12.20	237.84
650B	11-21-88	12.13	237.91
650B	11-28-88	12.07	237.97
650B	12-06-88	12.16	237.88
650B	12-12-88	12.41	237.63
650B	12-20-88	12.09	237.95
650B	12-27-88	11.95	238.09
650B	01-02-89	11.78	238.26
650B	01-11-89	12.04	238.00
650B	01-17-89	11.59	238.45
650B	01-27-89	11.66	238.38
650B	01-31-89	11.86	238.18
650B	02-10-89	11.69	238.35
650B	02-17-89	11.63	238.41
650B	02-24-89	11.95	238.09
650B	03-03-89	11.51	238.53
650B	03-15-89	10.09	239.95
650B	03-22-89	11.78	238.26
650B	03-28-89	11.59	238.45
650B	04-07-89	11.51	238.53
650B	04-14-89	11.61	238.43

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
650B	04-22-89	11.79	238.24
650B	05-04-89	11.81	238.22
650B	05-12-89	11.99	238.05
650B	05-26-89	11.59	238.45
650B	06-01-89	11.99	238.04
650B	06-09-89	11.81	238.22
650B	06-16-89	11.76	238.27
650B	06-23-89	11.65	238.39
650B	06-28-89	11.65	238.39
650B	07-07-89	11.64	238.40
650B	07-14-89	11.97	238.07
650B	07-21-89	11.95	238.09
650B	07-28-89	12.09	237.94
650B	08-04-89	11.97	238.07
650B	08-11-89	11.91	238.12
650B	08-18-89	11.89	238.15
650B	08-30-89	11.94	238.09
650B	09-07-89	11.91	238.12
650B	09-18-89	11.95	238.09
650B	09-27-89	11.97	238.07
650B	01-15-90	Blocked	
650B	02-15-90	Blocked	
650B	03-15-90	Blocked	
650B	04-23-90	Blocked	
650B	05-21-90	Blocked	
650B	06-26-90	Blocked	
650B	07-25-90	Blocked	
650B	08-23-90	Blocked	
650B	09-25-90	Blocked	
654	01-15-88	0.90	235.41
654	02-04-88	0.70	235.60
654	03-03-88	0.72	235.58
654	04-08-88	0.71	235.59
654	05-05-88	0.88	235.43
654	06-09-88	1.22	235.08
654	06-29-88	1.31	234.99
654	07-28-88	1.02	235.28
654	08-31-88	1.35	234.95
654	10-05-88	1.23	235.07
654	10-24-88	1.27	235.03
654	11-01-88	1.21	235.09
654	11-01-88	1.28	235.02
654	11-07-88	1.16	235.14
654	11-14-88	1.03	235.27
654	11-21-88	0.90	235.41
654	11-28-88	0.83	235.48
654	12-05-88	0.80	235.50
654	12-06-88	0.83	235.48
654	12-12-88	0.86	235.44
654	12-20-88	0.92	235.38
654	12-27-88	0.77	235.53
654	01-02-89	0.63	235.68
654	01-06-89	0.54	235.76
654	01-11-89	0.53	235.77
654	01-17-89	0.36	235.95
654	01-27-89	0.52	235.78
654	01-31-89	0.61	235.69
654	02-08-89	0.52	235.78

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
654	02-10-89	0.51	235.79
654	02-17-89	0.48	235.82
654	02-24-89	0.46	235.84
654	03-03-89	0.34	235.96
654	03-09-89	0.30	236.00
654	03-15-89	0.36	235.94
654	03-22-89	0.39	235.91
654	03-28-89	0.39	235.91
654	04-07-89	0.36	235.95
654	04-14-89	0.41	235.90
654	04-22-89	0.50	235.80
654	05-04-89	0.59	235.72
654	05-12-89	0.45	235.86
654	05-17-89	0.51	235.79
654	05-26-89	0.53	235.77
654	06-01-89	0.61	235.69
654	06-09-89	0.50	235.80
654	06-16-89	0.46	235.84
654	06-23-89	0.23	236.07
654	06-28-89	0.28	236.02
654	07-07-89	0.27	236.03
654	07-14-89	0.33	235.97
654	07-21-89	0.30	236.00
654	07-28-89	0.53	235.77
654	08-04-89	0.57	235.73
654	08-11-89	0.55	235.76
654	08-18-89	0.50	235.80
654	08-30-89	0.56	235.74
654	09-07-89	0.49	235.81
654	09-18-89	0.47	235.84
654	09-27-89	0.52	235.78
654	01-15-90	0.29	236.01
654	02-15-90	0.00	236.30
654	03-14-90	0.00	236.30
654	04-23-90	0.15	236.15
654	05-21-90	0.09	236.21
654	06-26-90	0.61	235.69
654	07-25-90	0.50	235.80
654	08-23-90	0.59	235.72
654	09-25-90	0.83	235.48
655	01-12-88	13.26	242.73
655	02-04-88	12.80	243.19
655	03-03-88	12.62	243.37
655	04-08-88	12.45	243.54
655	05-05-88	12.52	243.47
655	06-09-88	13.00	242.99
655	06-29-88	13.20	242.79
655	07-28-88	13.09	242.89
655	08-31-88	13.30	242.69
655	10-04-88	13.24	242.75
655	10-05-88	13.30	242.69
655	10-24-88	13.32	242.67
655	11-01-88	13.27	242.72
655	11-01-88	13.39	242.60
655	11-07-88	13.35	242.64
655	11-14-88	13.23	242.76
655	11-21-88	13.05	242.94
655	11-28-88	12.91	243.08

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
655	12-05-88	12.90	243.09
655	12-06-88	12.80	243.18
655	12-12-88	12.83	243.16
655	12-20-88	12.88	243.11
655	12-27-88	12.72	243.27
655	01-02-89	12.50	243.49
655	01-06-89	12.37	243.62
655	01-11-89	12.25	243.74
655	01-17-89	11.75	244.24
655	01-27-89	11.98	244.01
655	01-31-89	12.08	243.91
655	02-08-89	12.15	243.84
655	02-10-89	12.14	243.84
655	02-17-89	12.04	243.95
655	02-24-89	12.61	243.38
655	03-03-89	11.75	244.24
655	03-09-89	11.61	244.38
655	03-15-89	11.60	244.39
655	03-22-89	11.93	244.06
655	03-28-89	11.93	244.06
655	04-07-89	11.89	244.10
655	04-14-89	11.84	244.15
655	04-22-89	12.20	243.79
655	05-04-89	12.40	243.59
655	05-12-89	12.20	243.79
655	05-17-89	12.31	243.68
655	05-26-89	12.37	243.62
655	06-01-89	12.40	243.59
655	06-09-89	12.37	243.62
655	06-16-89	12.35	243.64
655	06-23-89	11.74	244.25
655	06-28-89	11.70	244.29
655	07-07-89	11.87	244.12
655	07-14-89	12.05	243.93
655	07-21-89	12.05	243.94
655	07-28-89	12.23	243.75
655	08-04-89	12.41	243.58
655	08-11-89	12.40	243.59
655	08-18-89	12.41	243.58
655	08-30-89	12.64	243.35
655	09-07-89	12.62	243.37
655	09-18-89	12.50	243.49
655	09-27-89	12.61	243.38
655	01-15-90	12.05	243.93
655	02-15-90	11.58	244.41
655	03-14-90	11.90	244.09
655	04-23-90	12.32	243.67
655	05-21-90	12.06	243.92
655	06-26-90	12.50	243.49
655	07-25-90	12.42	243.57
655	08-23-90	12.53	243.46
655	09-25-90	12.87	243.12
656	01-15-88	12.95	245.52
656	02-04-88	12.37	246.10
656	03-03-88	11.84	246.63
656	04-07-88	11.71	246.77
656	05-05-88	11.52	246.95
656	06-09-88	12.18	246.29

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
656	06-29-88	12.48	245.99
656	07-28-88	12.64	245.83
656	08-31-88	12.80	245.67
656	10-04-88	12.60	245.87
656	10-04-88	12.89	245.59
656	10-24-88	12.95	245.53
656	11-01-88	12.84	245.64
656	11-01-88	13.02	245.45
656	11-07-88	13.03	245.44
656	11-14-88	12.93	245.54
656	11-28-88	12.56	245.91
656	12-05-88	12.39	246.09
656	12-06-88	12.35	246.12
656	12-12-88	12.26	246.21
656	12-20-88	12.27	246.20
656	12-27-88	12.25	246.22
656	01-02-89	12.09	246.38
656	01-05-89	11.87	246.60
656	01-11-89	10.70	247.78
656	01-17-89	11.28	247.19
656	01-27-89	10.82	247.65
656	01-31-89	10.92	247.55
656	02-08-89	11.14	247.33
656	02-10-89	11.30	247.17
656	02-12-89	11.36	247.12
656	02-24-89	11.63	246.85
656	03-03-89	11.59	246.89
656	03-09-89	10.61	247.87
656	03-15-89	10.37	248.11
656	03-22-89	10.73	247.74
656	03-28-89	12.22	246.25
656	04-07-89	12.15	246.32
656	04-14-89	12.19	246.29
656	04-22-89	12.25	246.23
656	05-04-89	12.55	245.92
656	05-12-89	12.70	245.77
656	05-17-89	12.65	245.82
656	05-26-89	11.14	247.33
656	06-01-89	11.23	247.24
656	06-09-89	11.34	247.13
656	06-16-89	11.28	247.19
656	06-23-89	11.03	247.45
656	06-28-89	10.70	247.78
656	07-07-89	10.75	247.73
656	07-14-89	12.32	246.15
656	07-21-89	11.99	246.48
656	07-28-89	11.30	247.17
656	08-04-89	11.38	247.09
656	08-11-89	11.38	247.09
656	08-18-89	11.40	247.07
656	08-30-89	11.91	246.56
656	09-07-89	11.99	246.48
656	09-18-89	11.89	246.58
656	09-27-89	11.97	246.51
656	01-15-90	11.15	247.32
656	02-15-90	10.33	248.14
656	03-14-90	10.58	247.89
656	04-23-90	11.10	247.38

Table A.1 (continued)

Well No.	Date measured	Depth to water (m)	Water-level elevation (m)
656	05-21-90	10.82	247.65
656	06-26-90	11.54	246.93
656	07-25-90	11.74	246.73
656	08-23-90	11.83	246.64
656	09-25-90	12.23	246.24

Table A.2. Locations, elevations, and depth to water measurements for intratrench wells in SWSA 6 ICM capped areas

Well	ORNL Northing	ORNL Easting	Elevation at top of casing (m)	Elevation at bottom of well (m)	11-10-88	11-14-88	12-02-88	12-22-88	03-10-89	04-05-89	05-15-89	6-9-89	6-20-89	6-26-89
								Cap area 1						
T82	17702	24641	253.75	249.23			0.80	1.10	1.15	1.14	Dry	3.93	3.7	3.66
T103	17703	24682	254.89	249.77			Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T120	17650	24637	253.53	248.36			Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T370	17587	24683	254.28	250.09			Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T380	17642	24680	254.36	250.17			Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T444	17660	24715	255.26	250.49			4.55	4.59	4.63	4.64	4.66	4.65	4.65	4.65
								Cap area 2						
T69	16870	24565	243.31	239.65		3.19	3.06	3.12	3.04	3.18	3.49	3.29	3.39	3.43
T84	17057	24690	247.81	242.93		Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T121	17106	24629	249.35	244.22		5.02	5.00	Dry	5.09	Dry	Dry	Dry	Dry	Dry
T330	17044	24562	247.07	241.88		Dry	Dry	Dry	5.05	Dry	Dry	Dry	Dry	Dry
T363	16989	24567	244.87	240.58		4.14	3.93	3.70	3.73	3.99	Dry	Dry	Dry	Dry
T397	17049	24508	248.67	243.55		4.98	4.63	4.85	5.01	Dry	Dry	Dry	Dry	Dry
T408	17169	24550	250.39	245.20		Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T417	17141	24529	250.27	245.47		Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
								Cap area 5						
T85	16638	24614	239.01	235.35		3.21	2.36	2.60	2.11	2.18	2.56	2.34	1.82	2.11
T92-1	16733	24613	241.45	236.70		4.51	3.92	4.48	4.06	3.83	4.48	3.9	3.76	4.1
T92-2	16728	24615	240.83	236.46		4.37	3.81	Dry	3.41	3.19	3.84	3.26	3.14	3.4
T105	16574	24642	238.05	234.44		2.82	2.54	1.96	2.90	2.15	2.38	2.47	2.42	2.33
T110	16684	24650	239.52	236.16		2.78	2.77	2.15	2.78	3.13	Dry	Dry	Dry	Dry
T112	16628	24651	238.78	235.12		2.91	2.63	2.27	2.40	2.72	2.82	2.89	2.48	2.31
T308	16757	24673	239.87	236.21		Dry	3.49	Dry	3.49	Dry	Dry	Dry	3.49	3.39
T318	16638	24719	237.57	234.20		2.67	2.34	2.88	2.32	2.43	2.45	2.55	2.17	2.08
								Cap area 6						
T101	16423	25037	232.84	228.97	2.34		2.05	2.80	2.66	3.43	3.57	3.43	3.37	3.44
T315	16575	24965	234.50	231.68	2.48		2.27	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T329	16678	24922	236.99	233.14	3.20		2.87	3.12	2.85	2.99	Missing	3.11	3	2.97
T395	16718	24942	237.98	234.99	2.56		2.34	2.34	2.32	2.63	Dry	Dry	Dry	Dry
T413	16598	25006	236.81	234.09	Dry		2.44	2.50	2.45	Dry	Dry	Dry	Dry	Dry
T414	16650	24987	237.63	234.29	2.94		2.90	3.04	2.88	3.02	Dry	Dry	Dry	Dry
T426	16729	24982	239.21	235.54	Dry		3.31	3.52	3.53	2.58	Dry	Dry	Dry	Dry

Table A.2 (continued)

Well	6-29-89	7-17-89	7-21-89	7-28-89	8-4-89	8-11-89	8-18-89	9-1-89	9-11-89	9-22-89	10-3-89	10-6-89	10-16-89	10-30-89
Cap area 1														
T82	3.63	3.52	3.49	3.43	3.38	3.34	3.26							
T103	Dry	Dry	Dry	Dry	Dry	Dry	Dry							
T120	Dry	Dry	Dry	Dry	Dry	Dry	Dry							
T370	Dry	Dry	Dry	Dry	Dry	Dry	Dry							
T380	Dry	Dry	Dry	Dry	Dry	Dry	Dry							
T444	4.65	4.65	4.65	4.65	4.66	4.67	4.67							
Cap area 2														
T69	3.45	3.55	3.56	3.59	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T84	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T121	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T330	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T363	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.1	3.91	3.99
T397	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T408	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T417	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
Cap area 5														
T85	2.26	2.5	2.65	2.67	2.68	3.09	3.23	3.14	3.28	2.86	1.63	2.14	2.89	3.07
T92-1	4.13	4.44	4.58	4.61	4.26					4.42	3.53	4.14	4.67	4.67
T92-2	3.51	3.82	3.87	3.9	3.79	3.96	4.04	4.05	4.04	3.42	2.91	3.5	4.07	4.1
T105	2.33	2.28	2.29	2.31	2.36	2.4	2.47	2.6	2.65	2.68	2.54	2.47	2.44	2.49
T110	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	3.22	3.22	3.21	3.21	3.22
T112	2.41	2.61	2.73	2.77	2.89	2.96	2.96	2.92	2.93	2.92	2.31	2.29	2.84	2.88
T308	3.48	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	3.29	3.34	Dry	Dry
T318	2.15	2.25	2.33	2.39	2.45	2.53	2.86	2.86	2.87	2.6	2.06	2.02	2.36	2.53
Cap area 6														
T101	2.46	3.51	3.58	3.59	3.55	3.62	3.67	3.63	3.63	3.52	3.29	3.4	3.68	3.58
T315	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	2.46	2.7	Dry	Dry
T329	3.03	3.09	3.11	3.16	3.14	3.21	3.31	DRY	DRY	DRY	2.96	3	3.13	3.18
T395	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T413	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T414	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T426	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry

Table A.2 (continued)

Well	11-9-89	11-16-89	11-27-89	12-15-89	1-3-90	1-12-90	1-18-90	1-30-90	2-6-90	2-13-90	2-21-90	2-27-90	3-6-90	3-13-90
							Cap area 1							
T82														
T103														
T120														
T370														
T380														
T444														
							Cap area 2							
T69	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T84	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T121	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T330	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T363	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.18	Dry	Dry	Dry	4.05	Dry	4.14
T397	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked
T408	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T417	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
							Cap area 5							
T85	2.62	2.26	2.65	2.98	2.62	2.33	2.68	2.05	1.9	2.03	1.94	2.42	2.38	2.42
T92-1	4.1	3.83	4.52	4.67	4.32	4.21	4.5	3.89	3.75	3.94	3.9	4.45	4.31	4.33
T92-2	3.47	3.21	3.82	3.93	3.59	3.42	3.81	3.26	3.13	3.2	3.15	3.57	3.67	3.71
T105	2.55	2.58	2.58	2.66	2.74	2.68	2.68	2.64	2.59	2.53	2.47	2.47	2.48	2.49
T110	3.23	3.24	3.25	3.26	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T112	2.92	2.93	2.89	2.93	2.98	2.83	2.91	2.83	2.64	2.56	2.5	2.6	2.76	2.83
T308	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	3.39	3.36	3.35	3.49	Dry	Dry
T318	2.66	2.44	2.41	2.71	2.78	2.5	2.66	2.53	2.44	2.39	2.26	2.48	2.54	2.58
							Cap area 6							
T101	3.43	3.37	3.52	3.61	3.53	3.52	3.57	3.42	3.38	3.42	3.39	3.5	3.52	3.5
T315	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T329	3.14	3.11	3.13	3.16	3.26	3.14	3.21	3.07	2.99	2.98	2.94	3.04	3.06	3.08
T395	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	2.67	2.71	2.7	2.83	Dry	Dry
T413	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T414	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T426	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry

Table A.2 (continued)

Well	3-26-90	4-3-90	4-10-90	4-25-90	5-7-90	5-16-90	5-30-90	6-29-90	7-19-90	8-6-90	8-21-90	9-6-90	9-18-90
							Cap area 1						
T82													
T103													
T120													
T370													
T380													
T444													
							Cap area 2						
T69	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T84	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T121	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T330	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T363	Dry	Dry	3.94	4.03	4.14	4.17	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T397	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked
T408	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T417	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
							Cap area 5						
T85	2.53	2.75	2.79	3	2.56	2.7	2.75	3.38	2.62	2.88	2.92	3.28	3.25
T92-1	4.63	4.65	4.63	Dry	4.22	Dry	4.44	Dry	4.54	4.2	4.66	Dry	Dry
T92-2	4	4.06	4	4.06	3.59	3.81	3.68	4.17	3.86	3.58	4.09	4.12	4.09
T105	2.48	2.5	2.54	2.63	2.72	2.68	2.7	2.81	2.84	2.76	2.75	2.78	2.84
T110	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T112	2.7	2.88	2.91	2.97	3.02	2.91	2.95	3.03	2.89	2.91	2.9	2.96	3.01
T308	3.53	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T318	2.52	2.7	2.77	2.88	2.73	2.62	2.77	3.17	2.57	2.86	2.63	2.97	2.91
							Cap area 6						
T101	3.57	3.62	3.66	3.69	3.53	3.56	3.57	3.69	3.69	3.52	3.58	3.64	3.65
T315	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T329	3.08	3.16	3.16	3.26	3.15	3.15	3.18	3.34	3.19	3.26	3.19	3.29	3.36
T395	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T413	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T414	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T426	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry

Table A.2 (continued)

