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The Regional Water Table of the Savannah River Site and Related Coverages

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Environmental Sciences and Technology Department
Environmental Restoration Technologies Section

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Prepared by:
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Aiken, SC 29808

SAFETY • RESPONSIBILITY • SECURITY
SRS
SAVANNAH RIVER SITE

Prepared for the U.S. Department of Energy Under
Contract Number DE-AC09-96SR18500

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EXECUTIVE SUMMARY

A new regional-scale map of the water table configuration beneath the Savannah River Site and its surrounding area has been developed. This map is regarded as an update to the regional water table map presented in Hiergesell (1995), and a more accurate representation of this surface than all previous maps. The new coverage can be used: (1) to provide a frame of reference for development of local-scale water table maps, (2) for scoping analyses of contaminant migration, (3) for waste site characterization, and (4) for input to groundwater flow and transport models.

Increased accuracy was achieved by several ways, primarily, by a more thorough processing of water level measurements contained in the SRS database. This processing involved the calculation of simple statistical quantities for each well, including the number of measurements in the period of record, mean elevation, minimum and maximum elevations, and standard deviation. Well information from the SRS database was supplemented by obtaining measurements from a number of water table wells that are not part of the groundwater monitoring program and therefore do not have measurements recorded in any SRS database. This approach resulted in the availability of 946 wells to guide contour development compared to 617 that were utilized to produce the map that appears in Hiergesell (1995). Also, a much more extensive field survey to determine the perennial reaches of surface water drainage ways was conducted. The use of these methods allowed the water table to be contoured with a 10-foot contour interval, compared to the 20-foot contour interval of all previous efforts.

Several other new hydrologic coverages are also presented in this report, including: (1) the extent of continuously flowing natural stream reaches at SRS, (2) the extent of stream reaches that flow artificially, due to SRS operations, and (3) the configuration of groundwater basins associated with each of the major streams at the SRS.

1.0 INTRODUCTION

Efforts to characterize and monitor groundwater contamination sites at SRS was initiated in the early 1960's and has grown tremendously in the intervening years. As part of the characterization process for individual waste sites, knowledge of groundwater flow directions is needed to determine the direction that plumes of dissolved contaminants are moving. Horizontal groundwater flow directions are determined by the water table configuration near these facilities.

Early efforts to characterize sites involved installation of wells relatively close to individual waste disposal sites. As a result, early water table maps tended to focus locally on one or two waste sites. Later, water table maps were extended outward to include entire plumes or entire operations areas. Some of these maps suffered from inaccuracies that arose from a failure to recognize the relationship between the water table and the land surface, particularly in the vicinity of perennial streams. The need for a more regional water table map to serve as a guide for local-scale map development and to minimize map construction errors became apparent.

Other needs also encouraged the development of accurate regional-scale water table maps. These included: (1) scoping needs for subsurface contaminant migration, (2) waste site characterizations, and (3) the development of groundwater flow and transport models that require accurate water table data for boundary condition specification and calibration.

In the past 5 years there have been several efforts to develop regional water table maps for the SRS. The first such map developed is described in Nichols and Haselow (1993). Methodology for development of this map utilized an automatic contouring algorithm to contour well data from 1Q91 and employed some knowledge of land surface elevations near perennial streams. Development of the next available regional water table map is documented in Hiergesell (1995). In this investigation 617 water level measurements obtained from wells during 1Q95 were utilized to construct water table contours. These contours were "hand drawn" and were forced to conform to land surface elevations in the vicinity of flowing streams. The most recent effort to depict the regional water table surface was presented in Brewer (1998). The approach of this effort was to calculate a regional water table surface based upon an empirical relationship between the land surface elevation and the long-term mean water levels in wells for areas lacking well data. Using this relationship a grid was constructed for SRS and a water table elevation assigned to each grid point. The resulting set of values were then kriged and contoured.

All three regional water table maps have a common limitation in that they were developed using only a 20-foot contour interval. Both the Nichols and Haselow (1993) map, and the Brewer (1998) map are also limited in that they were developed using an auto-contouring approach, were not validated with field observations of stream reach points of effluence, and did not extend the coverage beyond the SRS site boundary. The Hiergesell (1995) map was developed utilizing field verification of the point of effluence for many stream reaches within or surrounding SRS, but not all.

Nichols and Haselow (1993) and Hiergesell (1995) maps are limited in the fact that well data utilized to develop the water table were obtained in a single quarter, thus constraining the total number of measurements points available for contouring. The Brewer (1998) map was not constrained by this since mean water levels were used. No indication is given as to how many wells were available for use but, presumably, more wells were available than the number measured in any given quarter. This map is constrained, however, by the use of an empirical relationship to establish the water level elevation at points between wells.

In this investigation an updated regional-scale map of the water table configuration beneath the Savannah River Site and its surrounding area has been developed. This map revises the previous regional water table maps that was presented in Hiergesell, 1995

A more thorough processing of water level measurements contained in the SRS database has produced a more accurate and realistic map of the water table. Processing involved the calculation of simple statistical quantities for each well, including the number of measurements in the period of record, mean elevation, minimum and maximum elevations, standard deviation and the standard error of the mean. Following this, a determination was made as to which wells were water table wells, based upon the position of the water level in the well and the screen elevations. One significant advantage of using the historic records to calculate mean water levels for use in development of the regional water table is the fact that additional information, previously obtained from wells that have now been abandoned, became available for use.

Well information from the SRS database was supplemented by obtaining measurements from a number of additional water table wells that are not part of the routine monitoring program. These measurements have not previously been included in SRS databases. The combination of data resulted in the availability of 946 measured control points to guide contour development compared to 617 that were utilized in Hiergesell (1995).

Field surveys were conducted to verify the extent of perennial stream reaches. This effort was a continuation of the field surveys that were begun as a part of the approach in Hiergesell (1995). Knowledge of this is needed because where streams have continuous natural flow, the water table elevation is coincident with the elevation of the stream (or the land surface very close to the stream).

Utilizing all of the above data, contours were developed at the 10-foot interval compared to the 20-foot interval presented in the three previous investigations. In order to achieve the finer resolution contour interval, more extensive hydrologic interpretations were occasionally required at some locations.

Several other hydrologic coverages, related to the regional water table configuration, are also presented in this report. These include a coverage delineating continuously flowing stream reaches, a delineation of surface drainage ways that have been made to flow continuously through site operations, and a coverage delineating the groundwater basins associated with each of the major streams at the SRS. These basins represent the extent of the area from which groundwater in the water table aquifer moves laterally toward the streams.

2.0 GROUND AND SURFACE WATER

2.1 Hydrogeology

Shallow groundwater flow patterns beneath SRS are primarily the result of the incision of the land surface by the network of streams that traverse SRS. Streams occur in drainage ways that serve to divert surface water runoff during times of precipitation events. The process of incision has been ongoing in recent geologic time periods and continues at the present time. Due to the erosive force of flowing water, these drainage ways have progressively cut deeper and deeper into the shallow sedimentary layers through time. The degree of incision is not uniform along a drainage way but has occurred to a progressively greater degree as one proceeds from headwater of each stream to its mouth. This incision and the development of surface topography exerts a primary control on local and regional groundwater flow patterns and the configuration of the water table. The process has been accelerated in surface drainageways that receive a significant amount of process water discharge at SRS. This topic has been extensively investigated and more detailed discussions of the effect of topography on regional groundwater flow systems can be found is various texts, including Freeze and Witherspoon (1967), Freeze and Cherry (1979) and Fetter (1988).

With the use of a groundwater flow net it is possible to depict the steady-state flow patterns within near surface aquifers and the position of recharge and discharge areas of these aquifers. Such a flow net was developed in Hubbert (1940) for a two-dimensional vertical cross section through an isotropic, homogenous system bounded on the bottom by an impermeable boundary. A similar flow net (de Marsily, 1986) is illustrated below in Figure 1 and is useful in illustrating the general flow patterns that develop in a regional groundwater flow system.

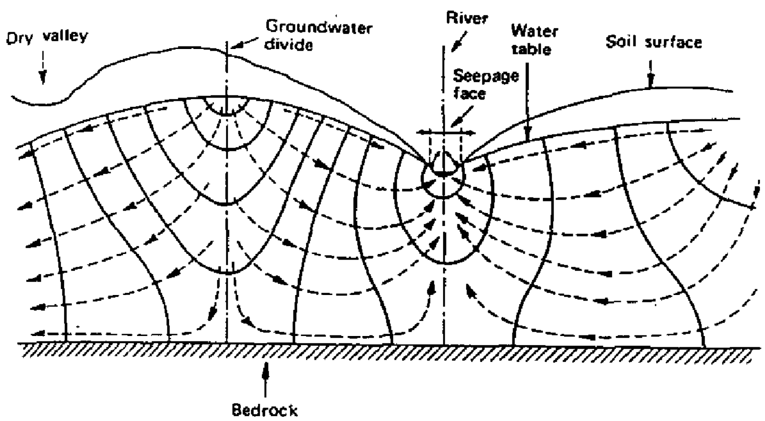


Figure 1. Groundwater flow net for a two-dimensional vertical cross-section through an isotropic, homogenous system bounded on the bottom by an impermeable boundary (from de Marsily, 1986).

In this figure the value of hydraulic head on any of the solid equipotential lines is equal to the elevation of the water table at it's point of intersection with the equipotential line. The direction of groundwater movement, illustrated with dashed lines and arrows, is clearly from areas of land surface highlands toward the valleys. Beneath divide areas groundwater moves vertically downward, then laterally toward the valleys and finally vertically upward beneath the streams. Water table elevations in the upland areas are maintained by recharge while groundwater discharge occurs in the vicinity of flowing streams. Recharge and discharge areas are those areas of the drainage basins where the net movement of groundwater is either away from the water table or toward it. (Freeze and Cherry, 1979). In a three-dimensional sense the water table is a subdued expression of the land surface topography. The higher elevations of the water table are located between perennial streams while the lowest areas are located along the streams themselves. Water table divides are roughly coincident with the surface water divides, although the water table occurs at some depth below the land surface.

In reality, the use of steady-state flow nets is technically valid only for the somewhat unrealistic case where the water table remains in a static position throughout the year. Use of the concept is still useful, however, when water table fluctuation is small relative to the entire thickness of the water table aquifer and if the water table configuration remains highly similar at all times in the fluctuation cycle. The steady-state groundwater condition should be regarded as one of dynamic equilibrium in which the recharge flux delivered to water table is the flux necessary to maintain the water table in its equilibrium position (Freeze and Cherry, 1979).

The water table is the upper surface of the saturated zone. Although the term "Water Table Aquifer" is sometimes used at the SRS, the regional water table is not constrained to occur exclusively in a particular hydrostratigraphic unit but actually occurs in different aquifers depending upon location.

The subsurface groundwater flow patterns can deviate from what is normally expected due to the existence of geologic complexity within the flow field. Variation of geologic depositional environments in both the horizontal and vertical direction often creates a hydraulic conductivity distribution field that varies widely within individual units as well as between units. This geologic complexity occurs not only within the saturated subsurface but also in the overlying unsaturated zone and may lead to complex saturated-unsaturated conditions. (Freeze and Cherry, 1979). When a low-permeability clay layer exists within a highly permeable sand unit the formation of a discontinuous saturated lens having unsaturated conditions above and below can occur. These lenses of saturated material are referred to as "perched" water. Perched lenses can be discontinuous in time as well as space. During periods of high rainfall perched lenses may form, only to dissipate during dryer times. Perching of water is suspected to occur at some parts of SRS but is difficult to verify.

2.2 Groundwater - surface water relationship

Groundwater and surface water are related due to the hydraulic connection that exists between the two flow domains. Several significant relationships can be identified that are relevant to this study. One groundwater - surface water relationship of primary importance for development of a water table map is the fact that the water table elevation is coincident with the land surface elevation along the reaches of continuously flowing, or perennial, streams. Where streams are known to be perennial, the water table elevation is known as accurately as the land surface elevation is known in those localities. Land surface elevation is available for the entire SRS by use of the USGS 7.5 minute quadrangle sheets. These sheets provide land surface elevations with a 10-foot contour interval and have an accuracy of +/- ½ the contour interval. As a result, the land surface elevation is known to an accuracy +/- 5 feet along all stream reaches at SRS. Some error due to the digital processing of DEM data may also contribute to elevation uncertainty along streams on scales smaller than the 30-meter distance between data points. Erosion along certain stream reaches has also contributed a significant elevation reduction along some minor tributary streams, especially the outfall streams near some of the operations areas. Information about water table elevation in the vicinity of streams is especially important at SRS because these areas are generally devoid of any piezometers or wells.

A second significant groundwater - surface water relationship is that surface streams are discharge zones for shallow aquifers. It can be demonstrated that naturally occurring SRS streams increase in flow rate from their point of effluence to the point where they flow into other, larger, streams and rivers. This relationship is observed even in the driest extreme of SRS climatic conditions, when practically all stream flow can be attributed to discharge from shallow aquifers.

The fact that naturally occurring SRS streams gain flow continuously along their extent from groundwater discharge is significant in that it implies that a fluid potential gradient must exist within the groundwater flow field near streams that drives groundwater toward the streams. In order for groundwater to move horizontally toward the streams, equi-potential lines (water table contour lines) must assume a "V" shape, with the apex pointing in the upstream direction. This configuration is similar to the configuration of land-surface elevation contour lines in the vicinity of incised stream valleys.

Some surface water flow at SRS is the result of continuous discharge of process water at the head of surface drainage ways. Such reaches are referred to in this report as "artificially flowing" stream reaches and represent locations where the groundwater flow system receives recharge from the stream. These reaches have been demonstrated to have flow rates that decrease from the discharge point (typically an NPDES outfall) to a point where groundwater begins to discharge naturally to the stream. The fact that flow decreases along such reaches indicates that surface water is seeping into the streambed and recharges the underlying aquifer. In order for groundwater to move horizontally away from the streams, equi-potential lines (water table contour lines) must assume a "V" shape, with the apex pointing in the downstream direction. Two examples of this condition exist at the A-01 and A-14 outfalls in the A/M Area. The drainage ways below these outfalls both flow continuously from the outfall to the mouth of Tims Branch. One study provides direct evidence that stream flow decreases below the A-14 outfall (WSRC-OS-97-00004). Measurements from nearby wells also provide evidence that groundwater is moving horizontally away from these reaches, immediately downstream from the outfalls to a point where Tims Branch begins to gain flow naturally from the shallow aquifers.

3.0 METHOD OF DEVELOPMENT

3.1 Data sources

Three basic types of data were used in this investigation to construct the regional water table contours. These included:

- Water level elevations from wells
- Land surface topography
- Continuously flowing stream reaches

One of the principal sources of data for development of the water table configuration is the historic record of water level measurements at SRS maintained by the Environmental Monitoring Section (EMS). Wells that are part of the on-going groundwater monitoring network are visited at least bi-annually to collect groundwater samples. Several parameters are measured in the field each time a well is visited, including the depth to water below the top of the standpipe, if the well has a standpipe, or below the top of casing. Each well is surveyed to provide accurate vertical and horizontal control, hence water level measurements are easily converted to water level elevation by subtracting the depth measurement from the surveyed elevations of the wellhead reference point. Water level information is entered into the GIMS database on a quarterly basis along with the analysis results from the samples. This database is maintained at WSRC by EMS.

Many wells at SRS were not specifically installed to become a part of the groundwater monitoring network, but rather to obtain baseline information on water levels and water chemistry. Data from these wells has not been entered into the site database and is not available by an electronic search of the GIMS database. As a part of this investigation, many of these wells were visited and one-time measurements were obtained to supplement the historical measurements stored in GIMS. The majority of these wells were installed in very remote parts of the SRS and have great value in reducing overall uncertainty in the water table configuration. The strategic location of these wells offsets the fact that "one-time only" measurements are utilized instead of a mean elevation from multiple measurements.

The land surface elevation information was acquired from the U.S.G.S. 7.5 minute quadrangle sheets. The SRS is completely covered by 14 quadrangle sheet, these being:

Girard	New Ellenton
Girard NE	New Ellenton SE
Girard NW	New Ellenton SW
Jackson	Shell Bluff Landing
Long Branch	Snelling
Martin	Williston
Millett	Windsor

These quadrangle sheets have land surface elevation contours of 10-feet although there are 5-foot contours on some quadrangles in the Savannah River floodplain.

Finally, information on perennial streams is also available on the 7.5 minute quadrangle sheets where such reaches are shown with a solid blue line while intermittently flowing stream reaches are illustrated using a dashed line. However, the point of transition from intermittent reach to continuously flowing reach on these maps is often considerably different than the transition point determined from direct field observation.

3.2 General strategy

One of the key strategies in development of the regional water table configuration is the use of the conceptual steady-state model to describe the water table. Water table elevations in wells at SRS are known to vary in response to transient recharge events, however the conditions identified in Section 2.1 for the practical employment of the steady-state model are not violated in terms of water table fluctuations. Additionally, it can be demonstrated with the use of quarterly water table maps that the general water table configuration does not change appreciably due to annual fluctuation cycles.

Steady-state water table elevations were estimated by calculating the long-term mean water level elevation for each well. The range of water table elevations during the period of record for each well was also calculated. The mean of the range of fluctuation for all wells having multiple measurements (910 wells) was found to be 7.2 feet. Seventy seven percent of the wells had a range of less than 10 feet. This statistic represents the range of water table fluctuation from the driest conditions to the wettest conditions and thus reflects the response to the extreme range of climatic conditions. Some wells will fluctuate more than others based only on their location. Wells situated near groundwater divides tend to have a greater fluctuation ranges than wells located closer to perennial streams.

Since the range of climatic conditions over the period of record is greater over longer periods of time than in any given year, it follows that the range of water level fluctuation is greater over the period of record than in any given year. While the annual fluctuation varies from year to year it is usually less than 4 feet in any year. The magnitude of this range of fluctuation is small compared to the total thickness of the water table aquifer. These comparisons serve to justify the use of mean water levels to characterize the regional water table.

The decision to utilize a steady-state model of the water table has a very practical benefit over the alternative method of utilizing the approximately "time-synchronous" measurements from a single quarter to develop the water table configuration. The benefit is derived from the fact that many more wells are available to calculate a long-term mean elevation than are measured in any specific quarter. Approximately 617 well measurements were previously available in 1Q95 to support the development of a water table configuration (Hiergesell, 1995) compared to 910 mean water table elevations available for this effort. This difference is primarily due to the fact that well samplers do not visit every well at the SRS in any particular quarter. Another contributing factor is that when there is a historical record of water level measurements from a well that has since been abandoned, the measurements can still be utilized as a control point at the location where the well once existed. One disadvantage of the use of abandoned wells is that the period of record of measurements obtained for some wells does not overlap with the period of record of measurements from newer wells. This is not thought to be significant disadvantage since a mean water level is used to estimate the water level at any well, therefore, the advantage of having many more data points available for contour development outweigh this disadvantage.

Although most monitoring wells at SRS are water table wells, many other wells have their screen zones finished in deeper aquifers and cannot be used to describe the water table. A water table well, by strict definition, must have the water level occur within the screen zone. According to SRS protocol, a well intended to monitor the water table is constructed with a 20-ft screen and is installed such that the 5-feet of the screen are above the water table and 15-feet below the water table at the time of installation. In order to increase the number of wells that could be used to construct the water table elevation contours an evaluation was conducted to determine if certain wells could also be utilized if their mean water level occurred slightly above the top of the screen zone. In the situation where the water level elevation in a well is positioned slightly above the screen zone, the measured water level will be slightly lower than the true water table. This is because of a slight head loss that occurs as water migrates vertically downward in the aquifer (i.e. from the water table to the top of the screen zone). A vertical distance of 5-feet above the screen was selected to evaluate the deviation from the true water table that could occur over this distance.

Assuming a relatively high vertical gradient ($\Delta h/\Delta l$) of 0.2 and the distance of 5 feet over which a drop in hydraulic head could occur, the following calculation was made:

$$\text{Decline} = (\Delta h/\Delta l) * (\Delta l) = (0.2)*(5) = 1.0 \text{ ft.}$$

where:

Δh = head difference
Δl = the vertical distance over which head difference occurs.
$\Delta h/\Delta l$ = vertical gradient

Estimates of vertical gradient can be obtained directly from well clusters at SRS. Data obtained from the MSB-47 cluster indicate the maximum vertical gradient is less than 0.2, although the vertical gradient in the vicinity of the water table is much less than 0.2. (Hiergesell, 1994). Thus, for wells in which the water level is less than five feet above top of the screen, the well level is less than 1.0 ft. below the true water table outside the well. This tolerance is regarded as acceptable for construction of a regional water table map, especially when considering the large number of wells that would otherwise be excluded from use.

3.3 Field measurements and observations

To supplement the topographic and perennial stream reach delineation of the 7.5 minute quadrangle sheets, a field survey was conducted to verify the map information. This survey was conducted by driving to every location where a road or trail crossed the headwaters of a minor stream and making a visual check. The survey was conducted both on the SRS and also in the area immediately surrounding SRS, although no survey was conducted on the Georgia side of the Savannah River. The map information on that side of the river was assumed to be accurate in regard to flowing stream reaches, but as a result water table contours were not reduced from 20 feet to 10 feet on the Georgia side of the river. Along a few headwater reaches access could only be obtained on foot. Visual examinations at each observation point were for the existence of flowing water, channel development, extent of wet soils and vegetation types associated with continuously wet soils. Field surveys were timed to coincide with times thought to reflect baseflow conditions of site streams. Using this constraint, any observed flowing reach with channel development could reasonably be assumed to be a perennial reach.

A field survey was conducted to obtain water level measurements from wells that are not part of the groundwater monitoring program at SRS and which have no water level measurements in the GIMS database. Such wells were identified by comparing files listing wells for which there are water level measurements with files containing surveyed well information. These wells were installed primarily to provide background information on water levels and groundwater chemistry at locations that were under consideration for siting of new facilities at the SRS. Because these wells are located in areas where no disposal of contaminants has occurred there has never been a need to include them in the groundwater monitoring program. Generally, the locations of these wells are highly desirable for the purpose of constructing regional water table elevation contours due to their being in remote parts of the site near groundwater divide areas. No other information on water table elevation is available in these areas. The uncertainty reduction in the water table elevation that is gained by the use of these wells is considered to be much greater than the uncertainty that is added by the use of a well with a single measurement. These wells have been added to a monitoring program and multiple measurements will be available at a later date to equate these measurements with mean water levels obtained from other water table wells.

A listing the 20 wells for which a single water level measurement was utilized is presented at the end of the table of wells in the Appendix. No statistical quantities are presented for any of these wells.

3.4 Databases and processing

Database operations were performed using the Heuristic Optimized Processing System (HOPS) data engine. The HOPS database has been populated with files containing a wide variety of environmental data from SRS. Files containing all of the groundwater data for SRS are periodically downloaded from the GIMS database where they are officially stored. Once data is entered into the HOPS data engine, the HOPS seed tool can be utilized to extract and process data of interest. The seed tool is easy to use and contains a Statistical Toolbox and Graphical Package and is capable of performing complicated queries extremely rapidly (Bowers, et. al. 1995).

Initial work was conducted to standardize common fields in different files such that database queries could be conducted using the common field to relate the data. In this case the well construction file had to have a common field with the file containing the historical water level measurements.

After this, simple statistical summaries of water level elevations were then calculated for each well having recorded water levels in the GIMS database. The statistical quantities calculated with HOPS included the number of measurements in the period of record, the mean, maximum, minimum, and standard deviation, and the standard error of the mean.

Analysis of the statistical quantities revealed that a number of wells had relatively high standard deviations, greater than 8 feet. Further investigation revealed a large difference between maximum and minimum water level elevations for these same wells. The most frequent problem contributing to this situation was found to be the existence of a single measurement from such wells that was much different from all other measurements obtained from the same well. Occasionally, there was more than one anomalous measurement. These measurements were frequently offset 100 feet from an elevation that fell within the range of the remaining measurements. The anomalous values were eliminated from the well files created with HOPS and the summary statistics then re-calculated. Readings were regarded to be anomalous if they differed from the remaining measurements by 30 feet or more and there were not more than two such measurements associated with any well. The total number of anomalous , and probably erroneous, measurements is a very small percentage of all water level measurements that are stored in GIMS. A list of the anomalous values was provided to EMS so they could make a determination if individual measurements stored in the GIMS database should be eliminated.