Well	ORNL Northing	ORNL Easting	Elevation (m) Top of Casing	Elevation (m) Bottom of Well	11-10-88	11-14-88	12-02-88	12-22-88	03-10-89	04-05-89	05-15-89	6-9-89	6-20-89	6-26-89
								Cap area 8						
T44	15809	23965	232.63	227.48	Dry		4.83	4.09	3.25	3.99	4.68	4.83	4.59	4.53
T57	15761	24032	233.01	228.27	Dry		Dry	Dry	3.67	4.50	Dry	Dry	Dry	Dry
T60	15700	24053	232.60	228.36	Dry		3.75	3.96	3.11	3.74	Dry	Dry	Dry	Dry
T63	15873	24026	232.83	227.64	3.87		3.24	2.84	2.44	3.33	4.08	4.66	4.59	4.56
T162	15768	24082	233.42	229.25	Dry		4.05	Dry	3.08	Missing	Dry	Dry	Dry	Dry
T180	15862	24076	233.31	228.16	Dry		3.98	4.87	2.66	3.51	4.78	4.97	5.01	5.01
T225	15949	24054	233.21	228.06	Dry		Dry	Dry	4.49	4.68	5.00	Dry	5.1	5.07
T237	15842	24113	233.14	228.45	Dry		4.34	Dry	3.15	3.68	Dry	Dry	Dry	Dry
T241	15793	24134	233.68	229.48	Dry		Dry	Dry	3.72	Missing	Dry	Dry	Dry	Dry
T352	15950	24111	234.49	229.81	4.65		4.43	4.62	4.33	Dry	Dry	Dry	Dry	Dry
T367	15896	24148	234.30	230.10	Dry		3.99	Dry	3.56	3.65	3.96	4.03	4.06	4.05
T373	15994	24126	236.06	231.86	Dry		Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T374	15806	24177	233.58	229.78	Dry		Dry	Dry	Missing	Missing	Dry	Dry	Dry	Dry
T422	15876	24189	234.13	231.78	1.80		1.76	1.77	1.61	Dry	Dry	Dry	Dry	Dry
T424	16038	24168	237.78	233.10	Dry		4.45	4.59	Missing	Missing	Dry	Dry	Dry	Dry
T453	15929	24220	235.79	232.29	3.21		3.07	3.15	3.12	3.25	3.28	3.3	3.31	3.32

Table A.2 (continued)

Well	6-29-89	7-17-89	7-21-89	7-28-89	8-4-89	8-11-89	8-18-89	9-1-89	9-11-89	9-22-89	10-3-89	10-6-89	10-16-89	10-30-89
							Cap area 8							
T44	4.55	4.83	4.9	4.92	5	Dry	Dry	Dry	Dry	Dry	4.67	4.75	4.52	4.59
T57	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T60	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T63	4.58	4.76	4.8	4.83	4.86	4.93	4.98	5.03	5.04	5.06	4.9	4.85	4.95	5.03
T162	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T180	5.06	5.05	5.06	5.06	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T225	5.16	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T237	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T241	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T352	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T367	4.05	4.08	4.1	4.12	4.1	4.1	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T373	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T374	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T422	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T424	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T453	3.33	3.36	3.36	3.36	3.38	3.42	3.39	3.4	Dry	Dry	Dry	Dry	Dry	Dry

Table A.2 (continued)

Well	11-9-89	11-16-89	11-27-89	12-15-89	1-3-90	1-12-90	1-18-90	1-30-90	2-6-90	2-13-90	2-21-90	2-27-90	3-6-90	3-13-90
							Cap area 8							
T44	4.97	4.87	4.9	5.05	4.95	4.82	4.96	4.74	4.63	4.65	4.62	4.77	4.8	4.85
T57	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T60	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T63	5	5	4.99	5	5.03	5.02	5.03	4.95	4.89	4.83	4.78	4.78	4.82	4.86
T162	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T180	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T225	Dry	Dry	Dry	Dry	Dry	Dry	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked
T237	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T241	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T352	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T367	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T373	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T374	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T422	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T424	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T453	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry

Table A.2 (continued)

Well	3-26-90	4-3-90	4-10-90	4-25-90	5-7-90	5-16-90	5-30-90	6-29-90	7-19-90	8-6-90	8-21-90	9-6-90	9-18-90
							Cap area 8						
T44	4.86	4.97	5	Dry	4.87	4.96	4.97	Dry	Dry	Dry	Dry	Dry	Dry
T57	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T60	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T63	4.87	4.91	4.95	5.01	5.04	5.03	5.04	Dry	Dry	Dry	Dry	Dry	Dry
T162	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T180	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T225	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked
T237	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T241	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T352	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T367	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T373	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T374	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T422	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T424	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.56	4.57	4.56	Blocked	Blocked	Blocked
T453	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry

Table A.3. Daily rainfall in SWSA 6 from October 1988 through September 1990

Date	Precipitation (mm)	Date	Precipitation (mm)	Date	Precipitation (mm)	Date	Precipitation (mm)
10/01/88	12.95	11/19/88	21.08	01/07/89	0.00	02/25/89	0.00
10/02/88	4.83	11/20/88	20.57	01/08/89	26.61	02/26/89	0.00
10/03/88	0.00	11/21/88	0.00	01/09/89	0.00	02/27/89	11.51
10/04/88	0.00	11/22/88	0.00	01/10/89	2.75	02/28/89	14.82
10/05/88	0.00	11/23/88	0.00	01/11/89	32.54	03/01/89	0.00
10/06/88	0.00	11/24/88	0.00	01/12/89	45.49	03/02/89	0.00
10/07/88	0.00	11/25/88	0.00	01/13/89	11.03	03/03/89	0.00
10/08/88	0.00	11/26/88	0.25	01/14/89	21.71	03/04/89	7.04
10/09/88	0.00	11/27/88	25.65	01/15/89	1.00	03/05/89	30.65
10/10/88	0.00	11/28/88	0.00	01/16/89	0.00	03/06/89	3.28
10/11/88	0.00	11/29/88	0.00	01/17/89	0.00	03/07/89	0.00
10/12/88	0.00	11/30/88	0.00	01/18/89	0.00	03/08/89	0.00
10/13/88	0.00	12/01/88	0.00	01/19/89	0.00	03/09/89	0.00
10/14/88	0.00	12/02/88	0.00	01/20/89	0.00	03/10/89	0.00
10/15/88	0.00	12/03/88	0.00	01/21/89	0.00	03/11/89	0.00
10/16/88	0.00	12/04/88	0.00	01/22/89	0.00	03/12/89	0.00
10/17/88	8.13	12/05/88	0.00	01/23/89	0.00	03/13/89	0.00
10/18/88	0.00	12/06/88	0.00	01/24/89	0.00	03/14/89	0.00
10/19/88	0.00	12/07/88	0.00	01/25/89	0.00	03/15/89	1.51
10/20/88	2.03	12/08/88	0.00	01/26/89	1.50	03/16/89	0.25
10/21/88	9.65	12/09/88	10.41	01/27/89	0.00	03/17/89	0.00
10/22/88	0.00	12/10/88	1.78	01/28/89	0.00	03/18/89	18.25
10/23/88	3.56	12/11/88	0.00	01/29/89	0.25	03/19/89	0.00
10/24/88	0.25	12/12/88	0.00	01/30/89	14.11	03/20/89	11.82
10/25/88	2.54	12/13/88	0.00	01/31/89	0.00	03/21/89	11.62
10/26/88	0.00	12/14/88	0.00	02/01/89	0.00	03/22/89	0.00
10/27/88	0.00	12/15/88	0.00	02/02/89	0.00	03/23/89	12.25
10/28/88	7.37	12/16/88	0.00	02/03/89	2.01	03/24/89	0.00
10/29/88	0.25	12/17/88	0.00	02/04/89	0.25	03/25/89	0.25
10/30/88	1.02	12/18/88	0.00	02/05/89	15.61	03/26/89	0.00
10/31/88	1.27	12/19/88	0.00	02/06/89	15.81	03/27/89	0.00
11/01/88	0.00	12/20/88	0.00	02/07/89	2.77	03/28/89	0.00
11/02/88	0.00	12/21/88	18.80	02/08/89	0.00	03/29/89	0.25
11/03/88	0.00	12/22/88	0.25	02/09/89	0.00	03/30/89	29.93
11/04/88	41.91	12/23/88	10.67	02/10/89	0.00	03/31/89	14.23
11/05/88	26.42	12/24/88	14.73	02/11/89	0.00	04/01/89	0.00
11/06/88	1.02	12/25/88	0.00	02/12/89	0.00	04/02/89	0.00
11/07/88	0.00	12/26/88	0.00	02/13/89	1.25	04/03/89	4.26
11/08/88	2.29	12/27/88	0.00	02/14/89	10.09	04/04/89	23.98
11/09/88	0.00	12/28/88	8.13	02/15/89	0.00	04/05/89	0.00
11/10/88	7.11	12/29/88	0.00	02/16/89	5.00	04/06/89	0.25
11/11/88	0.00	12/30/88	16.51	02/17/89	34.51	04/07/89	3.25
11/12/88	1.52	12/31/88	33.02	02/18/89	8.01	04/08/89	8.52
11/13/88	2.29	01/01/89	1.52	02/19/89	0.00	04/09/89	0.00
11/14/88	0.25	01/02/89	1.27	02/20/89	14.67	04/10/89	0.00
11/15/88	0.00	01/03/89	1.27	02/21/89	22.80	04/11/89	0.00
11/16/88	12.19	01/04/89	0.00	02/22/89	0.00	04/12/89	0.00
11/17/88	0.00	01/05/89	0.76	02/23/89	0.00	04/13/89	0.00
11/18/88	0.00	01/06/89	15.74	02/24/89	0.00	04/14/89	1.75

Table A.3 (continued)

Date	Precipitation (mm)	Date	Precipitation (mm)	Date	Precipitation (mm)	Date	Precipitation (mm)
04/15/89	4.51	06/03/89	0.00	07/22/89	3.03	09/09/89	0.00
04/16/89	0.00	06/04/89	3.52	07/23/89	6.85	09/10/89	0.00
04/17/89	0.00	06/05/89	15.67	07/24/89	0.25	09/11/89	14.98
04/18/89	0.00	06/06/89	17.21	07/25/89	0.25	09/12/89	0.00
04/19/89	0.00	06/07/89	0.00	07/26/89	0.00	09/13/89	0.00
04/20/89	0.00	06/08/89	9.56	07/27/89	0.00	09/14/89	12.17
04/21/89	0.00	06/09/89	17.76	07/28/89	3.05	09/15/89	45.88
04/22/89	0.00	06/10/89	0.00	07/29/89	0.00	09/16/89	0.51
04/23/89	2.28	06/11/89	0.00	07/30/89	3.04	09/17/89	0.00
04/24/89	0.75	06/12/89	20.54	07/31/89	2.02	09/18/89	0.00
04/25/89	0.00	06/13/89	8.86	08/01/89	31.45	09/19/89	0.00
04/26/89	0.00	06/14/89	1.75	08/02/89	0.00	09/20/89	0.00
04/27/89	0.25	06/15/89	35.68	08/03/89	0.00	09/21/89	0.00
04/28/89	0.25	06/16/89	14.93	08/04/89	0.25	09/22/89	33.35
04/29/89	5.58	06/17/89	0.00	08/05/89	0.00	09/23/89	6.08
04/30/89	0.25	06/18/89	0.00	08/06/89	0.25	09/24/89	0.00
05/01/89	13.13	06/19/89	4.28	08/07/89	0.00	09/25/89	23.22
05/02/89	0.00	06/20/89	35.93	08/08/89	0.00	09/26/89	0.25
05/03/89	0.00	06/21/89	8.63	08/09/89	0.00	09/27/89	0.00
05/04/89	5.75	06/22/89	17.21	08/10/89	0.00	09/28/89	1.00
05/05/89	45.84	06/23/89	1.01	08/11/89	0.00	09/29/89	15.55
05/06/89	1.77	06/24/89	0.00	08/12/89	0.00	09/30/89	55.31
05/07/89	0.00	06/25/89	0.00	08/13/89	0.00	10/01/89	9.31
05/08/89	2.50	06/26/89	0.00	08/14/89	0.00	10/02/89	0.25
05/09/89	18.99	06/27/89	0.00	08/15/89	1.25	10/03/89	0.00
05/10/89	0.00	06/28/89	8.83	08/16/89	0.00	10/04/89	0.00
05/11/89	0.00	06/29/89	0.00	08/17/89	0.25	10/05/89	0.00
05/12/89	0.00	06/30/89	0.00	08/18/89	0.25	10/06/89	0.00
05/13/89	0.00	07/01/89	5.04	08/19/89	0.00	10/07/89	0.00
05/14/89	0.00	07/02/89	7.01	08/20/89	0.00	10/08/89	0.00
05/15/89	0.50	07/03/89	21.45	08/21/89	0.00	10/09/89	0.00
05/16/89	0.00	07/04/89	1.76	08/22/89	0.00	10/10/89	0.00
05/17/89	0.00	07/05/89	0.25	08/23/89	30.16	10/11/89	0.00
05/18/89	0.00	07/06/89	35.25	08/24/89	2.50	10/12/89	0.00
05/19/89	2.25	07/07/89	0.25	08/25/89	0.00	10/13/89	0.00
05/20/89	29.95	07/08/89	0.00	08/26/89	4.56	10/14/89	0.00
05/21/89	0.00	07/09/89	0.00	08/27/89	0.00	10/15/89	0.00
05/22/89	4.06	07/10/89	0.00	08/28/89	0.00	10/16/89	17.70
05/23/89	0.50	07/11/89	0.00	08/29/89	0.00	10/17/89	20.27
05/24/89	0.00	07/12/89	4.02	08/30/89	4.30	10/18/89	7.80
05/25/89	0.00	07/13/89	1.26	08/31/89	0.00	10/19/89	0.25
05/26/89	15.97	07/14/89	0.00	09/01/89	30.98	10/20/89	0.00
05/27/89	11.64	07/15/89	0.00	09/02/89	0.25	10/21/89	0.00
05/28/89	0.00	07/16/89	3.00	09/03/89	0.00	10/22/89	0.00
05/29/89	0.00	07/17/89	0.00	09/04/89	0.00	10/23/89	0.00
05/30/89	0.00	07/18/89	0.00	09/05/89	0.00	10/24/89	0.00
05/31/89	0.00	07/19/89	7.36	09/06/89	0.00	10/25/89	0.00
06/01/89	0.00	07/20/89	0.25	09/07/89	0.00	10/26/89	0.00
06/02/89	0.00	07/21/89	6.57	09/08/89	0.00	10/27/89	0.00

Table A.3 (continued)

Date	Precipitation (mm)	Date	Precipitation (mm)	Date	Precipitation (mm)	Date	Precipitation (mm)
10/28/89	0.00	12/16/89	0.00	02/03/90	57.00	03/24/90	0.00
10/29/89	0.00	12/17/89	0.00	02/04/90	6.25	03/25/90	0.00
10/30/89	0.00	12/18/89	0.00	02/05/90	0.00	03/26/90	0.00
10/31/89	4.32	12/19/89	6.25	02/06/90	1.00	03/27/90	0.00
11/01/89	0.00	12/20/89	0.25	02/07/90	2.25	03/28/90	0.00
11/02/89	0.00	12/21/89	0.00	02/08/90	0.00	03/29/90	4.25
11/03/89	0.00	12/22/89	0.00	02/09/90	21.25	03/30/90	2.75
11/04/89	0.00	12/23/89	0.00	02/10/90	18.50	03/31/90	0.50
11/05/89	0.00	12/24/89	0.00	02/11/90	0.00	04/01/90	0.00
11/06/89	19.77	12/25/89	0.00	02/12/90	0.00	04/02/90	0.00
11/07/89	16.24	12/26/89	1.00	02/13/90	0.00	04/03/90	0.00
11/08/89	13.95	12/27/89	0.00	02/14/90	0.00	04/04/90	0.00
11/09/89	1.25	12/28/89	0.00	02/15/90	18.50	04/05/90	0.00
11/10/89	0.00	12/29/89	1.00	02/16/90	34.00	04/06/90	0.00
11/11/89	0.00	12/30/89	14.36	02/17/90	0.00	04/07/90	0.00
11/12/89	0.00	12/31/89	29.35	02/18/90	6.00	04/08/90	0.00
11/13/89	0.00	01/01/90	0.00	02/19/90	5.25	04/09/90	0.00
11/14/89	6.50	01/02/90	0.00	02/20/90	0.00	04/10/90	0.00
11/15/89	35.67	01/03/90	0.25	02/21/90	0.00	04/11/90	0.00
11/16/89	0.00	01/04/90	10.25	02/22/90	9.00	04/12/90	0.00
11/17/89	0.00	01/05/90	4.25	02/23/90	0.00	04/13/90	5.25
11/18/89	0.00	01/06/90	4.00	02/24/90	0.00	04/14/90	0.25
11/19/89	0.00	01/07/90	3.75	02/25/90	0.00	04/15/90	0.00
11/20/89	0.00	01/08/90	13.25	02/26/90	0.00	04/16/90	5.01
11/21/89	0.00	01/09/90	0.00	02/27/90	0.00	04/17/90	0.00
11/22/89	21.16	01/10/90	0.50	02/28/90	0.00	04/18/90	0.25
11/23/89	0.25	01/11/90	0.00	03/01/90	2.25	04/19/90	0.00
11/24/89	0.00	01/12/90	0.00	03/02/90	15.50	04/20/90	0.00
11/25/89	0.00	01/13/90	0.00	03/03/90	1.00	04/21/90	10.34
11/26/89	0.75	01/14/90	0.00	03/04/90	0.00	04/22/90	0.00
11/27/89	2.02	01/15/90	0.00	03/05/90	0.00	04/23/90	0.00
11/28/89	18.29	01/16/90	0.00	03/06/90	0.00	04/24/90	0.00
11/29/89	0.00	01/17/90	0.25	03/07/90	0.00	04/25/90	0.00
11/30/89	0.00	01/18/90	19.00	03/08/90	4.50	04/26/90	0.00
12/01/89	0.00	01/19/90	0.00	03/09/90	3.27	04/27/90	0.00
12/02/89	0.00	01/20/90	30.25	03/10/90	9.38	04/28/90	22.01
12/03/89	0.00	01/21/90	0.00	03/11/90	0.00	04/29/90	0.25
12/04/89	0.00	01/22/90	0.00	03/12/90	0.00	04/30/90	0.00
12/05/89	0.00	01/23/90	0.00	03/13/90	0.00	05/01/90	56.00
12/06/89	0.00	01/24/90	8.75	03/14/90	0.00	05/02/90	0.00
12/07/89	3.00	01/25/90	5.50	03/15/90	2.00	05/03/90	25.50
12/08/89	11.26	01/26/90	0.00	03/16/90	47.92	05/04/90	13.00
12/09/89	0.75	01/27/90	0.00	03/17/90	16.38	05/05/90	1.75
12/10/89	0.00	01/28/90	0.00	03/18/90	0.00	05/06/90	0.50
12/11/89	2.25	01/29/90	33.25	03/19/90	3.50	05/07/90	0.00
12/12/89	3.25	01/30/90	0.00	03/20/90	0.00	05/08/90	0.00
12/13/89	0.00	01/31/90	0.00	03/21/90	0.00	05/09/90	18.00
12/14/89	0.00	02/01/90	0.00	03/22/90	0.00	05/10/90	4.00
12/15/89	0.25	02/02/90	2.00	03/23/90	0.00	05/11/90	0.00

Table A.3 (continued)

Date	Precipitation (mm)	Date	Precipitation (mm)	Date	Precipitation (mm)
05/12/90	0.00	06/30/90	0.00	08/18/90	0.00
05/13/90	0.00	07/01/90	34.04	08/19/90	0.76
05/14/90	0.00	07/02/90	0.00	08/20/90	0.00
05/15/90	0.00	07/03/90	0.00	08/21/90	5.84
05/16/90	0.00	07/04/90	0.00	08/22/90	8.38
05/17/90	2.05	07/05/90	0.00	08/23/90	0.00
05/18/90	0.00	07/06/90	0.00	08/24/90	0.00
05/19/90	0.00	07/07/90	0.00	08/25/90	0.00
05/20/90	7.00	07/08/90	0.00	08/26/90	0.00
05/21/90	1.00	07/09/90	0.00	08/27/90	0.00
05/22/90	0.00	07/10/90	0.00	08/28/90	0.00
05/23/90	0.00	07/11/90	24.64	08/29/90	22.35
05/24/90	0.00	07/12/90	50.04	08/30/90	0.00
05/25/90	0.00	07/13/90	25.91	08/31/90	0.00
05/26/90	5.00	07/14/90	14.22	09/01/90	0.00
05/27/90	14.50	07/15/90	0.00	09/02/90	0.00
05/28/90	20.50	07/16/90	0.00	09/03/90	0.00
05/29/90	0.00	07/17/90	0.00	09/04/90	0.00
05/30/90	0.00	07/18/90	0.00	09/05/90	0.00
05/31/90	0.00	07/19/90	5.33	09/06/90	0.00
06/01/90	0.00	07/20/90	0.00	09/07/90	0.00
06/02/90	0.00	07/21/90	28.19	09/08/90	0.00
06/03/90	0.00	07/22/90	5.84	09/09/90	0.00
06/04/90	0.00	07/23/90	0.00	09/10/90	0.00
06/05/90	0.00	07/24/90	0.00	09/11/90	0.00
06/06/90	0.00	07/25/90	0.00	09/12/90	5.75
06/07/90	0.00	07/26/90	0.00	09/13/90	2.25
06/08/90	0.00	07/27/90	0.00	09/14/90	21.50
06/09/90	0.00	07/28/90	0.00	09/15/90	0.25
06/10/90	0.00	07/29/90	0.00	09/16/90	0.00
06/11/90	0.00	07/30/90	0.00	09/17/90	0.00
06/12/90	0.00	07/31/90	0.00	09/18/90	0.00
06/13/90	0.00	08/01/90	0.00	09/19/90	12.50
06/14/90	8.62	08/02/90	0.00	09/20/90	0.00
06/15/90	0.00	08/03/90	0.00	09/21/90	7.00
06/16/90	0.00	08/04/90	21.59	09/22/90	1.00
06/17/90	0.00	08/05/90	22.61	09/23/90	0.00
06/18/90	0.00	08/06/90	3.56	09/24/90	0.00
06/19/90	0.00	08/07/90	0.00	09/25/90	0.00
06/20/90	0.00	08/08/90	12.95	09/26/90	0.00
06/21/90	1.00	08/09/90	18.29	09/27/90	0.00
06/22/90	7.37	08/10/90	0.00	09/28/90	0.00
06/23/90	0.00	08/11/90	0.00	09/29/90	0.00
06/24/90	0.00	08/12/90	0.00	09/30/90	0.50
06/25/90	0.00	08/13/90	0.76		
06/26/90	0.00	08/14/90	13.72		
06/27/90	0.00	08/15/90	0.00		
06/28/90	0.00	08/16/90	0.00		
06/29/90	0.76	08/17/90	10.92		

Table A.4. Peak monthly elevations of White Oak Lake from October 1988 through September 1990

Date peak occurred	Lake elevation (ft)	Lake elevation (m)
10-02-88	745.08	227.16
12-31-88	747.44	227.88
01-12-89	748.19	228.11
02-21-89	747.28	227.83
03-30-89	746.98	227.74
04-04-89	746.41	227.56
05-05-89	746.75	227.67
06-22-89	747.11	227.78
07-06-89	746.45	227.58
08-01-89	745.72	227.35
09-30-89	748.47	228.19
10-01-89	748.65	228.25
11-16-89	747.43	227.88
12-31-89	747.78	227.98
01-29-90	747.52	227.90
02-04-90	748.08	228.07
03-17-90	748.16	228.10
04-22-90	745.56	227.30
05-01-90	749.00	228.35
06-09-90	745.78	227.37
07-14-90	746.76	227.67
08-09-90	746.90	227.71
09-15-90	745.44	227.27

APPENDIX B: Procedures for Soil Penetration Testing and Monitoring Well Installation in Radioactive Waste Trenches

PROCEDURES FOR SOIL PENETRATION TESTING AND MONITORING WELL INSTALLATION IN RADIOACTIVE WASTE TRENCHES

PURPOSE

The purpose of this document is to describe procedures to be put into effect in the conducting of soil stability (penetration) tests and installation of monitoring wells in low-level radioactive waste trenches. The procedures are aimed specifically at the Solid Waste Storage Area (SWSA) 6 Test Area for Remedial Action (TARA) experimental site, which has a need to conduct such activities, but also has application at other Oak Ridge National Laboratory (ORNL) waste disposal sites where measuring soil cap stability and monitoring or sampling trench water may be deemed necessary.