Another statistical quantity, the standard error of the mean, σ_m, was calculated and provides a measure of the accuracy of the sample mean as an estimator of the population mean. This statistic ranged from 0.01 to 2.88 feet.

Next, an evaluation was conducted to determine which wells were "water table" wells. This was accomplished by determining the position of the mean water level from each well relative to its well screen. The criterion used to determine which wells are water table wells was whether the mean water level occurs between bottom of the screen zone and a position 5-feet above the top of the screen. The justification of this criterion was previously discussed in Section 3.2, General Strategy, and a listing of all wells which meet this criterion are presented in the Appendix.

3.5 Data integration and use of Geographic Information System (GIS)

Management of hydrogeologic coverages was conducted using a Geographic Information System (GIS). The particular GIS used was ArcView, a product of ESRI, Inc. This program was used to superimpose related coverages so that water table contours could be configured to honor all relevant data. Coverages regarded as relevant to construction of accurate water tables include several exisiting coverages as well as new data collected specifically to improve the water table contours.

New data resulted from the previously described data base work to calculate mean water levels and from field surveys to observe continuously flowing stream reaches. The water levels obtained from one-time field measurements are also considered to be new data. Tables were created containing the pertinent information for each well, including: well name, well coordinates, mean water level, maximum and minimum water level, standard deviation of water levels, and the number of measurements in the period of record for each well. The tables were then loaded into ArcView so that well locations and water levels could be posted. Other previously existing GIS overages needed to configure the 10-foot water table contours included: Land surface elevations (images of USGS quadrangle sheets); NPDES outfall stations; and the 1Q95 Water table contour (20-ft).

The initial step involved the development of a new coverage depicting perennial stream reaches. Streams were assumed to follow the stream channel path illustrated on the USGS 7.5 minute quadrangle sheets. The point of effluence was determined for each surface drainage way based primarily on field observation of it's continuously flowing reach, but also involved applying a best estimate for headwater reaches of some tributaries that could not be field checked. Once the coverage for continuously flowing streams was created, the locations where water table contours are coincident with land surface contours were defined.

Key coverages that provided control for configuring the water table contours were the well locations (with water table elevations), the land surface elevation contours and the flowing stream reach coverage. These coverages (ArcView themes) were all activated within the same ArcView project view. The 20-foot water table contours were then added, as well. Once all the coverages were super-imposed, 10-foot water table contour lines were digitized between the 20-foot water table contour lines. Then all contours were adjusted using the ArcView theme editing function to honor the posted water level values and the land surface elevations in the vicinity of streams. Extensive modification was required to adjust all water table contours to be consistent with all of the control data on the local-scale.

After the all adjustments were completed, another coverage was created to represent the boundaries of groundwater basins associated with each stream drainage way at SRS. Since basin divides represent no-flow groundwater boundaries, their configuration is such that the boundary lines are oriented perpendicular to water table contour lines and parallel to groundwater flow lines.

4.0 RESULTS

The work conducted in this investigation has resulted in a significant increase in the accuracy of the water table map for SRS and the area immediately surrounding its boundary. This is due primarily to the availability of additional control points used to constrain the water table surface, thus allowing the reduction of the contour interval of the regional water table map from 20-feet to 10-feet.

The total number of wells was increased from 617 to 946 for this investigation. Although many of the additional 329 wells are in areas where many other wells already existed, a considerable number occur in areas where no other well information existed. This was an important factor in the increase in accuracy. Another factor contributing to the increased accuracy was the effort made to assure that water table contours were coincident with land surface contours along flowing stream reaches. A major effort was made to assure that this stream-aquifer relationship was strictly adhered to at a local-scale.

In general, the degree of accuracy of the water table elevation is greatest in those areas where groups of wells exist. The accuracy is slightly less where isolated wells exist and along perennial stream reaches. The least accurate parts of the map are at groundwater divide areas where there are no well measurements. Water table contours in these areas were extrapolated based upon the land surface elevations along perennial stream reaches in adjacent areas, and assuming mounding occurs to a similar degree as in other parts of SRS. There are three main areas at SRS where this situation occurs. These are: the portion of SRS located north of Upper Three Runs Creek and east of Tims Branch, the divide between Upper Three Runs Creek and Tinker Creek, the divide between Tinker Creek and Lower Three Runs Creek and Tinker Creek, and the divide west of Lower Three Runs Creek and east of Steel Creek. Uncertainty in water table elevations at these locations cannot be reduced without the acquisition of additional water table elevation measurements.

4.1 SRS region

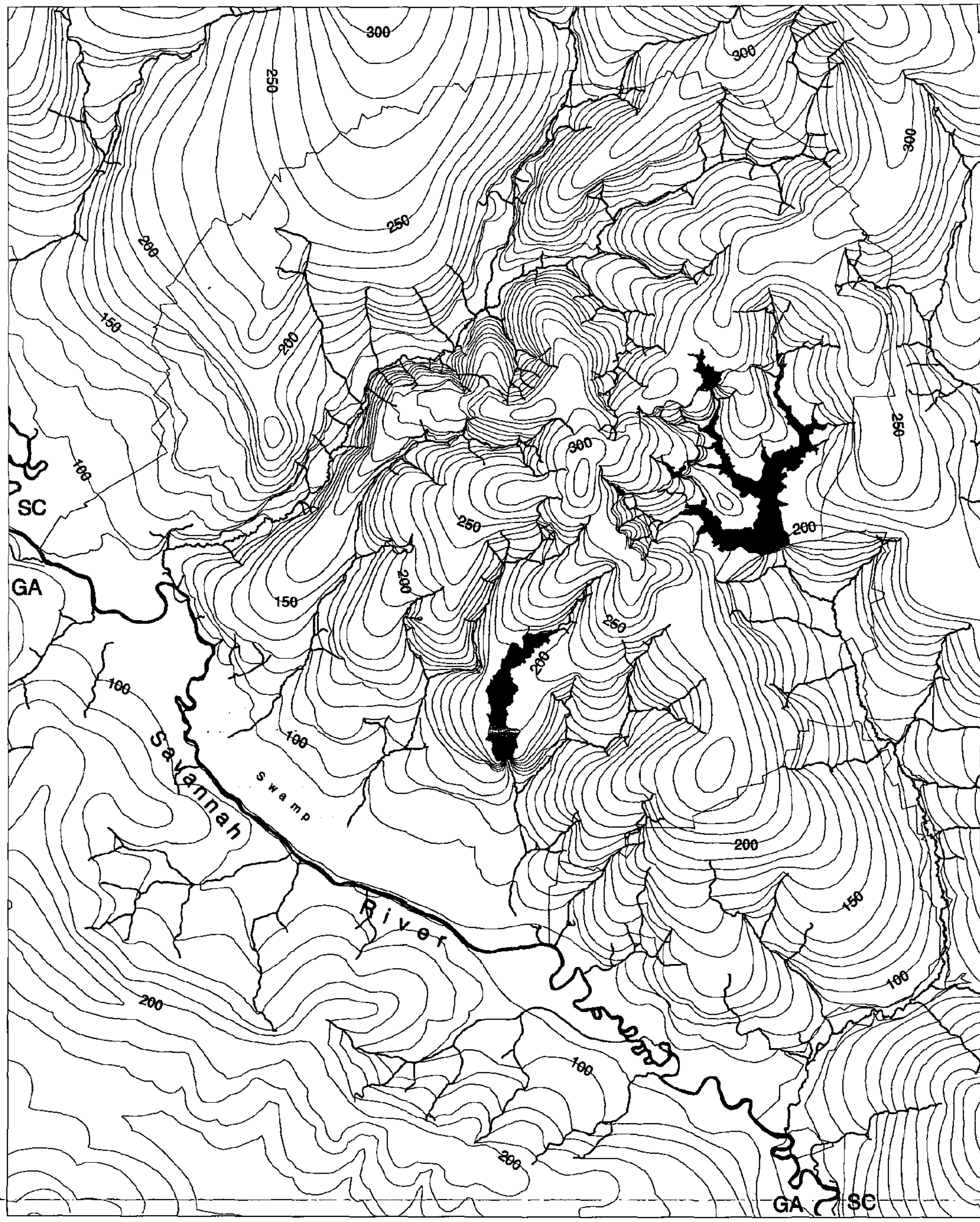
The configuration of the regional water table beneath the SRS is presented in Figure 2. The most prominent feature of this surface is the high degree to which the water table is controlled by incision of site streams into the shallow sediments. Also prominent is the "V" nature of water table contours, pointing in the upstream direction of the different SRS streams. These, and other features, are explained in Section 2.1 (Hydrogeology) and Section 2.2 (Stream - Aquifer Relationships).

The highest elevation of the water table within the SRS boundary is approximately 310 feet above mean sea level, occurring at the peak of the broad mound located near center of SRS. The headwaters of many of the site streams occur on the flanks of this mounded area. Other mound areas occur northeast of the A/M Area, and in the southeastern part of SRS between Lower Three Runs and Meyer Branch. Distinct "ridges" occur along the groundwater divides between surface streams. The lowest water table elevation within the SRS boundary, 70 feet above mean sea level, occurs near the mouth of Lower Three Runs Creek, where it flows into the Savannah River.

Groundwater gradients are greatest along the flanks of the major drainage ways. In particular, steep gradients occur on the south side of Upper Three Runs Creek. The lowest, or flattest, gradients occur near the mounded areas and along groundwater divides.

The water table configuration has been altered somewhat in the vicinity of the surface water impoundments, most notably L-Lake and Par Pond, but also at several of the smaller

Figure 2 SRS Regional Water Table Elevation



- Water Table Contour
- Perennial Stream Reach
- Swamp
- Outfall Stream Reach
- Lakes
- Savannah River
- SRS Site Boundary

SRS Regional Water Table Elevation
WSRC-TR-98-00045

Contour Interval: 10 feet in South Carolina; 20 feet in Georgia

5 0 5 10 15 Miles

impoundments and along the canal system that connects them. Water levels in the lakes and canals are maintained at a constant elevation, hence the water table has reached a new equilibrium level near these locations.

4.2 General Separations Area

The configuration of the water table in the General Separations Area is illustrated in Figure 3. The general configuration shows a divide area running from west to east with a second divide extending north between McQueen Branch and Crouch Branch to Upper Three Runs Creek. North of the main divide, the water table slopes steeply toward Upper Three Runs Creek but is relatively flat in the flood plain of the creek. South of the divide, the water table slopes less steeply toward Four Mile Branch. The highest elevations occur just southeast of H-Area, where the tip of the 280-foot contour is observed. The lowest elevation is slightly less than 140 feet, at the point where Upper Three Runs exits the view.

There is a pump and treat groundwater remediation system in operation in the GSA. The effect of this system is not shown in Figure 3 due to the scale of the figure and the regional water table contour interval.

Numerous wells exist in the GSA and are widely distributed throughout the GSA, as shown in Figure 3. Water table contours have been made to be consistent with mean water level elevations obtained from the great majority of these wells. This configuration is highly similar to previous water table map configurations that utilized measurements from a single quarter. The large number of control points, and the widespread distribution of these points throughout the GSA, combine to provide a relative high degree of certainty in the elevation of the water table in the GSA.

4.3 A/M Area

The configuration of the water table in the A/M Area is shown in Figure 4. The general configuration shows a divide that extends from the northeast corner to the south central part of the illustration. Groundwater flow is to the south and southwest beneath most of the A/M Areas, toward the Savannah River floodplain.
The red lines depict the trace of the A-01 and A-14 outfall drainage ways. They flow continuously due to surface discharge at the NPDES outfall stations, located at the upstream end of the red lines. Because these reaches are wet continuously they are areas of continuous infiltration. This infiltration becomes groundwater recharge, resulting in a mounding in the water table beneath them. The loss of water along the "red" reaches has been confirmed in the A-014 outfall reach with surface flow measurements (WSRC-OS-97-00004). The available well measurements also appear to be consistent with the interpretation of groundwater mounding at these locations, and suggest the contour "V's" point in the downstream direction near the outfalls. Water table elevations range from over 250 feet in the area northeast of the A/M Areas, to 160 feet at the location where Tims Branch exits the view on Figure 4.

There is a pump and treat groundwater remediation system in operation in the A/M Area which induces downward movement of groundwater from the water table to the underlying aquifer near the contamination waste sites in the A/M Area. However, at the scale of this figure, and because of the 10-foot contour interval, the effects of this system are not shown on Figure 4.

Numerous wells are located within the A/M Area and are widely distributed throughout the area, as shown on Figure 4. Water table contours have been made to be consistent with mean water level elevations obtained from the great majority of these wells. The large number of control points and their distribution throughout the A/M Area combine to provide a relative high degree of certainty in the elevation of the water table in the A/M Area.

Figure 3 General Separations Area Water Table Elevation

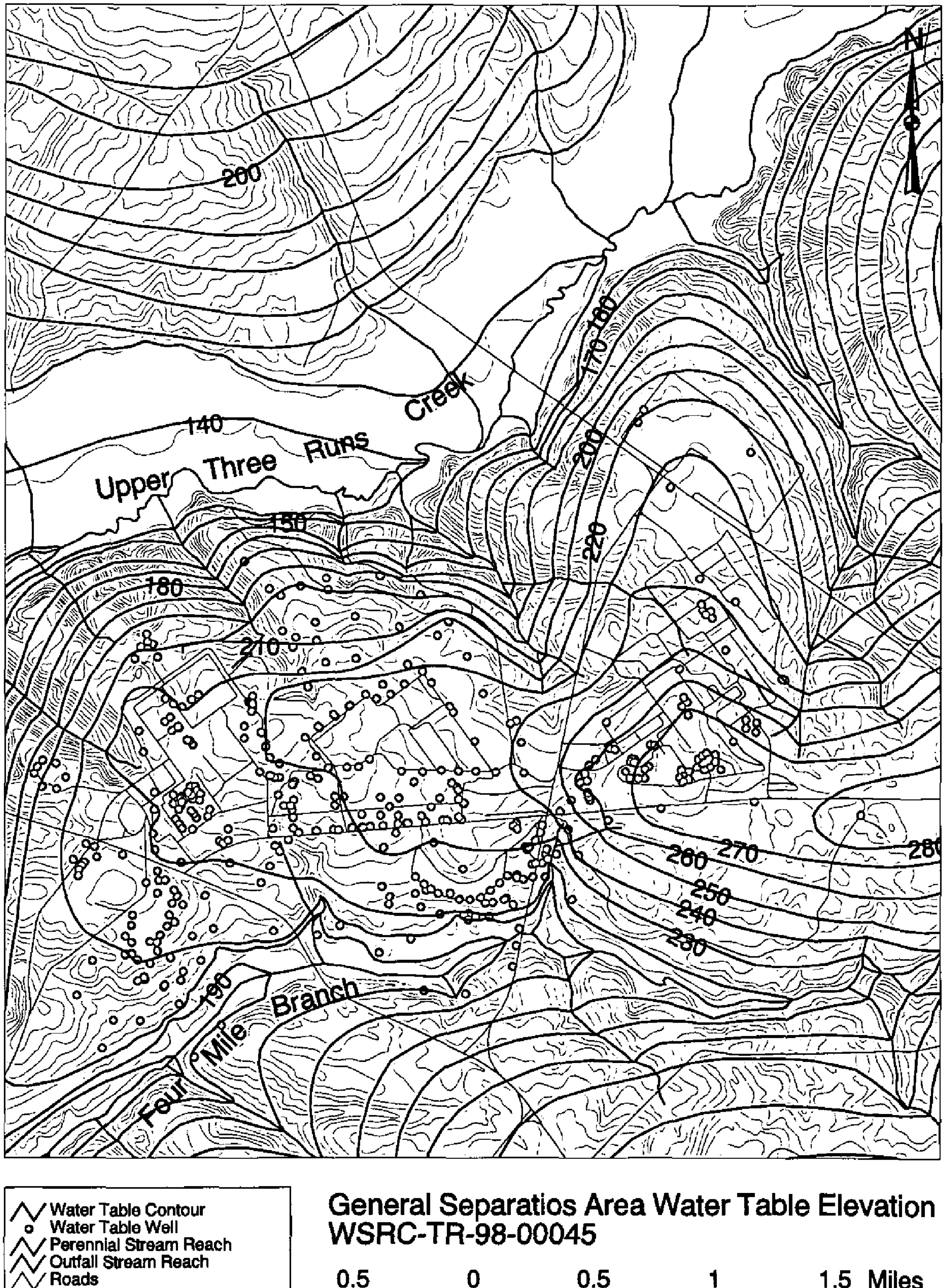
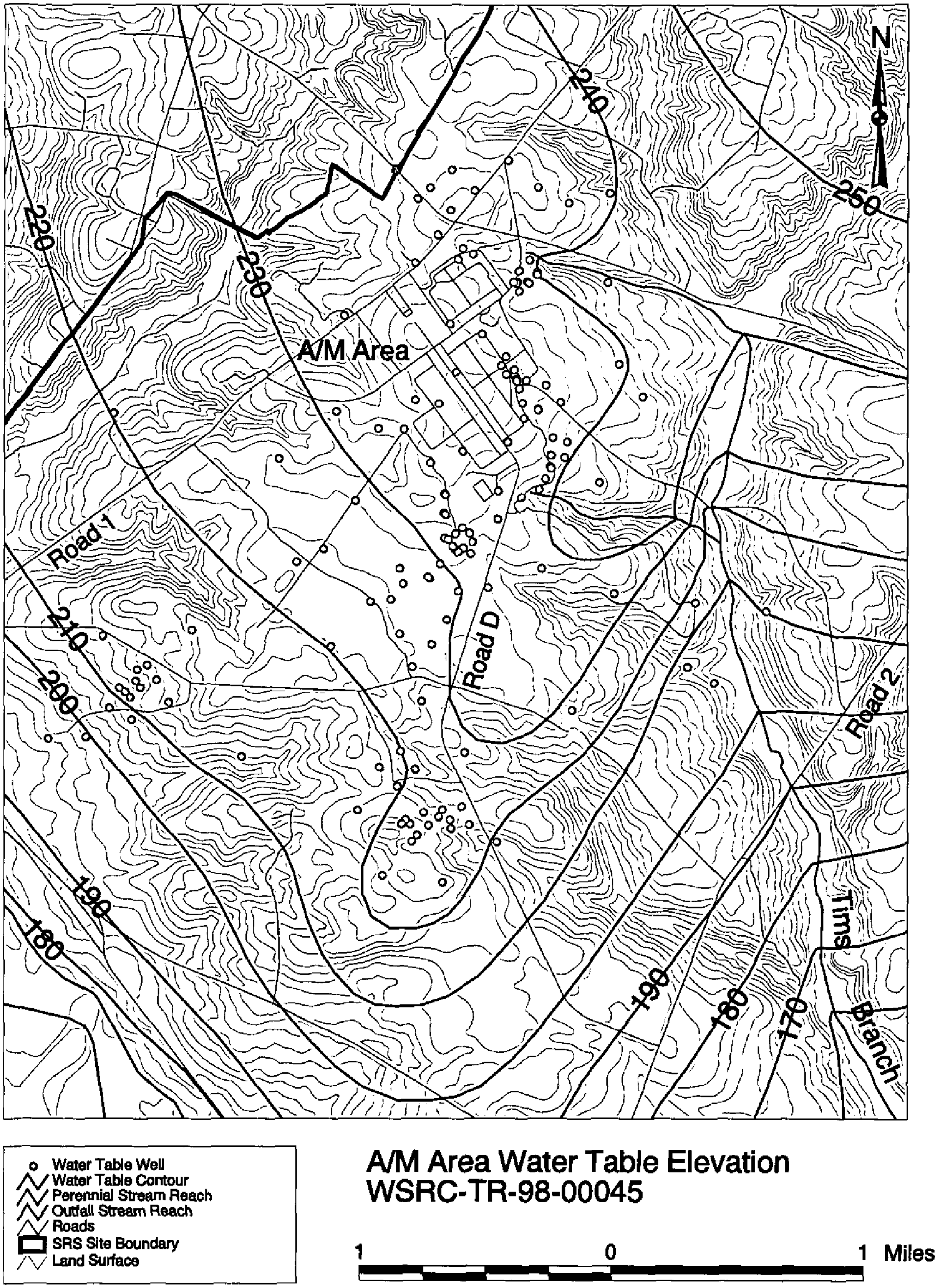


Figure 4. A/M Area Water Table Elevation



4.4 D-Area / TNX

The configuration of the water table in the D-Area/TNX Area is shown in Figure 5. The general configuration shows that groundwater generally moves from northeast to southwest, toward the Savannah River floodplain. A groundwater divide does extend from northeast to southwest between Upper Three Runs Creek and Four Mile Branch, however the dominant direction of groundwater movement is in the direction indicated. Water table elevations range from approximately 150 feet, northeast of D-Area, to approximately 85 feet where groundwater discharges into the Savannah River.

Clusters of wells exist in both the D-Area and TNX, providing a high degree of certainty in water table elevations near these locations. Overall, the level of certainty in water table elevation is regarded as moderate to high in this area. The effects of the TNX groundwater remediation system are not shown due to the scale of the figure and the regional contour interval.

4.5 B-Area

The configuration of the water table near B-Area is shown in Figure 6. The general configuration shows a divide that extends from the north to south and running just west of the B-Area. East of the divide groundwater generally moves east and southeast toward Upper Three Runs Creek. West of the divide, groundwater moves southwest toward the floodplain of the Savannah River. Water table elevations range from approximately 200 feet, just northwest and just southeast of B-Area, to approximately 110 feet along Upper Three Runs Creek.

A small mounded area in the water table is shown just south of B-Area and is confirmed by mean water levels obtained from several wells. There is some uncertainty in the water levels immediately west of B-Area, where the mean water levels from two wells are approximately 20-feet lower than surrounding wells. The contours of the water table elevation in this area has been made to be consistent with the most reasonable interpretation of the data, and some additional work may be required to determine why anomalous water levels have been obtained from the two well.

The large number of wells located just east of B-Area monitor the Sanitary Landfill. These wells tend to provide a relatively high degree of certainty in the water table elevation near that facility. A clay cap has now been placed over most of the Sanitary Landfill, which could have slight impact on the configuration of the water table in the immediate area. Some wells located within the area of cap placement had their casing extended upward approximately 2-feet. Water level elevations obtained from these wells may be in error because the TOC reference elevation does not appear to have been updated. This level of impact is not reflected in the regional map because of the 10-foot contour interval used for that surface. Overall, the level of certainty of water table elevation in other parts of B-Area is regarded as moderate.

4.6 Central Shops / C-Area

The configuration of the water table near Central Shops / C-Area is shown in Figure 7. The general configuration shows a divide that extends from east to west, running beneath both areas, and partitioning groundwater flow north to Four Mile Branch and south to Pen Branch. The effect of tributaries to Four Mile Branch on the interpretation of the water table elevation can be seen in the areas north and south of C-Area. Water table elevations range from 280 feet, east of Central Shops, to approximately 180 feet along Four Mile Branch and Pen Branch

A moderate number of wells exist in these areas and are widely distributed. The well measurements coupled with land elevations near flowing stream reached provide adequate control, although some data gaps exist south of the two areas, near the divide extensions. Overall, the level of certainty with which the water table

Figure 5 TNX / D-Area Water Table Elevation

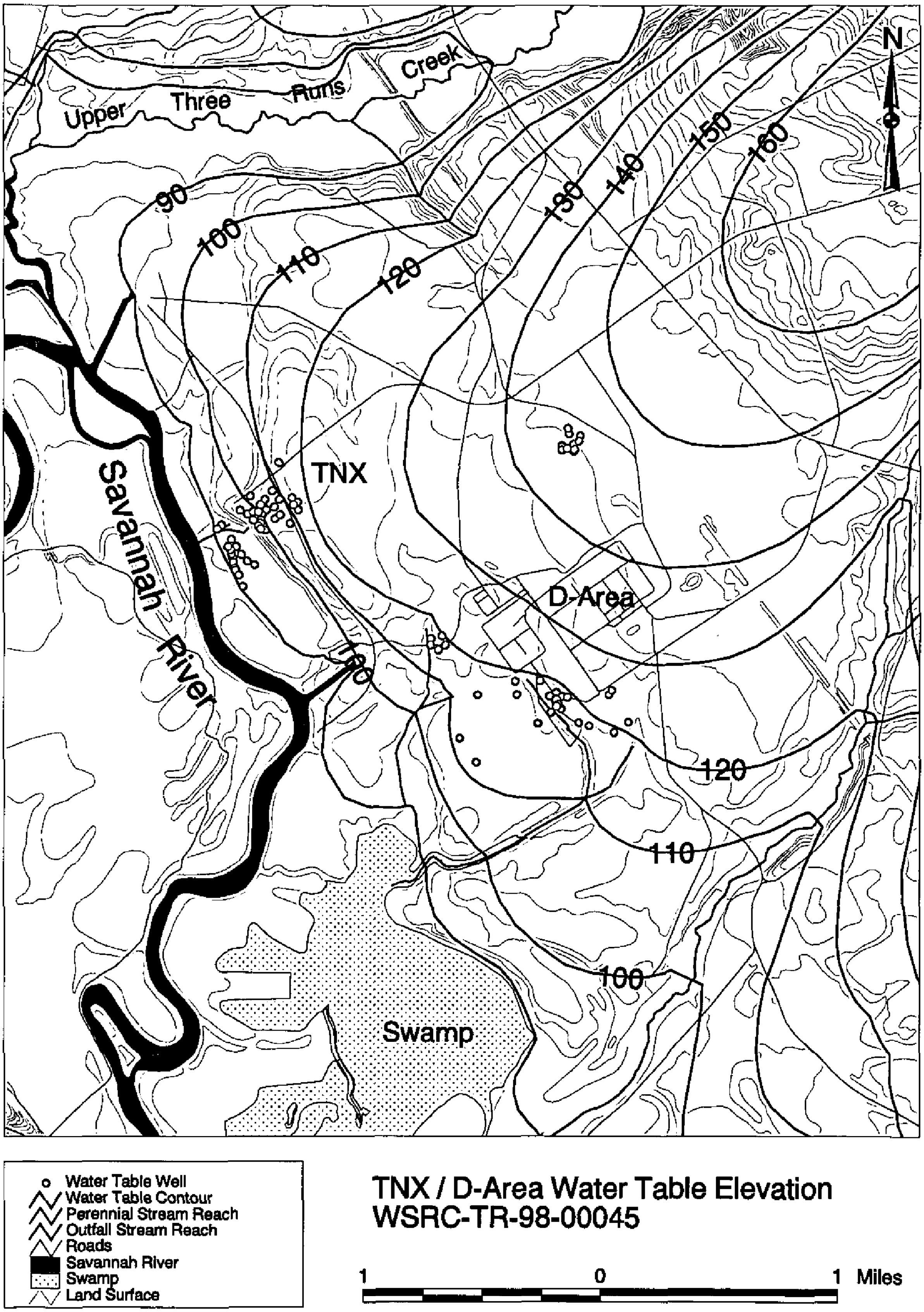


Figure 6 B-Area Water Table Elevation

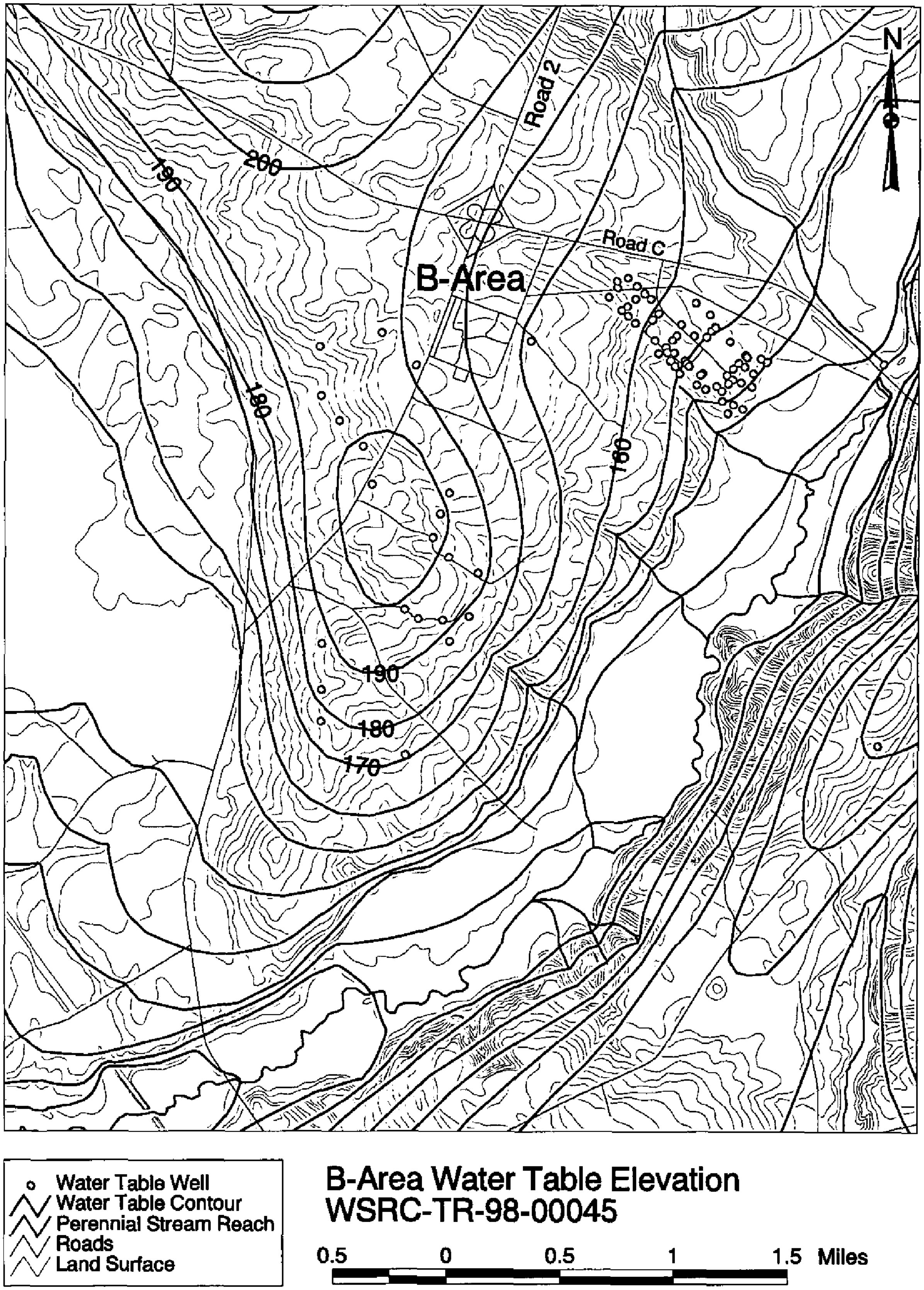
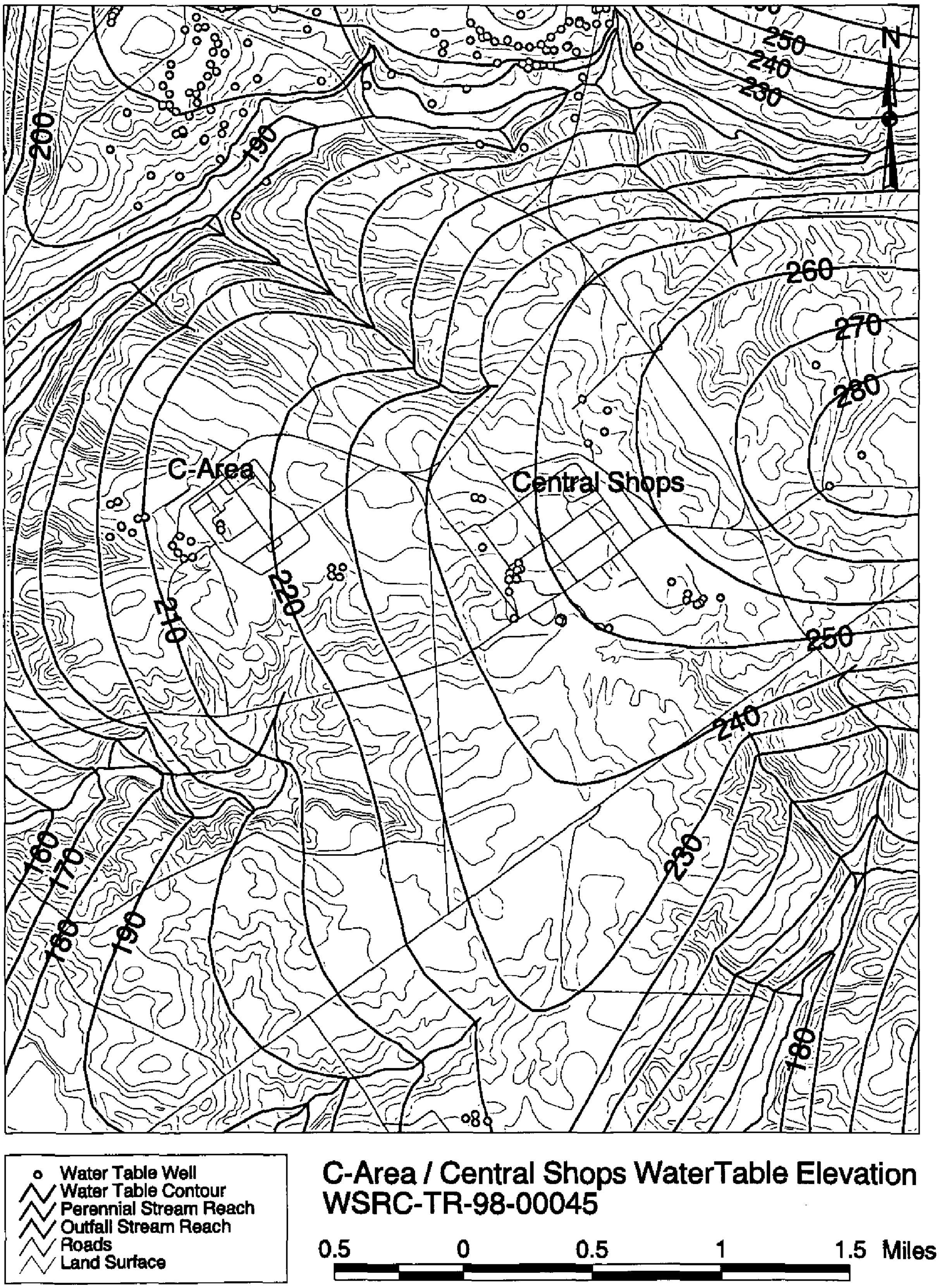


Figure 7 C-Area / Central Shops Water Table Elevation



elevation is known in vicinity of the Central Shops / C-Area is moderate.

4.7 R-Area

The configuration of the water table in the R-Area is shown in Figure 8. The general configuration shows a mounded area, centered on the R-Area, with flow radiating outward. To the north groundwater flows toward discharge points along Mill Creek, to the north and northeast flow proceeds to discharge areas along a stream that runs into Par Pond, and to the southeast toward Par Pond, itself. Water table elevations range from 300 feet, just west of R-Area, to 280 feet along the R-Canal turnout drainage way. The mounded groundwater near R-Area is suspected of reflecting perched conditions. Evidence to suggest perching include geologic logs, shallow water levels that have a somewhat higher degree of variability associated with the occurrence or absence of recharge events,
and the preliminary results of a groundwater flow model that has been developed to simulate groundwater movement near R-Area.

In the vicinity of R-Area, a canal was constructed for diverting cooling water to Par Pond. The canal no-longer receives discharge, however water stands in the bottom of the canal over its entire length. Groundwater seeps into the canal from the north and west sides and seeps out along the east and south sides, hence it is a "flow-through" type hydrologic feature from a groundwater standpoint. Water in the canal moves slowly from near the R-Area toward Pond A, Pond B and discharges into Par Pond.

There are a moderate number of wells located at R-Area but their distribution tends to be clustered just north of R-Area, in the vicinity of a capped basin. As a result the certainty with which the elevation of the water table is known is moderate near R-Area.

4.8 P-Area

The configuration of the water table in the P-Area is shown in Figure 9. The general configuration shows a divide that extends from the northwest to southeast, partitioning flow between Steel Creek to the southwest and tributaries of Lower Three Runs to the northeast. A groundwater mound area exists beneath P-Area and flow radiates outward in all directions except to the northwest. Water table elevations range from just over 280 feet, beneath P-Area, to approximately 220 along the tributary to Lower Three Runs.

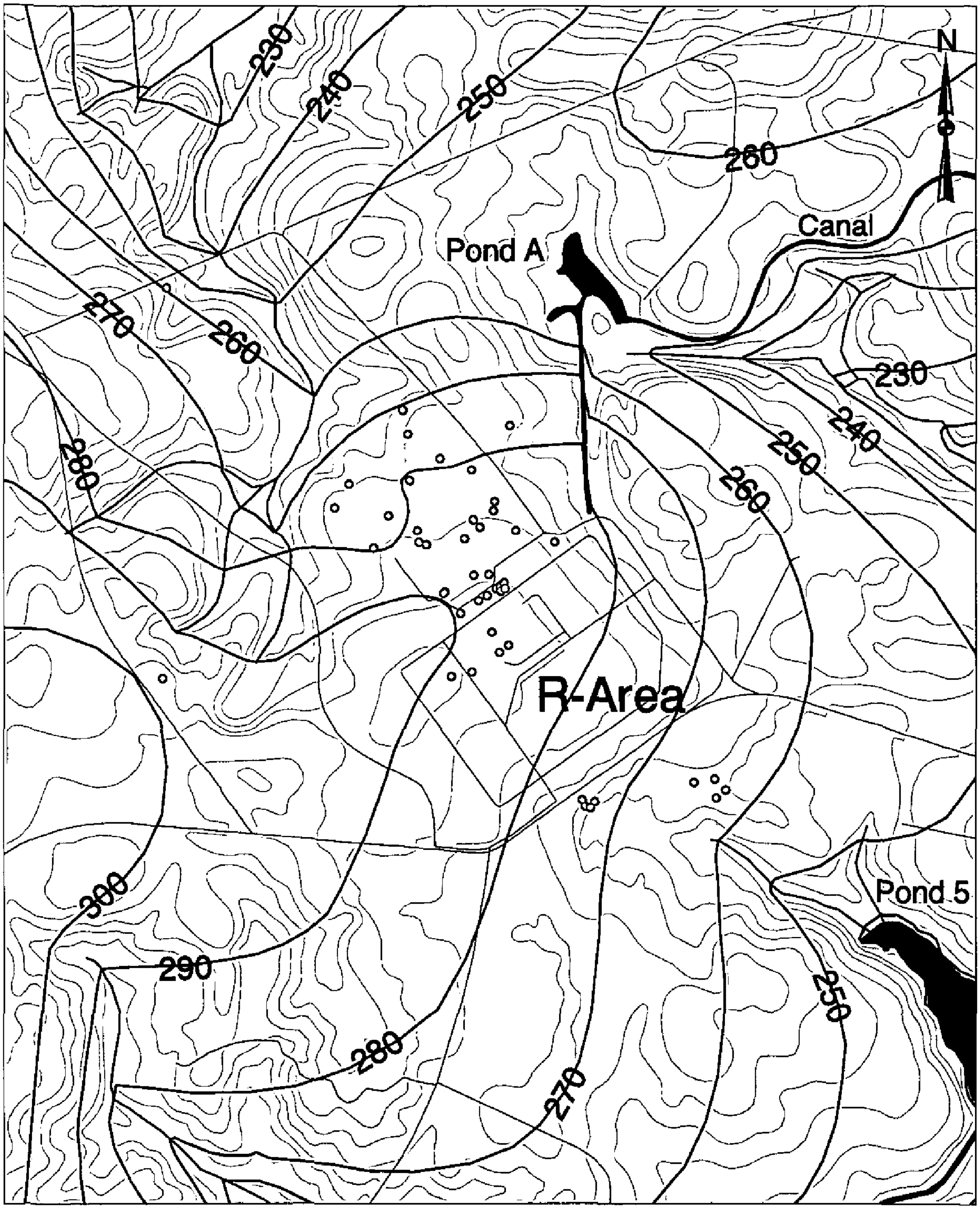
Only a few wells are clustered around individual waste sites at P-Area and much of the control for water table elevation is derived from flowing stream reaches. As a result the certainty with which water table elevation is known is moderate near P-Area.

4.9 K-Area

The configuration of the water table in the K-Area is shown in Figure 10. The general configuration shows a divide that extends from the north to south, dividing groundwater movement toward discharge zones along Indian Grave Branch and Pen Branch. Groundwater movement is to the south and southwest beneath most of the K-Area. An NPDES outfall is located just to the west of K-Area, and a prominent discharge ditch has been excavated between the outfall point and Indian Grave Branch. The outfall ditch is continuously wet and loses water to the subsurface along its length. As a result, groundwater is shown to mound slightly beneath the ditch, although there are no wells located to confirm this interpretation. The water table contours in the vicinity of the outfall reach have "V's" that point in the downstream direction. Water table elevations range from 230 feet, north of K-Area, to 140 feet near the confluence of Indian Grave Branch and Pen Branch.

There are a moderate number of wells located at K-Area and their distribution is fairly widespread. As a result the certainty with which

Figure 8 R-Area Water Table Elevation



R-Area Water Table Elevation
WSRC-TR-98-00045

Figure 9 P-Area Water Table Elevation

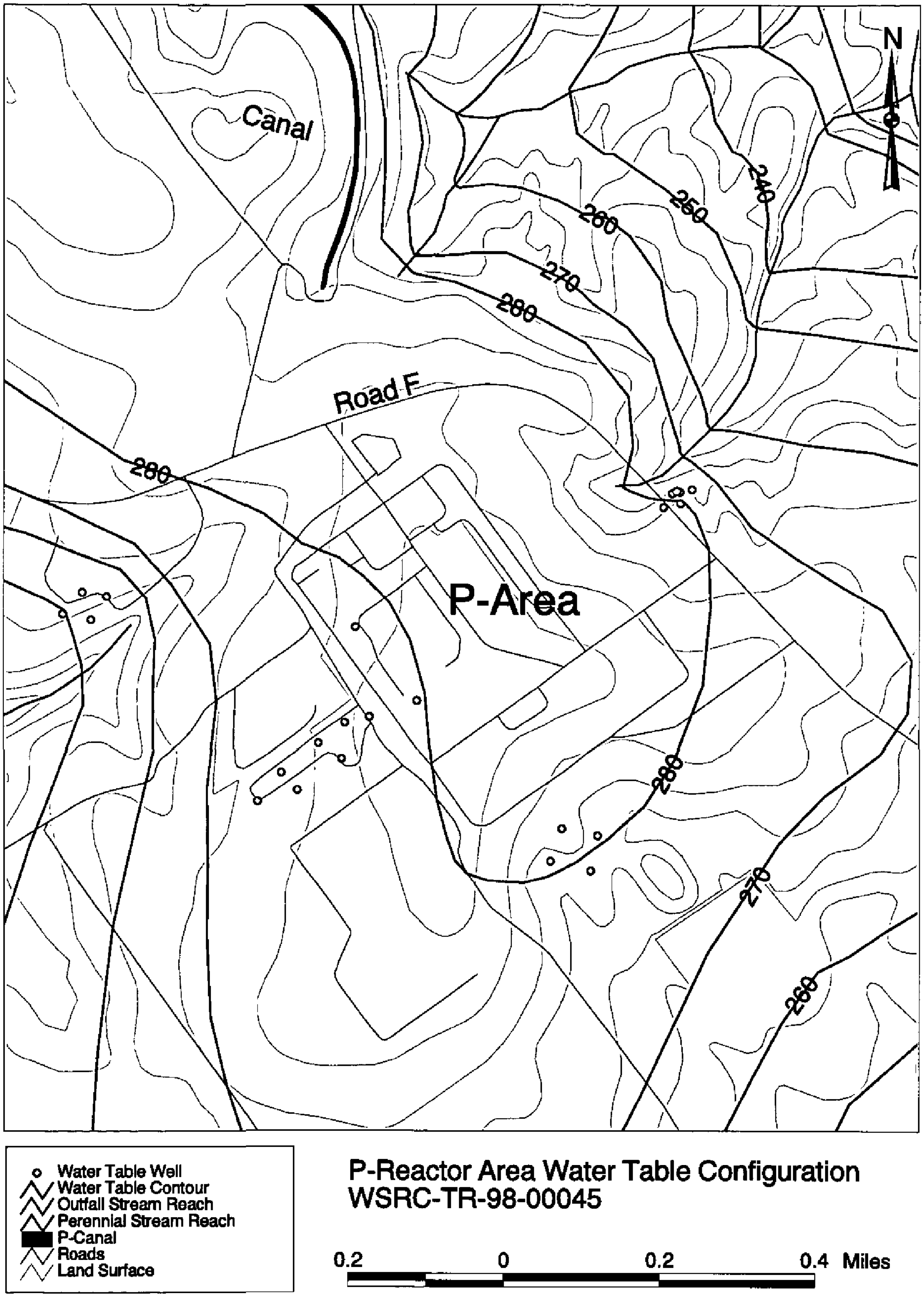
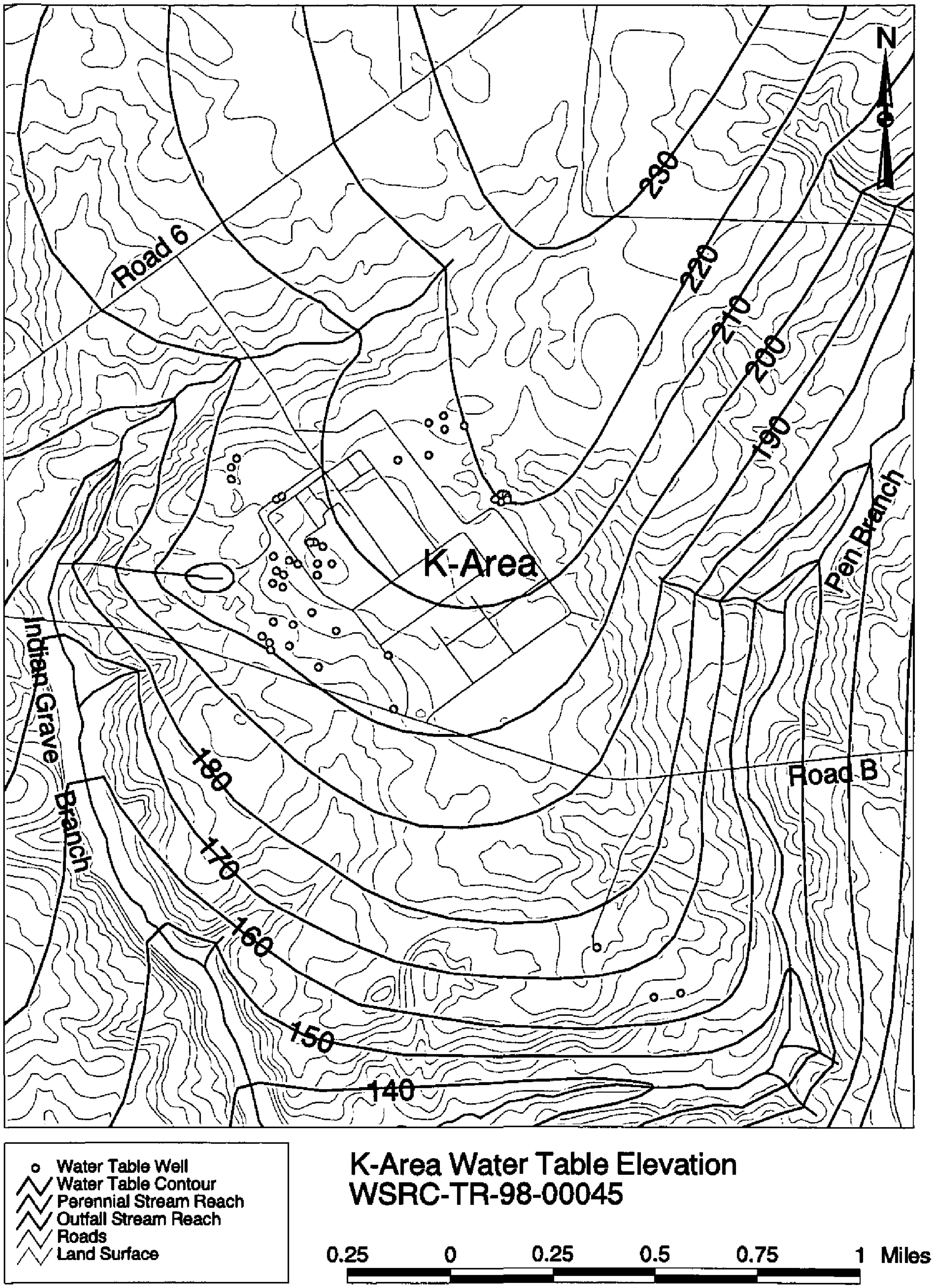