PROCEDURES

1. All personnel within a 10-ft radius of the trench-penetration point will wear contamination zone clothing, gloves, full-face respirator with combination cartridges, shoe covers, and hard hats. Respirators will be taken off only when radiation protection (RP) and industrial hygiene (IH) personnel have surveyed and determined that a particular hole is not contaminated and respiratory protection is no longer required.
2. Penetration of the trench will be achieved using the drop hammer of a trailer-mounted drill rig to drive a 1.75-in-diam steel drill rod into the trench cap and trench contents in much the same way that one would drive a nail into a piece of wood. The 140-lb drop hammer will be physically connected to the drill rod at all times during hammering and the tip end of the drill rod will be fitted with a 2-in. cone-shaped steel penetration point to facilitate driving into the soil. The maximum depth of penetration will be 15 ft, which includes three 5-ft sections of drill rod.
3. Before penetration starts at a particular hole, an ~3-ft-square piece of plastic will be laid out over the ground to serve as protection against the spread of radioactive contamination should any be encountered during the process.
4. The drill rod will then be driven into the trench to the maximum depth of 15 ft, at which time the drill rig will be shut off and a radiation survey of the hole area will be made while the rod is still in the hole. If a hard piece of waste such as a steel container or concrete debris is encountered, the hammering will stop short of the desired 15 ft depth and the resulting hole will either be filled with soil or cased with well screen material, depending on the depths of other holes in that particular trench. At least two 15-ft deep holes are desired in each burial trench to facilitate both grout injection and grout monitoring. The additional three holes in each trench can be of intermediate depth (>5 ft and <15 ft).
5. Removal of the drill rod will be accomplished by reversing the "hammering in" process and using the hammer to bump the rod out of the hole. The suspect drill rod that is slowly emerging from the ground (inch by inch as the hammer bumps it out) will be pulled into a plastic sleeve that is attached at the bottom end to the 3 ft by 3 ft sheet of plastic covering the ground and at the top end near the connection to the clean drop hammer. In this manner, the suspect drill rod is never exposed to the air, avoiding the possible spread of contamination, should any be brought to the surface.
6. During the drill rod removal process, continuous beta-gamma monitoring of the rod will be accomplished with a GM probe attached to a meter stick and positioned at the

ground surface so that the removal process can be stopped if it is determined that the rod is highly contaminated (see 7). If no contamination is detected by this preliminary survey, the rod will continue to be bumped out of the ground and into the plastic sleeve until ~6 ft of rod is above ground. At this point, the drill rig will be shut down and the HP will initiate a more detailed beta-gamma survey with the plastic sleeve in place.

7. If the rod is found to be contaminated by either the beta-gamma survey described in 6, or by the alpha survey described in 8, a decision will be made either to decontaminate the rod or to drive the rod back in the hole and sacrifice the drill rods. The decision level for hole and drill rod abandonment will be any beta-gamma surface reading >10 mrad/h.

8. Assuming the beta-gamma survey to show no contamination above the abandonment action level, the plastic sleeve will be cut at the top end where it is attached near the drop hammer and will be slowly pulled down the rod (an inch at a time) to facilitate an alpha activity survey. Again, if the rod is found to be contaminated, it will either be cleaned or driven back into the hole after resealing the plastic sleeve. The decision level for hole and drill rod abandonment will be an alpha surface reading exceeding 10,000 dpm/100 cm^2.

9. Decontamination of a drill rod section will be initiated whenever surface survey instruments detect either: (a) alpha activity >600 dpm/100 cm^2 or (b) beta-gamma activity >0.5 mrad/h on any length of drill rod section. Decontamination will consist of wiping the drill rod with moist cloth or paper towels by personnel in full protective clothing as described in 1, except that an additional pair of rubber gloves will be worn. Decontamination will continue until the on-site RP officer is satisfied that surficial activity is at or below the decontamination limits. If the drill rod cannot be decontaminated by this method, decontamination by scraping with a moistened wire brush and soap solution on paper towels will be attempted. If the rod cannot be decontaminated at this point, it will be designated as radioactive waste, packaged in plastic, and disposed by ORNL procedures.

10. After the top 5 ft of drill rod is found to be clean, it will be removed and the drop hammer will be attached to the next 5-ft section of drill rod to be extracted from the hole. Again, the plastic sleeve will be attached near the drop hammer and will still be attached at the ground surface so that this next piece of rod will also be drawn into a plastic sleeve. Monitoring for radioactivity will proceed as described herein, and this process will be repeated until all 3 sections of drill rod have been removed from the hole.

11. At this point, a 5-ft section of polyvinylchloride (PVC) well screen (with 0.1-in. slots for grout wells or 0.01-in. slots for monitoring wells) will be inserted in the hole and gently tapped into place using the weight of the drop hammer. Additional well casing will be attached to the screen in 2 ft sections and driven into the hole until the entire depth of the hole is cased. All casing protruding from the ground will be solid pipe as opposed to slotted well screen used for the remainder of the hole. A cap will be screwed onto the top of the PVC well, and IH will survey the hole for volatile organics. A penetration hole will be considered clean if the reading with a calibrated TIP Organic Vapor Analyzer is <100 units; the sensitivity of the TIP instrument will be set so that a reading of 1000 units is achieved with a standard of 100 ppm isobutylene in air and a reading of 0 units is achieved in ambient air. If the hole is clean at this point, respirators will be removed and the drill rig will be moved to the site of the next hole.

12. Immediately before leaving the well, a GM tube will be lowered down the dry cased hole to determine if there is extremely high radioactivity underground in proximity to the hole. This information, along with the IH gas analysis, will be valuable in predicting what hazards might exist in future water level monitoring or sampling of the well.

13. The well will be labeled with a metal tag identifying the trench number, for example T-199. Engineering will be contacted and requested to conduct an as built survey of location and elevation so that the wells can be placed on SWSA 6 maps.

14. Following completion of all penetration testing, the drill rig and any tools used in the testing will be thoroughly checked by RP personnel for any residual contamination. Decontamination of any tools or drill rig parts will be initiated whenever transferable smear activities exceed either 30 dpm/100 cm^2 (alpha) or 200 dpm/100 cm^2 (beta-gamma).

APPENDIX C: Penetration Resistance of SWSA 6 Burial Trenches and Control Sites Used for Leachate Monitoring Wells

Table C.1. Penetration resistance (1 to 3 ft) of SWSA 6 burial trenches and control sites used for leachate monitoring wells

Trench No.	Well No.	Test date	Test time	Cumulative blow counts 1ft	2ft	3ft
103	T103B	10-Oct-88	11:08	14	33	39
103	T103A	10-Oct-88	13:10	8	20	30
380	None	10-Oct-88	14:00	8	13	15
380	T380	10-Oct-88	14:20	7	12	16
370	T370	10-Oct-88	14:48	17	41	65
370	None	10-Oct-88	15:15	21	46	60
370	None	10-Oct-88	15:45	19	44	58
82	T82	11-Oct-88	10:33	12	26	32
120	T120	11-Oct-88	11:00	8	18	26
408	None	11-Oct-88	14:55	6	11	14
408	None	11-Oct-88	15:15	6	11	14
408	T408	11-Oct-88	15:30	6	9	11
397	T397	12-Oct-88	09:00	9	24	32
330	T330	12-Oct-88	09:30	9	20	30
363	None	12-Oct-88	10:20	16	28	34
363	None	12-Oct-88	10:50	14	25	31
363	None	12-Oct-88	11:05	15	28	37
363	T363	12-Oct-88	11:15	15	27	33
69	T69	12-Oct-88	13:00	19	36	41
71	None	12-Oct-88	13:30	10	19	21
71	None	12-Oct-88	13:50	15	25	31
71	None	12-Oct-88	14:05	12	23	27
71	None	12-Oct-88	14:20	32	64	92
71	None	12-Oct-88	14:30	12	21	29
71	None	12-Oct-88	14:40	13	21	24
121	T121	12-Oct-88	15:00	8	17	31
84	None	12-Oct-88	15:30	16	37	47
84	T84	13-Oct-88	09:30	13	32	41
308	T308	13-Oct-88	10:00	32	46	52
308	None	13-Oct-88	10:33	20	36	46
318	T318	13-Oct-88	11:00	22	42	51
112	T112	13-Oct-88	14:00	14	25	32
85	T85	13-Oct-88	14:36	11	20	29
110	T110	13-Oct-88	15:21	12	21	25
105	T105	14-Oct-88	09:45	12	26	32
426	T426	14-Oct-88	10:20	14	25	32
432	T432	14-Oct-88	11:00	6	12	16
414	T414	14-Oct-88	13:00	6	12	15
413	T413	17-Oct-88	13:30	9	18	25
395	T395	17-Oct-88	14:00	9	20	26
329	T329	17-Oct-88	14:35	8	23	31
79	None	17-Oct-88	14:55	8	16	24
79	T79	17-Oct-88	15:10	9	26	40
101	T101	17-Oct-88	15:25	14	31	38
461	T461	17-Oct-88	15:40	10	18	23
424	None	18-Oct-88	09:15	9	17	23

Table C.1 (continued)

Trench No.	Well No.	Test date	Test time	Cumulative blow counts 1ft	2ft	3ft
424	T424	18-Oct-88	09:30	12	22	28
373	None	18-Oct-88	10:10	5	9	17
373	T373	18-Oct-88	10:45	5	10	19
352	T352	18-Oct-88	13:15	5	15	22
367	T367	18-Oct-88	13:50	12	24	29
453	T453	18-Oct-88	14:30	9	17	21
422	T422	18-Oct-88	15:00	19	33	38
374	T374	18-Oct-88	15:38	15	29	38
241	T241	19-Oct-88	09:05	11	23	30
237	T237	19-Oct-88	09:35	9	17	20
180	T180	19-Oct-88	10:35	12	24	29
162	T162	19-Oct-88	13:30	9	20	26
60	T60	19-Oct-88	14:00	12	24	31
57	None	19-Oct-88	14:30	14	25	31
57	T57	19-Oct-88	14:40	14	32	44
44	T44	20-Oct-88		10	19	23
63	T63	20-Oct-88		11	23	30
225	T225	20-Oct-88		12	22	27
279	T279-6	08-Aug-89		11	22	26
288	T288-6	08-Aug-89		5	9	12
13	T13-6	08-Aug-89		20	29	33
279	T279-1	06-Feb-90		5	12	16
279	T279-2	06-Feb-90		5	10	15
279	T279-3	06-Feb-90		6	10	13
279	T279-4	06-Feb-90		4	9	12
279	T279-5	06-Feb-90		4	8	11
288	T288-1	08-Feb-90		4	8	11
288	T288-2	08-Feb-90		6	13	15
288	T288-3	08-Feb-90		5	11	14
288	T288-4	08-Feb-90		4	9	12
288	T288-5	08-Feb-90		2	3	4
288	T288N	08-Feb-90		6	10	14
13	T13-5	13-Feb-90		5	11	17
13	T13-4	13-Feb-90		6	10	12
13	T13-3	13-Feb-90		8	14	19
13	T13-2	13-Feb-90		7	19	25
13	T13-1	13-Feb-90		7	14	17
11	T11	13-Feb-90		6	13	16
16	T16	13-Feb-90		7	13	17
252	T252	14-Feb-90		9	16	20
285	T285	14-Feb-90		5	9	11
284	T284	14-Feb-90		4	7	8
275	T275	14-Feb-90		5	12	14

Table C.1 (continued)

Trench No.	Well No.	Test date	Test time	Cumulative blow counts 1ft	2ft	3ft
		Wells near but outside burial trenches				
279	T279N	06-Feb-90		9	22	37
279	T279S	06-Feb-90		7	16	31
279	T279NE	08-Feb-90		6	13	23
279	T279SE	08-Feb-90		6	14	32
279	T279NW	08-Feb-90		6	16	25
279	T279SW	08-Feb-90		6	13	25
288	T288S	12-Feb-90		8	15	31
288	T288NW	12-Feb-90		9	17	31
288	T288SW	12-Feb-90		7	13	32
288	T288NE	12-Feb-90		9	18	37
288	T288SE	12-Feb-90		7	13	32
13	T13SE	12-Feb-90		8	27	55
13	T13NE	12-Feb-90		6	19	50
13	T13S	13-Feb-90		8	13	24
13	T13N	13-Feb-90		6	10	31
13	T13SW	13-Feb-90		6	23	43
13	T13NW	13-Feb-90		7	20	43
151	T151E	05-Feb-90		4	8	17
151	T151SE	05-Feb-90		6	17	27
151	T151S	05-Feb-90		6	11	20
151	T151SW	05-Feb-90		6	10	20
151	T151NE	05-Feb-90		4	7	19
151	T151NW	05-Feb-90		5	9	23
170	T170NW	05-Feb-90		3	6	9
170	T170W	05-Feb-90		7	11	25
151	T151W	05-Feb-90		6	10	25

Table C.2. Penetration resistance (4 to 9 ft) of SWSA 6 burial trenches and control sites used for leachate monitoring wells

Trench No.	Well No.	Cumulaticve blow counts 4ft	5ft	6ft	7ft	8ft	9ft
103	T103B	43	47	49	51	53	56
103	T103A	36	40	45	47	50	53
380	None	18	21	37	46	51	55
380	T380	20	23	24	27	29	32
370	T370	75	84	91	99	105	116
370	None	71	81	89	97	101	107
370	None	64	78	90	99	104	109
82	T82	36	39	41	43	45	47
120	T120	34	41	47	52	55	57
408	None	16	18	20	22	24	26
408	None	17	19	22	23	25	29
408	T408	13	14	16	19	20	22
397	T397	37	41	43	45	46	47
330	T330	42	52	59	62	65	68
363	None	40	46	51	53	56	60
363	None	36	41	45	48	50	
363	None	42	47	52	54	57	58
363	T363	36	40	42	44	47	49
69	T69	43	49	55	66	74	89
71	None	21	21	22	23	24	45
71	None	54					
71	None	28	29	32	33	34	
71	None						
71	None	36					
71	None	29	34	41	44	50	56
121	T121	40	43	45	47	49	51
84	None	53	58	61	65	69	74
84	T84	48	52	55	58	61	64
308	T308	55	56	58	61	71	86
308	None	55	62	67	71	80	131
318	T318	57	59	61	64	66	88
112	T112	36	39	40	41	42	52
85	T85	41	49	55	62	69	77
110	T110	27	29	31	34	50	70
105	T105	37	39	40	42	44	59
426	T426	36	43	46	48	50	52
432	T432	18	21	25	27	31	35
414	T414	18	20	22	28	35	56
413	T413	28	31	32	34	36	48
395	T395	30	33	34	38	62	79
329	T329	35	39	40	44	48	53
79	None	43	92				
79	T79	58	88				
101	T101	42	47	50	54	57	88
461	T461	27	33	40	46	51	71
424	None						
424	T424	32	34	37	39	46	63

Table C.2 (continued)

Trench No.	Well No.	Cumulaticve blow counts 4ft	5ft	6ft	7ft	8ft	9ft
373	None	27	35	41	46	50	54
373	T373	31	40	46	51	56	60
352	T352	25	28	30	32	34	37
367	T367	32	36	38	39	42	51
453	T453	23	27	29	31	41	61
422	T422	40	43	51	53	63	90
374	T374	41	43	45	47	48	50
241	T241	35	38	41	42	44	45
237	T237	23	25	28	29	31	32
180	T180	34	37	39	41	43	45
162	T162	31	33	35	36	39	41
60	T60	34	38	40	41	43	45
57	None	36	49	82			
57	T57	49	54	56	58	59	61
44	T44	24	26	27	28	29	30
63	T63	34	36	38	39	42	44
225	T225	31	33	36	38	40	42
279	T279-6	28	29	30	32	38	40
288	T288-6	14	15	17	18	19	28
13	T13-6	36	38	40	41	42	45
279	T279-1	18	19	20	21	22	43
279	T279-2	18	20	22	24	26	34
279	T279-3	15	17	18	19	21	39
279	T279-4	14	16	18	19	20	31
279	T279-5	13	14	15	16	28	42
288	T288-1	13	15	16	21	24	26
288	T288-2	16	17	19	20	21	22
288	T288-3	17	19	21	23	25	27
288	T288-4	13	15	22	25	28	30
288	T288-5	5	6	16	45	98	116
288	T288N	20	24	25	29	32	53
13	T13-5	19	20	21	22	24	26
13	T13-4	14	16	18	19	20	21
13	T13-3	22	24	25	26	27	28
13	T13-2	28	30	31	32	33	34
13	T13-1	19	20	22	23	25	34
11	T11	17	18	22	27	42	55
16	T16	19	20	21	23	24	36
252	T252	23	24	27	27	29	31
285	T285	13	14	19	32	53	91
284	T284	10	11	20	37	55	97
275	T275	15	24	36	59	73	93

Table C.2 (continued)

Trench No.	Well No.	Cumulaticve blow counts 4ft	5ft	6ft	7ft	8ft	9ft
		Wells near but outside burial trenches					
279	T279N	62	87	122	158	188	262
279	T279S	66	108	146	223	289	332
279	T279NE	41	63	101	145	175	241
279	T279SE	53	88	140	202	248	313
279	T279NW	46	89	138	169	195	239
279	T279SW	57	89	134	165	205	228
288	T288S	70	118	176	232	296	343
288	T288NW	56	75	94	141	186	223
288	T288SW	49	75	104	135	170	218
288	T288NE	59	89	115	134	157	220
288	T288SE	61	86	121	148	182	216
13	T13SE	77	128	179	227	255	283
13	T13NE	89	118	155	188	210	254
13	T13S	64	117	154	196	249	302
13	T13N	69	96	127	151	182	256
13	T13SW	67	101	133	154	173	201
13	T13NW	67	93	121	142	155	161
151	T151E	30	48	80	107	127	143
151	T151SE	40	56	95			
151	T151S	34	81	128	221		
151	T151SW	30	37	51	83	111	130
151	T151NE	34	49	59	66	84	130
151	T151NW	30	41	65	91	106	115
170	T170NW	14	18	25	34	48	78
170	T170W	46					
151	T151W	34	47	92	143	169	202