Figure 10 K-Area Water Table Elevation



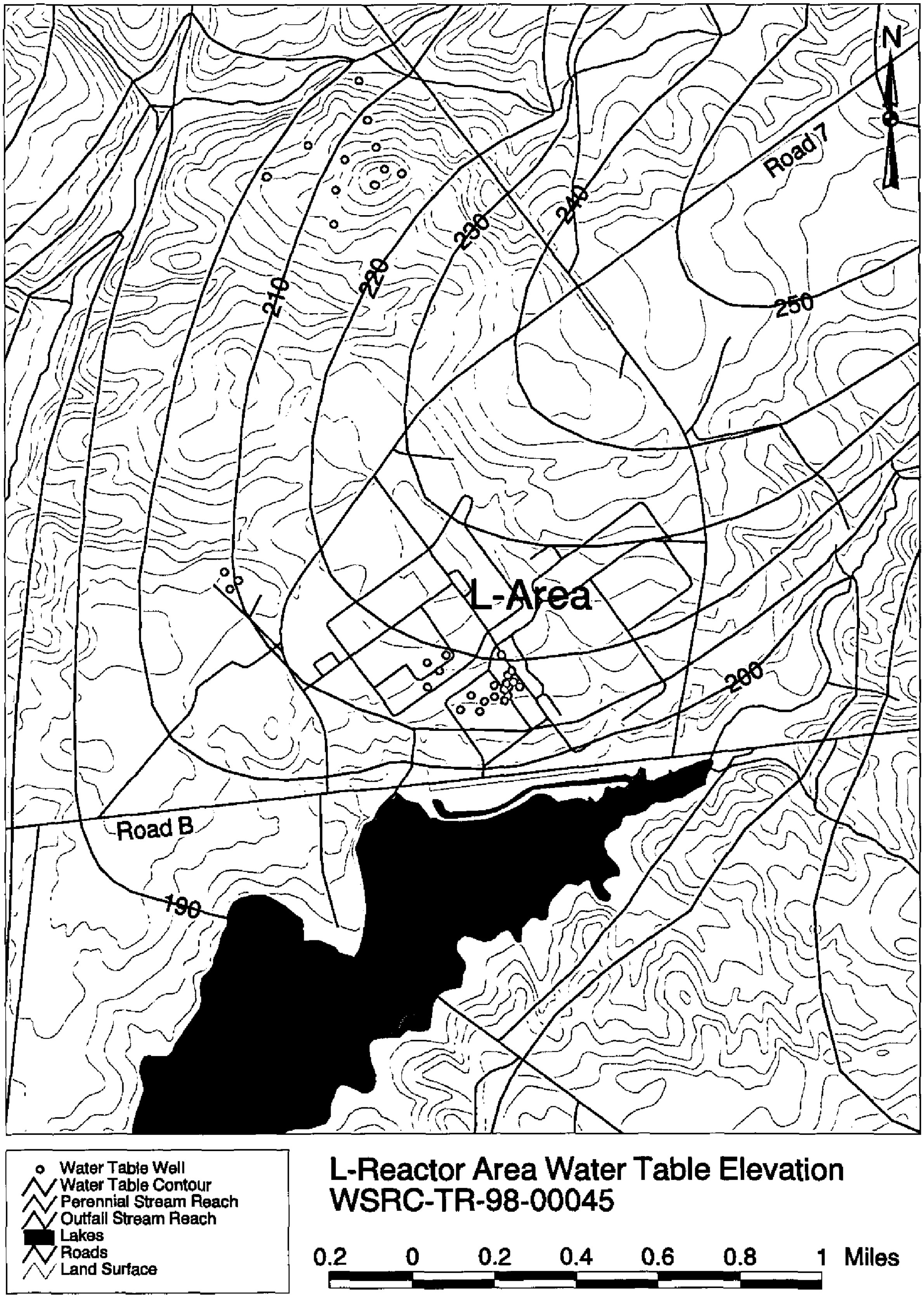
the elevation of the water table is known at K-Area is moderate to high.

4.10 L-Area

The configuration of the water table in the L-Area is shown in Figure 11. The general configuration shows a divide that extends from the northeast corner to the south central part of the illustration. The divide separates groundwater moving toward Pen Branch, to the north, and Steel Creek (and L-Lake) to the south. Groundwater movement beneath L-Area is southward toward L-Lake. Water table elevations range from 250 feet, northeast of L-Area, to 190 feet along the banks of L-Lake.

There are a few wells clustered at waste disposal facilities in L-Area and some farther north near Pen Branch. Flowing stream reaches and wells provide sufficient control to allow water table elevations to be known with moderate certainty.

Figure 11 L-Area Water Table Elevation



5.0 RELATED HYDROLOGIC COVERAGES

Three hydrologic coverages, in addition to the water table elevation maps, have been created. These are the perennial stream reaches, artificially flowing stream reaches and groundwater basin delineations.

5.1 Perennial and artificial stream reaches

The extent of continuously flowing, or perennial, stream reaches are shown in Figure 12. This coverage was created by digitizing the trace of all flowing stream reaches. The digitized lines were made to be co-incident with the continuously flowing stream reaches found on the USGS 7.5 minute quadrangle sheets for most reaches. However, the new coverage differs from the 7.5 minute quadrangle coverage in several ways. Primarily, the position of the point of effluence for a number of streams is different for some streams than what is depicted on the quadrangle sheets. Points of effluence were modified based upon an extensive field survey. Secondly, where the quadrangle sheets show wetlands along some stream reaches, the continuous stream line is discontinuous, terminating at each end of the wetland. The new coverage extends streams through such wetland areas. An example of where this was done is along the lower reaches of Tims Branch.

An additional coverage associated with perennial stream reaches is that of "artificially" flowing stream reaches. These are drainage ways flow continuously as a result discharges from SRS operations. These stream segments are shown as red lines, as opposed to the blue lines used to delineate natural perennial stream reaches.

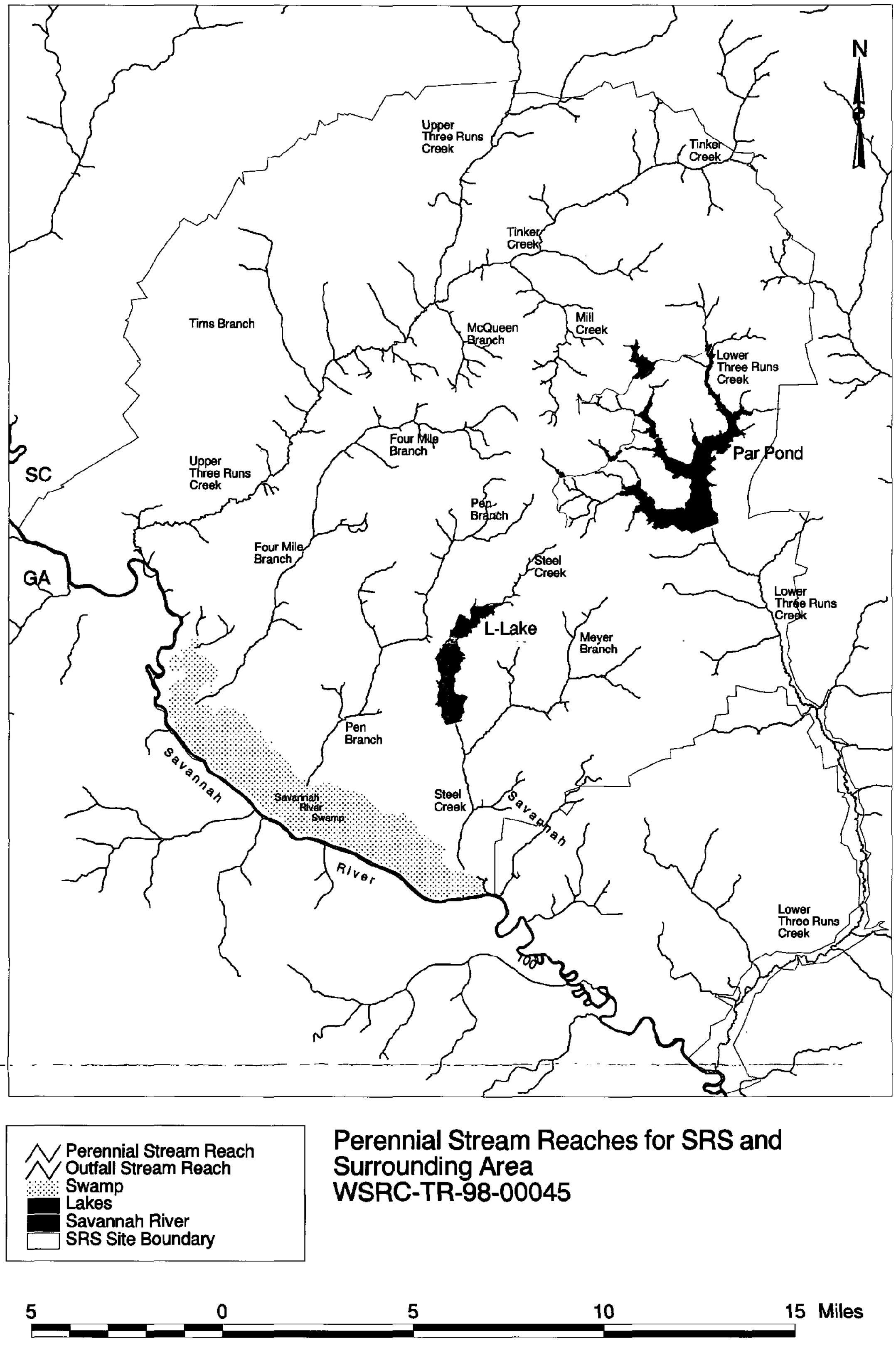
5.2 Groundwater basins

Delineations of groundwater basins for each of the major drainage ways at SRS are illustrated in Figure 13. These basins are similar to the surface watershed basins associated with each stream, except that they represent the area where shallow groundwater drains laterally into each stream. Surface and groundwater basin boundaries are nearly coincident, but are not exactly the same. There are places where surface water runoff at some point (x,y) may drain toward one site stream whereas any water infiltrating to the sub-surface at that point would eventually discharge at a different stream.

Although most water infiltrating to the water table moves laterally and discharges to local streams, some moves downward into deeper aquifers. Those aquifers may discharge to different site streams than the shallower aquifer. One example is found in the General Separations Area where the water table aquifer discharges laterally to Four Mile Branch (south of the main divide). Some of the water recharging the water table aquifer eventually migrates downward to the Gordon Aquifer, which discharges to Upper Three Runs Creek.

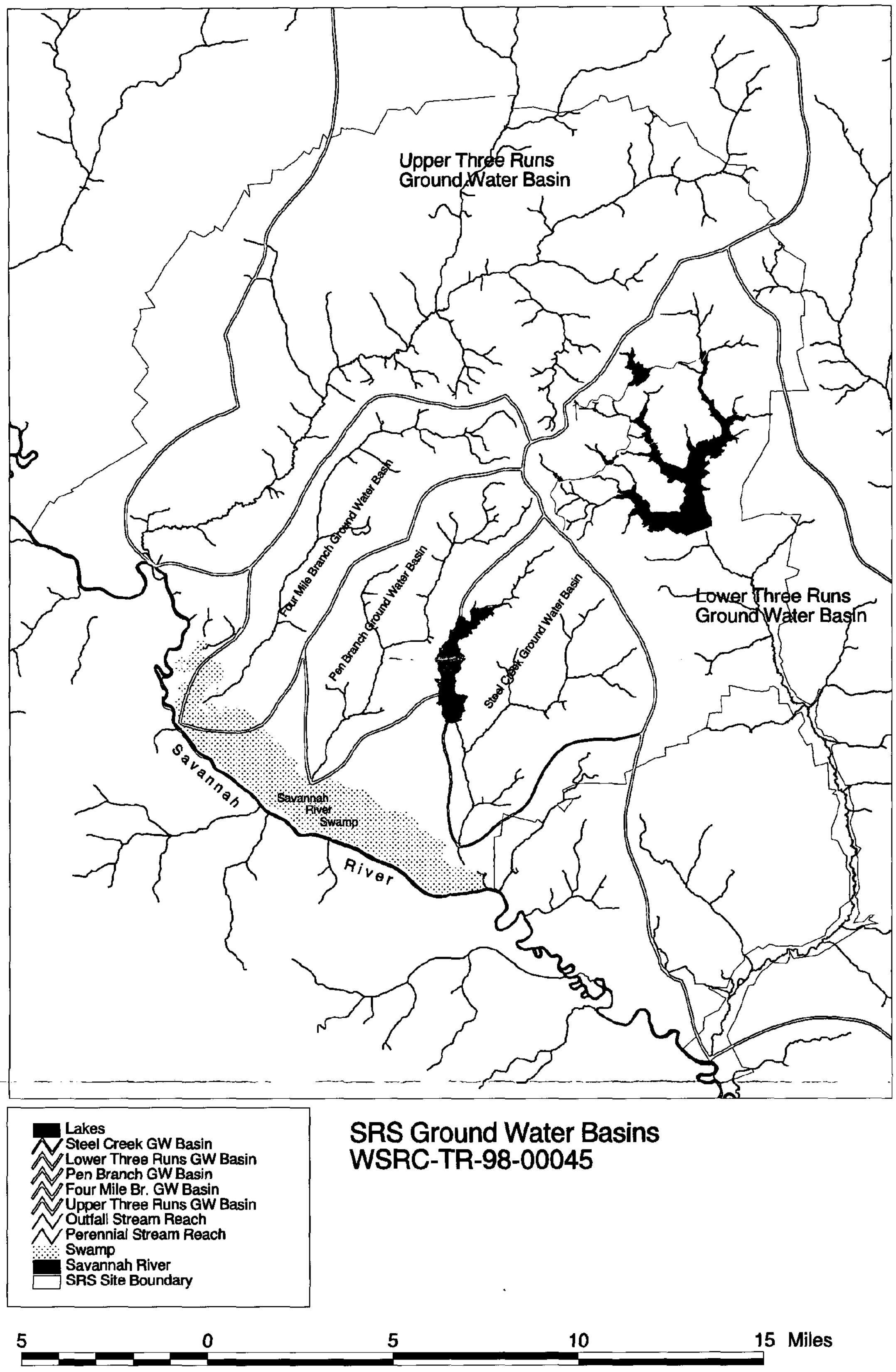
The occurrence of one unusual groundwater / surface water relationship is worthy of being mentioned. Along the western edge of L-Lake water is seeping out of the lake and into the groundwater system. This groundwater moves directly toward Pen Branch, where it discharges. Along the western edge of L-Lake the impoundment has raised lake levels higher than the mound that existed between Pen Branch and Steel Creek prior to construction of the dam. As a result, water from the Steel Creek basin discharges directly into the Pen Branch basin.

Figure 12 Perennial Stream Reaches for SRS and Surrounding Area



Perennial Stream Reaches for SRS and Surrounding Area
WSRC-TR-98-00045

Figure 13 SRS Ground Water Basins



6.0 AVAILABILITY OF COVERAGES

All of the coverages mentioned in previous sections of this report were developed as ArcView shape files. It is anticipated that these coverages will be maintained and periodically updated, on an DEC Alpha workstation, known as Falcon, in Building 773-35. The workstation is operated by the Environmental Protection Department, Environmental Monitoring Section. Access can be obtained by contacting that organization to establish an account on Falcon. All ArcView coverages have been provided to the E&GIS group and will be placed on the SRS Site Legacy CD the next time the Legacy CD is updated. Access can alternatively be obtained by acquiring one of these CDs.

It is expected that updates to this coverage will be attempted in the future. To assist in this endeavor any suggestions, criticisms, corrections or additions are requested to be provided to the author.

7.0 REFERENCES

Bowers, J.A., J.B. Gladden, R.E. Osteen, C. Hopson, 1995, DataDelve and Eco Track Server: A Spatial Data System For Environmental Information , WSRC-RP-95-194, Westinghouse Savannah River Company, Aiken, SC, 29808.

Brewer, K.E., 1998, SGS Water Table Mapping Documentation. PECD-SGS-98-154, August 17, 1998.

DeMarsily, G., 1986, Quantitative Hydrogeology, Groundwater Hydrology for Engineers, Academic Press, Inc., Orlando, FL. 440 p.

Fetter, C.W., 1988, Applied Hydrogeology (2'nd Edition), Merrill Publishing Co., Columbus, Ohio, 592 p.

Freeze, R.A., and J.A. Cherry, 1979, Groundwater, Prentice-Hall, 604 p.

Freeze, R.A., and P.A. Witherspoon, 1967. Theoretical analysis of regional groundwater flow: 2 Effects of water table configuration and subsurface permeability variation, Water Resources Research 3, pp. 623-634.

Hiergesell, R.A., 1994, Hydrologic Analysis of Data from the Lower Lost Lake Aquifer at Recovery Well RWM-12. WSRC-TR-93-666, Westinghouse Savannah River Company, Aiken, SC 29808.

Hiergesell, R.A., 1995, A regional water table map for the Savannah River Site, 1Q95, WSRC-MS-95-0524, Westinghouse Savannah River Company, Aiken, SC 29808.

Nichols. R. L. and J.S. Haselow, 1993. Potentiometric map of the Upper Three Runs/Steed Pond aquifers (Water table map), first quarter 1991. Figure contained in Hydrogeologic Framework of West-Central South Carolina, Aadland, R.K., J.A. Gellici, and P.A. Thayer, South Carolina Water Department of Water Resources, Water Resources Division Report 5.

WSRC-OS-97-00004, Tim's Branch Drainage Area Stream Flow and Analysis Study, E.I. du Pont de Nemours & Company, Inc., Savannah River Plant, Aiken, SC.

APPENDIX

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Well ID	UTM N	UTM E	Sz top	Sz bot.	Gr. Elev.	No.	Max.	Min.	Range	Std. Dev.	Mean WL	StdErr_Mean
ABP 1DD	3686140.3	431186.8	227.2	207.2	357.9	15	230.9	223.0	7.9	2.11	226.4	0.54
ABP 2DD	3686144.8	431067.8	222.3	202.2	368.3	15	225.4	220.6	4.9	1.66	222.8	0.43
ABP 3	3686223.5	431154.8	236.9	206.9	351.9	42	227.7	218.0	9.7	2.84	223.4	0.44
ABP 4DD	3686076.8	431107.8	223.2	203.2	362.7	14	226.4	221.4	5.0	1.64	224.0	0.44
ABP 6D	3686173.8	431037.1	222.4	202.4	363.0	15	224.9	220.5	4.4	1.45	222.9	0.37
ABP 7D	3686034.8	431073.8	225.2	205.2	361.9	14	226.4	221.2	5.2	1.56	224.0	0.42
ABP 8D	3686144.3	431014.5	228.2	208.1	368.8	37	225.3	214.3	11.0	3.14	221.1	0.52
ABP 9D	3685817.8	430889.5	232.0	212.0	351.0	11	224.5	222.0	2.5	0.72	223.7	0.22
ABP 10D	3686233.8	430731.5	226.8	206.9	351.4	13	218.3	216.0	2.3	0.67	217.4	0.19
AC 2B	3688505.5	430222.9	236.4	216.4	342.8	36	229.2	225.3	3.8	0.94	227.7	0.16
AC 3B	3686582.8	429990.3	213.4	193.4	300.1	39	222.1	207.8	14.2	2.54	212.2	0.41
ACB 1A	3688643.3	431979.0	247.6	217.6	357.6	41	239.7	233.4	6.3	1.39	237.4	0.22
ACB 2A	3688614.8	432071.9	237.8	207.8	347.8	41	244.5	234.3	10.2	1.95	238.6	0.30
ACB 3A	3688517.8	432049.1	236.3	206.3	346.3	42	241.2	236.2	5.0	1.5	239.2	0.23
ACB 4A	3688529.0	431966.5	241.7	211.7	356.7	41	240.3	234.6	5.7	1.5	238.4	0.23
AMB 4	3689033.3	431736.7	242.8	222.8	378.6	11	234.2	230.3	3.9	1.29	232.3	0.39
AMB 4D	3689042.0	431733.6	233.4	213.4	378.4	34	235.7	230.7	5.0	1.01	233.4	0.17
AMB 5	3689020.5	431741.0	242.1	222.1	377.6	44	235.8	230.6	5.2	1.2	233.8	0.18
AMB 6	3689008.3	431749.6	242.6	222.6	375.1	45	235.6	228.2	7.4	1.57	233.4	0.23
AMB 7	3689008.5	431809.2	242.1	222.1	368.1	46	235.9	230.8	5.1	1.26	234.1	0.19
AMB 8D	3688957.3	431762.0	240.8	220.8	367.8	43	235.6	231.4	4.2	1.2	233.7	0.18
AMB 9D	3688861.3	431780.1	239.7	219.7	365.7	42	236.0	231.3	4.7	1.37	233.7	0.21
AMB 10D	3688824.0	431879.9	239.4	219.4	363.4	42	237.6	231.8	5.8	1.53	235.3	0.24
AMB 10DD	3688820.3	431882.6	358.6	338.6	363.6	38	359.7	357.4	2.3	0.67	358.9	0.11
AMB 11D	3688869.8	432026.3	240.5	220.5	362.0	40	238.4	233.2	5.3	1.52	236.1	0.24
AMB 12D	3688980.0	431934.3	239.4	219.4	367.8	42	236.7	232.2	4.6	1.36	234.7	0.21
AMB 14D	3689049.5	431679.8	235.1	215.1	380.1	14	233.4	230.2	3.2	1.15	232.0	0.31
AMB 15D	3689108.5	431645.7	236.2	216.2	381.2	13	235.7	232.4	3.3	1.02	234.6	0.28
AMB 16D	3689082.5	431730.0	233.4	213.4	378.4	14	235.3	231.4	3.9	1.24	233.9	0.33
AOB 1	3688309.3	431888.9	248.5	218.5	338.5	45	238.2	233.0	5.2	1.39	236.0	0.21
AOB 2	3688376.5	431930.0	250.2	220.2	343.2	43	243.3	227.3	16.0	2.71	236.3	0.41
AOB 3	3688456.8	431960.1	243.9	223.9	350.6	40	239.8	229.5	10.3	1.86	237.7	0.29
ARP 1A	3686511.5	430872.8	223.0	193.0	353.0	22	228.6	215.2	13.3	2.75	217.6	0.59
ARP 2	3686615.8	431007.4	220.3	190.3	335.3	43	221.7	212.6	9.1	2.53	218.4	0.39
ARP 3	3686502.0	431100.6	218.2	188.2	338.2	39	224.5	214.8	9.7	2.63	220.7	0.42
ARP 4	3686389.8	430982.9	227.8	197.8	346.8	36	221.7	214.8	6.9	1.93	218.9	0.32
ASB 1A	3689583.8	431763.2	247.2	217.2	347.2	33	248.0	236.4	11.7	2.67	238.1	0.46
ASB 2A	3689645.5	431809.8	246.9	216.9	346.9	22	238.7	235.4	3.3	0.94	237.3	0.20
ASB 2AR	3689635.8	431826.4	240.1	220.2	353.1	28	240.2	236.9	3.3	0.84	239.0	0.16
ASB 3A	3689710.5	431874.0	247.9	217.9	342.9	22	239.8	236.2	3.6	1.06	238.1	0.23
ASB 3AR	3689691.0	431874.1	243.1	223.1	339.1	28	240.6	229.8	10.9	2.49	238.8	0.47
ASB 4	3689783.5	431830.1	256.1	226.1	333.1	46	243.3	235.3	7.9	1.53	238.3	0.23
ASB 5A	3689715.3	431762.4	247.9	217.9	342.9	22	237.7	234.8	2.9	0.89	236.5	0.19
ASB 5AR	3689717.0	431756.9	243.8	223.8	344.5	28	246.2	235.2	11.1	2.47	237.9	0.47
ASB 6	3689642.0	431746.9	243.9	223.9	348.4	1	238.2	238.2	0.0	-	238.2	
ASB 6A	3689639.5	431746.0	248.2	218.2	348.2	50	248.7	229.5	19.2	2.88	236.9	0.41
ASB 7	3689644.0	431724.0	231.3	211.3	351.3	21	235.4	232.2	3.2	0.95	234.3	0.21
ASB 9	3689640.0	432330.0	236.4	216.4	306.4	41	243.2	230.6	12.6	2.23	240.9	0.35
BG 52	3682807.5	437792.7	243.8	223.8	287.6	21	231.8	227.0	4.8	1.35	229.1	0.29
BG 53	3682787.8	437637.5	234.7	214.7	283.8	5	227.6	226.9	0.7	0.29	227.3	0.13
BG 54	3682665.3	437634.8	235.2	215.2	275.3	23	231.0	225.2	5.8	1.56	228.6	0.33
BG 55	3682545.3	437631.8	234.9	214.9	274.8	22	229.4	224.4	5.0	1.44	227.0	0.31
BG 56	3682447.3	437662.2	230.9	210.9	272.6	5	226.4	224.1	2.3	0.93	225.2	0.42
BG 57	3682457.0	437782.4	234.6	214.6	270.9	5	225.4	224.9	0.5	0.17	225.1	0.08
BG 58	3682467.0	437904.3	238.2	218.2	276.1	5	228.0	226.2	1.8	0.81	227.1	0.36
BG 59	3682480.3	438025.0	237.7	217.7	280.9	20	233.7	227.3	6.4	2	229.8	0.45
BG 60	3682490.5	438146.3	235.5	215.5	273.6	20	234.5	228.0	6.5	1.88	230.8	0.42
BG 61	3682505.5	438327.9	245.0	225.0	272.5	20	236.0	226.5	9.5	2.31	232.6	0.52
BG 62	3682510.5	438388.4	242.5	222.5	270.5	6	236.0	231.6	4.4	1.61	232.9	0.66
BG 63	3682518.0	438511.0	244.2	224.2	272.4	6	237.2	233.8	3.4	1.2	234.9	0.49
BG 64	3682528.3	438632.4	247.3	227.3	283.3	6	239.8	236.4	3.4	1.18	237.7	0.48
BG 65	3682538.3	438753.3	250.9	230.9	289.1	6	236.5	234.4	2.1	0.88	235.1	0.36
BG 66	3682643.8	438771.6	251.0	231.0	294.3	5	234.5	233.0	1.5	0.56	233.9	0.25
BG 67	3682752.3	438729.4	244.7	224.7	292.8	22	247.2	233.2	14.0	3.09	236.3	0.66
BG 91	3683531.8	437689.6	235.4	205.4	270.9	17	221.8	215.6	6.2	1.94	218.6	0.47
BG 92	3683807.3	437556.3	227.2	197.2	252.7	17	212.0	198.1	13.9	3.11	208.8	0.75
BG 93	3684091.5	437474.9	210.5	180.5	256.0	17	203.6	191.1	12.5	4.5	198.9	1.09

Well ID	UTM N	UTM E	Sz top	Sz bot.	Gr. Elev.	No.	Max.	Min.	Range	Std. Dev.	Mean WL	StdErr_Mean
BG 96	3684163.8	437850.9	207.2	177.2	242.7	17	200.7	187.5	13.2	2.87	197.7	0.70
BG 101	3684177.8	438209.7	191.4	161.4	228.9	15	197.3	194.0	3.3	1.03	195.6	0.27
BG 103	3684051.8	438480.4	199.5	169.5	237.0	15	202.7	198.3	4.4	1.32	199.8	0.34
BG 104	3683868.0	438665.4	245.8	215.8	283.3	1	224.8	224.8	0.0	-	224.8	
BG 108	3683203.0	439126.8	247.3	217.3	264.8	18	241.3	236.7	4.6	1.33	238.8	0.31
BG 109	3683054.3	439159.0	258.4	228.4	283.9	17	242.7	237.9	4.8	1.44	240.1	0.35
BG 110	3682851.0	439175.6	254.3	224.3	291.8	17	245.8	238.6	7.2	2.09	241.2	0.51
BG 122	3683692.5	437625.5	209.9	189.9	246.0	17	213.8	208.8	5.0	1.51	211.2	0.37
BGO 1D	3682856.0	438984.2	245.0	225.0	293.0	43	242.2	230.5	11.7	2.86	237.5	0.44
BGO 2D	3683062.3	438845.5	238.9	218.9	294.9	45	240.8	235.5	5.3	1.24	237.9	0.18
BGO 3D	3683259.0	438702.2	247.6	227.6	290.8	28	237.7	233.3	4.5	0.93	235.2	0.18
BGO 3DR	3683300.5	438676.0	237.6	217.5	289.3	10	232.5	231.2	1.4	0.49	232.0	0.15
BGO 4D	3683454.8	438557.6	240.6	220.6	295.6	15	236.9	230.5	6.3	1.55	231.6	0.40
BGO 5D	3683532.0	438494.3	239.3	219.3	294.2	37	231.9	229.5	2.4	0.54	230.7	0.09
BGO 6D	3683447.0	438372.3	237.2	217.2	283.2	43	232.6	230.2	2.5	0.52	231.4	0.08
BGO 7D	3683380.5	438277.5	240.2	220.2	285.2	38	236.6	227.5	9.2	1.68	232.5	0.27
BGO 8D	3683350.3	438186.8	240.6	220.6	285.6	38	236.9	230.7	6.2	1.52	232.9	0.25
BGO 9D	3683380.3	438112.6	229.2	209.2	283.2	42	233.3	216.0	17.4	4.1	230.0	0.63
BGO 10D	3683298.3	438003.4	250.5	230.5	299.5	5	232.8	231.7	1.1	0.47	232.2	0.21
BGO 10DR	3683305.8	438014.0	238.3	218.3	298.3	28	233.9	230.0	3.9	0.96	232.0	0.18
BGO 11D	3683230.0	437909.9	236.3	216.3	303.3	33	233.8	224.3	9.5	2.57	230.6	0.45
BGO 11DR	3683240.8	437901.8	233.0	213.1	302.9	10	231.5	229.5	2.1	0.68	230.5	0.22
BGO 12D	3683154.8	437806.4	237.8	217.8	311.8	33	234.1	229.3	4.8	1.38	231.3	0.24
BGO 12DR	3683159.0	437797.1	232.8	212.7	311.3	10	220.6	218.6	2.0	0.76	219.8	0.24
BGO 13D	3683084.8	437710.0	248.5	228.5	316.5	3	230.7	229.5	1.3	0.64	230.1	0.37
BGO 14DR	3682956.5	437784.2	238.1	218.1	298.2	32	232.9	228.6	4.3	1.16	230.9	0.21
BGO 15D	3682883.3	437863.9	238.7	218.7	296.7	41	232.5	228.2	4.3	1.23	230.0	0.19
BGO 16D	3682890.0	437988.2	237.3	217.3	302.3	42	233.5	229.3	4.1	1.06	231.0	0.16
BGO 17DR	3682890.5	438065.2	236.9	216.9	296.9	27	241.3	229.1	12.2	2.14	232.2	0.41
BGO 18D	3682944.0	438140.8	239.6	219.6	292.6	41	234.3	230.5	3.8	0.97	232.1	0.15
BGO 20D	3682859.0	438354.3	236.3	216.3	281.3	39	240.8	231.6	9.2	1.51	234.1	0.24
BGO 21D	3682855.8	438491.3	237.7	217.7	283.0	45	237.1	232.5	4.5	1.05	234.7	0.16
BGO 22DR	3682867.0	438619.1	239.2	219.2	284.2	18	238.7	235.9	2.8	0.74	237.0	0.17
BGO 23D	3682863.5	438735.3	242.0	222.0	287.0	42	238.2	234.1	4.1	0.97	235.9	0.15
BGO 24D	3682862.8	438851.1	241.0	221.0	291.0	41	238.9	235.2	3.8	0.91	236.7	0.14
BGO 26D	3682770.0	437628.3	233.5	213.4	283.5	42	230.8	225.6	5.2	1.39	227.9	0.21
BGO 27D	3682598.8	437626.6	229.3	209.3	274.3	42	231.0	224.9	6.1	1.35	227.6	0.21
BGO 28D	3682478.0	437630.8	230.1	210.1	275.1	41	229.9	223.4	6.4	1.34	226.3	0.21
BGO 29D	3682473.8	437498.7	228.5	208.5	263.5	30	229.5	224.1	5.4	1.21	226.4	0.22
BGO 30D	3682445.8	437669.8	227.8	207.8	272.8	41	229.4	222.9	6.5	1.36	225.7	0.21
BGO 31D	3682457.3	437790.5	231.1	211.1	271.6	41	230.4	223.5	6.9	1.41	226.6	0.22
BGO 32D	3682467.0	437937.4	234.5	214.5	279.5	42	231.3	225.4	5.9	1.38	227.6	0.21
BGO 33D	3682483.0	438093.4	233.1	213.1	278.1	40	234.9	220.3	14.6	2.35	230.2	0.37
BGO 34D	3682493.5	438231.8	232.7	212.7	272.7	40	237.2	230.0	7.2	1.63	232.9	0.26
BGO 35D	3682508.8	438399.3	239.4	219.4	271.4	39	244.8	227.4	17.4	2.51	234.7	0.40
BGO 36D	3682518.5	438517.2	243.3	223.3	273.3	41	241.0	225.2	15.8	2.45	236.8	0.38
BGO 37D	3682528.8	438662.3	246.1	226.1	285.1	40	243.0	234.6	8.4	1.98	238.1	0.31
BGO 38D	3682536.3	438756.5	242.3	222.3	289.3	40	240.0	233.2	6.8	1.55	235.3	0.25
BGO 39D	3682648.0	438778.3	244.7	224.7	293.7	39	238.3	233.2	5.2	1.29	235.2	0.21
BGO 40D	3682701.8	437535.9	226.5	216.6	286.4	30	224.9	220.0	4.9	1.26	222.6	0.23
BGO 44D	3683444.5	438228.2	233.4	223.4	283.4	27	234.4	230.3	4.1	0.9	232.7	0.17
BGO 45D	3682625.5	437571.5	229.6	209.6	276.6	30	230.9	225.5	5.4	1.21	228.0	0.22
BGO 49D	3682441.0	438313.8	238.5	218.5	269.5	28	238.8	231.6	7.2	1.53	234.5	0.29
BGO 50D	3682392.3	437599.5	228.0	208.0	254.0	29	228.6	223.0	5.7	1.25	225.2	0.23
BGO 51D	3682785.0	438689.7	240.1	220.1	287.1	11	236.8	234.0	2.8	0.88	235.5	0.27
BGO 52D	3682789.8	438437.8	239.4	219.4	282.1	11	235.4	232.5	2.9	0.83	234.1	0.25
BGO 53D	3682825.8	437742.3	245.3	225.3	289.0	10	230.8	228.3	2.5	0.72	229.6	0.23
BGX 1D	3683582.3	438391.3	234.7	214.7	289.2	30	230.8	228.7	2.1	0.53	229.8	0.10
BGX 3D	3683622.8	438049.6	221.6	201.6	289.1	31	217.6	203.6	13.9	2.38	214.8	0.43
BGX 4D	3683594.3	437846.4	223.8	203.8	288.8	31	218.5	213.0	5.6	1.42	215.9	0.26
BGX 5D	3683741.5	437785.5	215.0	195.0	283.0	31	212.4	206.4	6.0	1.58	209.2	0.28
BGX 6D	3683863.5	437778.1	211.0	191.0	275.0	31	209.9	203.5	6.5	1.61	205.9	0.29
BGX 7D	3683908.5	438042.3	214.1	194.1	277.1	26	209.1	203.5	5.6	1.41	205.7	0.28
BGX 8DR	3683834.3	438333.7	203.1	183.1	276.1	27	208.3	203.9	4.4	1	205.5	0.19
BGX 9D	3683777.3	438593.7	232.4	212.4	277.4	31	228.3	225.1	3.1	0.67	226.9	0.12
BGX 10D	3683635.5	438788.6	236.2	216.2	274.8	30	227.7	218.6	9.1	2.01	225.5	0.37
BGX 11D	3683385.0	438901.5	236.7	216.7	273.8	25	238.1	233.8	4.3	1.05	235.6	0.21
BGX 12D	3683182.5	439084.0	243.7	223.7	273.2	31	242.5	236.5	6.0	1.58	238.8	0.28

Well ID	UTM N	UTM E	Sz top	Sz bot.	Gr. Elev.	No.	Max.	Min.	Range	Std. Dev.	Mean WL	StdErr_Mean
BRD 1	3673161.5	434922.4	178.9	148.9	203.9	28	169.8	164.7	5.2	1.74	167.3	0.33
BRD 2	3673233.0	434900.3	178.5	148.5	205.5	28	175.0	157.8	17.2	3.6	169.2	0.68
BRD 3	3673222.5	434976.3	188.5	158.5	218.5	10	170.8	169.5	1.3	0.44	170.0	0.14
BRD 5D	3673180.3	434899.2	168.4	148.4	202.7	25	169.1	162.9	6.2	1.84	166.8	0.37
BRR 1D	3682280.8	436315.8	220.4	200.4	293.8	21	220.4	213.1	7.3	2.11	217.2	0.46
BRR 2D	3682246.5	436234.5	216.1	196.1	289.6	22	218.8	211.4	7.4	2.2	215.5	0.47
BRR 3D	3682220.0	436215.1	217.1	197.1	289.5	23	218.6	211.2	7.3	2.06	215.2	0.43
BRR 4D	3682193.0	436197.5	218.7	198.7	290.0	21	218.2	210.9	7.3	2.06	215.1	0.45
BRR 5D	3682152.8	436190.8	222.1	202.1	292.6	20	217.8	210.4	7.4	1.91	214.9	0.43
BRR 6D	3682298.0	436491.9	219.3	199.4	294.3	7	219.8	205.3	14.5	6.88 ·	213.7	2.60
BRR 7D	3682349.5	436303.6	221.9	201.9	289.2	5	218.7	217.3	1.4	0.67	217.9	0.30
BRR 8DR	3682265.5	436159.0	219.0	204.0	277.4	3	214.7	214.0	0.7	0.33	214.3	0.19
CBR 1D	3678506.8	439905.0	250.9	230.9	298.5	21	256.9	248.0	8.9	2.54	253.5	0.55
CBR 2D	3678471.5	439882.6	253.8	233.8	298.8	22	256.2	247.7	8.5	2.49	252.9	0.53
CBR 3D	3678464.3	439862.6	254.1	234.1	299.6	22	256.2	247.7	8.5	2.51	253.0	0.54
CBR 4D	3678508.5	440011.6	253.3	233.2	293.4	8	256.5	241.8	14.7	4.76	245.1	1.68
CCB 1	3678697.5	437568.3	228.4	198.4	276.4	18	230.4	219.9	10.5	3.2	226.8	0.75
CCB 2	3678647.5	437568.2	228.6	198.6	268.6	28	228.6	215.5	13.1	4.59	222.5	0.87
CCB 3	3678638.5	437617.3	235.6	205.6	265.6	26	230.2	219.0	11.2	3.79	225.4	0.74
CCB 4	3678700.3	437638.4	241.2	211.2	281.2	28	231.5	213.3	18.2	4.2	226.3	0.79
CDB 1	3678975.0	436874.6	216.6	195.7	286.6	30	219.6	209.3	10.3	3.3	214.3	0.60
CDB 2	3678938.3	436875.7	216.1	195.1	286.1	29	224.0	209.9	14.1	3.39	215.5	0.63
CMP 8	3676860.8	441650.0	214.0	184.0	227.0	28	205.9	201.1	4.8	1.3	203.6	0.25
CMP 10	3676495.0	441816.0	218.8	188.8	308.8	20	223.2	217.4	5.8	2.16	220.3	0.48
CMP 10D	3676493.3	441812.6	229.6	209.6	309.3	4	232.7	219.1	13.7	5.75	224.9	2.88
CMP 11	3676451.8	441709.6	215.2	185.2	309.2	23	216.1	208.5	7.6	2.44	212.3	0.51
CMP 11D	3676449.5	441713.6	230.3	209.9	309.1	3	224.0	220.3	3.7	1.97	222.6	1.14
CMP 12	3676547.0	441594.4	223.6	193.6	281.6	25	213.9	204.4	9.5	2.7	210.5	0.54
CMP 13	3676600.3	441716.4	212.7	182.7	287.7	28	211.0	205.5	5.5	1.74	208.2	0.33
CMP 14C	3676480.8	441288.5	215.1	185.1	262.8	23	217.1	205.7	11.3	3.57	212.4	0.74
CMP 14D	3676480.5	441292.4	224.5	204.1	263.7	4	217.7	216.1	1.7	0.74	217.0	0.37
CMP 15C	3676290.8	441550.6	250.6	220.6	275.5	17	245.3	234.3	11.0	2.78	239.9	0.67
CMP 16C	3676512.0	441746.8	235.6	215.6	315.7	4	224.7	222.6	2.1	0.94	223.5	0.47
CMP 30D	3676429.5	441560.8	231.6	211.6	287.6	4	223.4	222.0	1.4	0.57	222.8	0.29
CMP 31C	3676606.5	441451.8	207.9	197.9	252.9	4	211.8	210.2	1.6	0.69	211.2	0.35
CMP 32C	3676707.8	441681.7	195.2	185.2	252.2	4	196.4	195.5	0.8	0.34	195.9	0.17
CMP 32D	3676707.8	441684.6	228.6	218.6	252.6	3	221.0	221.0	0.1	0.07	221.0	0.04
CRP 1	3679011.0	436353.2	217.8	187.8	272.8	24	212.4	204.7	7.7	2.33	208.1	0.48
CRP 3	3678956.3	436253.2	214.0	184.0	264.0	9	210.4	205.4	5.0	1.37	208.1	0.46
CRP 3D	3678965.5	436251.1	214.3	194.3	265.3	10	208.6	206.1	2.5	0.86	207.6	0.27
CRP 4	3678920.5	436317.0	210.7	180.7	265.7	27	213.1	204.2	8.9	2.76	208.2	0.53
CRP 5D	3679019.8	436400.7	214.6	194.6	274.6	10	212.9	209.9	3.0	1.28	211.7	0.40
CRP 7D	3679101.8	436177.8	208.0	188.0	263.0	11	211.3	205.1	6.2	1.75	206.5	0.53
CRP 8D	3678895.3	436177.2	211.0	191.0	246.0	5	207.7	205.5	2.3	0.91	206.9	0.41
CRP 9D	3679120.8	436224.8	211.4	191.4	268.4	6	207.6	205.8	1.8	0.81	206.8	0.33
CSA 1	3678378.3	439009.3	262.0	232.0	289.0	23	248.3	239.2	9.0	3.64	243.5	0.76
CSA 2	3678370.5	439022.9	248.2	218.2	288.2	24	252.7	239.2	13.5	4.1	243.9	0.84
CSA 3	3678352.3	439019.2	248.6	218.6	287.6	24	248.3	238.6	9.7	3.64	243.2	0.74
CSA 4	3678360.3	438998.2	248.4	218.4	288.4	24	247.9	238.5	9.4	3.7	242.9	0.76
CSB 1A	3678866.5	436685.2	224.9	194.9	289.9	22	216.9	208.7	8.2	2.11	213.7	0.45
CSB 2A	3678766.3	436693.7	222.6	192.6	282.6	21	216.2	206.5	9.7	3.24	210.7	0.71
CSB 3A	3678757.0	436642.2	223.0	193.0	283.0	29	215.7	206.1	9.6	3.08	210.8	0.57
CSB 4A	3678795.3	436603.2	218.0	188.0	283.0	31	215.6	206.0	9.6	3.12	210.9	0.56
CSB 5A	3678842.0	436569.3	215.9	185.9	280.9	31	215.5	206.1	9.4	3.01	210.9	0.54
CSB 6A	3678901.0	436618.7	219.8	189.8	284.8	27	216.4	206.9	9.5	3.07	211.5	0.59
CSD 1D	3678730.0	438743.2	273.4	238.4	313.4	23	248.3	241.1	7.2	2.68	244.9	0.56
CSD 2D	3678693.3	438759.9	258.8	233.8	308.8	12	250.1	246.2	3.9	1.04	248.9	0.30
CSD 4D	3678682.5	438735.8	263.5	213.5	306.5	21	247.5	240.0	7.6	2.94	244.0	0.64
CSD 8D	3678667.0	438688.2	256.8	226.8	301.8	22	247.0	239.7	7.3	2.68	243.1	0.57
CSD 9D	3678627.5	438692.8	256.2	226.2	296.2	21	246.7	239.4	7.3	2.82	243.2	0.62
CSD 10D	3678625.0	438682.5	254.5	224.5	294.5	21	246.6	239.3	7.3	2.82	243.1	0.62
CSD 11D	3678829.8	438517.4	250.9	220.9	290.9	21	246.6	238.9	7.6	3	243.0	0.65
CSD 12D	3678626.3	438730.8	254.5	224.5	299.5	21	247.2	239.7	7.5	2.87	243.6	0.63
CSD 13D	3678551.3	438683.0	252.4	202.4	287.4	22	246.0	238.1	7.9	2.96	242.4	0.63
CSF 1D	3678379.0	438720.2	248.2	228.2	293.2	3	243.7	243.2	0.5	0.3	243.4	0.17
CSF 2D	3678314.8	439313.1	255.2	235.2	289.2	2	251.3	250.6	0.7	0.48	251.0	0.34
CSO 1	3678606.8	439704.9	262.0	232.0	302.0	24	257.6	244.6	13.0	3.99	251.3	0.81
CSR 1	3679487.5	439184.5	267.2	237.2	272.2	21	261.4	245.9	15.4	3.96	255.9	0.86