Table C.3. Penetration resistance (10 to 15 ft) of SWSA 6 burial trenches and control sites used for leachate monitoring wells

Trench No.	Well No.	Cumulaticve blow counts					
		10 ft	11 ft	12 ft	13 ft	14 ft	16 ft
103	T103B	60	62	65	69	71	
103	T103A	56	60	62	65	68	72
380	None	60	67	75			
380	T380	33	34	36			
370	T370	123	130	143	209		
370	None	111	124				
370	None	114	128	163			
82	T82	48	50	51	53	55	63
120	T120	59	62	65	71	73	
408	None	28	30	39			
408	None	31	33				
408	T408	26	29	35	39	66	75
397	T397	65	70	71	80	99	121
330	T330	71	74	77	79	89	96
363	None	64	67				
363	None						
363	None	61	68				
363	T363	53	60	79	116		
69	T69	125	163	188	221	265	308
71	None						
71	None						
71	None						
71	None						
71	None						
71	None	66	95	123			
121	T121	54	57	61	64	68	74
84	None	80	85				
84	T84	67	68	70	72	74	
308	T308	126	194				
308	None						
318	T318	128					
112	T112	81	117	156			
85	T85	96	131				
110	T110	100					
105	T105	91	109				
426	T426	76	123				
432	T432	37	45	89			
414	T414	97					
413	T413	69					
395	T395	124					
329	T329	61					
79	None						
79	T79						
101	T101	114	143				
461	T461	123					
424	None						
424	T424	75	94	111	133	171	

Table C.3 (continued)

Trench No.	Well No.	Cumulaticve blow counts 10 ft	11 ft	12 ft	13 ft	14 ft	16 ft
373	None	60	68	87	110	124	162
373	T373	65	70	81	98	123	139
352	T352	40	45	59	67	84	110
367	T367	72	95	124			
453	T453	96					
422	T422	132					
374	T374	53	66	75	109		
241	T241	47	51	70			
237	T237	34	35	39	43	54	66
180	T180	49	52	58	70	80	112
162	T162	43	49	64			
60	T60	48	72	113			
57	None						
57	T57	65	69	73	77	79	86
44	T44	31	33	34	36	36	37
63	T63	46	47	50	59	71	83
225	T225	44	47	51	62	82	92
279	T279-6	58	71	98	139	207	231
288	T288-6	41	76	144			
13	T13-6	64	109				
279	T279-1	71	88				
279	T279-2	61					
279	T279-3						
279	T279-4	42	84				
279	T279-5	75	103	126	219	289	312
288	T288-1	35	38	58	91	138	188
288	T288-2	28	67	90	95	115	168
288	T288-3	34	74				
288	T288-4	44	74	107	130	155	218
288	T288-5	130					
288	T288N	81	92	122	159	183	218
13	T13-5	33	88	170			
13	T13-4	22	29				
13	T13-3	29	63	148			
13	T13-2	40	69				
13	T13-1	60	113	201			
11	T11	59	71	110			
16	T16	56					
252	T252	45	93	115	135		
285	T285	133	160	184	248		
284	T284	116					
275	T275	110	148	160	191		

Table C.3 (continued)

Trench No.	Well No.	Cumulaticve blow counts 10 ft	11 ft	12 ft	13 ft	14 ft	16 ft
		Wells near but outside burial trenches					
279	T279N	309					
279	T279S	382	413	476			
279	T279NE						
279	T279SE	333	403				
279	T279NW	287					
279	T279SW	308					
288	T288S	425	530	616	666		
288	T288NW	266	293	297	317	353	
288	T288SW	258	285	297	324	378	
288	T288NE	241	286				
288	T288SE	252	283	298	306	325	406
13	T13SE	311	352	421	508		
13	T13NE	278	308				
13	T13S	328	369	414	474		
13	T13N	320					
13	T13SW	226	250	272			
13	T13NW	170	202	264	336		
151	T151E	163	190	251			
151	T151SE						
151	T151S						
151	T151SW	142	154	164	175	187	202
151	T151NE	174	202	265			
151	T151NW	127	146	163	215		
170	T170NW	123	174	222	274	326	372
170	T170W						
151	T151W						

APPENDIX D: Chemical Analyses of SWSA 6 Burial Trench Leachates

Table D.1. Chemical analyses of SWSA 6 burial trench leachates

Sampling Date: Burial Trench Number: Species/Chemical:	CAS No.	26Feb88 T-5 (ppb)	21Jun89 T-4 (ppb)	21Jun89 T-7 (ppb)	11Aug89 T-13 (ppb)	11Aug89 T-279 (ppb)	11Aug89 T-288 (ppb)
Chloromethane	74-87-3	NA	<10.00	<10.00	<10.00	<10.00	<10.00
Bromomethane	74-83-9	NA	<10.00	<10.00	<10.00	<10.00	<10.00
Vinyl Chloride	75-01-4	NA	<10.00	<10.00	<10.00	<10.00	<10.00
Chloroethane	75-00-3	NA	<10.00	<10.00	<10.00	<10.00	<10.00
Methylene chloride	75-09-2	NA	<10.00	B450.00	B50.00	B7.00	JB3.00
Acetone	67-64-1	NA	B77.00	JB6.00	B140.00	<10.00	JB4.00
Carbon disulfide	75-15-0	NA	<5.00	<5.00	<5.00	<5.00	<5.00
1,1-Dichloroethene	75-35-4	NA	<5.00	<5.00	<5.00	<5.00	<5.00
1,1-Dichloroethane	75-34-3	NA	<5.00	<5.00	<5.00	<5.00	<5.00
1,2-Dichloroethene (Total)	540-59-0	NA	<5.00	<5.00	<5.00	<5.00	<5.00
Chloroform	67-66-3	NA	<5.00	<5.00	35.00	J5.00	<5.00
1,2-Dichloroethane	107-06-2	NA	<5.00	<5.00	<5.00	J3.00	<5.00
2-Butanone	78-93-3	NA	<10.00	<10.00	<10.00	<10.00	<10.00
1,1,1-Trichloroethane	71-55-6	NA	<5.00	<5.00	<5.00	<5.00	<5.00
Carbon tetrachloride	56-23-5	NA	<5.00	<5.00	<5.00	<5.00	<5.00
Vinyl acetate	108-05-4	NA	<10.00	<10.00	<10.00	<10.00	<10.00
Bromodichloromethane	75-27-4	NA	<5.00	<5.00	<5.00	<5.00	<5.00
1,2-Dichloropropane	78-87-5	NA	<5.00	<5.00	<5.00	<5.00	<5.00
cis-1,3-Dichloropropene	10061-01-5	NA	<5.00	<5.00	<5.00	<5.00	<5.00
Trichloroethene	79-01-6	NA	<5.00	<5.00	<5.00	<5.00	<5.00
Dibromochloromethane	124-48-1	NA	<5.00	<5.00	<5.00	<5.00	<5.00
1,1,2-Trichloroethane	79-00-5	NA	<5.00	<5.00	<5.00	<5.00	<5.00
Benzene	71-43-2	NA	<5.00	<5.00	240.00	140.00	J2.00
trans-1,3-Dichloropropene	10061-02-06	NA	<5.00	<5.00	<5.00	<5.00	<5.00
Bromoform	75-25-2	NA	<5.00	<5.00	<5.00	<5.00	<5.00
4-Methyl-2-pentanone	108-10-1	NA	<10.00	<10.00	<10.00	<10.00	<10.00
2-Hexanone	591-78-6	NA	<10.00	<10.00	<10.00	<10.00	<10.00
Tetrachloroethene	127-18-4	NA	<5.00	<5.00	<5.00	<5.00	<5.00
1,1,2,2-tetrachloroethane	79-34-5	NA	<5.00	<5.00	<5.00	<5.00	<5.00
Toluene	108-88-3	NA	<5.00	<5.00	4300.00	3400.00	180.00
Chlorobenzene	108-90-7	NA	<5.00	<5.00	<5.00	<5.00	<5.00
Ethylbenzene	100-41-4	NA	<5.00	<5.00	6000.00	280.00	<5.00
Styrene	100-42-5	NA	<5.00	<5.00	<5.00	<5.00	<5.00
Xylene (Total)	1330-20-7	NA	<5.00	<5.00	32000.00	820.00	480.00
Phenol	108-95-2	NA	<11.00	<11.00	690.00	38.00	J2.00
bis(2-Chloroethyl)ether	111-44-4	NA	<11.00	<11.00	<13.00	<14.00	<13.00
2-Chlorophenol	95-57-8	NA	<11.00	<11.00	<13.00	<14.00	<13.00
1,3-Dichlorobenzene	541-73-1	NA	<11.00	<11.00	<13.00	<14.00	<13.00
1,4-Dichlorobenzene	106-46-7	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Benzyl alcohol	100-51-6	NA	<11.00	<11.00	<13.00	<14.00	<13.00
1,2-Dichlorobenzene	95-50-1	NA	<11.00	<11.00	<13.00	<14.00	<13.00
2-Methylphenol	95-48-7	NA	<11.00	<11.00	46.00	64.00	16.00
bis(2-Chloroisopropyl)ether	108-60-1	NA	<11.00	<11.00	<13.00	<14.00	<13.00
4-Methylphenol	106-44-5	NA	<11.00	<11.00	3900.00	120.00	25.00
N-nitroso-di-n-propylamine	621-64-7	NA	<11.00	<11.00	<13.00	<14.00	<13.00

Table D.1 (continued)

Sampling Date:		26Feb88	21Jun89	21Jun89	11Aug89	11Aug89	11Aug89
Burial Trench Number:		T-5	T-4	T-7	T-13	T-279	T-288
Species/Chemical:	CAS No.	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Hexachloroethane	67-72-1	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Nitrobenzene	98-95-3	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Isophorone	78-59-1	NA	<11.00	<11.00	<13.00	<14.00	<13.00
2-Nitrophenol	88-75-5	NA	<11.00	<11.00	<13.00	<14.00	<13.00
2,4-Dimethylphenol	105-67-9	NA	<11.00	<11.00	260.00	27.00	17.00
Benzoic acid	65-85-0	NA	<56.00	<56.00	300.00	110.00	J10.00
bis(2-chloroethoxy)methane	111-91-1	NA	<11.00	<11.00	<13.00	<14.00	<13.00
2,4-Dichlorophenol	120-83-2	NA	<11.00	<11.00	<13.00	<14.00	<13.00
1,2,4-Trichlorobenzene	120-82-1	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Naphthalene	91-20-3	NA	<11.00	<11.00	4000.00	<14.00	57.00
4-chloroaniline	106-47-8	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Hexachlorobutadiene	87-68-3	NA	<11.00	<11.00	<13.00	<14.00	<13.00
4-Chloro-3-methylphenol	59-50-7	NA	<11.00	<11.00	<13.00	<14.00	<13.00
2-Methylnaphthalene	91-57-6	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Hexachlorocyclopentadiene	77-47-4	NA	<11.00	<11.00	<13.00	<14.00	<13.00
2,4,6-Trichlorophenol	88-06-2	NA	<11.00	<11.00	<13.00	<14.00	<13.00
2,4,5-Trichlorophenol	95-95-4	NA	<56.00	<56.00	<67.00	<71.00	<67.00
2-Chloronaphthalene	91-58-7	NA	<11.00	<11.00	<13.00	<14.00	<13.00
2-Nitroaniline	88-74-4	NA	<56.00	<56.00	<67.00	<71.00	<67.00
Dimethylphthalate	131-11-3	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Acenaphthylene	208-96-8	NA	<11.00	<11.00	<13.00	<14.00	<13.00
2,6-Dinitrotoluene	606-20-2	NA	<11.00	<11.00	<13.00	<14.00	<13.00
3-Nitroaniline	99-09-2	NA	<56.00	<56.00	<67.00	<71.00	<67.00
Acenaphthene	83-32-9	NA	<11.00	<11.00	<13.00	<14.00	<13.00
2,4-Dinitrophenol	51-28-5	NA	<56.00	<56.00	<67.00	<71.00	<67.00
4-Nitrophenol	100-02-7	NA	<56.00	<56.00	<67.00	<71.00	<67.00
Dibenzofuran	132-64-9	NA	<11.00	<11.00	<13.00	<14.00	<13.00
2,4-Dinitrotoluene	121-14-2	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Diethylphthalate	84-66-2	NA	<11.00	<11.00	J12.00	<14.00	<13.00
4-Chlorophenyl-phenylether	7005-72-3	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Fluorene	86-73-7	NA	<11.00	<11.00	<13.00	<14.00	<13.00
4-Nitroaniline	100-01-6	NA	<56.00	<56.00	<67.00	<71.00	<67.00
4,6-Dinitro-2-methylphenol	534-52-1	NA	<56.00	<56.00	<67.00	<71.00	<67.00
N-nitrosodiphenylamine	86-30-6	NA	<11.00	<11.00	<13.00	<14.00	<13.00
4-bromophenyl-phenylether	101-55-3	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Hexachlorobenzene	118-74-1	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Pentachlorophenol	87-86-5	NA	<56.00	<56.00	<67.00	<71.00	<67.00
Phenanthrene	85-01-8	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Anthracene	120-12-7	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Di-n-butylphthalate	84-74-2	NA	JB1.00	<11.00	JB2.00	JB2.00	JB2.00
Fluoranthene	206-44-0	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Pyrene	129-00-0	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Butylbenzylphthalate	85-68-7	NA	<11.00	<11.00	<13.00	<14.00	<13.00
3,3'-Dichlorobenzidene	91-94-1	NA	<22.00	<22.00	<27.00	<29.00	<27.00
Benzo(a)anthracene	56-55-3	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Chrysene	218-01-9	NA	<11.00	<11.00	<13.00	<14.00	<13.00

Table D.1 (continued)

Sampling Date:		26Feb88	21Jun89	21Jun89	11Aug89	11Aug89	11Aug89
Burial Trench Number:		T-5	T-4	T-7	T-13	T-279	T-288
Species/Chemical:	CAS No.	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
bis(2-Ethylhexyl)phthalate	117-81-7	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Di-n-Octylphthalate	117-84-0	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Benzo(b)fluoranthene	205-99-2	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Benzo(k)fluoranthene	207-08-9	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Benzo(a)pyrene	50-32-8	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Indeno(1,2,3-cd)pyrene	193-39-5	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Dibenz(a,h)anthracene	53-70-3	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Benzo(g,h,i)perylene	191-24-2	NA	<11.00	<11.00	<13.00	<14.00	<13.00
Acrylamide	78-06-1	NA	NA	NA	NA	NA	NA
Silver	Ag	NA	6	<5	7	<5	<5
Aluminum	Al	NA	510	510	210	<50	<50
Arsenic	As	NA	60	87	<50	<50	<50
Boron	B	NA	<80	<80	<80	<80	<80
Barium	Ba	NA	120	170	440	550	430
Beryllium	Be	NA	<0.4	<0.4	<0.4	<0.4	<0.4
Calcium	Ca	NA	40000	99000	110000	24000	58000
Cadmium	Cd	NA	290	<2	<2	<2	<2
Cobalt	Co	NA	30	<3	7	<3	<3
Chromium	Cr	NA	14	20	43	36	27
Copper	Cu	NA	13	<10	29	27	14
Iron	Fe	NA	250	21	10	<10	<10
Mercury	Hg	NA	5	<0.1	1.0	<0.1	<0.1
Potassium	K	NA	NA	NA	7200	3900	1800
Lithium	Li	NA	<15000	<15000	<15000	<15000	<15000
Magnesium	Mg	NA	7100	17000	28000	27000	17000
Manganese	Mn	NA	3100	11	2700	27	440
Molybdenum	Mo	NA	<40	<40	<40	<40	<40
Sodium	Na	NA	6800	28000	13000	7400	<2000
Nickel	Ni	NA	190	<6	<6	<6	<6
Phosphorus	P	NA	<300	<300	<300	<300	<300
Lead	Pb	NA	<30	<30	<30	<30	<30
Antimony	Sb	NA	<40	<40	<40	<40	<40
Selenium	Se	NA	<80	<80	<80	<80	<80
Silicon	Si	NA	2600	3400	800	5200	3800
Tin	Sn	NA	<50	<50	<50	<50	<50
Strontium	Sr	NA	75	140	210	160	130
Titanium	Ti	NA	<20	<20	<20	<20	<20
Vanadium	V	NA	<4	<4	<3	<3	<3
Zinc	Zn	NA	140	<8	470	8	180
Zirconium	Zr	NA	<20	<20	<20	<20	<20
Bromide	Br-	NA	<50	<50	80	<50	<50
Chloride	Cl-	NA	4310	9100	47000	9300	1600
Fluoride	F-	NA	500	830	6400	900	200
Nitrate	NO3-	NA	750	3890	130	200	100
Phosphate	PO4	NA	<50	120	<50	<50	<50
Sulfate	SO4	NA	2440	56200	9100	8000	2200

Table D.1 (continued)

Sampling Date:		26Feb88	21Jun89	21Jun89	11Aug89	11Aug89	11Aug89
Burial Trench Number:		T-5	T-4	T-7	T-13	T-279	T-288
Species/Chemical:	CAS No.	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Total Organic Carbon	T.O.C.	NA	6500	15200	166000	182000	41300
Carbon-14	(Bq/L)	NA	NA	NA	38	19	9
Cobalt-60	(Bq/L)	NA	NA	NA	<0.1	<0.1	<0.1
Cesium-137	(Bq/L)	NA	NA	NA	<0.1	36	1.5
Gross Alpha	(Bq/L)	4500	NA	NA	0.55	1.0	0.56
Gross Beta	(Bq/L)	NA	NA	NA	55	91	26
Strontium-90	(Bq/L)	NA	NA	NA	5.5	35	14
Tritium	(Bq/L)	NA	2420	NA	11000	950	250
Americium-241	(Bq/L)	1.1	NA	NA	NA	NA	NA
Curium-244	(Bq/L)	<0.1	NA	NA	NA	NA	NA
Plutonium-239	(Bq/L)	0.8	NA	NA	NA	NA	NA
Uranium-232	(Bq/L)	58	NA	NA	NA	NA	NA
Uranium-233	(Bq/L)	3700	NA	NA	NA	NA	NA
pH	-log[H+]	NA	7.7	NA	7.8	7.9	8
Electrical Conductivity	(dS/m)	NA	194	NA	260	405	296
Dissolved Solids	(mg/L)	NA	200	100	560	500	280
Total Solids	(mg/L)	NA	NA	NA	NA	NA	NA
Suspended Solids	(mg/L)	NA	NA	NA	NA	NA	NA
Hardness	(mg/L)	NA	122	NA	326	188	194
Alkalinity	(mg/L)	NA	110	NA	420	160	240

Table D.2. Chemical analyses of SWSA 6 burial trench leachates

Sampling Date:	27Sep89	27Sep89	27Sep89	15Feb90	15Feb90	15Feb90	15Feb90
Burial Trench Number:	T-2	T-3	T-5	T-11	T-13	T-16	T-252
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Chloromethane	NA	NA	NA	<5000	<5000	<5000	<5000
Bromomethane	NA	NA	NA	<5000	<5000	<5000	<5000
Vinyl Chloride	NA	NA	NA	<5000	<5000	<5000	<5000
Chloroethane	NA	NA	NA	<5000	<5000	<5000	<5000
Methylene chloride	NA	NA	NA	<2500	<2500	J440	J550
Acetone	NA	NA	NA	<5000	<5000	J3800	5600
Carbon disulfide	NA	NA	NA	<2500	<2500	<2500	<2500
1,1-Dichloroethene	NA	NA	NA	<2500	<2500	<2500	<2500
1,1-Dichloroethane	NA	NA	NA	<2500	<2500	<2500	<2500
1,2-Dichloroethene (Total)	NA	NA	NA	<2500	<2500	<2500	<2500
Chloroform	NA	NA	NA	<2500	<2500	<2500	<2500
1,2-Dichloroethane	NA	NA	NA	<2500	<2500	<2500	<2500
2-Butanone	NA	NA	NA	<5000	<5000	<5000	<5000
1,1,1-Trichloroethane	NA	NA	NA	<2500	<2500	<2500	<2500
Carbon tetrachloride	NA	NA	NA	<2500	<2500	<2500	<2500
Vinyl acetate	NA	NA	NA	<5000	<5000	<5000	<5000
Bromodichloromethane	NA	NA	NA	<2500	<2500	<2500	<2500
1,2-Dichloropropane	NA	NA	NA	<2500	<2500	<2500	<2500
cis-1,3-Dichloropropene	NA	NA	NA	<2500	<2500	<2500	<2500
Trichloroethene	NA	NA	NA	<2500	<2500	<2500	<2500
Dibromochloromethane	NA	NA	NA	<2500	<2500	<2500	<2500
1,1,2-Trichloroethane	NA	NA	NA	<2500	<2500	<2500	<2500
Benzene	NA	NA	NA	<2500	<2500	<2500	<2500
trans-1,3-Dichloropropene	NA	NA	NA	<2500	<2500	<2500	<2500
Bromoform	NA	NA	NA	<2500	<2500	<2500	<2500
4-Methyl-2-pentanone	NA	NA	NA	<5000	<5000	<5000	<5000
2-Hexanone	NA	NA	NA	<5000	<5000	<5000	<5000
Tetrachloroethene	NA	NA	NA	<2500	<2500	<2500	<2500
1,1,2,2-tetrachloroethane	NA	NA	NA	<2500	<2500	<2500	<2500
Toluene	NA	NA	NA	3400	8700	69000	J2000
Chlorobenzene	NA	NA	NA	<2500	<2500	<2500	<2500
Ethylbenzene	NA	NA	NA	3500	14000	170000	3400
Styrene	NA	NA	NA	<2500	<2500	<2500	<2500
Xylene (Total)	NA	NA	NA	J1600	6400	77000	J1500
Phenol	NA	NA	NA	1800	<100	J18	<100
bis(2-Chloroethyl)ether	NA	NA	NA	<100	<100	<100	<100
2-Chlorophenol	NA	NA	NA	<100	<100	<100	<100
1,3-Dichlorobenzene	NA	NA	NA	<100	<100	<100	<100
1,4-Dichlorobenzene	NA	NA	NA	<100	<100	<100	<100
Benzyl alcohol	NA	NA	NA	<100	<100	<100	<100
1,2-Dichlorobenzene	NA	NA	NA	<100	<100	<100	<100
2-Methylphenol	NA	NA	NA	<100	<100	<100	<100
bis(2-Chloroisopropyl)ether	NA	NA	NA	<100	<100	<100	<100
4-Methylphenol	NA	NA	NA	2300	420	140	<100
N-nitroso-di-n-propylamine	NA	NA	NA	<100	<100	<100	<100
Hexachloroethane	NA	NA	NA	<100	<100	<100	<100

Table D.2 (continued)

Sampling Date:	27Sep89	27Sep89	27Sep89	15Feb90	15Feb90	15Feb90	15Feb90
Burial Trench Number:	T-2	T-3	T-5	T-11	T-13	T-16	T-252
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Nitrobenzene	NA	NA	NA	<100	<100	410	<100
Isophorone	NA	NA	NA	<100	<100	<100	<100
2-Nitrophenol	NA	NA	NA	<100	<100	<100	<100
2,4-Dimethylphenol	NA	NA	NA	<100	<100	<100	<100
Benzoic acid	NA	NA	NA	2400	<510	570	<510
bis(2-chloroethoxy)methane	NA	NA	NA	<100	<100	<100	<100
2,4-Dichlorophenol	NA	NA	NA	<100	<100	<100	<100
1,2,4-Trichlorobenzene	NA	NA	NA	<100	<100	<100	<100
Naphthalene	NA	NA	NA	1400	2300	<100	160
4-chloroaniline	NA	NA	NA	<100	<100	<100	<100
Hexachlorobutadiene	NA	NA	NA	<100	<100	<100	<100
4-Chloro-3-methylphenol	NA	NA	NA	<100	<100	<100	<100
2-Methylnaphthalene	NA	NA	NA	<100	<100	420	<100
Hexachlorocyclopentadiene	NA	NA	NA	<100	<100	<100	<100
2,4,6-Trichlorophenol	NA	NA	NA	<100	<100	<100	<100
2,4,5-Trichlorophenol	NA	NA	NA	<510	<510	<520	<510
2-Chloronaphthalene	NA	NA	NA	<100	<100	<100	<100
2-Nitroaniline	NA	NA	NA	<510	<510	<520	<510
Dimethylphthalate	NA	NA	NA	<100	<100	<100	<100
Acenaphthylene	NA	NA	NA	<100	<100	<100	<100
2,6-Dinitrotoluene	NA	NA	NA	<100	<100	<100	<100
3-Nitroaniline	NA	NA	NA	<510	<510	<520	<510
Acenaphthene	NA	NA	NA	<100	<100	<100	<100
2,4-Dinitrophenol	NA	NA	NA	<510	<510	<520	<510
4-Nitrophenol	NA	NA	NA	<510	<510	<520	<510
Dibenzofuran	NA	NA	NA	<100	<100	<100	<100
2,4-Dinitrotoluene	NA	NA	NA	<100	<100	<100	<100
Diethylphthalate	NA	NA	NA	<100	<100	<100	<100
4-Chlorophenyl-phenylether	NA	NA	NA	<100	<100	<100	<100
Fluorene	NA	NA	NA	<100	<100	<100	<100
4-Nitroaniline	NA	NA	NA	<510	<510	<520	<510
4,6-Dinitro-2-methylphenol	NA	NA	NA	<510	<510	<520	<510
N-nitrosodiphenylamine	NA	NA	NA	<100	<100	<100	<100
4-bromophenyl-phenylether	NA	NA	NA	<100	<100	<100	<100
Hexachlorobenzene	NA	NA	NA	<100	<100	<100	<100
Pentachlorophenol	NA	NA	NA	<510	<510	<520	<510
Phenanthrene	NA	NA	NA	<100	<100	<100	<100
Anthracene	NA	NA	NA	<100	<100	<100	<100
Di-n-butylphthalate	NA	NA	NA	<100	<100	<100	<100
Fluoranthene	NA	NA	NA	<100	<100	<100	<100
Pyrene	NA	NA	NA	<100	<100	<100	<100
Butylbenzylphthalate	NA	NA	NA	<100	<100	<100	<100
3,3'-Dichlorobenzidene	NA	NA	NA	<200	<200	<210	<200
Benzo(a)anthracene	NA	NA	NA	<100	<100	<100	<100
Chrysene	NA	NA	NA	<100	<100	<100	<100
bis(2-Ethylhexyl)phthalate	NA	NA	NA	<100	<100	<100	<100

Table D.2 (continued)

Sampling Date:	27Sep89	27Sep89	27Sep89	15Feb90	15Feb90	15Feb90	15Feb90
Burial Trench Number:	T-2	T-3	T-5	T-11	T-13	T-16	T-252
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Di-n-Octylphthalate	NA	NA	NA	<100	<100	<100	<100
Benzo(b)fluoranthene	NA	NA	NA	<100	<100	<100	<100
Benzo(k)fluoranthene	NA	NA	NA	<100	<100	<100	<100
Benzo(a)pyrene	NA	NA	NA	<100	<100	<100	<100
Indeno(1,2,3-cd)pyrene	NA	NA	NA	<100	<100	<100	<100
Dibenz(a,h)anthracene	NA	NA	NA	<100	<100	<100	<100
Benzo(g,h,i)perylene	NA	NA	NA	<100	<100	<100	<100
Acrylamide	NA	NA	NA	1190	<10	90	<10
Silver	<5	<5	<5	5	8	<5	6
Aluminum	<50	<50	<50	310	350	130	<30
Arsenic	<50	<50	<50	<50	54	<50	<50
Boron	<80	<80	<80	<80	<80	<80	<80
Barium	160	61	100	290	210	150	230
Beryllium	<0.4	<0.4	<0.4	<0.3	<0.3	<0.3	<0.3
Calcium	37000	27000	23000	130000	95000	110000	21000
Cadmium	<2	<2	<2	<7	<7	<7	<7
Cobalt	<3	<3	5	15	17	24	40
Chromium	14	6	10	13	8	10	10
Copper	25	23	26	<5	<5	<5	<5
Iron	130	280	410	39000	40000	30	17000
Mercury	<0.1	<0.1	<0.1	0.1	<0.1	0.3	0.3
Potassium	1000	2300	3300	110000	2650	2230	2080
Lithium	<15000	<15000	<15000	<15000	<15000	<15000	<15000
Magnesium	6200	4700	4500	40000	26000	35000	12000
Manganese	200	26	1900	5900	9300	4400	7900
Molybdenum	<40	<40	<40	<40	<40	<40	<40
Sodium	<2000	<2000	<2000	30900	6540	4960	4690
Nickel	<6	<6	<6	<9	<9	<9	<9
Phosphorus	<300	<300	<300	47000	<300	<300	<300
Lead	<30	<30	<30	<30	<30	<30	<30
Antimony	<40	<40	<40	100	<50	<50	65
Selenium	<80	<80	<80	59	81	<40	<40
Silicon	1600	1500	410	7700	11000	4600	4500
Tin	<50	<50	<50	<50	<50	<50	<50
Strontium	59	41	42	200	170	170	80
Titanium	<20	<20	<20	<20	<20	<20	<20
Vanadium	<3	<3	<3	<4	<4	<4	<4
Zinc	16	24	25	150	58	<5	8
Zirconium	<20	<20	<20	<20	<20	<20	<20
Bromide	<50	<50	<50	<500	<50	<50	<50
Chloride	4650	4450	3360	50000	13300	11300	4270
Fluoride	2400	330	2750	45000	2920	9720	780
Nitrate	120	380	180	<500	60	170	70
Phosphate	150	340	<50	66000	<50	<50	<50
Sulfate	7590	4760	10500	20000	6290	40100	5010
Total Organic Carbon	6900	8800	29300	615000	33000	362000	17000

Table D.2 (continued)

Sampling Date:	27Sep89	27Sep89	27Sep89	15Feb90	15Feb90	15Feb90	15Feb90
Burial Trench Number:	T-2	T-3	T-5	T-11	T-13	T-16	T-252
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)
Carbon-14	NA	NA	NA	21	5	14	10
Cobalt-60	NA	NA	NA	0.5	0.6	0.6	0.1
Cesium-137	NA	NA	NA	<0.1	<0.1	0.2	1.2
Gross Alpha	NA	NA	NA	0.032	0.029	0.057	0.035
Gross Beta	NA	NA	NA	2.1	0.04	0.79	0.11
Strontium-90	NA	NA	NA	0.02	0.02	0.30	0.02
Tritium	86	692	86	570	2500	1500	330
Americium-241	NA	NA	NA	NA	NA	NA	NA
Curium-244	NA	NA	NA	NA	NA	NA	NA
Plutonium-239	NA	NA	NA	NA	NA	NA	NA
Uranium-232	NA	NA	NA	NA	NA	NA	NA
Uranium-233	NA	NA	NA	NA	NA	NA	NA
pH	7.2	7.2	7.3	7.2	7.4	7.1	7
Electrical Conductivity	162	135	159	1823	594	609	249
Dissolved Solids	200	180	240	1900	420	720	180
Total Solids	NA	NA	NA	2140	840	1060	660
Suspended Solids	NA	NA	NA	240	420	340	480
Hardness	92	72	66	424	328	398	134
Alkalinity	110	100	80	838	381	345	146

Table D.3. Chemical analyses of SWSA 6 burial trench leachates

Sampling Date:	15Feb90	15Feb90	15Feb90	15Feb90	15Feb90	24Jul90	24Jul90
Burial Trench Number:	T-275	T-279	T-284	T-285	T-288	T-13	T-16
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Chloromethane	<5000	<5000	<5000	<5000	<10000	<10	<10
Bromomethane	<5000	<5000	<5000	<5000	<10000	<10	<10
Vinyl Chloride	<5000	<5000	<5000	<5000	<10000	<10	<10
Chloroethane	<5000	<5000	<5000	<5000	<10000	<10	<10
Methylene chloride	J520	J430	J1000	J1400	J790	<5	<5
Acetone	5700	8300	13000	50000	<10000	16	37
Carbon disulfide	J890	<2500	2800	<2500	<5000	<5	<5
1,1-Dichloroethene	<2500	<2500	<2500	<2500	<5000	<5	<5
1,1-Dichloroethane	<2500	<2500	<2500	<2500	<5000	<5	<5
1,2-Dichloroethene (Total)	<2500	<2500	<2500	<2500	<5000	<5	<5
Chloroform	<2500	<2500	<2500	<2500	<5000	<5	<5
1,2-Dichloroethane	<2500	<2500	<2500	<2500	<5000	<5	<5
2-Butanone	<5000	<5000	<5000	<5000	<10000	<10	<10
1,1,1-Trichloroethane	<2500	<2500	<2500	<2500	<5000	<5	<5
Carbon tetrachloride	<2500	<2500	<2500	<2500	<5000	<5	<5
Vinyl acetate	<5000	<5000	<5000	<5000	<10000	<10	<10
Bromodichloromethane	<2500	<2500	<2500	<2500	<5000	<5	<5
1,2-Dichloropropane	<2500	<2500	<2500	<2500	<5000	<5	<5
cis-1,3-Dichloropropene	<2500	<2500	<2500	<2500	<5000	<5	<5
Trichloroethene	<2500	<2500	<2500	<2500	<5000	<5	<5
Dibromochloromethane	<2500	<2500	<2500	<2500	<5000	<5	<5
1,1,2-Trichloroethane	<2500	<2500	<2500	<2500	<5000	<5	<5
Benzene	<2500	<2500	<2500	<2500	<5000	<5	10
trans-1,3-Dichloropropene	<2500	<2500	<2500	<2500	<5000	<5	<5
Bromoform	<2500	<2500	<2500	<2500	<5000	<5	<5
4-Methyl-2-pentanone	<5000	<5000	<5000	<5000	<10000	<10	<10
2-Hexanone	<5000	<5000	<5000	<5000	<10000	<10	<10
Tetrachloroethene	<2500	<2500	<2500	<2500	<5000	<5	<5
1,1,2,2-tetrachloroethane	<2500	<2500	<2500	<2500	<5000	<5	<5
Toluene	150000	5000	<2500	<2500	<5000	18	37
Chlorobenzene	<2500	<2500	<2500	<2500	<5000	<5	<5
Ethylbenzene	3200	J2300	<2500	<2500	<5000	<5	<5
Styrene	<2500	<2500	<2500	<2500	<5000	<5	<5
Xylene (Total)	J1500	<2500	<2500	<2500	<5000	486	56600
Phenol	<100	<100	<100	<100	<100	NA	NA
bis(2-Chloroethyl)ether	<100	<100	<100	<100	<100	NA	NA
2-Chlorophenol	<100	<100	<100	<100	<100	NA	NA
1,3-Dichlorobenzene	<100	<100	<100	<100	<100	NA	NA
1,4-Dichlorobenzene	<100	<100	<100	<100	<100	NA	NA
Benzyl alcohol	<100	<100	<100	<100	<100	NA	NA
1,2-Dichlorobenzene	<100	<100	<100	<100	<100	NA	NA
2-Methylphenol	<100	<100	<100	<100	<100	NA	NA
bis(2-Chloroisopropyl)ether	<100	<100	<100	<100	<100	NA	NA
4-Methylphenol	<100	<100	<100	<100	<100	NA	NA
N-nitroso-di-n-propylamine	<100	<100	<100	<100	<100	NA	NA
Hexachloroethane	<100	<100	<100	<100	<100	NA	NA

Table D.3 (continued)

Sampling Date: Burial Trench Number: Species/Chemical:	15Feb90 T-275 (ppb)	15Feb90 T-279 (ppb)	15Feb90 T-284 (ppb)	15Feb90 T-285 (ppb)	15Feb90 T-288 (ppb)	24Jul90 T-13 (ppb)	24Jul90 T-16 (ppb)
Nitrobenzene	<100	<100	<100	<100	<100	NA	NA
Isophorone	<100	<100	<100	<100	<100	NA	NA
2-Nitrophenol	<100	<100	<100	<100	<100	NA	NA
2,4-Dimethylphenol	<100	<100	<100	<100	<100	NA	NA
Benzoic acid	J4	<510	<510	<510	<510	NA	NA
bis(2-chloroethoxy)methane	<100	<100	<100	<100	<100	NA	NA
2,4-Dichlorophenol	<100	<100	<100	<100	<100	NA	NA
1,2,4-Trichlorobenzene	<100	<100	<100	<100	<100	NA	NA
Naphthalene	820	810	<100	<100	J32	NA	NA
4-chloroaniline	<100	<100	<100	<100	<100	NA	NA
Hexachlorobutadiene	<100	<100	<100	<100	<100	NA	NA
4-Chloro-3-methylphenol	<100	<100	<100	<100	<100	NA	NA
2-Methylnaphthalene	<100	<100	<100	<100	<100	NA	NA
Hexachlorocyclopentadiene	<100	<100	<100	<100	<100	NA	NA
2,4,6-Trichlorophenol	<100	<100	<100	<100	<100	NA	NA
2,4,5-Trichlorophenol	<510	<510	<510	<510	<510	NA	NA
2-Chloronaphthalene	<100	<100	<100	<100	<100	NA	NA
2-Nitroaniline	<510	<510	<510	<510	<510	NA	NA
Dimethylphthalate	<100	<100	<100	<100	<100	NA	NA
Acenaphthylene	<100	<100	<100	<100	<100	NA	NA
2,6-Dinitrotoluene	<100	<100	<100	<100	<100	NA	NA
3-Nitroaniline	<510	<510	<510	<510	<510	NA	NA
Acenaphthene	<100	<100	<100	<100	<100	NA	NA
2,4-Dinitrophenol	<510	<510	<510	<510	<510	NA	NA
4-Nitrophenol	<510	<510	<510	<510	<510	NA	NA
Dibenzofuran	<100	<100	<100	<100	<100	NA	NA
2,4-Dinitrotoluene	<100	<100	<100	<100	<100	NA	NA
Diethylphthalate	<100	<100	<100	<100	<100	NA	NA
4-Chlorophenyl-phenylether	<100	<100	<100	<100	<100	NA	NA
Fluorene	<100	<100	<100	<100	<100	NA	NA
4-Nitroaniline	<510	<510	<510	<510	<510	NA	NA
4,6-Dinitro-2-methylphenol	<510	<510	<510	<510	<510	NA	NA
N-nitrosodiphenylamine	<100	<100	<100	<100	<100	NA	NA
4-bromophenyl-phenylether	<100	<100	<100	<100	<100	NA	NA
Hexachlorobenzene	<100	<100	<100	<100	<100	NA	NA
Pentachlorophenol	<510	<510	<510	<510	<510	NA	NA
Phenanthrene	<100	<100	<100	<100	<100	NA	NA
Anthracene	<100	<100	<100	<100	<100	NA	NA
Di-n-butylphthalate	<100	<100	<100	<100	<100	NA	NA
Fluoranthene	<100	<100	<100	<100	<100	NA	NA
Pyrene	<100	<100	<100	<100	<100	NA	NA
Butylbenzylphthalate	<100	<100	<100	<100	<100	NA	NA
3,3'-Dichlorobenzidene	<200	<200	<200	<200	<200	NA	NA
Benzo(a)anthracene	<100	<100	<100	<100	<100	NA	NA
Chrysene	<100	<100	<100	<100	<100	NA	NA
bis(2-Ethylhexyl)phthalate	<100	<100	<100	<100	<100	NA	NA

Table D.3 (continued)