Well ID	UTM N	UTM E	Sz top	Sz bot.	Gr. Elev.	No.	Max.	Min.	Range	Std. Dev.	Mean WL	StdErr_Mean
CSR 2	3679695.5	439304.6	285.5	255.5	295.5	18	278.8	255.9	23.0	6.66	265.2	1.57
CSR 3	3679766.3	439142.0	268.1	238.1	283.1	21	259.0	247.0	12.0	4.06	254.6	0.89
CSR 4	3679561.0	439285.6	267.6	237.6	282.6	20	260.6	246.5	14.1	3.48	256.7	0.78
DBP 1	3673925.8	430364.8	123.2	93.2	133.2	27	124.5	116.2	8.3	2.05	119.9	0.39
DBP 2	3673827.8	430340.3	114.3	84.3	124.3	28	120.4	114.5	6.0	1.46	117.4	0.28
DBP 3	3673904.5	430292.0	116.4	86.4	126.4	30	123.7	115.4	8.3	2.18	121.1	0.40
DBP 4	3673865.5	430288.2	114.2	84.2	124.2	27	121.7	114.6	7.1	1.8	119.1	0.35
DBP 5	3673865.0	430387.8	116.1	96.1	132.6	12	120.9	114.6	6.3	1.76	117.3	0.51
DCB 1A	3673484.0	431136.6	120.1	90.1	125.1	20	116.8	113.9	2.9	0.73	115.3	0.16
DCB 2A	3673524.5	431498.8	127.4	97.4	132.4	24	127.1	122.3	4.8	1.24	125.0	0.25
DCB 3A	3673337.8	431636.5	126.2	96.2	131.2	23	122.7	119.2	3.5	0.98	120.9	0.20
DCB 4A	3673265.8	431535.7	122.5	92.5	127.5	26	120.7	117.7	3.0	0.73	119.4	0.14
DCB 5A	3673312.5	431368.3	115.9	85.9	120.9	25	120.4	117.1	3.2	0.76	119.0	0.15
DCB 6	3673540.5	431141.9	129.5	109.5	131.5	25	119.9	115.5	4.4	0.91	116.9	0.18
DCB 7	3673509.8	431185.8	128.9	108.9	130.9	25	119.4	116.4	3.1	0.79	118.1	0.16
DCB 8	3673555.0	431521.3	130.3	110.3	134.8	25	129.3	123.9	5.4	1.39	126.7	0.28
DCB 9	3673515.3	431095.5	117.3	97.3	120.2	23	116.9	113.6	3.3	0.78	114.9	0.16
DCB 10	3673427.8	431176.1	119.8	99.8	121.8	24	120.2	113.5	6.8	1.92	116.9	0.39
DCB 11	3673525.3	430877.6	126.8	106.8	128.8	24	127.4	120.1	7.3	1.72	122.1	0.35
DCB 12	3673522.5	430608.7	112.0	92.0	115.0	24	111.3	108.6	2.7	0.76	109.9	0.16
DCB 13	3673326.8	431017.0	122.1	102.0	127.8	23	124.2	110.4	13.9	4.41	116.4	0.92
DCB 14	3673618.0	430864.3	114.6	94.6	127.5	6	110.6	109.3	1.3	0.56	109.9	0.23
DCB 15	3673228.5	430485.8	119.9	99.8	125.4	22	115.7	108.0	7.7	2.19	111.7	0.47
DCB 16	3673063.5	430596.6	120.1	100.1	125.9	25	116.1	110.1	6.0	1.31	112.0	0.26
DCB 17A	3673618.0	431033.6	119.4	109.4	127.4	2	116.5	116.4	0.0	0.04	116.4	0.03
DCB 18A	3673494.3	431138.6	120.1	110.1	125.1	3	116.4	115.4	1.0	0.55	115.8	0.32
DCB 19A	3673488.5	431146.2	121.9	111.9	126.4	2	119.1	119.0	0.1	0.06	119.1	0.04
DCB 20A	3673505.0	431215.8	120.9	110.9	130.9	2	117.0	117.0	0.0	0	117.0	0.00
DCB 21A	3673455.8	431156.6	120.1	110.1	126.6	2	117.0	116.2	0.8	0.55	116.6	0.39
DCB 22A	3673443.0	431143.0	119.8	109.8	125.3	3	112.7	112.6	0.0	0	112.6	0.00
DCB 23A	3673400.5	431103.9	115.7	105.7	119.2	3	111.8	111.7	0.1	0.08	111.8	0.05
DCB 24A	3673332.8	431294.6	119.2	109.2	122.2	2	115.4	115.3	0.0	0.02	115.3	0.01
DOB 1	3675236.0	431260.2	144.7	114.7	149.7	40	146.9	137.4	9.5	2.41	143.7	0.38
DOB 2	3675227.3	431181.0	145.3	115.3	150.3	40	148.4	137.1	11.3	2.5	143.7	0.40
DOB 3	3675310.8	431230.5	145.9	115.9	150.9	29	147.4	137.4	10.1	2.84	143.7	0.53
DOB 4	3675299.3	431307.5	139.2	109.2	151.2	29	146.8	136.9	9.9	2.76	143.0	0.51
DOB 7	3675191.0	431261.9	145.7	125.7	148.7	13	144.7	139.0	5.7	1.86	143.2	0.52
DOB 8	3675259.3	431296.9	148.3	128.3	151.3	13	145.3	139.5	5.8	1.76	143.8	0.49
DOB 9	3675350.0	431223.5	148.5	128.5	151.5	3	144.9	143.5	1.4	0.72	144.1	0.42
DOB 10	3675199.5	431182.6	148.3	128.3	151.3	13	144.8	139.3	5.5	1.65	143.4	0.46
DOB 12	3675208.5	431216.5	137.9	132.9	149.6	15	141.9	136.5	5.4	1.49	140.4	0.38
DOB 14	3675203.3	431268.8	137.4	132.4	149.1	3	140.2	139.1	1.1	0.58	139.5	0.33
F 10	3681710.5	436676.7	276.5	266.5	277.5	1	269.1	269.1	0.0	-	269.1	
F 18A	3681407.5	436770.5	204.4	194.4	231.4	5	213.6	201.9	11.7	5.09	204.5	2.28
FAB 1	3683163.8	437304.1	235.4	215.4	325.4	12	229.1	226.9	2.3	0.78	228.3	0.23
FAB 2	3683122.5	437417.8	236.5	216.5	326.5	13	229.9	227.6	2.3	0.75	229.1	0.21
FAB 3	3683024.8	437448.6	231.8	211.8	321.8	11	229.6	227.3	2.3	0.7	228.8	0.21
FAB 4	3683083.0	437304.1	234.2	214.2	324.2	10	229.3	227.0	2.4	0.7	228.5	0.22
FAC 3	3683290.8	437365.1	254.8	224.8	309.8	27	232.0	225.0	7.0	1.64	229.1	0.32
FAC 4	3683368.3	437365.2	237.8	207.8	307.8	27	231.3	226.4	4.9	1.54	228.6	0.30
FAC 5	3683261.8	437355.4	234.0	214.0	314.0	26	230.0	220.9	9.1	3.16	225.2	0.62
FAC 5P	3683328.0	437334.9	235.7	225.7	310.9	4	230.7	229.1	1.6	0.76	230.0	0.38
FAC 6	3683320.3	437348.3	236.2	216.2	310.8	24	232.1	216.2	15.9	4.19	220.9	0.86
FAC 7	3683322.8	437354.5	235.7	215.7	310.3	27	230.2	216.1	14.1	5.53	223.6	1.06
FAC 8	3683316.5	437362.7	236.0	216.0	309.0	27	232.0	221.6	10.5	3.94	227.4	0.76
FAL 1	3683034.0	436961.7	238.5	207.0	310.5	31	221.7	216.5	5.2	1.84	218.8	0.33
FAL 2	3683062.8	436941.1	238.0	206.6	310.0	29	220.1	214.8	5.2	1.83	217.2	0.34
FBP 5D	3682818.5	436107.6	212.6	192.6	290.1	13	208.0	203.0	5.0	1.54	205.3	0.43
FBP 6D	3682842.0	435891.8	198.3	178.3	287.3	15	199.0	192.0	7.0	2.2	194.9	0.57
FBP 7D	3682934.3	435949.8	203.2	183.2	292.2	4	194.7	194.2	0.5	0.25	194.5	0.13
FBP 9D	3682909.8	436041.0	197.9	177.9	281.9	11	204.1	194.6	9.6	2.66	200.6	0.80
FBP 10D	3682755.3	435950.6	200.8	180.8	283.8	5	201.5	199.9	1.6	0.62	200.9	0.28
FBP 11D	3682740.3	436049.1	212.1	192.0	287.3	5	203.4	202.9	0.5	0.21	203.3	0.09
FBP 13D	3682887.0	435914.4	192.7	172.7	295.7	14	199.7	184.5	15.2	3.61	195.1	0.96
FCA 2D	3683070.8	436919.3	239.0	219.0	310.3	34	228.5	219.1	9.4	2.5	224.9	0.43
FCA 9D	3683149.0	436869.0	241.9	221.9	309.9	23	227.2	222.7	4.5	1.43	225.1	0.30
FCA 9DR	3683151.5	436867.9	227.7	207.7	310.2	14	225.6	220.2	5.4	1.52	224.0	0.41
FCA 10A	3683130.0	436822.2	241.0	221.0	310.0	34	228.1	222.9	5.2	1.55	225.3	0.27

Well ID	UTM N	UTM E	Sz top	Sz bot.	Gr. Elev.	No.	Max.	Min.	Range	Std. Dev.	Mean WL	StdErr_Mean
FCA 10D	3683158.8	436861.7	239.5	219.5	309.5	15	228.5	223.3	5.2	1.37	226.7	0.35
FCA 16A	3683193.3	436774.9	235.1	215.1	310.4	34	227.9	223.0	4.9	1.4	225.2	0.24
FCA 16D	3683220.0	436812.3	241.1	221.1	310.1	20	227.7	222.2	5.5	1.58	225.0	0.35
FCA 19D	3683065.8	436924.5	229.7	209.7	309.7	29	220.1	214.6	5.4	1.85	217.2	0.34
FCB 2	3682911.5	437537.1	235.2	205.2	305.2	27	232.4	212.4	20.0	3.61	229.1	0.69
FCB 3	3682818.5	437539.8	225.3	195.3	300.3	26	227.5	221.0	6.6	1.79	224.1	0.35
FCB 4	3682857.3	437410.5	234.5	204.5	304.5	28	231.3	211.0	20.4	3.65	228.1	0.69
FCB 5	3682816.3	437503.2	237.1	217.1	301.7	28	232.0	225.1	6.9	1.75	228.9	0.33
FCB 6	3682831.3	437477.4	235.1	215.1	308.4	25	231.7	227.0	4.7	1.42	229.1	0.28
FCB 7	3682953.0	437473.0	238.3	218.3	313.1	1	231.0	231.0	0.0	-	231.0	
FET 1D	3682471.5	437199.0	226.9	206.9	268.0	26	226.4	221.8	4.5	1.45	223.6	0.28
FET 2D	3682385.0	437141.9	229.5	209.5	267.9	26	225.2	220.5	4.7	1.54	222.3	0.30
FET 3D	3682372.0	437168.1	223.0	203.0	283.2	26	225.1	220.5	4.6	1.51	222.4	0.30
FET 4D	3682393.8	437198.8	225.1	205.1	284.7	27	225.5	220.9	4.7	1.51	222.7	0.29
FIW 2MD	3682038.5	436723.6	220.8	190.9	290.3	1	215.5	215.5	0.0	-	215.5	
FNB 1	3683627.8	436723.6	207.2	177.2	282.2	26	215.0	207.8	7.1	2.31	211.1	0.45
FNB 2	3683715.5	436693.7	210.8	180.8	285.8	27	211.9	204.0	7.9	2.42	207.3	0.47
FNB 3	3683697.0	436610.7	212.1	182.1	282.1	27	213.5	205.6	7.8	2.45	209.5	0.47
FNB 4	3683614.5	436571.8	209.6	179.6	289.6	27	218.3	209.8	8.6	2.83	213.8	0.54
FNB 5	3683731.8	436656.8	203.5	193.5	285.5	8	208.0	205.0	3.0	1.12	206.7	0.40
FSB 0PD	3681454.8	436638.9	215.3	171.6	252.6	5	207.7	206.0	1.7	0.77	207.4	0.34
FSB 50PD	3681471.8	436635.8	219.8	174.7	255.7	1	206.2	206.2	0.0	-	206.2	
FSB 76	3682123.0	436732.5	227.0	197.0	292.0	43	229.9	214.2	15.7	2.41	218.1	0.37
FSB 77	3681752.5	436747.5	216.4	186.4	271.4	52	215.8	207.8	8.1	1.55	212.0	0.21
FSB 78	3681564.0	436678.0	217.7	187.7	270.7	58	212.2	194.1	18.1	2.32	208.6	0.30
FSB 79	3681288.3	436869.2	204.1	174.1	216.1	54	203.8	191.3	12.5	2.17	201.9	0.30
FSB 87D	3681751.8	436509.9	216.8	187.4	285.3	14	215.5	213.0	2.5	0.85	213.9	0.23
FSB 88D	3682019.8	436859.8	222.1	202.1	280.1	48	219.6	212.9	6.7	1.57	216.0	0.23
FSB 89D	3681967.3	436825.8	221.9	201.9	278.9	46	218.9	212.3	6.6	1.6	215.3	0.24
FSB 90D	3681890.0	436808.5	225.1	205.1	276.1	28	234.8	210.5	24.3	4.41	215.0	0.83
FSB 91D	3681813.5	436791.0	220.9	200.9	276.9	45	216.2	210.8	5.4	1.54	213.5	0.23
FSB 92D	3681704.0	436724.2	221.7	201.7	273.7	46	215.3	209.1	6.2	1.39	211.7	0.20
FSB 93D	3681646.3	436726.5	217.9	197.9	273.9	51	216.7	207.9	8.7	1.61	210.5	0.23
FSB 95DR	3681590.0	436595.6	207.0	187.0	282.0	38	213.2	208.4	4.8	1.27	210.2	0.21
FSB 97D	3681634.8	436555.2	216.9	196.9	283.9	52	213.9	208.0	5.9	1.45	210.6	0.20
FSB 98D	3681704.3	436555.9	220.3	200.3	282.3	47	215.4	210.0	5.4	1.47	212.1	0.21
FSB 99D	3681821.8	436551.6	218.1	198.1	285.1	54	215.3	208.5	6.8	1.77	211.8	0.24
FSB104D	3681179.5	436615.1	210.4	190.4	216.9	46	206.5	200.6	5.9	1.3	204.3	0.19
FSB105D	3681623.0	436510.2	223.7	203.7	283.7	8	208.6	207.2	1.3	0.47	207.7	0.17
FSB105DR	3681627.8	436509.6	208.6	188.5	283.6	38	213.6	208.7	4.9	1.22	210.7	0.20
FSB106D	3681508.0	436896.7	222.9	202.9	232.9	24	214.9	205.9	9.0	1.8	207.1	0.37
FSB107D	3681842.5	436846.5	220.9	200.9	268.7	52	217.5	210.9	6.6	1.5	213.6	0.21
FSB108D	3682108.0	436650.4	223.8	203.8	295.8	67	221.1	209.2	11.9	2.1	217.7	0.26
FSB109D	3681891.0	436561.9	225.8	205.8	290.8	50	217.0	207.7	9.3	2.04	213.2	0.29
FSB110D	3681419.3	436774.6	211.1	191.1	232.6	52	208.8	203.2	5.5	1.13	205.4	0.16
FSB111D	3681958.8	436899.8	221.7	201.7	274.4	47	219.0	211.6	7.3	1.73	215.1	0.25
FSB112D	3681182.5	436433.7	208.9	188.9	227.6	38	208.4	204.0	4.4	1.03	205.9	0.17
FSB113D	3681581.5	437017.2	209.6	189.6	220.6	38	209.4	204.5	4.9	0.98	207.3	0.16
FSB114D	3682023.3	437042.4	217.8	197.7	250.2	38	220.0	215.1	5.0	1.13	217.0	0.18
FSB115D	3680929.0	436975.7	192.5	182.5	206.5	39	193.1	188.9	4.2	1.06	191.3	0.17
FSB116D	3681145.8	437157.8	196.4	186.4	200.9	42	193.3	189.6	3.7	0.72	191.9	0.11
FSB117D	3681451.0	436881.7	209.7	189.7	228.7	36	207.1	203.9	3.2	0.77	205.0	0.13
FSB118D	3681747.0	436963.7	211.3	191.3	241.3	38	214.6	207.6	6.9	1.37	211.4	0.22
FSB119D	3681601.8	436814.8	213.1	193.1	252.1	44	211.3	206.0	5.4	1.05	208.1	0.16
FSB120D	3681582.8	436287.1	216.5	196.5	278.5	43	212.6	202.3	10.3	1.79	209.4	0.27
FSB121DR	3681348.5	436181.0	211.3	191.3	253.3	34	209.8	205.0	4.8	1.22	207.0	0.21
FSB122D	3680990.8	436355.5	206.6	186.6	215.6	39	206.7	201.4	5.3	1.24	203.4	0.20
FSB123D	3681796.0	437100.9	214.1	194.1	236.1	39	214.5	210.1	4.4	0.99	212.1	0.16
FSB150PD	3681447.5	436594.5	221.3	176.2	257.2	1	206.2	206.2	0.0	-	206.2	
FSL 1D	3683130.3	436603.6	228.6	208.5	308.6	33	227.1	222.9	4.2	1.08	224.7	0.19
FSL 2D	3682989.0	436630.4	228.8	208.7	303.8	34	227.6	222.1	5.5	1.28	225.2	0.22
FSL 3D	3682716.0	436706.5	226.0	205.9	300.0	31	231.7	220.8	10.9	2.01	223.1	0.36
FSL 4D	3682596.8	436704.8	224.1	204.0	292.1	31	219.9	215.4	4.5	1.11	217.5	0.20
FSL 5D	3682438.5	436696.7	223.7	203.5	289.7	29	223.4	218.7	4.7	1.22	220.8	0.23
FSL 6D	3682329.5	436709.9	222.1	202.1	284.1	31	222.6	217.9	4.7	1.18	220.1	0.21
FSL 7D	3682186.3	436722.9	219.6	199.5	285.6	30	226.7	216.0	10.8	2.03	218.3	0.37
FSL 8D	3682124.0	436778.8	222.8	202.7	288.8	29	220.4	215.2	5.2	1.22	217.4	0.23
FSL 9D	3682058.8	436837.6	221.5	201.4	283.5	28	220.0	214.8	5.2	1.24	216.9	0.23

Well ID	UTM N	UTM E	Sz top	Sz bot.	Gr. Elev.	No.	Max.	Min.	Range	Std. Dev.	Mean WL	StdErr_Mean
FSS 1D	3682355.0	437509.1	229.9	209.9	263.9	38	227.4	221.4	6.0	1.49	223.7	0.24
FSS 2D	3682321.0	437541.9	224.4	204.4	259.4	38	227.0	220.7	6.3	1.51	223.0	0.24
FSS 3D	3682219.3	437476.2	225.8	205.8	255.8	38	224.6	217.5	7.1	1.62	220.7	0.26
FSS 4D	3682241.0	437207.2	222.6	202.6	289.8	38	222.5	215.5	7.0	1.9	218.9	0.31
FST 1D	3682969.5	435254.3	129.5	119.5	132.0	5	126.3	124.9	1.3	0.52	125.5	0.23
FTF 1	3682757.5	436945.6	241.2	221.2	281.2	5	233.1	225.0	8.1	3.51	226.9	1.57
FTF 2	3682755.5	436983.0	239.4	219.4	279.4	12	227.8	222.5	5.3	1.68	225.0	0.49
FTF 3	3682725.3	436993.6	221.2	218.2	278.2	20	228.0	220.5	7.5	2.35	223.7	0.53
FTF 4	3682704.3	437017.7	236.6	216.6	276.6	22	227.0	219.8	7.2	1.94	223.8	0.41
FTF 5	3682662.3	437010.5	235.3	215.3	275.3	18	228.8	218.1	10.7	3	224.2	0.71
FTF 6	3682671.8	436963.6	236.9	216.9	276.9	16	227.0	219.3	7.7	2.39	223.9	0.60
FTF 7	3682697.5	436955.3	226.1	222.1	278.1	21	227.0	220.7	6.3	1.96	223.7	0.43
FTF 8	3682717.0	436929.9	239.6	219.6	279.6	7	235.7	224.5	11.2	3.91	227.0	1.48
FTF 9	3682701.0	436832.1	236.4	216.4	270.4	12	225.9	221.1	4.8	1.44	224.0	0.42
FTF 10	3682689.0	436891.8	235.1	215.1	269.1	9	225.5	223.1	2.4	0.78	224.4	0.26
FTF 11	3682622.8	436881.2	235.8	215.8	269.8	9	229.0	223.0	6.1	1.78	224.6	0.59
FTF 12	3682639.5	436831.2	235.0	215.0	269.0	23	228.7	220.5	8.2	1.77	226.6	0.37
FTF 13	3682551.8	437064.7	236.1	216.1	284.1	15	234.8	222.3	12.5	2.93	225.8	0.76
FTF 15	3682598.5	437080.2	227.5	197.5	284.5	24	236.5	222.0	14.5	3.75	225.3	0.77
FTF 16	3682542.3	436989.1	233.8	203.8	286.8	24	235.1	219.8	15.3	3.13	223.2	0.64
FTF 17	3682571.0	436969.8	230.6	200.6	287.6	25	227.6	219.8	7.8	2.19	222.8	0.44
FTF 18	3682590.8	436953.6	232.3	202.3	286.3	23	235.0	219.3	15.7	3.31	223.1	0.69
FTF 19	3682598.5	436869.3	228.3	198.3	285.3	24	227.2	219.2	8.0	2.27	222.2	0.46
FTF 20	3682537.3	436849.6	228.3	198.3	285.3	25	225.1	218.7	6.4	1.93	221.6	0.39
FTF 21	3682500.5	436875.8	228.7	198.7	285.7	25	226.5	219.5	7.0	1.52	223.1	0.30
FTF 22	3682471.5	436895.6	242.6	212.6	284.6	25	226.8	218.3	8.5	2.22	221.7	0.44
FTF 23	3682466.8	436961.4	231.2	201.2	284.2	24	228.5	219.3	9.2	2.31	222.2	0.47
FTF 24A	3682647.3	436875.4	232.7	212.7	268.4	23	225.8	219.8	6.0	2.05	222.6	0.43
FTF 25A	3682675.8	436887.8	232.8	212.8	269.1	24	226.2	220.1	6.1	1.96	223.1	0.40
FTF 26	3682662.5	436899.9	226.3	206.3	268.8	23	226.4	219.9	6.5	2.05	223.0	0.43
FTF 27	3682647.8	436891.3	243.5	213.5	268.5	24	229.7	219.9	9.8	2.36	223.0	0.48
GBW 1	3691415.5	443676.8	279.6	249.6	332.6	18	266.4	257.7	8.7	3.13	260.6	0.74
H 6	3682350.8	439184.9	235.2	225.2	259.2	1	230.2	230.2	0.0	-	230.2	
H 7	3682336.0	439195.8	234.9	224.9	256.9	1	227.7	227.7	0.0	-	227.7	
H 8	3682235.5	439230.5	228.4	218.4	253.8	3	227.2	226.0	1.2	0.7	226.8	0.40
H 10	3682159.8	439130.7	232.5	222.5	254.5	3	227.3	226.3	1.0	0.58	226.6	
H 11	3682141.8	439127.4	222.0	212.0	246.0	1	226.3	226.3	0.0	-	226.3	
H 18A	3682006.8	439059.1	227.5	217.5	237.5	14	226.1	221.7	4.4	1.23	224.0	0.33
H 19	3681977.0	438969.3	221.1	219.6	243.7	3	224.8	223.6	1.2	0.61	224.2	0.35
HAA 1D	3682655.8	440717.3	281.8	261.8	291.8	8	279.3	274.7	4.6	1.54	276.4	0.54
HAA 2D	3682611.3	440093.8	280.4	260.3	290.8	9	278.6	275.7	2.9	0.89	276.6	0.30
HAA 3D	3682531.3	439738.9	266.7	246.7	271.3	8	267.7	259.3	8.4	2.78	262.6	0.98
HAA 4D	3683040.8	440022.1	275.7	255.7	298.7	8	271.4	268.5	2.9	1.05	269.9	0.37
HAA 6D	3683208.5	440657.8	267.2	247.1	278.8	9	267.1	263.7	3.4	0.99	264.9	0.33
HAC 1	3682942.8	439914.5	278.8	258.8	296.4	27	272.4	266.1	6.3	1.57	269.5	0.30
HAC 2	3682946.3	439893.8	278.8	258.8	296.2	27	272.7	265.5	7.2	1.73	269.1	0.33
HAC 3	3682927.8	439887.3	275.0	255.0	295.4	28	271.8	265.9	5.9	1.5	269.2	0.28
HAC 4	3682922.5	439913.0	274.1	254.1	294.7	27	272.8	266.3	6.5	1.59	269.7	0.31
HAP 1	3683061.8	440575.6	276.3	256.3	287.3	19	273.8	268.9	4.9	1.32	271.2	0.30
HCA 1	3683333.0	440268.9	273.7	253.7	307.7	30	272.6	266.1	6.5	1.36	269.7	0.25
HCA 2	3683240.3	440274.0	273.4	242.0	308.4	29	273.7	267.0	6.7	1.44	270.6	0.27
HCA 3	3683365.0	440245.5	273.8	253.8	307.8	30	272.3	266.2	6.1	1.27	269.4	0.23
HCA 4	3683303.8	440227.6	273.3	241.9	308.3	36	273.0	266.0	7.0	1.45	269.6	0.24
HCB 2	3683153.0	440659.6	269.9	239.9	279.9	28	270.8	265.6	5.2	1.14	268.4	0.22
HCB 3	3683127.8	440723.8	263.6	233.6	273.6	26	268.7	264.8	3.9	0.89	266.8	0.17
HCB 4	3683187.8	440730.9	265.9	235.9	275.9	26	267.2	261.8	5.4	1.28	264.7	0.25
HET 2D	3682665.3	439618.8	259.7	239.7	274.8	30	262.8	255.6	7.3	1.89	258.7	0.35
HET 3D	3682689.8	439606.9	259.9	239.9	274.6	32	263.1	255.8	7.3	1.81	259.0	0.32
HET 4D	3682720.8	439605.7	259.6	239.5	274.5	30	262.7	256.6	6.2	1.67	259.4	0.30
HIW 1MD	3682510.0	439125.6	239.7	214.9	272.7	1	232.1	232.1	0.0	-	232.1	
HIW 1PD	3682493.0	439103.8	240.5	215.5	274.5	1	231.7	231.7	0.0	-	231.7	
HIW 2D	3682376.8	438568.4	230.8	210.9	275.8	6	230.5	226.9	3.6	1.29	229.1	0.53
HMD 1D	3683762.5	437643.8	219.7	199.7	262.7	31	212.8	206.9	5.9	1.54	209.7	0.28
HMD 2D	3684045.8	437549.3	210.8	190.8	259.3	32	204.5	198.4	6.1	1.64	200.8	0.29
HMD 3D	3684109.5	437682.0	207.7	187.7	257.5	31	204.0	197.8	6.2	1.62	200.2	0.29
HMD 4D	3684086.0	437866.2	208.9	188.9	248.5	31	204.0	192.7	11.3	2.87	199.6	0.52
HR8 12	3682472.5	439471.0	235.9	206.3	255.7	27	244.6	238.1	6.5	1.28	239.9	0.25
HSB 65	3682470.5	439134.0	242.4	212.4	270.4	47	237.3	230.1	7.2	1.57	232.7	0.23