Sampling Date:	15Feb90	15Feb90	15Feb90	15Feb90	15Feb90	24Jul90	24Jul90
Burial Trench Number:	T-275	T-279	T-284	T-285	T-288	T-13	T-16
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Di-n-Octylphthalate	<100	<100	<100	<100	<100	NA	NA
Benzo(b)fluoranthene	<100	<100	<100	<100	<100	NA	NA
Benzo(k)fluoranthene	<100	<100	<100	<100	<100	NA	NA
Benzo(a)pyrene	<100	<100	<100	<100	<100	NA	NA
Indeno(1,2,3-cd)pyrene	<100	<100	<100	<100	<100	NA	NA
Dibenz(a,h)anthracene	<100	<100	<100	<100	<100	NA	NA
Benzo(g,h,i)perylene	<100	<100	<100	<100	<100	NA	NA
Acrylamide	<10	<10	<10	<10	<10	NA	NA
Silver	<5	5	<5	<5	<5	NA	NA
Aluminum	<30	130	440	180	<30	NA	NA
Arsenic	<50	63	<50	<50	<50	NA	NA
Boron	<80	<80	<80	<80	<80	NA	NA
Barium	130	130	170	130	160	NA	NA
Beryllium	<0.3	<0.3	<0.3	<0.3	<0.3	NA	NA
Calcium	39000	110000	120000	110000	64000	NA	NA
Cadmium	<7	<7	<7	<7	<7	NA	NA
Cobalt	43	10	<4	<4	21	NA	NA
Chromium	6	8	5	5	6	NA	NA
Copper	<5	<5	<5	<5	<5	NA	NA
Iron	190	16000	140	27	7900	NA	NA
Mercury	<0.1	0.3	0.4	<0.1	2120	NA	NA
Potassium	730	1960	800	530	3300	NA	NA
Lithium	<15000	<15000	<15000	<15000	<15000	NA	NA
Magnesium	14000	26000	32000	15000	18000	NA	NA
Manganese	3600	6100	600	260	3700	NA	NA
Molybdenum	<40	<40	<40	<40	<40	NA	NA
Sodium	1650	3010	2530	1040	1200	NA	NA
Nickel	<9	<9	<9	<9	<9	NA	NA
Phosphorus	<300	<300	<300	<300	<300	NA	NA
Lead	<30	<30	<30	<30	<30	NA	NA
Antimony	<50	66	<50	<50	51	NA	NA
Selenium	<40	<40	<40	<40	<40	NA	NA
Silicon	2200	5100	890	880	2900	NA	NA
Tin	<50	<50	<50	<50	<50	NA	NA
Strontium	81	170	170	130	120	NA	NA
Titanium	<20	<20	<20	<20	<20	NA	NA
Vanadium	<4	<4	<4	<4	<4	NA	NA
Zinc	17	58	560	<5	320	NA	NA
Zirconium	<20	<20	<20	<20	<20	NA	NA
Bromide	<50	70	<50	<50	<50	NA	NA
Chloride	2220	4610	5090	1150	2540	NA	NA
Fluoride	1600	1090	190	200	140	NA	NA
Nitrate	80	110	110	170	130	NA	NA
Phosphate	<50	<50	<50	<50	<50	NA	NA
Sulfate	10500	1390	7320	6130	820	NA	NA
Total Organic Carbon	17000	22000	8800	4000	7500	NA	NA

Table D.3 (continued)

Sampling Date:	15Feb90	15Feb90	15Feb90	15Feb90	15Feb90	24Jul90	24Jul90
Burial Trench Number:	T-275	T-279	T-284	T-285	T-288	T-13	T-16
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)
Carbon-14	8	3	8	2	<1	NA	NA
Cobalt-60	1.2	<0.1	<0.1	1.6	<0.1	NA	NA
Cesium-137	<0.1	<0.1	<0.1	0.8	<0.1	NA	NA
Gross Alpha	0.049	0.035	0.058	0.076	<0.02	NA	NA
Gross Beta	0.01	0.10	0.43	0.28	0.54	NA	NA
Strontium-90	0.01	0.02	<0.01	0.06	0.09	NA	NA
Tritium	100	300	430	94	350	NA	NA
Americium-241	NA	NA	NA	NA	NA	NA	NA
Curium-244	NA	NA	NA	NA	NA	NA	NA
Plutonium-239	NA	NA	NA	NA	NA	NA	NA
Uranium-232	NA	NA	NA	NA	NA	NA	NA
Uranium-233	NA	NA	NA	NA	NA	NA	NA
pH	7.4	7	7.9	7.8	6.9	6.4	6.6
Electrical Conductivity	266	511	590	490	373	748	935
Dissolved Solids	240	552	500	380	320	380	640
Total Solids	4160	1080	1620	2040	740	NA	NA
Suspended Solids	3920	528	1120	1660	420	NA	NA
Hardness	158	512	396	308	206	328	512
Alkalinity	159	482	421	331	236	396	560

Table D.4. Chemical analyses of SWSA 6 burial trench leachates

Sampling Date: Burial Trench Number: Species/Chemical:	24Jul90 T-11 (ppb)	24Jul90 T-288 (ppb)	24Jul90 T-285 (ppb)	24Jul90 T-252 (ppb)	24Jul90 T-284 (ppb)	24Jul90 T-275 (ppb)	24Jul90 T-279 (ppb)
Chloromethane	<10	<10	<10	<10	<10	<10	<10
Bromomethane	<10	<10	<10	<10	<10	<10	<10
Vinyl Chloride	<10	<10	<10	<10	<10	<10	<10
Chloroethane	<10	<10	<10	<10	<10	<10	<10
Methylene chloride	<5	<5	<5	<5	<5	<5	<5
Acetone	3270	108	<10	J5	J1	J3	J3
Carbon disulfide	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethene	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethene (Total)	<5	<5	<5	<5	<5	<5	<5
Chloroform	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane	<5	<5	<5	<5	<5	<5	<5
2-Butanone	<10	<10	<10	<10	<10	<10	<10
1,1,1-Trichloroethane	<5	<5	<5	<5	<5	<5	<5
Carbon tetrachloride	<5	<5	<5	<5	<5	<5	<5
Vinyl acetate	<10	<10	<10	<10	<10	<10	<10
Bromodichloromethane	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloropropane	<5	<5	<5	<5	<5	<5	<5
cis-1,3-Dichloropropene	<5	<5	<5	<5	<5	<5	<5
Trichloroethene	<5	<5	<5	<5	<5	<5	<5
Dibromochloromethane	<5	<5	<5	<5	<5	<5	<5
1,1,2-Trichloroethane	<5	<5	<5	<5	<5	<5	<5
Benzene	9	<5	<5	<5	<5	<5	J2
trans-1,3-Dichloropropene	<5	<5	<5	<5	<5	<5	<5
Bromoform	<5	<5	<5	<5	<5	<5	<5
4-Methyl-2-pentanone	<10	<10	<10	<10	<10	<10	<10
2-Hexanone	<10	<10	<10	<10	<10	<10	<10
Tetrachloroethene	<5	<5	<5	<5	<5	<5	<5
1,1,2,2-tetrachloroethane	<5	<5	<5	<5	<5	<5	<5
Toluene	23	15	<5	20	<5	J2	J4
Chlorobenzene	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	<5	<5	<5	<5	<5	<5	<5
Styrene	<5	<5	<5	<5	<5	<5	<5
Xylene (Total)	9000	7300	J2	28	J1	60	42300
Phenol	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroisopropyl)ether	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA
N-nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA

Table D.4 (continued)

Sampling Date: Burial Trench Number: Species/Chemical:	24Jul90 T-11 (ppb)	24Jul90 T-288 (ppb)	24Jul90 T-285 (ppb)	24Jul90 T-252 (ppb)	24Jul90 T-284 (ppb)	24Jul90 T-275 (ppb)	24Jul90 T-279 (ppb)
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA
Benzoic acid	NA	NA	NA	NA	NA	NA	NA
bis(2-chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA
4-chloroaniline	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA
Dimethylphthalate	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	NA	NA
N-nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA
4-bromophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA

Table D.4 (continued)

Sampling Date:	24Jul90	24Jul90	24Jul90	24Jul90	24Jul90	24Jul90	24Jul90
Burial Trench Number:	T-11	T-288	T-285	T-252	T-284	T-275	T-279
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Di-n-Octylphthalate	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA
Acrylamide	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA
Aluminum	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA
Boron	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA
Lithium	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA
Molybdenum	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA
Phosphorus	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA
Silicon	NA	NA	NA	NA	NA	NA	NA
Tin	NA	NA	NA	NA	NA	NA	NA
Strontium	NA	NA	NA	NA	NA	NA	NA
Titanium	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA
Zirconium	NA	NA	NA	NA	NA	NA	NA
Bromide	NA	NA	NA	NA	NA	NA	NA
Chloride	NA	NA	NA	NA	NA	NA	NA
Fluoride	NA	NA	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA
Phosphate	NA	NA	NA	NA	NA	NA	NA
Sulfate	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA

Table D.4 (continued)

Sampling Date:	24Jul90	24Jul90	24Jul90	24Jul90	24Jul90	24Jul90	24Jul90
Burial Trench Number:	T-11	T-288	T-285	T-252	T-284	T-275	T-279
Species/Chemical:	(ppb) (Bq/L)	(ppb) (Bq/L)	(ppb) (Bq/L)	(ppb) (Bq/L)	(ppb) (Bq/L)	(ppb) (Bq/L)	(ppb) (Bq/L)
Carbon-14	NA	NA	NA	NA	NA	NA	NA
Cobalt-60	NA	NA	NA	NA	NA	NA	NA
Cesium-137	NA	NA	NA	NA	NA	NA	NA
Gross Alpha	NA	NA	NA	NA	NA	NA	NA
Gross Beta	NA	NA	NA	NA	NA	NA	NA
Strontium-90	NA	NA	NA	NA	NA	NA	NA
Tritium	NA	NA	NA	NA	NA	NA	NA
Americium-241	NA	NA	NA	NA	NA	NA	NA
Curium-244	NA	NA	NA	NA	NA	NA	NA
Plutonium-239	NA	NA	NA	NA	NA	NA	NA
Uranium-232	NA	NA	NA	NA	NA	NA	NA
Uranium-233	NA	NA	NA	NA	NA	NA	NA
pH	5.5	6.6	6.4	6.8	6.4	6.1	6.7
Electrical Conductivity	1629	606	417	505	614	358	583
Dissolved Solids	1760	480	300	240	360	180	360
Total Solids	NA	NA	NA	NA	NA	NA	NA
Suspended Solids	NA	NA	NA	NA	NA	NA	NA
Hardness	700	268	204	224	394	204	410
Alkalinity	610	310	284	325	419	223	393

Table D.5. Chemical analyses of SWSA 6 burial trench leachates

Sampling Date:	09Nov89	09Nov89	09Nov89	09Nov89	09Nov89	09Nov89	06Apl89
Burial Trench Number:	T-13	T-279	T-288	T-85	T-105	T-318	T-237
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Chloromethane	<2500	<1000	<250	<2500	<10000	<1000	<10
Bromomethane	<2500	<1000	<250	<2500	<10000	<1000	<10
Vinyl Chloride	<2500	<1000	<250	<2500	<10000	<1000	<10
Chloroethane	<2500	<1000	<250	<2500	<10000	<1000	<10
Methylene chloride	JB390	JB107	JB37	JB280	JB2900	JB120	B7
Acetone	2800	1200	JB220	3100	12500	1200	B51
Carbon disulfide	<1300	<500	<130	<1300	<5000	<500	J0.7
1,1-Dichloroethene	<1300	<500	<130	<1300	<5000	<500	<5
1,1-Dichloroethane	<1300	<500	<130	<1300	<5000	<500	<5
1,2-Dichloroethene (Total)	<1300	<500	<130	<1300	<5000	<500	<5
Chloroform	<1300	<500	<130	<1300	5300	<500	<5
1,2-Dichloroethane	<1300	<500	<130	<1300	<5000	<500	<5
2-Butanone	<2500	<1000	<250	<2500	<10000	<1000	B19
1,1,1-Trichloroethane	<1300	<500	<130	<1300	<5000	<500	<5
Carbon tetrachloride	<1300	<500	<130	<1300	<5000	<500	<5
Vinyl acetate	<2500	<1000	<250	<2500	<10000	<1000	<10
Bromodichloromethane	<1300	<500	<130	<1300	<5000	<500	<5
1,2-Dichloropropane	<1300	<500	<130	<1300	<5000	<500	<5
cis-1,3-Dichloropropene	<1300	<500	<130	<1300	<5000	<500	<5
Trichloroethene	<1300	<500	<130	<1300	<5000	<500	<5
Dibromochloromethane	<1300	<500	<130	<1300	<5000	<500	<5
1,1,2-Trichloroethane	<1300	<500	<130	<1300	<5000	<500	<5
Benzene	<1300	<500	<130	<1300	<5000	<500	28
trans-1,3-Dichloropropene	<1300	<500	<130	<1300	<5000	<500	<5
Bromoform	<1300	<500	<130	<1300	<5000	<500	<5
4-Methyl-2-pentanone	<2500	<1000	<250	<2500	<10000	<1000	<10
2-Hexanone	<2500	<1000	<250	<2500	<10000	<1000	<10
Tetrachloroethene	<1300	<500	<130	<1300	<5000	<500	<5
1,1,2,2-tetrachloroethane	<1300	<500	<130	<1300	<5000	<500	<5
Toluene	6600	9500	180	18000	74000	8400	E2500
Chlorobenzene	<1300	<500	<130	<1300	<5000	<500	<5
Ethylbenzene	3300	<500	<130	<1300	<5000	<500	190
Styrene	<1300	<500	<130	<1300	<5000	<500	<5
Xylene (Total)	28000	2500	420	12000	21000	9600	E1700
Phenol	140	<130	<13	J16	760	J36	<11
bis(2-Chloroethyl)ether	<120	<130	<13	<120	<130	<120	<11
2-Chlorophenol	<120	<130	<13	<120	<130	<120	<11
1,3-Dichlorobenzene	<120	<130	<13	<120	<130	<120	<11
1,4-Dichlorobenzene	<120	<130	<13	<120	<130	<120	<11
Benzyl alcohol	<120	<130	<13	<120	<130	<120	<11
1,2-Dichlorobenzene	<120	<130	<13	<120	<130	<120	<11
2-Methylphenol	J26	<130	<13	J23	200	<120	<11
bis(2-Chloroisopropyl)ether	<120	<130	<13	<120	<130	<120	<11
4-Methylphenol	1800	J69	<13	500	4600	740	<11
N-nitroso-di-n-propylamine	<120	<130	<13	<120	<130	<120	<11
Hexachloroethane	<120	<130	<13	<120	<130	<120	<11

Table D.5 (continued)

Sampling Date:	09Nov89	09Nov89	09Nov89	09Nov89	09Nov89	09Nov89	06Apr89
Burial Trench Number:	T-13	T-279	T-288	T-85	T-105	T-318	T-237
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Nitrobenzene	<120	<130	<13	<120	<130	<120	<11
Isophorone	<120	<130	<13	<120	<130	<120	<11
2-Nitrophenol	<120	<130	<13	<120	<130	<120	<11
2,4-Dimethylphenol	<120	<130	<13	<120	160	380	20
Benzoic acid	<610	<630	<65	J250	J540	<610	<57
bis(2-chloroethoxy)methane	<120	<130	<13	<120	<130	<120	<11
2,4-Dichlorophenol	<120	<130	<13	<120	<130	<120	<11
1,2,4-Trichlorobenzene	<120	<130	<13	<120	<130	<120	<11
Naphthalene	3000	1100	18	2200	8800	1100	240
4-chloroaniline	<120	<130	<13	<120	<130	<120	<11
Hexachlorobutadiene	<120	<130	<13	<120	<130	<120	<11
4-Chloro-3-methylphenol	<120	<130	<13	<120	<130	<120	<11
2-Methylnaphthalene	<120	<130	<13	<120	<130	<120	<11
Hexachlorocyclopentadiene	<120	<130	<13	<120	<130	<120	<11
2,4,6-Trichlorophenol	<120	<130	<13	<120	<130	<120	<11
2,4,5-Trichlorophenol	<610	<630	<65	<620	<630	<610	<57
2-Chloronaphthalene	<120	<130	<13	<120	<130	<120	<11
2-Nitroaniline	<610	<630	<65	<620	<630	<610	<57
Dimethylphthalate	<120	<130	<13	<120	<130	<120	<11
Acenaphthylene	<120	<130	<13	<120	<130	<120	<11
2,6-Dinitrotoluene	<120	<130	<13	<120	<130	<120	<11
3-Nitroaniline	<610	<630	<65	<620	<630	<610	<57
Acenaphthene	<120	<130	<13	<120	<130	<120	<11
2,4-Dinitrophenol	<610	<630	<65	<620	<630	<610	<57
4-Nitrophenol	<610	<630	<65	<620	<630	<610	<57
Dibenzofuran	<120	<130	<13	<120	<130	<120	<11
2,4-Dinitrotoluene	<120	<130	<13	<120	<130	<120	<11
Diethylphthalate	<120	<130	<13	<120	<130	<120	<11
4-Chlorophenyl-phenylether	<120	<130	<13	<120	<130	<120	<11
Fluorene	<120	<130	<13	<120	<130	<120	<11
4-Nitroaniline	<610	<630	<65	<620	<630	<610	<57
4,6-Dinitro-2-methylphenol	<610	<630	<65	<620	<630	<610	<57
N-nitrosodiphenylamine	<120	<130	<13	<120	<130	<120	<11
4-bromophenyl-phenylether	<120	<130	<13	<120	<130	<120	<11
Hexachlorobenzene	<120	<130	<13	<120	<130	<120	<11
Pentachlorophenol	<610	<630	<65	<620	<630	<610	<57
Phenanthrene	<120	<130	<13	<120	<130	<120	<11
Anthracene	<120	<130	<13	<120	<130	<120	<11
Di-n-butylphthalate	<120	<130	<13	<120	<130	<120	<11
Fluoranthene	<120	<130	<13	<120	<130	<120	<11
Pyrene	<120	<130	<13	<120	<130	<120	<11
Butylbenzylphthalate	<120	<130	<13	<120	<130	<120	<11
3,3'-Dichlorobenzidene	<240	<250	<26	<250	<250	<240	<23
Benzo(a)anthracene	<120	<130	<13	<120	<130	<120	<11
Chrysene	<120	<130	<13	<120	<130	<120	<11
bis(2-Ethylhexyl)phthalate	<120	<130	<13	<120	<130	<120	<11

Table D.5 (continued)

Sampling Date:	09Nov89	09Nov89	09Nov89	09Nov89	09Nov89	09Nov89	06Apl89
Burial Trench Number:	T-13	T-279	T-288	T-85	T-105	T-318	T-237
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Di-n-Octylphthalate	<120	<130	<13	<120	<130	<120	<11
Benzo(b)fluoranthene	<120	<130	<13	<120	<130	<120	<11
Benzo(k)fluoranthene	<120	<130	<13	<120	<130	<120	<11
Benzo(a)pyrene	<120	<130	<13	<120	<130	<120	<11
Indeno(1,2,3-cd)pyrene	<120	<130	<13	<120	<130	<120	<11
Dibenz(a,h)anthracene	<120	<130	<13	<120	<130	<120	<11
Benzo(g,h,i)perylene	<120	<130	<13	<120	<130	<120	<11
Acrylamide	NA	NA	NA	NA	NA	NA	<1000
Silver	NA	NA	NA	NA	NA	NA	15
Aluminum	NA	NA	NA	NA	NA	NA	290
Arsenic	NA	NA	NA	NA	NA	NA	69
Boron	NA	NA	NA	NA	NA	NA	<80
Barium	NA	NA	NA	NA	NA	NA	360
Beryllium	NA	NA	NA	NA	NA	NA	<0.4
Calcium	NA	NA	NA	NA	NA	NA	130000
Cadmium	NA	NA	NA	NA	NA	NA	<2
Cobalt	NA	NA	NA	NA	NA	NA	31
Chromium	NA	NA	NA	NA	NA	NA	12
Copper	NA	NA	NA	NA	NA	NA	<10
Iron	NA	NA	NA	NA	NA	NA	11000
Mercury	NA	NA	NA	NA	NA	NA	0.3
Potassium	NA	NA	NA	NA	NA	NA	5700
Lithium	NA	NA	NA	NA	NA	NA	<15000
Magnesium	NA	NA	NA	NA	NA	NA	20000
Manganese	NA	NA	NA	NA	NA	NA	13000
Molybdenum	NA	NA	NA	NA	NA	NA	<40
Sodium	NA	NA	NA	NA	NA	NA	8000
Nickel	NA	NA	NA	NA	NA	NA	<6
Phosphorus	NA	NA	NA	NA	NA	NA	<300
Lead	NA	NA	NA	NA	NA	NA	<30
Antimony	NA	NA	NA	NA	NA	NA	<40
Selenium	NA	NA	NA	NA	NA	NA	<80
Silicon	NA	NA	NA	NA	NA	NA	2200
Tin	NA	NA	NA	NA	NA	NA	<50
Strontium	NA	NA	NA	NA	NA	NA	170
Titanium	NA	NA	NA	NA	NA	NA	<20
Vanadium	NA	NA	NA	NA	NA	NA	<4
Zinc	NA	NA	NA	NA	NA	NA	200
Zirconium	NA	NA	NA	NA	NA	NA	<20
Bromide	NA	NA	NA	NA	NA	NA	170
Chloride	NA	NA	NA	NA	NA	NA	13600
Fluoride	NA	NA	NA	NA	NA	NA	7230
Nitrate	NA	NA	NA	NA	NA	NA	100
Phosphate	NA	NA	NA	NA	NA	NA	<50
Sulfate	NA	NA	NA	NA	NA	NA	280
Total Organic Carbon	NA	NA	NA	NA	NA	NA	140000

Table D.5 (continued)

Sampling Date:	09Nov89	09Nov89	09Nov89	09Nov89	09Nov89	09Nov89	06Apl89
Burial Trench Number:	T-13	T-279	T-288	T-85	T-105	T-318	T-237
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)
Carbon-14	NA	NA	NA	NA	NA	NA	<30
Cobalt-60	NA	NA	NA	NA	NA	NA	<2
Cesium-137	NA	NA	NA	NA	NA	NA	2.4
Gross Alpha	NA	NA	NA	NA	NA	NA	<0.4
Gross Beta	NA	NA	NA	NA	NA	NA	12
Strontium-90	NA	NA	NA	NA	NA	NA	0.14
Tritium	NA	NA	NA	NA	NA	NA	2700
Americium-241	NA	NA	NA	NA	NA	NA	NA
Curium-244	NA	NA	NA	NA	NA	NA	NA
Plutonium-239	NA	NA	NA	NA	NA	NA	NA
Uranium-232	NA	NA	NA	NA	NA	NA	NA
Uranium-233	NA	NA	NA	NA	NA	NA	NA
pH	NA	NA	NA	NA	NA	NA	8
Electrical Conductivity	NA	NA	NA	NA	NA	NA	554
Dissolved Solids	NA	NA	NA	NA	NA	NA	600
Total Solids	NA	NA	NA	NA	NA	NA	840
Suspended Solids	NA	NA	NA	NA	NA	NA	240
Hardness	NA	NA	NA	NA	NA	NA	372
Alkalinity	NA	NA	NA	NA	NA	NA	330

Table D.6. Chemical analyses of SWSA 6 burial trench leachates

Sampling Date:	06Apr89	06Apr89	10Apr89	06Apr89	06Apr89	06Apr89	06Apr89
Burial Trench Number:	T-112	T-101	T-180	T-318	T-329	T-82	T-105
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Chloromethane	<10	<10	<10	<10	<10	<10	<10
Bromomethane	<10	<10	<10	<10	<10	<10	<10
Vinyl Chloride	<10	<10	<10	<10	<10	<10	<10
Chloroethane	<10	<10	<10	<10	<10	<10	<10
Methylene chloride	B8	B5	JB5	B19	JB4	B19	B45
Acetone	BE3600	B55	B20	B130	B64	BE6600	BE3200
Carbon disulfide	<5	<5	<5	<5	<5	<5	J0.6
1,1-Dichloroethene	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethene (Total)	<5	<5	<5	<5	<5	<5	<5
Chloroform	J1	<5	14	J1	<5	8	E560
1,2-Dichloroethane	<5	<5	<5	<5	<5	<5	<5
2-Butanone	B95	<10	<10	<10	B20	<10	B18
1,1,1-Trichloroethane	<5	<5	<5	<5	<5	<5	<5
Carbon tetrachloride	<5	<5	<5	<5	<5	<5	<5
Vinyl acetate	<10	<10	<10	<10	<10	<10	<10
Bromodichloromethane	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloropropane	<5	<5	<5	<5	<5	<5	<5
cis-1,3-Dichloropropene	<5	<5	<5	<5	<5	<5	<5
Trichloroethene	<5	<5	<5	<5	<5	<5	<5
Dibromochloromethane	<5	<5	<5	<5	<5	<5	<5
1,1,2-Trichloroethane	<5	<5	<5	<5	<5	<5	<5
Benzene	J1	J0.6	11	J2	J0.8	<5	12
trans-1,3-Dichloropropene	<5	<5	<5	<5	<5	<5	<5
Bromoform	<5	<5	<5	<5	<5	<5	<5
4-Methyl-2-pentanone	J3	<10	<10	<10	<10	<10	<10
2-Hexanone	<10	<10	<10	<10	<10	<10	<10
Tetrachloroethene	<5	<5	<5	<5	<5	<5	<5
1,1,2,2-tetrachloroethane	<5	<5	<5	<5	<5	<5	<5
Toluene	E260	83	E5000	E2500	E670	18	E3500
Chlorobenzene	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	65	<5	69	140	41	<5	130
Styrene	<5	<5	23	<5	<5	<5	23
Xylene (Total)	E400	31	E730	E3400	E510	<5	E3000
Phenol	<11	<12	<12	<12	40	<12	<11
bis(2-Chloroethyl)ether	<11	<12	<12	<12	<12	<12	<11
2-Chlorophenol	<11	<12	<12	<12	<12	<12	<11
1,3-Dichlorobenzene	<11	<12	<12	<12	<12	<12	<11
1,4-Dichlorobenzene	<11	<12	<12	<12	<12	<12	<11
Benzyl alcohol	<11	<12	<12	<12	<12	<12	<11
1,2-Dichlorobenzene	<11	<12	<12	<12	<12	<12	<11
2-Methylphenol	<11	<12	15	<12	<12	<12	<11
bis(2-Chloroisopropyl)ether	<11	<12	<12	<12	<12	<12	<11
4-Methylphenol	<11	<12	16	<12	E600	<12	E1200
N-nitroso-di-n-propylamine	<11	<12	<12	<12	<12	<12	<11
Hexachloroethane	<11	<12	<12	<12	<12	<12	<11

Table D.6 (continued)

Sampling Date: Burial Trench Number: Species/Chemical:	06Apr89 T-112 (ppb)	06Apr89 T-101 (ppb)	10Apr89 T-180 (ppb)	06Apr89 T-318 (ppb)	06Apr89 T-329 (ppb)	06Apr89 T-82 (ppb)	06Apr89 T-105 (ppb)
Nitrobenzene	<11	<12	<12	<12	<12	<12	<11
Isophorone	<11	<12	<12	<12	<12	<12	<11
2-Nitrophenol	<11	<12	<12	<12	<12	<12	<11
2,4-Dimethylphenol	<11	<12	<12	20	<12	<12	210
Benzoic acid	<57	<59	E400	J17	<60	<62	<57
bis(2-chloroethoxy)methane	<11	<12	<12	<12	<12	<12	<11
2,4-Dichlorophenol	<11	<12	<12	<12	<12	<12	<11
1,2,4-Trichlorobenzene	<11	<12	<12	<12	<12	<12	<11
Naphthalene	<11	<12	E3600	E760	170	<12	E3000
4-chloroaniline	<11	<12	<12	<12	<12	<12	<11
Hexachlorobutadiene	<11	<12	<12	<12	<12	<12	<11
4-Chloro-3-methylphenol	<11	<12	<12	<12	<12	<12	<11
2-Methylnaphthalene	<11	<12	24	<12	<12	<12	<11
Hexachlorocyclopentadiene	<11	<12	<12	<12	<12	<12	<11
2,4,6-Trichlorophenol	<11	<12	<12	<12	<12	<12	<11
2,4,5-Trichlorophenol	<57	<59	<60	<60	<60	<62	<57
2-Chloronaphthalene	<11	<12	<12	<12	<12	<12	<11
2-Nitroaniline	<57	<59	<60	<60	<60	<62	<57
Dimethylphthalate	<11	<12	<12	<12	<12	<12	<11
Acenaphthylene	<11	<12	<12	<12	<12	<12	<11
2,6-Dinitrotoluene	<11	<12	<12	<12	<12	<12	<11
3-Nitroaniline	<57	<59	<60	<60	<60	<62	<57
Acenaphthene	<11	<12	<12	<12	<12	<12	<11
2,4-Dinitrophenol	<57	<59	<60	<60	<60	<62	<57
4-Nitrophenol	<57	<59	<60	<60	<60	<62	<57
Dibenzofuran	<11	<12	<12	<12	<12	<12	<11
2,4-Dinitrotoluene	<11	<12	<12	<12	<12	<12	<11
Diethylphthalate	<11	<12	<12	<12	<12	<12	<11
4-Chlorophenyl-phenylether	<11	<12	<12	<12	<12	<12	<11
Fluorene	<11	<12	<12	<12	<12	<12	<11
4-Nitroaniline	<57	<59	<60	<60	<60	<62	<57
4,6-Dinitro-2-methylphenol	<57	<59	<60	<60	<60	<62	<57
N-nitrosodiphenylamine	<11	<12	<12	<12	<12	<12	<11
4-bromophenyl-phenylether	<11	<12	<12	<12	<12	<12	<11
Hexachlorobenzene	<11	<12	<12	<12	<12	<12	<11
Pentachlorophenol	<57	<59	<60	<60	<60	<62	<57
Phenanthrene	<11	<12	<12	<12	<12	<12	<11
Anthracene	<11	<12	<12	<12	<12	<12	<11
Di-n-butylphthalate	<11	<12	<12	<12	<12	<12	<11
Fluoranthene	<11	<12	<12	<12	<12	<12	<11
Pyrene	<11	<12	<12	<12	<12	<12	<11
Butylbenzylphthalate	<11	<12	<12	<12	<12	<12	<11
3,3'-Dichlorobenzidene	<23	<24	<24	<24	<24	<25	<23
Benzo(a)anthracene	<11	<12	<12	<12	<12	<12	<11
Chrysene	<11	<12	<12	<12	<12	<12	<11
bis(2-Ethylhexyl)phthalate	<11	<12	<12	<12	<12	<12	<11

Table D.6 (continued)

Sampling Date:	06Apl89	06Apl89	10Apl89	06Apl89	06Apl89	06Apl89	06Apl89
Burial Trench Number:	T-112	T-101	T-180	T-318	T-329	T-82	T-105
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Di-n-Octylphthalate	<11	<12	<12	<12	<12	<12	<11
Benzo(b)fluoranthene	<11	<12	<12	<12	<12	<12	<11
Benzo(k)fluoranthene	<11	<12	<12	<12	<12	<12	<11
Benzo(a)pyrene	<11	<12	<12	<12	<12	<12	<11
Indeno(1,2,3-cd)pyrene	<11	<12	<12	<12	<12	<12	<11
Dibenz(a,h)anthracene	<11	<12	<12	<12	<12	<12	<11
Benzo(g,h,i)perylene	<11	<12	<12	<12	<12	<12	<11
Acrylamide	<1000	<1000	<1000	3800	1900	<1000	<1000
Silver	14	<5	12	12	12	<5	14
Aluminum	<50	210	170	<50	<50	<50	320
Arsenic	63	<50	<50	<50	<50	<50	80
Boron	<80	160	<80	<80	<80	<80	<80
Barium	230	200	250	370	340	200	200
Beryllium	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Calcium	59000	96000	87000	53000	56000	28000	130000
Cadmium	<2	<2	<2	<2	<2	5	<2
Cobalt	49	4	23	16	28	28	17
Chromium	9	10	12	10	8	<3	12
Copper	<10	<10	<10	<10	<10	<10	<10
Iron	<10	<10	4300	9100	19000	<10	12000
Mercury	5.2	0.2	0.5	0.3	0.3	0.9	0.3
Potassium	30000	1130	4000	4070	4280	19900	9330
Lithium	<15000	<15000	<15000	<15000	<15000	<15000	<15000
Magnesium	30000	19000	16000	16000	11000	5800	26000
Manganese	14000	19	17000	18000	19000	480	15000
Molybdenum	<40	<40	<40	<40	<40	<40	<40
Sodium	50200	7200	3790	6200	4150	3920	16000
Nickel	<6	<6	<6	<6	<6	<6	<6
Phosphorus	140000	<300	<300	<300	<300	<300	<300
Lead	<30	<30	<30	<30	<30	<30	<30
Antimony	<40	<40	<40	<40	<40	<40	<40
Selenium	<80	<80	<80	<80	<80	<80	<80
Silicon	67000	3300	4700	5800	4900	1400	8600
Tin	<50	<50	<50	<50	<50	<50	<50
Strontium	100	170	190	130	110	50	180
Titanium	<20	<20	<20	<20	<20	<20	<20
Vanadium	<4	<4	<4	<4	<4	<4	<4
Zinc	120	<8	<8	<8	<8	<8	<8
Zirconium	<20	<20	<20	<20	<20	<20	<20
Bromide	<50	<50	<50	60	160	<50	80
Chloride	44400	4100	5900	12600	5810	7690	51700
Fluoride	63300	<50	2470	430	4270	180	14900
Nitrate	<50	6690	110	80	80	2470	100
Phosphate	294000	60	<50	<50	<50	<50	<50
Sulfate	2960	52700	1230	450	1580	13900	520
Total Organic Carbon	576000	4500	46000	17000	103000	2400	7200

Table D.6 (continued)

Sampling Date:	06Apl89	06Apl89	10Apl89	06Apl89	06Apl89	06Apl89	06Apl89
Burial Trench Number:	T-112	T-101	T-180	T-318	T-329	T-82	T-105
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)
Carbon-14	<30	1	2	12	12	<20	17
Cobalt-60	<2	<2	<2	<2	<2	<2	<2
Cesium-137	27	<2	3.5	<2	<2	12	4.7
Gross Alpha	<0.4	<0.6	<0.4	0.8	<0.4	<0.4	<0.4
Gross Beta	55	2.5	15	4.6	2.7	1100	21
Strontium-90	0.77	0.41	1.5	0.04	0.80	660	0.83
Tritium	2700	150	470	1500	1200	32	1800
Americium-241	NA	NA	NA	NA	NA	NA	NA
Curium-244	NA	NA	NA	NA	NA	NA	NA
Plutonium-239	NA	NA	NA	NA	NA	NA	NA
Uranium-232	NA	NA	NA	NA	NA	NA	NA
Uranium-233	NA	NA	NA	NA	NA	NA	NA
pH	7.6	8	7.85	7.9	7.65	7.5	6.9
Electrical Conductivity	4620	356	369	335	323	160	774
Dissolved Solids	780	320	300	260	300	120	880
Total Solids	1980	1240	380	400	2040	2400	1060
Suspended Solids	1200	920	80	140	1740	2280	180
Hardness	168	290	274	208	184	96	400
Alkalinity	2021	231	277	236	186	79	291

Table D.7. Chemical analyses of SWSA 6 burial trench leachates

Sampling Date:	06Apr89	05Apr89	05Apr89	10Apr89	10Apr89	29Mar89	29Mar89
Burial Trench Number:	T-85	T-92-2	T-92-1	T-63	T-44	T-5	T-9
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Chloromethane	<50	<10	<10	<10	<50	NA	NA
Bromomethane	<50	<10	<10	<10	<50	NA	NA
Vinyl Chloride	<50	<10	<10	<10	<50	NA	NA
Chloroethane	<50	<10	<10	<10	<50	NA	NA
Methylene chloride	JB12	B5	JB5	JB4	JB12	NA	NA
Acetone	BE8300	BE5400	B130	B16	B100	NA	NA
Carbon disulfide	<25	<5	<5	<5	<25	NA	NA
1,1-Dichloroethene	<25	<5	<5	<5	<25	NA	NA
1,1-Dichloroethane	<25	<5	<5	<5	<25	NA	NA
1,2-Dichloroethene (Total)	<25	<5	<5	<5	<25	NA	NA
Chloroform	J16	<5	J3	J0.6	J4	NA	NA
1,2-Dichloroethane	<25	<5	<5	<5	<25	NA	NA
2-Butanone	<50	<10	J0.5	<10	<50	NA	NA
1,1,1-Trichloroethane	<25	<5	<5	<5	<25	NA	NA
Carbon tetrachloride	<25	<5	<5	<5	<25	NA	NA
Vinyl acetate	<50	<10	<10	<10	<50	NA	NA
Bromodichloromethane	<25	<5	<5	<5	<25	NA	NA
1,2-Dichloropropane	<25	<5	<5	<5	<25	NA	NA
cis-1,3-Dichloropropene	<25	<5	<5	<5	<25	NA	NA
Trichloroethene	B36	JB5	JB4	JB4	JB16	NA	NA
Dibromochloromethane	<25	<5	<5	<5	<25	NA	NA
1,1,2-Trichloroethane	<25	<5	<5	<5	<25	NA	NA
Benzene	<25	<5	<5	<5	<25	NA	NA
trans-1,3-Dichloropropene	<25	<5	<5	<5	<25	NA	NA
Bromoform	<25	<5	<5	<5	<25	NA	NA
4-Methyl-2-pentanone	<50	<10	<10	<10	<50	NA	NA
2-Hexanone	<50	<10	<10	<10	<50	NA	NA
Tetrachloroethene	<25	<5	<5	<5	<25	NA	NA
1,1,2,2-tetrachloroethane	<25	<5	<5	<5	<25	NA	NA
Toluene	BE3200	B7	B41	B75	B220	NA	NA
Chlorobenzene	<25	<5	<5	<5	<25	NA	NA
Ethylbenzene	80	<5	<5	<5	<25	NA	NA
Styrene	<25	<5	<5	<5	<25	NA	NA
Xylene (Total)	E1900	<5	19	<5	<25	NA	NA
Phenol	19	<12	<12	<10	<10	NA	NA
bis(2-Chloroethyl)ether	<11	<12	<12	<10	<10	NA	NA
2-Chlorophenol	<11	<12	<12	<10	<10	NA	NA
1,3-Dichlorobenzene	<11	<12	<12	<10	<10	NA	NA
1,4-Dichlorobenzene	<11	<12	<12	<10	<10	NA	NA
Benzyl alcohol	<11	<12	<12	<10	<10	NA	NA
1,2-Dichlorobenzene	<11	<12	<12	<10	<10	NA	NA
2-Methylphenol	<11	<12	<12	<10	<10	NA	NA
bis(2-Chloroisopropyl)ether	<11	<12	<12	<10	<10	NA	NA
4-Methylphenol	<11	<12	<12	<10	<10	NA	NA
N-nitroso-di-n-propylamine	<11	<12	<12	<10	<10	NA	NA
Hexachloroethane	<11	<12	<12	<10	<10	NA	NA

Table D.7 (continued)

Sampling Date:	06Apl89	05Apl89	05Apl89	10Apl89	10Apl89	29Mar89	29Mar89
Burial Trench Number:	T-85	T-92-2	T-92-1	T-63	T-44	T-5	T-9
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Nitrobenzene	<11	<12	<12	<10	<10	NA	NA
Isophorone	<11	<12	<12	<10	<10	NA	NA
2-Nitrophenol	<11	<12	<12	<10	<10	NA	NA
2,4-Dimethylphenol	<11	<12	<12	<10	<10	NA	NA
Benzoic acid	<57	<58	<60	<50	<50	NA	NA
bis(2-chloroethoxy)methane	<11	<12	<12	<10	<10	NA	NA
2,4-Dichlorophenol	<11	<12	<12	<10	<10	NA	NA
1,2,4-Trichlorobenzene	<11	<12	<12	<10	<10	NA	NA
Naphthalene	E830	<12	<12	<10	270	NA	NA
4-chloroaniline	<11	<12	<12	<10	<10	NA	NA
Hexachlorobutadiene	<11	<12	<12	<10	<10	NA	NA
4-Chloro-3-methylphenol	<11	<12	<12	<10	<10	NA	NA
2-Methylnaphthalene	<11	<12	<12	<10	<10	NA	NA
Hexachlorocyclopentadiene	<11	<12	<12	<10	<10	NA	NA
2,4,6-Trichlorophenol	<11	<12	<12	<10	<10	NA	NA
2,4,5-Trichlorophenol	<57	<58	<60	<50	<50	NA	NA
2-Chloronaphthalene	<11	<12	<12	<10	<10	NA	NA
2-Nitroaniline	<57	<58	<60	<50	<50	NA	NA
Dimethylphthalate	<11	<12	<12	<10	<10	NA	NA
Acenaphthylene	<11	<12	<12	<10	<10	NA	NA
2,6-Dinitrotoluene	<11	<12	<12	<10	<10	NA	NA
3-Nitroaniline	<57	<58	<60	<50	<50	NA	NA
Acenaphthene	<11	<12	<12	<10	<10	NA	NA
2,4-Dinitrophenol	<57	<58	<60	<50	<50	NA	NA
4-Nitrophenol	<57	<58	<60	<50	<50	NA	NA
Dibenzofuran	<11	<12	<12	<10	<10	NA	NA
2,4-Dinitrotoluene	<11	<12	<12	<10	<10	NA	NA
Diethylphthalate	<11	<12	<12	<10	<10	NA	NA
4-Chlorophenyl-phenylether	<11	<12	<12	<10	<10	NA	NA
Fluorene	<11	<12	<12	<10	<10	NA	NA
4-Nitroaniline	<57	<58	<60	<50	<50	NA	NA
4,6-Dinitro-2-methylphenol	<57	<58	<60	<50	<50	NA	NA
N-nitrosodiphenylamine	<11	<12	<12	<10	<10	NA	NA
4-bromophenyl-phenylether	<11	<12	<12	<10	<10	NA	NA
Hexachlorobenzene	<11	<12	<12	<10	<10	NA	NA
Pentachlorophenol	<57	<58	<60	<50	<50	NA	NA
Phenanthrene	<11	<12	<12	<10	<10	NA	NA
Anthracene	<11	<12	<12	<10	<10	NA	NA
Di-n-butylphthalate	J5	<12	<12	<10	<10	NA	NA
Fluoranthene	<11	<12	<12	<10	<10	NA	NA
Pyrene	<11	<12	<12	<10	<10	NA	NA
Butylbenzylphthalate	<11	<12	<12	<10	<10	NA	NA
3,3'-Dichlorobenzidene	<23	<23	<24	<20	<20	NA	NA
Benzo(a)anthracene	<11	<12	<12	<10	<10	NA	NA
Chrysene	<11	<12	<12	<10	<10	NA	NA
bis(2-Ethylhexyl)phthalate	<11	<12	<12	<10	<10	NA	NA