Well ID	UTM N	UTM E	Sz top	Sz bot.	Gr. Elev.	No.	Max.	Min.	Range	Std. Dev.	Mean WL	StdErr_Mean
HSB 66	3682201.8	438762.9	228.1	198.1	278.1	58	227.9	210.9	17.0	2.13	225.0	0.28
HSB 67	3682242.5	439297.2	230.7	200.7	235.7	54	226.4	211.1	15.3	1.98	223.4	0.27
HSB 68	3681975.0	438917.8	243.3	213.3	248.3	33	223.4	220.0	3.4	0.8	221.3	0.14
HSB 69	3681903.3	438809.5	229.0	199.0	234.0	53	220.9	218.1	2.8	0.73	219.4	0.10
HSB 70	3682035.8	438442.9	235.7	205.7	240.7	46	233.7	215.7	18.0	2.92	223.9	0.43
HSB 71	3682016.0	438276.5	234.8	204.8	239.8	45	230.9	213.5	17.4	3.12	224.4	0.47
HSB 83D	3682304.5	439318.8	228.7	198.7	234.4	49	227.5	222.7	4.8	0.99	224.7	0.14
HSB 84D	3681889.8	438772.0	219.5	199.5	225.7	45	220.7	217.7	3.0	0.72	218.8	0.11
HSB 86D	3682057.5	438516.7	236.6	206.6	260.7	47	227.5	220.6	6.9	1.43	223.2	0.21
HSB100D	3682449.3	439286.9	236.9	216.9	257.9	54	237.9	231.2	6.8	1.28	233.3	0.17
HSB100PD	3681861.0	438804.1	214.9	195.0	224.0	1	216.9	216.9	0.0	-	216.9	
HSB101D	3682394.3	439250.8	236.1	216.1	256.4	53	234.8	229.1	5.7	1.06	230.5	0.15
HSB102D	3682347.0	439209.3	236.3	216.3	256.3	45	230.9	226.6	4.3	0.87	228.1	0.13
HSB103D	3682243.3	439255.5	233.7	213.7	245.4	49	229.3	223.8	5.5	1	225.4	0.14
HSB104D	3682146.8	439235.5	230.6	210.6	245.6	48	227.8	218.7	9.1	1.31	224.7	0.19
HSB105D	3682132.0	439171.4	231.8	211.8	247.2	50	228.2	223.3	5.0	1.06	225.1	0.15
HSB106D	3682157.5	439065.2	230.7	210.7	250.7	45	229.4	223.9	5.5	1.04	225.6	0.16
HSB107D	3682108.0	439013.5	235.1	215.1	260.0	48	227.1	222.8	4.3	0.98	224.5	0.14
HSB108D	3682058.3	438949.3	232.0	212.0	264.0	39	225.0	221.7	3.3	0.85	223.2	0.14
HSB109D	3682011.0	438885.7	233.0	213.0	259.0	36	225.6	221.3	4.3	0.92	222.7	0.15
HSB110D	3681997.3	438815.3	231.4	211.4	253.4	47	224.7	219.5	5.2	1.05	221.9	0.15
HSB111E	3682000.5	438743.3	231.7	211.7	253.7	47	224.5	218.4	6.2	1.1	221.9	0.16
HSB112E	3682042.3	438679.7	231.7	211.7	252.7	50	225.3	220.8	4.6	1.11	222.4	0.16
HSB113D	3682033.5	438597.4	236.2	216.2	258.7	50	225.9	220.4	5.5	1.35	222.3	0.19
HSB114D	3682065.3	438551.9	232.8	212.8	261.8	46	226.9	220.8	6.1	1.45	223.1	0.21
HSB115D	3682099.8	438502.2	233.9	213.9	266.9	52	228.2	221.4	6.8	1.65	223.8	0.23
HSB116D	3682148.8	438447.2	234.5	214.5	254.5	47	243.5	222.8	20.7	4	226.1	0.58
HSB117D	3681962.3	438269.1	220.3	200.3	235.3	52	231.4	219.6	11.8	2.75	223.9	0.38
HSB125D	3682269.3	439337.8	219.4	199.4	229.4	48	222.8	220.1	2.7	0.76	221.1	0.11
HSB126D	3681802.8	439144.4	200.5	190.5	210.5	49	206.1	204.0	2.2	0.54	205.1	0.08
HSB127D	3681878.5	438945.4	217.8	197.8	223.8	47	219.7	217.1	2.6	0.66	218.2	0.10
HSB129D	3681728.8	438419.5	205.2	185.2	212.7	48	210.5	206.6	3.9	0.94	208.5	0.14
HSB130D	3681381.5	438501.9	202.1	182.1	216.1	49	201.4	198.4	3.0	0.61	200.1	0.09
HSB131D	3681686.5	439123.9	205.7	195.7	209.8	50	207.0	203.8	3.2	0.79	205.1	0.11
HSB132D	3682301.0	439395.9	226.5	206.5	238.5	46	227.9	218.5	9.4	1.36	221.2	0.20
HSB134D	3682148.5	439317.3	225.8	205.8	235.9	49	225.2	220.5	4.7	1.11	222.1	0.16
HSB135D	3681880.0	438855.5	219.9	199.9	229.9	47	220.1	217.0	3.1	0.74	218.2	0.11
HSB136D	3681896.0	438613.7	220.2	200.2	225.7	47	223.1	218.9	4.2	1.11	220.7	0.16
HSB137D	3681943.8	438486.3	225.3	205.3	234.3	48	225.4	219.6	5.8	1.45	222.0	0.21
HSB138D	3682082.8	438221.0	228.1	208.1	250.1	48	229.3	215.4	13.9	2.44	223.6	0.35
HSB139D	3681964.3	439107.7	226.7	206.7	231.7	48	228.9	220.1	8.8	1.76	222.5	0.25
HSB140D	3681546.3	439101.5	214.1	194.1	234.1	39	219.1	206.5	12.6	2.36	213.5	0.38
HSB141D	3682297.3	439538.6	237.8	217.8	252.8	41	249.9	233.4	16.4	4.61	240.7	0.72
HSB142D	3681754.3	437794.0	199.7	189.7	201.7	38	206.0	196.4	9.7	1.65	198.2	0.27
HSB143D	3681783.3	437502.0	216.9	196.9	220.9	39	215.7	211.2	4.5	1.14	213.1	0.18
HSB146D	3681999.8	439499.8	224.1	204.0	251.1	40	227.6	209.9	17.7	3.07	221.9	0.49
HSB147D	3682344.8	438235.2	235.2	215.2	265.2	40	237.4	227.4	10.0	2.39	231.3	0.38
HSB148D	3681361.0	438782.3	218.1	198.1	249.1	42	217.2	211.7	5.6	1.43	213.2	0.22
HSB149D	3681997.3	439046.6	227.0	207.0	238.0	39	226.8	212.3	14.5	3.43	222.2	0.55
HSB150D	3682336.8	439329.7	226.9	206.9	236.9	42	233.1	224.0	9.1	2.52	226.6	0.39
HSB151D	3681821.5	437946.0	207.6	197.6	211.6	39	210.8	205.2	5.6	1.33	207.2	0.21
HSB152D	3681638.8	438205.6	207.0	197.0	212.0	7	209.3	204.2	5.1	1.72	205.7	0.65
HSL 1D	3682498.3	439299.5	239.8	219.8	261.8	30	238.3	227.7	10.6	1.86	234.9	0.34
HSL 2D	3682590.5	439420.3	245.3	225.2	263.3	31	244.3	239.5	4.8	1.24	241.5	0.22
HSL 3D	3682667.8	439494.9	253.8	233.7	265.6	33	261.0	247.7	13.4	2.35	250.0	0.41
HSL 4D	3682789.5	439557.6	265.1	245.0	271.1	33	264.4	257.7	6.7	1.73	261.4	0.30
HSL 5D	3682846.3	439579.4	267.7	247.8	274.7	29	269.8	258.2	11.7	2.94	265.7	0.55
HSL 6D	3682904.8	439609.1	264.0	243.9	277.7	35	263.4	256.7	6.7	1.78	259.5	0.30
HSL 7D	3682942.8	439653.8	262.4	242.3	281.4	32	262.4	257.2	5.2	1.47	259.4	0.26
HSL 8D	3683016.8	439748.4	268.4	248.4	286.4	37	263.6	258.1	5.6	1.35	260.5	0.22
HSS 3D	3682569.5	441427.9	282.6	262.6	308.1	26	287.9	272.2	15.7	3.31	282.2	0.65
HTF 5	3682875.0	440225.8	284.3	264.3	304.3	16	279.8	266.2	13.7	3.29	277.0	0.82
HTF 6	3682864.0	440278.3	283.6	263.6	303.6	16	279.4	265.6	13.8	3.11	275.9	0.78
HTF 7	3682811.3	440272.9	283.5	263.5	303.5	22	281.3	272.2	9.1	1.82	276.2	0.39
HTF 8	3682819.5	440211.6	283.6	263.6	303.9	16	276.2	264.3	11.9	3.04	273.5	0.76
HTF 13	3682895.8	440013.1	282.6	262.6	322.6	25	277.4	270.4	7.0	1.68	274.4	0.34
HTF 14	3682874.0	439982.2	281.9	261.9	321.9	19	282.2	271.0	11.2	2.3	273.7	0.53
HTF 15	3682815.5	439983.7	280.7	260.7	320.7	28	275.7	271.0	4.7	1.3	273.6	0.25

Well ID	UTM N	UTM E	Sz top	Sz bot.	Gr. Elev.	No.	Max.	Min.	Range	Std. Dev.	Mean WL	StdErr_Mean
HTF 16	3683033.5	440050.1	268.3	248.3	298.4	20	274.3	267.5	6.8	2.06	270.0	0.46
HTF 17	3683007.8	439781.6	258.4	238.4	288.4	27	273.2	253.7	19.5	3.37	262.6	0.65
HTF 18	3682810.0	439938.8	271.7	251.7	321.7	28	274.5	268.7	5.8	1.51	271.9	0.29
HTF 19	3682816.5	439879.9	265.7	245.7	322.7	28	271.8	265.8	6.0	1.49	269.2	0.28
HTF 20	3682859.8	439851.1	271.9	251.9	322.9	28	270.9	259.8	11.1	2.2	268.0	0.42
HTF 22	3682948.0	440339.8	271.4	251.4	331.4	26	278.7	272.3	6.4	1.79	275.7	0.35
HTF 23	3682968.8	440368.6	276.8	256.8	331.8	27	278.0	266.7	11.3	2.31	274.7	0.44
HTF 24	3682987.5	440394.6	277.8	257.8	331.8	25	277.3	270.9	6.4	1.74	274.4	0.35
HTF 25	3682976.3	440450.6	272.5	252.5	332.5	26	283.8	270.5	13.3	3.06	275.0	0.60
HTF 26	3682927.8	440453.3	275.5	255.5	333.5	26	284.0	271.7	12.3	2.82	275.8	0.55
HTF 27	3682892.0	440420.9	279.1	259.1	331.1	27	292.9	267.1	25.8	4.23	277.0	0.81
HTF 28	3682871.5	440381.3	271.9	251.9	331.9	25	278.6	273.7	4.9	1.35	276.0	0.27
HTF 29	3682890.3	440329.6	289.9	259.9	331.9	25	279.2	272.7	6.5	1.54	275.8	0.31
HTF 32	3682874.8	440489.0	271.1	251.1	327.1	27	278.0	252.2	25.8	4.61	274.1	0.89
HTF 34	3682790.8	440237.5	271.7	251.7	303.7	15	278.5	273.3	5.2	1.25	276.1	0.32
HWS 1A	3679143.0	438466.8	255.2	225.2	323.2	23	248.3	242.2	6.1	2.1	244.9	0.44
HWS 2	3679138.5	438512.0	245.3	215.3	320.3	23	249.1	242.9	6.3	2.26	245.5	0.47
HXB 4D	3678535.8	439806.8	254.9	234.9	304.4	19	257.2	251.0	6.2	2.05	254.1	0.47
HXB 5D	3678492.3	439798.1	254.2	234.2	306.2	17	256.4	250.5	5.9	2	253.5	0.49
IDB 4	3686341.5	442531.3	259.6	239.6	314.8	16	257.8	244.4	13.3	4.3	249.9	1.08
IDB 5	3686304.0	442771.9	255.1	235.1	320.1	18	255.0	241.8	13.2	3.79	247.7	0.89
IDB 6	3685554.5	443233.0	260.7	240.7	317.0	18	264.3	246.7	17.6	4.92	258.2	1.16
IDB 7	3685610.8	442885.2	261.4	241.4	311.4	18	265.4	253.6	11.8	3.82	259.5	0.90
IDB 8	3685710.8	443796.8	249.3	229.3	291.3	18	245.6	234.8	10.8	2.88	239.5	0.68
IDP 4	3681475.8	432389.4	199.6	189.5	238.6	14	196.3	189.6	6.6	1.96	193.2	0.52
IDP 5	3681591.0	432180.8	206.6	186.4	251.7	18	203.3	192.1	11.3	3.4	198.2	0.80
IDP 6	3681730.5	432065.6	209.1	184.5	259.6	18	206.5	196.8	9.7	3.35	201.3	0.79
IDP 7	3681899.3	432118.2	208.6	188.6	246.6	18	206.1	196.0	10.1	3.53	201.1	0.83
IDP 8	3682050.8	432181.4	204.5	185.4	262.5	18	204.9	188.3	16.6	4.74	198.9	1.12
IDP 9	3682108.0	431633.2	208.0	188.0	270.0	18	209.5	198.2	11.3	3.87	203.6	0.91
IDQ 4	3681214.0	431867.9	205.6	185.6	263.5	18	203.5	192.9	10.6	3.25	198.2	0.77
IDQ 5	3681147.3	431963.7	207.5	187.4	265.0	12	200.0	194.1	5.9	1.75	197.0	0.51
IDQ 6	3681141.5	432136.6	202.1	181.9	256.1	19	198.5	188.1	10.3	3.09	193.6	0.71
IDQ 7	3681162.3	432323.9	194.8	174.6	238.8	13	191.7	183.5	8.3	2.15	187.9	0.60
IDQ 8	3680966.0	431280.2	200.4	180.4	240.7	9	191.6	188.2	3.3	1.05	189.3	0.35
IDQ 9	3680637.3	431280.4	193.9	173.9	234.3	7	183.2	180.1	3.1	1.21	181.8	0.46
IDQ 10	3680411.3	431277.7	185.7	165.7	234.7	13	176.7	170.4	6.4	1.63	174.0	0.45
IDQ 11	3680177.0	431874.6	134.8	129.7	206.8	3	140.9	135.5	5.4	2.78	137.9	1.61
IDQ 12	3680985.5	432181.3	184.9	164.9	240.5	12	191.2	183.6	7.6	2.04	187.8	0.59
K 301P	3674676.5	437801.2	201.0	194.4	261.0	36	208.9	202.3	6.6	1.94	204.9	0.32
KAB 1	3674379.0	438047.1	224.0	194.0	264.0	23	209.2	201.7	7.6	2.12	205.0	0.44
KAB 2	3674284.3	438251.0	228.6	198.6	258.6	24	219.6	204.2	15.4	4.16	208.9	0.85
KAB 3	3674071.3	438270.6	223.0	193.0	248.0	21	208.1	198.9	9.3	2.47	203.0	0.54
KAB 4	3674234.8	437977.7	217.0	187.0	252.0	22	206.8	197.6	9.2	2.52	202.0	0.54
KAC 1	3674889.8	438691.1	229.0	199.0	264.0	28	225.5	215.4	10.2	2.57	219.8	0.49
KAC 2	3674922.8	438690.6	225.4	195.4	255.4	27	226.8	216.6	10.2	2.61	222.2	0.50
KAC 3	3674917.8	438711.7	225.8	195.8	255.8	28	226.7	218.4	8.3	2.21	222.6	0.42
KAC 5	3674906.5	438717.0	224.3	204.3	256.8	28	226.7	218.4	8.4	2.36	222.5	0.45
KAC 6	3674897.0	438715.3	224.6	204.6	257.1	27	226.7	218.2	8.5	2.41	222.5	0.46
KAC 7	3674903.5	438665.8	223.0	203.0	263.0	29	224.1	215.5	8.6	2.22	219.6	0.41
KCB 1	3674405.8	437878.1	213.6	183.6	258.6	28	209.1	200.1	9.0	2.29	204.0	0.43
KCB 2	3674417.0	437799.8	217.7	187.7	252.7	27	208.1	192.5	15.6	3.95	202.3	0.76
KCB 3	3674333.8	437785.8	214.1	184.1	246.1	29	206.9	198.1	8.8	2.2	201.7	0.41
KCB 4	3674320.0	437862.3	218.9	188.9	253.9	9	206.6	202.1	4.5	1.6	204.0	0.53
KCB 5	3674303.8	437789.4	209.3	189.3	246.3	7	202.1	197.9	4.2	1.54	200.4	0.58
KCB 6	3674357.5	437756.8	208.7	188.7	245.7	6	202.5	198.1	4.4	1.73	201.0	0.71
KCB 7	3674453.3	437952.5	216.5	196.5	265.5	8	207.2	203.3	3.9	1.68	205.3	0.59
KDB 1	3674714.8	437993.4	205.8	184.8	270.8	42	211.7	205.6	6.1	1.61	208.2	0.25
KDB 2	3674646.5	437973.6	203.5	182.5	270.6	42	210.7	204.1	6.6	1.7	206.8	0.26
KDB 3	3674646.0	438031.4	205.4	184.2	270.5	46	211.5	204.9	6.6	1.65	207.6	0.24
KDB 4	3674600.5	437972.7	209.2	189.2	271.0	14	208.0	205.5	2.5	0.67	206.3	0.18
KDB 5	3674644.8	437896.3	208.5	188.5	268.4	21	207.6	203.1	4.5	1.27	205.0	0.28
KDT 1D	3674732.0	437963.5	213.7	193.7	270.7	19	211.1	205.3	5.8	1.63	208.1	0.37
KRB 8	3674900.3	437811.7	215.8	195.8	265.8	7	209.4	207.5	1.9	0.78	208.4	0.29
KRB 16D	3674914.8	437834.4	211.5	191.5	266.5	18	210.8	207.2	3.7	1.05	209.3	0.25
KRB 17D	3674980.8	437636.2	206.8	186.8	282.1	18	208.2	204.1	4.1	1.12	205.9	0.26
KRB 18D	3675026.5	437638.0	205.8	185.8	280.8	18	206.2	202.8	3.4	0.9	204.5	0.21
KRB 19D	3675062.5	437657.9	206.8	186.8	279.8	18	205.3	202.1	3.2	0.79	203.7	0.19