Table D.7 (continued)

Sampling Date:	06Apl89	05Apl89	05Apl89	10Apl89	10Apl89	29Mar89	29Mar89
Burial Trench Number:	T-85	T-92-2	T-92-1	T-63	T-44	T-5	T-9
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Di-n-Octylphthalate	<11	<12	<12	<10	<10	NA	NA
Benzo(b)fluoranthene	<11	<12	<12	<10	<10	NA	NA
Benzo(k)fluoranthene	<11	<12	<12	<10	<10	NA	NA
Benzo(a)pyrene	<11	<12	<12	<10	<10	NA	NA
Indeno(1,2,3-cd)pyrene	<11	<12	<12	<10	<10	NA	NA
Dibenz(a,h)anthracene	<11	<12	<12	<10	<10	NA	NA
Benzo(g,h,i)perylene	<11	<12	<12	<10	<10	NA	NA
Acrylamide	<1000	<1000	<1000	<1000	<1000	NA	NA
Silver	9	8	<5	12	13	NA	NA
Aluminum	<50	<50	<50	340	<50	NA	NA
Arsenic	<50	<50	<50	67	<50	NA	NA
Boron	<80	<80	<80	<80	<80	NA	NA
Barium	280	150	150	200	290	NA	NA
Beryllium	<0.4	<0.4	<0.4	<0.4	<0.4	NA	NA
Calcium	20000	48000	52000	140000	46000	NA	NA
Cadmium	<2	<2	<2	<2	<2	NA	NA
Cobalt	43	7	33	9	26	NA	NA
Chromium	5	5	3	13	10	NA	NA
Copper	<10	<10	<10	<10	<10	NA	NA
Iron	8500	<10	1100	<10	19000	NA	NA
Mercury	0.5	<0.1	<0.1	0.3	0.4	NA	NA
Potassium	3010	2610	1800	3310	5210	NA	NA
Lithium	<15000	<15000	<15000	<15000	<15000	NA	NA
Magnesium	9600	7300	6800	16000	12000	NA	NA
Manganese	36000	2600	270	4700	12000	NA	NA
Molybdenum	<40	<40	<40	<40	<40	NA	NA
Sodium	3720	13100	10400	3780	5050	NA	NA
Nickel	<6	<6	1100	<6	<6	NA	NA
Phosphorus	<300	<300	<300	<300	<300	NA	NA
Lead	<30	<30	<30	<30	<30	NA	NA
Antimony	<40	<40	<40	<40	<40	NA	NA
Selenium	<80	<80	<80	<80	<80	NA	NA
Silicon	4200	2300	2200	1300	1900	NA	NA
Tin	<50	<50	<50	<50	<50	NA	NA
Strontium	54	98	86	160	140	NA	NA
Titanium	<20	<20	<20	<20	<20	NA	NA
Vanadium	<4	<4	<4	<4	<4	NA	NA
Zinc	<8	<8	<8	<8	<8	NA	NA
Zirconium	<20	<20	<20	<20	<20	NA	NA
Bromide	70	<50	<50	<50	80	NA	NA
Chloride	10500	7310	6750	4480	8810	NA	NA
Fluoride	2800	<50	<50	<50	<50	NA	NA
Nitrate	90	850	5040	2900	100	NA	NA
Phosphate	<50	<50	<50	<50	<50	NA	NA
Sulfate	720	20400	17200	61900	1240	NA	NA
Total Organic Carbon	9400	1400	4800	4500	6000	NA	NA

Table D.7 (continued)

Sampling Date:	06Apr89	05Apr89	05Apr89	10Apr89	10Apr89	29Mar89	29Mar89
Burial Trench Number:	T-85	T-92-2	T-92-1	T-63	T-44	T-5	T-9
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)
Carbon-14	3	8	9	<20	9	NA	NA
Cobalt-60	<2	<2	<2	<2	<2	NA	NA
Cesium-137	7.7	2.6	<2	6.3	4.4	NA	NA
Gross Alpha	<0.4	<0.4	<0.4	0.20	0.44	7	2
Gross Beta	14	7.5	5.4	13	5.1	512	ND
Strontium-90	3.3	0.88	2.3	2.0	1.0	NA	NA
Tritium	860	880	930	99	970	NA	NA
Americium-241	NA	NA	NA	NA	NA	NA	NA
Curium-244	NA	NA	NA	NA	NA	NA	NA
Plutonium-239	NA	NA	NA	NA	NA	NA	NA
Uranium-232	NA	NA	NA	NA	NA	NA	NA
Uranium-233	NA	NA	NA	NA	NA	NA	NA
pH	7.65	7.65	7.7	7.9	7.8	8.1	6.1
Electrical Conductivity	260	200	253	464	371	617	88
Dissolved Solids	160	120	180	400	80	520	20
Total Solids	1300	100	2180	500	220	NA	NA
Suspended Solids	1140	0	2000	100	140	NA	NA
Hardness	126	134	146	366	172	332	16
Alkalinity	171	134	129	322	272	276	21

Table D.8. Chemical analyses of SWSA 6 burial trench leachates

Sampling Date:	29Mar89	29Mar89	29Mar89	10Apl89	10Apl89	05Apl89	05Apl89
Burial Trench Number:	T-8	T-2	T-3	T-57	T-60	T-69	T-110
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Chloromethane	NA	NA	NA	NA	NA	NA	NA
Bromomethane	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA
Chloroethane	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (Total)	NA	NA	NA	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	NA
2-Butanone	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA
Bromoform	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-tetrachloroethane	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	NA
Xylene (Total)	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroisopropyl)ether	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA
N-nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA

Table D.8 (continued)

Sampling Date:	29Mar89	29Mar89	29Mar89	10Apl89	10Apl89	05Apl89	05Apl89
Burial Trench Number:	T-8	T-2	T-3	T-57	T-60	T-69	T-110
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA
Benzoic acid	NA	NA	NA	NA	NA	NA	NA
bis(2-chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA
4-chloroaniline	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA
Dimethylphthalate	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	NA	NA
N-nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA
4-bromophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA

Table D.8 (continued)

Sampling Date:	29Mar89	29Mar89	29Mar89	10Apl89	10Apl89	05Apl89	05Apl89
Burial Trench Number:	T-8	T-2	T-3	T-57	T-60	T-69	T-110
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Di-n-Octylphthalate	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA
Acrylamide	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA
Aluminum	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA
Boron	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA
Lithium	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA
Molybdenum	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA
Phosphorus	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA
Silicon	NA	NA	NA	NA	NA	NA	NA
Tin	NA	NA	NA	NA	NA	NA	NA
Strontium	NA	NA	NA	NA	NA	NA	NA
Titanium	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA
Zirconium	NA	NA	NA	NA	NA	NA	NA
Bromide	NA	NA	NA	NA	NA	NA	NA
Chloride	NA	NA	NA	NA	NA	NA	NA
Fluoride	NA	NA	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA
Phosphate	NA	NA	NA	NA	NA	NA	NA
Sulfate	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA

Table D.8 (continued)

Sampling Date:	29Mar89	29Mar89	29Mar89	10Apl89	10Apl89	05Apl89	05Apl89
Burial Trench Number:	T-8	T-2	T-3	T-57	T-60	T-69	T-110
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)
Carbon-14	NA	NA	NA	NA	NA	NA	NA
Cobalt-60	NA	NA	NA	NA	NA	NA	NA
Cesium-137	NA	NA	NA	NA	NA	NA	NA
Gross Alpha	320	10	10	ND	ND	25	ND
Gross Beta	14275	103	457	13	15	237	103
Strontium-90	NA	NA	NA	NA	NA	NA	NA
Tritium	NA	1110	2810	6600	640	850000	3000
Americium-241	NA	NA	NA	NA	NA	NA	NA
Curium-244	NA	NA	NA	NA	NA	NA	NA
Plutonium-239	NA	NA	NA	NA	NA	NA	NA
Uranium-232	NA	NA	NA	NA	NA	NA	NA
Uranium-233	NA	NA	NA	NA	NA	NA	NA
pH	8.1	7.6	7.9	7.95	7.7	8.1	7.8
Electrical Conductivity	6490	247	477	420	459	478	416
Dissolved Solids	6360	200	320	340	340	360	320
Total Solids	NA	2860	2400	17020	580	1080	1980
Suspended Solids	NA	2660	2080	16680	240	720	1660
Hardness	5220	186	336	318	330	356	244
Alkalinity	6511	169	294	282	301	340	274

Table D.9. Chemical analyses of SWSA 6 burial trench leachates

Sampling Date:	06Apr89	05Apr89	06Apr89	06Apr89	06Apr89	06Apr89	30Oct87
Burial Trench Number:	T-225	T-363	T-367	T-395	T-414	T-453	T-2
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Chloromethane	NA	NA	NA	NA	NA	NA	NA
Bromomethane	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA
Chloroethane	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (Total)	NA	NA	NA	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	NA
2-Butanone	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA
Bromoform	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-tetrachloroethane	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	NA
Xylene (Total)	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroisopropyl)ether	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA
N-nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA

Table D.9 (continued)

Sampling Date:	06Apr89	05Apr89	06Apr89	06Apr89	06Apr89	06Apr89	30Oct87
Burial Trench Number:	T-225	T-363	T-367	T-395	T-414	T-453	T-2
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA
Benzoic acid	NA	NA	NA	NA	NA	NA	NA
bis(2-chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA
4-chloroaniline	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA
Dimethylphthalate	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	NA	NA
N-nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA
4-bromophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA

Table D.9 (continued)

Sampling Date:	06Apr189	05Apr189	06Apr189	06Apr189	06Apr189	06Apr189	30Oct87
Burial Trench Number:	T-225	T-363	T-367	T-395	T-414	T-453	T-2
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Di-n-Octylphthalate	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA
Acrylamide	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA
Aluminum	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA
Boron	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA
Lithium	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA
Molybdenum	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA
Phosphorus	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA
Silicon	NA	NA	NA	NA	NA	NA	NA
Tin	NA	NA	NA	NA	NA	NA	NA
Strontium	NA	NA	NA	NA	NA	NA	NA
Titanium	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA
Zirconium	NA	NA	NA	NA	NA	NA	NA
Bromide	NA	NA	NA	NA	NA	NA	NA
Chloride	NA	NA	NA	NA	NA	NA	NA
Fluoride	NA	NA	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA
Phosphate	NA	NA	NA	NA	NA	NA	NA
Sulfate	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA

Table D.9 (continued)

Sampling Date:	06Apr89	05Apr89	06Apr89	06Apr89	06Apr89	06Apr89	30Oct87
Burial Trench Number:	T-225	T-363	T-367	T-395	T-414	T-453	T-2
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)
Carbon-14	NA	NA	NA	NA	NA	NA	NA
Cobalt-60	NA	NA	NA	NA	NA	NA	NA
Cesium-137	NA	NA	NA	NA	NA	NA	NA
Gross Alpha	ND	20	3	3	3	2	117
Gross Beta	23	880	8	25	5	88	200
Strontium-90	NA	NA	NA	NA	NA	NA	NA
Tritium	2900	1900	6200	270	130	2100	NA
Americium-241	NA	NA	NA	NA	NA	NA	NA
Curium-244	NA	NA	NA	NA	NA	NA	NA
Plutonium-239	NA	NA	NA	NA	NA	NA	NA
Uranium-232	NA	NA	NA	NA	NA	NA	NA
Uranium-233	NA	NA	NA	NA	NA	NA	NA
pH	7.4	7.8	7.8	8.2	7.5	8.55	6.2
Electrical Conductivity	613	252	55	440	226	8580	170
Dissolved Solids	740	120	360	960	200	1360	60
Total Solids	18960	3660	3800	15760	26020	2780	NA
Suspended Solids	18220	3540	3440	14800	25820	1420	NA
Hardness	306	136	208	604	154	300	86
Alkalinity	219	171	234	1073	83	2844	54

Table D.10. Chemical analyses of SWSA 6 burial trench leachates

Sampling Date:	27Oct87	03Nov87	27Oct87	30Oct87
Burial Trench Number:	T-3	T-4	T-5	T-6
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)
Chloromethane	NA	NA	NA	NA
Bromomethane	NA	NA	NA	NA
Vinyl Chloride	NA	NA	NA	NA
Chloroethane	NA	NA	NA	NA
Methylene chloride	NA	NA	NA	NA
Acetone	NA	NA	NA	NA
Carbon disulfide	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA
1,2-Dichloroethene (Total)	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA
2-Butanone	NA	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	NA	NA
Carbon tetrachloride	NA	NA	NA	NA
Vinyl acetate	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA	NA
cis-1,3-Dichloropropene	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA
Dibromochloromethane	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA
Benzene	NA	NA	NA	NA
trans-1,3-Dichloropropene	NA	NA	NA	NA
Bromoform	NA	NA	NA	NA
4-Methyl-2-pentanone	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA
1,1,2,2-tetrachloroethane	NA	NA	NA	NA
Toluene	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA
Styrene	NA	NA	NA	NA
Xylene (Total)	NA	NA	NA	NA
Phenol	NA	NA	NA	NA
bis(2-Chloroethyl)ether	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA
Benzyl alcohol	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA
bis(2-Chloroisopropyl)ether	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA
N-nitroso-di-n-propylamine	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA

Table D.10 (continued)

Sampling Date:	27Oct87	03Nov87	27Oct87	30Oct87
Burial Trench Number:	T-3	T-4	T-5	T-6
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)
Nitrobenzene	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA
Benzoic acid	NA	NA	NA	NA
bis(2-chloroethoxy)methane	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA
4-chloroaniline	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA
Dimethylphthalate	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA
2,4-Dinitrophenol	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA
4-Chlorophenyl-phenylether	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA
N-nitrosodiphenylamine	NA	NA	NA	NA
4-bromophenyl-phenylether	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA
3,3'-Dichlorobenzidene	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA

Table D.10 (continued)

Sampling Date:	27Oct87	03Nov87	27Oct87	30Oct87
Burial Trench Number:	T-3	T-4	T-5	T-6
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)
Di-n-Octylphthalate	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA
Acrylamide	NA	NA	NA	NA
Silver	NA	NA	NA	NA
Aluminum	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA
Boron	NA	NA	NA	NA
Barium	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA
Calcium	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA
Chromium	NA	NA	NA	NA
Copper	NA	NA	NA	NA
Iron	NA	NA	NA	NA
Mercury	NA	NA	NA	NA
Potassium	NA	NA	NA	NA
Lithium	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
Molybdenum	NA	NA	NA	NA
Sodium	NA	NA	NA	NA
Nickel	NA	NA	NA	NA
Phosphorus	NA	NA	NA	NA
Lead	NA	NA	NA	NA
Antimony	NA	NA	NA	NA
Selenium	NA	NA	NA	NA
Silicon	NA	NA	NA	NA
Tin	NA	NA	NA	NA
Strontium	NA	NA	NA	NA
Titanium	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA
Zinc	NA	NA	NA	NA
Zirconium	NA	NA	NA	NA
Bromide	NA	NA	NA	NA
Chloride	NA	NA	NA	NA
Fluoride	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA
Phosphate	NA	NA	NA	NA
Sulfate	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA

Table D.10 (continued)

Sampling Date:	27Oct87	03Nov87	27Oct87	30Oct87
Burial Trench Number:	T-3	T-4	T-5	T-6
Species/Chemical:	(ppb)	(ppb)	(ppb)	(ppb)
	(Bq/L)	(Bq/L)	(Bq/L)	(Bq/L)
Carbon-14	NA	NA	NA	NA
Cobalt-60	NA	NA	NA	NA
Cesium-137	NA	NA	NA	NA
Gross Alpha	ND	50	3117	ND
Gross Beta	1717	346736	717	4284
Strontium-90	NA	NA	NA	NA
Tritium	NA	NA	NA	NA
Americium-241	NA	NA	NA	NA
Curium-244	NA	NA	NA	NA
Plutonium-239	NA	NA	NA	NA
Uranium-232	NA	NA	NA	NA
Uranium-233	NA	NA	NA	NA
pH	7.2	6.4	6.7	6.1
Electrical Conductivity	760	1100	510	740
Dissolved Solids	480	200	440	420
Total Solids	NA	NA	NA	NA
Suspended Solids	NA	NA	NA	NA
Hardness	242	168	184	298
Alkalinity	166	446	68	158

Explanation of Data Qualifiers (prefixes):

< This qualifier indicates that the compound was analyzed for but not detected. The sample lower quantitation limit is listed. Data values of this type were not used in computing averages or frequencies of occurrence.

J Indicates that the quantitative value is estimated. Usually this qualifier is used before a value which is below the lower quantitation limit (i.e., the compound was detected). Data values of this type were used in computing averages and frequencies of occurrence.

B This qualifier appears for a compound which was detected in both the sample and its associated blank. Data values of this type were used in computing averages and frequencies of positive findings.

E This qualifier indicates that the reported concentration of the compound exceeded the upper calibration limit of the method and was estimated by extrapolation. Data values of this type were used in computing averages and frequencies of occurrence.

NA Not analyzed.

DISTRIBUTION

1. H. L. Adair
2–6. T. L. Ashwood
7. L. V. Asplund/N. W. Durfee
8. L. D. Bates
9. H. L. Boston
10. T. W. Burwinkle
11. R. B. Clapp
12. K. W. Cook
13. J. H. Cushman
14. N. H. Cutshall
15. M. P. Farrell
16. D. E. Fowler
17. C. W. Francis
18. S. B. Garland II
19. C. W. Gehrs
20. C. D. Goins
21. D. F. Hall
22. S. G. Hildebrand
23. L. D. Hyde
24. D. D. Huff
25. R. H. Ketelle
26. A. J. Kuhaida
27. A. P. Malinauskas
28. W. M. McMaster
29. L. E. McNeese
30. G. K. Moore
31. J. B. Murphy
32. C. E. Nix
33-34. P. T. Owen
35. D. E. Reichle
36. G. E. Rymer
37. T. F. Scanlan
38. P. A. Schrandt
39. D. S. Shriner
40. R. L. Siegrist
41. D. K. Solomon
42–46. B. P. Spalding
47. S. H. Stow
48. D. W. Swindle
49. J. R. Trabalka
50. S. D. Van Hoesen
51. R. I. Van Hook
52. L. D. Voorhees
53. J. S. Watson
54. R. K. White
55. D. S. Wickliff
56. Central Research Library
57–61. ER Document Management Center
62–69. ESD Library
70–71. Laboratory Records Department
72. ORNL Patent Section
73. ORNL Y-12 Technical Library

74. Office of Assistant Manager for Energy Research and Development, DOE Field Office, Oak Ridge, P.O. Box 2001, Oak Ridge, TN 37831-8600
75. P. H. Edmonds, Radian Corporation, 120 S. Jefferson Circle, Oak Ridge, TN 37830
76. J. F. Franklin, Bloedel Professor of Ecosystem Analysis, College of Forest Resources, University of Washington, Anderson Hall (AR-10), Seattle, WA 98195
77. G. M. Hornberger, Professor, Department of Environmental Sciences, University of Virginia, Charlottesville, VA 22903
78. G. Y. Jordy, Director, Office of Program Analysis, Office of Energy Research, ER-30, G-226, U.S. Department of Energy, Washington, DC 20545
79. J. R. Kannard, Program Manager, Bechtel National, Inc., P.O. Box 350, Oak Ridge Corporate Center, 151 Lafayette Drive, Oak Ridge, TN 37830
80–83. W. E. Murphie, Department of Energy, Office of Environmental Restoration, Eastern Area D&D Branch, EM-423 (GTN), Washington, DC 20545
84. R. H. Olsen, Vice President for Research, University of Michigan, 6643 Medical Science Building II, Ann Arbor, MI 48109-0620
85. A. Patrinos, Acting Director, Environmental Sciences Division, Office of Health and Environmental Research, ER-74, U.S. Department of Energy, Washington, DC 20585
86–87. S. S. Perkins, DOE Field Office, Oak Ridge, Information Resource Center, 105 Broadway, Oak Ridge, TN 37830
88. S. P. Riddle, DOE Field Office, Oak Ridge, P.O. Box 2001, Oak Ridge, TN 37831-8541
89. R. C. Sleeman, DOE Field Office, Oak Ridge, P.O. Box 2001, Oak Ridge, TN 37831-8541

90. F. J. Wobber, Ecological Research Division, Office of Health and Environmental Research, Office of Energy Research, ER-75, U.S. Department of Energy, Washington, DC 20545

91–92. Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831