Well ID	UTM N	UTM E	Sz top	Sz bot.	Gr. Elev.	No.	Max.	Min.	Range	Std. Dev.	Mean WL	StdErr_Mean
KRP 1	3675203.3	438408.8	237.0	207.0	262.0	28	222.3	208.8	13.6	2.61	218.5	0.49
KRP 2	3675231.0	438467.8	229.2	199.2	254.2	25	222.6	215.5	7.1	1.95	219.4	0.39
KRP 3	3675192.0	438546.3	237.5	207.5	252.5	24	223.6	214.1	9.5	2.34	219.5	0.48
KRP 4	3675180.0	438470.6	218.7	188.7	253.7	27	221.9	215.0	6.9	1.85	218.6	0.36
KRP 6	3675076.3	438409.1	213.1	203.1	267.9	7	217.7	217.2	0.5	0.21	217.4	0.08
KRP 7	3675057.8	438288.6	213.2	203.1	267.9	6	215.6	215.2	0.4	0.18	215.4	0.07
KSB 1	3674602.3	437842.0	205.6	175.6	265.6	48	208.5	200.2	8.3	2.01	203.8	0.29
KSB 2	3674555.0	437837.4	203.8	173.8	263.8	51	208.3	200.5	7.8	2.06	203.5	0.29
KSB 3	3674568.8	437798.0	199.7	169.7	259.7	49	207.5	199.8	7.7	2.09	202.8	0.30
KSB 4A	3674617.0	437812.4	199.6	169.6	259.1	47	208.2	193.5	14.6	3.73	202.9	0.54
KSB 5D	3674659.3	437862.2	214.5	194.5	267.1	7	205.5	203.5	1.9	0.98	204.5	0.37
KSM 1D	3674731.3	437944.7	213.7	193.7	270.2	27	209.8	205.1	4.7	1.21	208.2	0.23
KSS 1D	3673127.8	439070.8	177.5	157.4	228.1	27	178.2	170.4	7.8	2.29	174.4	0.44
KSS 2D	3672931.5	439295.7	164.7	144.6	190.4	27	168.3	160.9	7.4	2.2	164.8	0.42
KSS 3D	3672948.0	439400.9	159.3	139.3	183.2	27	167.8	154.3	13.5	2.93	164.0	0.56
LAC 1	3674497.5	442257.1	221.1	191.1	236.1	26	223.8	211.8	12.0	2.97	216.9	0.58
LAC 2	3674511.3	442228.7	223.4	193.4	238.4	28	223.8	202.9	20.9	3.86	216.4	0.73
LAC 3	3674464.8	442231.2	220.7	190.7	235.7	28	223.6	211.8	11.8	2.85	217.0	0.54
LAC 4	3674482.5	442249.8	215.3	185.3	235.3	26	223.5	193.3	30.2	5.36	215.6	1.05
LAC 5DU	3674529.3	442245.2	227.8	207.9	239.3	7	223.8	217.6	6.2	2.1	219.5	0.79
LAC 6DU	3674477.0	442221.9	221.7	201.7	237.7	6	223.2	216.8	6.4	2.27	219.0	0.93
LAC 7DU	3674431.3	442230.4	224.8	204.9	239.8	6	222.5	215.5	7.0	2.38	218.1	0.97
LAC 8DU	3674464.3	442274.9	219.8	199.8	234.5	6	222.4	215.7	6.7	2.29	218.1	0.93
LCO 1	3674422.8	442175.4	225.8	195.8	238.8	27	221.2	206.7	14.5	3.4	215.2	0.65
LCO 2	3674467.5	442175.1	226.6	196.6	239.6	28	220.9	207.8	13.1	3.49	215.3	0.66
LCO 3	3674451.8	442212.9	226.3	196.3	239.3	26	235.2	224.4	10.8	2.81	229.5	0.55
LCO 4	3674409.5	442214.6	222.3	192.3	235.3	29	219.3	203.1	16.2	3.58	213.0	0.66
LCO 8DU	3674590.8	442205.4	226.1	211.1	243.7	6	224.5	218.7	5.8	2.05	220.6	0.84
LDB 1	3674526.5	441961.5	215.0	185.0	250.5	37	220.8	211.5	9.3	2.27	216.7	0.37
LDB 2	3674591.0	441987.7	214.5	184.5	250.5	40	223.3	213.6	9.7	2.18	218.8	0.34
LDB 3	3674559.8	441912.9	219.3	199.3	251.2	22	220.8	216.3	4.4	1.17	218.0	0.25
LDB 4	3674462.3	441913.6	220.7	200.7	247.7	21	218.2	214.4	3.8	1.04	215.9	0.23
LFW 6	3683089.0	433712.3	160.4	141.1	170.2	28	156.8	147.5	9.3	1.95	154.3	0.37
LFW 6R	3683050.0	433722.9	154.5	134.5	168.2	5	153.8	152.8	1.1	0.4	153.4	0.18
LFW 7	3683046.8	433772.3	159.8	140.5	169.6	23	154.8	150.2	4.7	1.13	152.2	0.24
LFW 8	3682995.8	433845.8	159.2	139.9	169.0	30	152.5	148.2	4.3	1.18	150.2	0.22
LFW 8R	3682975.0	433860.6	155.1	135.1	168.7	5	150.1	148.9	1.2	0.45	149.6	0.20
LFW 10A	3683172.0	433913.5	159.2	129.2	174.2	32	155.2	145.0	10.3	2.19	151.8	0.39
LFW 16	3683250.5	433825.1	161.2	131.2	177.2	27	158.3	152.5	5.8	1.47	155.9	0.28
LFW 17	3683170.5	433790.8	158.5	128.5	176.5	28	157.2	147.2	10.1	2.9	154.0	0.55
LFW 18	3683137.8	433759.0	160.1	130.1	174.1	30	157.5	144.6	12.9	3	153.8	0.55
LFW 19	3683138.8	433636.1	160.0	130.0	175.0	29	160.7	153.4	7.3	1.61	156.4	0.30
LFW 20	3683328.8	433666.5	165.0	135.0	179.0	28	162.0	156.3	5.8	1.61	159.4	0.30
LFW 21	3683163.3	434000.5	158.9	128.9	173.9	31	153.7	139.9	13.8	3.15	149.5	0.57
LFW 22	3683206.0	434035.7	152.4	122.4	172.4	30	155.5	148.5	7.0	1.65	151.6	0.30
LFW 23	3683236.3	434063.0	155.1	125.1	170.1	29	156.4	132.6	23.8	4.01	151.6	0.74
LFW 24	3683320.0	434026.4	154.5	124.5	169.5	29	159.2	150.6	8.6	1.83	154.8	0.34
LFW 25	3683407.0	433927.1	153.2	123.2	173.2	29	161.2	153.1	8.1	1.84	157.2	0.34
LFW 26	3683434.5	433608.8	164.2	143.2	184.2	28	164.2	158.1	6.2	1.73	161.6	0.33
LFW 27	3683473.3	433566.4	163.9	142.9	186.9	29	165.1	158.6	6.5	1.75	162.5	0.32
LFW 28	3683525.0	433513.2	162.1	141.1	190.1	33	167.3	159.8	7.5	1.84	163.8	0.32
LFW 29	3683588.0	433447.8	164.9	143.9	192.9	29	168.1	161.1	7.0	1.92	165.1	0.36
LFW 30	3683515.0	433375.7	162.7	141.7	207.7	30	168.4	160.9	7.5	1.97	165.1	0.36
LFW 31	3683447.0	433311.4	166.0	145.0	227.0	36	176.0	160.9	15.1	2.6	164.9	0.43
LFW 32	3683354.3	433404.1	165.3	144.3	221.3	34	165.4	158.9	6.5	1.66	162.6	0.28
LFW 33	3683310.8	433449.7	165.4	144.4	211.4	31	164.0	157.8	6.2	1.73	161.3	0.31
LFW 34	3683263.5	433500.7	164.7	143.7	198.7	32	162.6	156.6	6.0	1.6	160.1	0.28
LFW 35	3683286.0	433620.8	164.4	143.4	181.4	29	161.6	155.5	6.1	1.61	159.1	0.30
LFW 36	3682903.3	433976.1	151.3	130.3	168.3	31	148.4	144.5	3.9	1.01	146.1	0.18
LFW 36R	3682892.3	433960.2	142.0	122.0	166.4	6	146.5	144.5	2.1	0.76	145.9	0.31
LFW 37	3682814.5	434072.8	150.8	129.8	167.8	31	145.1	140.9	4.1	1.02	142.9	0.18
LFW 38	3682892.0	434148.7	151.5	130.5	168.5	26	146.2	135.7	10.5	1.9	143.6	0.37
LFW 39	3682937.8	434190.6	152.2	131.2	169.2	26	146.8	136.3	10.5	1.89	143.8	0.37
LFW 40	3682978.3	434227.7	152.2	131.2	169.2	24	146.0	137.4	8.6	1.72	143.7	0.35
LFW 41	3683033.8	434274.8	151.3	130.3	168.3	30	149.1	134.9	14.2	2.48	145.3	0.45
LFW 41R	3683018.8	434288.8	140.2	120.2	167.6	7	144.0	142.3	1.6	0.59	142.9	0.22
LFW 42	3683133.0	434167.1	151.2	130.2	168.2	26	151.0	135.9	15.1	2.78	147.8	0.55
LFW 43D	3683559.0	433371.4	170.9	150.9	200.9	27	169.0	164.1	4.9	1.31	166.5	0.25

Well ID	UTM N	UTM E	Sz top	Sz bot.	Gr. Elev.	No.	Max.	Min.	Range	Std. Dev.	Mean WL	StdErr_Mean
LFW 44D	3683046.5	433660.9	159.3	139.5	168.3	19	156.4	154.2	2.2	0.68	155.3	0.16
LFW 45D	3682992.3	433745.3	154.7	134.7	164.4	25	153.7	151.2	2.5	0.71	152.6	0.14
LFW 46D	3682955.8	433779.8	157.1	137.3	163.1	19	152.5	150.5	2.0	0.62	151.5	0.14
LFW 47D	3682900.5	433815.4	154.7	134.9	159.7	26	150.4	148.4	2.0	0.51	149.4	0.10
LFW 48D	3682954.5	433880.1	155.0	134.9	167.5	21	150.7	148.5	2.2	0.6	149.4	0.13
LFW 56D	3682819.8	433932.8	151.4	131.3	155.9	26	146.6	144.7	1.9	0.45	145.5	0.09
LFW 57D	3682788.5	433997.4	150.4	130.6	162.9	21	144.8	143.4	1.4	0.39	144.0	0.09
LFW 58D	3682777.8	434111.8	147.6	127.5	165.6	24	142.9	141.1	1.9	0.5	142.0	0.10
LFW 59D	3682856.3	434188.8	149.3	129.3	165.3	23	145.4	142.0	3.3	0.95	143.2	0.20
LFW 60D	3682681.0	434190.6	143.8	123.8	155.2	28	139.2	137.3	1.9	0.41	138.2	0.08
LFW 61D	3682952.5	434275.1	150.4	130.3	166.4	21	146.8	142.3	4.5	1.3	144.0	0.28
LFW 62D	3682830.3	434157.5	147.6	127.6	162.6	17	145.2	141.7	3.5	0.98	143.4	0.24
LFW 63D	3682707.8	434113.4	146.4	126.4	166.2	17	141.0	140.0	1.0	0.27	140.4	0.07
LFW 66D	3682836.8	434247.4	141.8	121.8	159.6	13	144.0	140.6	3.5	1.05	141.9	0.29
LFW 67D	3682905.5	434331.6	140.6	120.6	155.4	17	144.8	140.0	4.8	1.36	141.8	0.33
LFW 68D	3683009.5	434383.2	144.6	124.6	159.4	17	144.9	140.5	4.4	1.2	142.3	0.29
LFW 69D	3682621.8	434150.4	139.0	119.0	144.0	17	138.2	137.5	0.7	0.22	137.8	0.05
LFW 70D	3682649.0	434258.2	138.3	118.3	144.3	10	136.4	135.3	1.1	0.37	135.7	0.12
LFW 71D	3682808.8	434322.8	135.5	115.5	145.5	16	138.2	136.6	1.6	0.5	137.3	0.13
LFW 72D	3682986.0	434428.6	140.0	120.0	148.0	10	140.1	137.7	2.4	0.86	138.7	0.27
LFW 74D	3683381.0	433445.6	167.7	152.7	211.7	10	164.2	161.8	2.4	0.73	162.9	0.23
LFW 75D	3683437.3	433501.9	166.0	151.0	196.0	7	164.4	161.9	2.5	0.88	163.1	0.33
LRP 1	3674920.0	441124.0	215.8	185.8	250.8	24	214.2	204.5	9.7	3.09	209.4	0.63
LRP 2	3674887.3	441180.2	214.7	184.7	254.7	23	221.6	195.7	25.8	4.92	210.3	1.03
LRP 3	3674854.5	441145.1	221.4	191.4	256.4	24	214.3	204.4	9.9	3.12	209.4	0.64
LSB 1	3674365.5	442120.3	222.7	192.7	230.7	33	218.4	205.7	12.7	2.85	212.0	0.50
LSB 2	3674405.3	442138.0	225.0	195.0	233.0	31	219.6	206.4	13.2	2.97	212.8	0.53
LSB 3	3674428.8	442085.1	226.6	196.6	234.6	34	224.1	210.4	13.7	3.09	217.6	0.53
LSB 4	3674373.5	442043.7	221.5	191.5	229.5	34	224.4	198.6	25.8	4.63	217.2	0.79
MCB 2	3686142.0	431447.6	225.9	205.9	326.1	43	229.1	218.3	10.8	3.23	223.6	0.49
MCB 4	3686194.0	431249.9	229.6	208.6	348.2	39	228.0	210.9	17.1	3.79	222.8	0.61
MCB 5	3686174.0	431324.3	226.3	206.3	337.7	43	229.0	220.0	9.0	2.61	224.7	0.40
MCB 6	3686259.0	431394.4	219.7	199.7	329.9	45	224.4	213.3	11.1	3.36	217.9	0.50
MCB 8D	3686119.0	431329.0	225.7	205.7	337.4	15	229.2	218.7	10.5	2.33	225.3	0.60
MCB 9D	3686239.8	431274.6	226.2	206.2	339.1	15	226.5	221.4	5.1	1.48	223.9	0.38
MCB 10D.	3686605.3	431417.2	244.9	224.9	317.9	3	239.1	237.7	1.4	0.73	238.5	0.42
MCB 11D	3686031.8	431620.6	230.3	210.3	300.3	14	221.2	215.3	5.9	2.02	218.5	0.54
MCB 13D	3685773.0	431275.2	235.0	214.9	355.0	7	225.4	224.5	0.9	0.38	224.9	0.14
MGA 36	3682737.8	438735.7	254.2	234.2	296.2	5	238.8	236.3	2.5	0.89	237.4	0.40
MGC 9	3682690.5	437910.5	237.3	217.3	282.3	21	232.6	226.1	6.5	1.57	229.6	0.34
MGC 11	3682689.8	437971.4	239.2	219.2	289.2	2	231.7	229.7	2.0	1.41	230.7	1.00
MGC 19	3682685.3	438215.1	234.6	230.6	284.6	20	236.6	230.1	6.5	1.52	232.4	0.34
MGC 23	3682682.8	438336.8	247.9	227.9	283.9	5	245.7	231.7	14.0	5.36	237.4	2.40
MGC 32	3682677.8	438612.6	252.0	232.0	287.0	19	248.0	242.3	5.7	1.51	244.9	0.35
MGC 36	3682676.5	438736.8	254.4	234.4	294.4	18	239.6	233.6	6.0	1.57	236.0	0.37
MGE 9	3682630.0	437908.8	238.1	218.1	281.1	13	231.1	227.6	3.5	0.88	229.1	0.24
MGE 21	3682622.5	438274.9	247.9	227.9	282.9	10	236.0	230.0	6.0	1.78	234.1	0.56
MGE 30	3682617.3	438553.6	249.3	229.3	280.3	17	240.2	233.8	6.4	1.75	236.4	0.42
MGG 15	3682567.8	438090.6	243.3	223.3	282.3	6	238.5	230.0	8.5	3.03	232.9	1.24
MGG 19	3682565.8	438213.7	246.0	226.0	278.0	10	235.0	226.0	9.0	2.68	232.5	0.85
MGG 23	3682563.3	438335.3	247.1	227.1	276.1	10	237.6	233.8	3.8	1.35	235.2	0.43
MGG 28	3682559.5	438490.1	250.3	230.3	274.3	5	236.9	234.0	2.9	1.14	235.6	0.51
MGG 36	3682554.3	438737.6	252.5	232.5	290.5	13	241.2	234.8	6.4	1.86	237.7	0.52
MSB 1A	3687928.3	431405.4	253.2	223.2	352.2	6	232.3	227.9	4.4	1.74	231.5	0.71
MSB 1D	3687925.5	431401.8	229.8	210.4	352.8	42	232.1	227.5	4.6	1.17	230.5	0.18
MSB 2A	3688026.3	431439.3	252.6	222.6	351.2	8	233.8	228.8	5.0	1.59	232.6	0.56
MSB 2D	3688024.5	431444.1	230.1	210.7	351.7	41	233.2	228.3	4.9	1.25	231.2	0.20
MSB 3D	3688026.0	431355.9	230.7	211.2	358.7	27	231.5	221.0	10.5	2.11	230.0	0.41
MSB 4A	3687925.3	431349.5	254.8	224.8	352.9	7	231.6	231.2	0.4	0.18	231.4	0.07
MSB 4D	3687943.3	431335.9	228.4	209.0	353.4	41	231.8	226.3	5.4	1.26	229.7	0.20
MSB 5A	3687699.0	431018.9	247.2	217.2	342.2	27	229.0	225.6	3.4	0.93	227.9	0.18
MSB 6A	3687370.8	431001.9	241.9	211.9	341.9	54	229.1	222.4	6.7	1.83	226.5	0.25
MSB 7A	3687308.8	431200.3	242.0	212.0	342.0	54	230.5	220.5	10.0	1.74	227.8	0.24
MSB 8A	3687467.0	431298.8	242.4	212.4	342.4	39	230.9	227.3	3.7	1.02	229.5	0.16
MSB 9C	3687995.0	431283.7	241.6	221.6	357.6	30	233.0	228.6	4.4	0.98	231.3	0.18
MSB 11E	3688156.8	431281.6	251.0	231.0	363.5	17	241.1	239.4	1.7	0.57	240.0	0.14
MSB 11F	3688144.0	431289.8	243.1	223.1	363.6	24	233.1	229.8	3.2	0.72	231.4	0.15
MSB 12D	3687795.8	431001.5	245.3	225.3	347.3	6	234.4	234.2	0.2	0	234.3	0.00

Well ID	UTM N	UTM E	Sz top	Sz bot.	Gr. Elev.	No.	Max.	Min.	Range	Std. Dev.	Mean WL	StdErr_Mean
MSB 13C	3687737.3	431188.3	244.1	224.1	345.1	17	230.3	227.3	3.0	0.93	228.9	0.23
MSB 13D	3687744.3	431181.4	231.5	211.5	345.5	45	229.7	224.7	5.0	1.14	228.2	0.17
MSB 14C	3687891.8	431450.9	243.9	223.9	347.2	22	235.0	232.1	2.9	0.94	232.8	0.20
MSB 15C	3688282.0	431286.2	260.6	240.6	364.8	39	248.9	242.7	6.2	1.4	244.1	0.22
MSB 15D	3688273.3	431290.2	241.4	221.9	366.4	45	235.7	227.5	8.2	1.35	232.7	0.20
MSB 16C	3688481.8	431192.2	244.8	224.8	365.8	33	232.5	228.8	3.7	0.84	230.9	0.15
MSB 17D	3687581.5	430813.3	232.8	213.3	357.8	39	228.6	224.1	4.5	1.14	227.0	0.18
MSB 18C	3687162.0	431079.1	229.2	209.2	340.4	40	232.9	223.5	9.4	2.56	228.1	0.40
MSB 20C	3687926.3	430510.6	232.7	212.7	352.7	40	229.3	225.6	3.7	0.83	227.6	0.13
MSB 21C	3688234.3	430718.1	233.2	213.2	353.0	45	231.6	227.1	4.5	0.99	229.5	0.15
MSB 22	3688022.8	431352.4	243.2	223.2	358.2	10	232.4	230.5	2.0	0.85	231.6	0.27
MSB 24	3688860.0	431245.7	243.9	223.9	378.9	45	255.5	233.8	21.7	3.07	236.1	0.46
MSB 25	3688554.0	431402.8	244.7	224.7	364.7	5	237.5	237.2	0.3	0.13	237.4	0.06
MSB 26	3688698.0	431023.9	240.7	220.7	359.7	20	237.9	233.6	4.3	0.94	237.3	0.21
MSB 27	3688884.8	431093.9	244.0	234.0	374.0	43	240.9	235.7	5.2	1.26	237.7	0.19
MSB 28	3688703.0	430860.4	230.6	210.6	352.6	44	232.4	228.3	4.2	1.11	230.5	0.17
MSB 29DD	3689766.3	431094.2	250.4	230.4	362.4	14	233.9	232.0	1.9	0.55	233.2	0.15
MSB 30C	3688807.3	430594.8	237.6	217.6	352.6	44	232.9	229.0	3.9	0.98	230.8	0.15
MSB 31C	3688255.3	431779.0	236.1	216.1	346.1	45	236.7	231.3	5.3	1.11	234.6	0.17
MSB 33	3687577.8	432892.7	228.7	208.7	253.7	42	222.4	216.4	6.0	1.02	218.1	0.16
MSB 34C	3689063.0	431358.9	240.9	220.9	381.9	35	234.6	228.2	6.4	1.44	230.8	0.24
MSB 35D	3688444.8	431965.2	254.5	233.8	349.5	11	243.7	243.4	0.3	0.13	243.6	0.04
MSB 36D	3687799.0	431907.0	249.5	228.8	339.5	32	238.2	228.9	9.3	2.51	236.7	0.44
MSB 37D	3689308.3	431521.4	245.7	225.1	380.7	27	233.1	228.8	4.3	1.11	231.7	0.21
MSB 38D	3688299.3	431629.3	240.4	220.9	356.4	25	237.4	232.8	4.6	0.93	234.1	0.19
MSB 39D	3687675.5	431562.7	239.7	219.0	339.7	47	234.0	229.2	4.9	1.28	231.8	0.19
MSB 40D	3686879.8	432100.2	236.8	216.2	320.8	25	238.1	225.9	12.2	2.28	228.8	0.46
MSB 41D	3688907.3	432553.4	247.8	227.1	322.8	18	241.2	237.2	3.9	0.9	240.9	0.21
MSB 42D	3689167.3	431677.7	247.2	226.6	374.2	27	235.3	231.2	4.2	0.97	233.5	0.19
MSB 43DD	3689425.0	430645.3	243.2	223.1	356.2	15	233.2	230.0	3.1	0.93	231.9	0.24
MSB 44C	3688762.0	431793.3	239.4	229.4	374.4	38	240.5	231.4	9.1	2.1	234.9	0.34
MSB 46C	3688613.3	431691.4	247.0	237.0	370.0	29	241.3	236.2	5.1	1.51	239.7	0.28
MSB 47D	3689857.8	431401.8	246.1	226.5	366.6	43	235.4	230.9	4.4	1.05	233.8	0.16
MSB 48D	3690428.8	431691.9	243.5	222.0	360.5	37	249.0	230.1	19.0	6.16	235.4	1.01
MSB 49D	3686940.8	431140.4	236.4	216.7	331.8	43	232.4	224.6	7.8	2.3	228.7	0.35
MSB 50D	3687056.0	433011.6	210.9	190.8	220.7	38	211.3	200.9	10.4	1.61	202.8	0.26
MSB 51D	3687521.3	433340.8	218.5	198.8	260.0	39	212.2	208.1	4.0	1.07	210.1	0.17
MSB 52D	3689118.8	432404.4	250.8	231.1	319.4	37	240.0	233.9	6.2	1.54	237.9	0.25
MSB 53D	3690156.5	432077.2	244.9	223.6	342.9	39	235.1	226.7	8.4	1.44	233.2	0.23
MSB 54D	3690371.3	431329.7	244.8	223.8	371.4	40	236.5	231.9	4.6	1.05	234.2	0.17
MSB 55D	3690183.3	431107.8	245.9	224.7	365.9	33	237.1	232.8	4.3	1.11	234.5	0.19
MSB 56D	3688797.8	429167.2	232.4	211.1	277.4	43	222.9	218.7	4.2	0.86	220.8	0.13
MSB 57D	3687969.3	431463.9	229.6	210.1	354.1	37	233.3	228.6	4.7	1.21	231.5	0.20
MSB 58D	3688059.3	431395.3	230.5	211.1	355.8	41	233.0	226.2	6.7	1.38	231.2	0.22
MSB 59D	3687987.0	431305.3	229.3	209.9	357.3	38	231.8	226.5	5.3	1.38	230.0	0.22
MSB 60D	3687903.5	431370.5	228.3	208.9	352.3	39	232.1	227.3	4.8	1.2	230.3	0.19
MSB 61D	3690219.5	432346.9	234.2	214.3	315.7	39	227.8	222.4	5.3	1.54	225.1	0.25
MSB 62D	3687827.3	431258.7	231.9	212.4	347.4	42	230.7	226.1	4.7	1.2	229.2	0.19
MSB 63D	3687650.8	431370.1	232.8	212.8	344.8	42	231.1	226.0	5.1	1.24	229.6	0.19
MSB 64D	3687598.5	430941.3	230.1	210.1	346.6	39	228.7	223.3	5.4	1.27	226.9	0.20
MSB 65D	3688118.3	431623.9	243.9	224.4	347.1	45	236.5	231.3	5.2	1.16	233.9	0.17
MSB 66D	3689377.8	431321.4	239.5	220.0	381.5	28	234.4	224.8	9.6	1.7	231.9	0.32
MSB 67D	3689787.8	431372.6	241.0	221.5	363.1	42	235.3	231.6	3.8	0.81	233.8	0.12
MSB 68D	3689823.5	431468.0	239.9	220.4	354.9	38	235.9	232.1	3.8	0.83	234.3	0.13
MSB 69D	3690110.8	431322.4	239.8	220.3	379.8	44	236.9	231.7	5.2	1.05	233.8	0.16
MSB 70D	3687293.3	430559.9	228.3	208.2	360.3	36	223.3	217.3	6.0	1.48	221.3	0.25
MSB 74D	3687635.0	432373.7	237.1	217.1	313.1	38	237.0	230.7	6.3	1.29	232.9	0.21
MSB 77D	3690257.5	431883.2	236.2	216.2	355.2	31	236.1	231.1	5.0	1.39	234.2	0.25
MSB 78D	3687839.0	430345.4	225.5	206.1	361.1	18	225.9	219.2	6.7	2.04	224.1	0.48
MSB 78DR	3687839.0	430341.1	226.9	206.9	361.5	8	224.5	222.0	2.6	0.93	223.1	0.33
MSB 82D	3689950.5	431240.3	236.9	216.8	371.4	35	234.8	230.7	4.1	0.94	233.5	0.16
MSB 83D	3690254.3	431191.3	236.1	216.7	369.3	36	234.9	230.5	4.4	1.02	233.7	0.17
MSB 85D	3690236.3	431474.9	236.3	216.2	378.8	36	234.8	230.5	4.3	0.96	233.5	0.16
MSB 87C	3688352.3	432276.1	246.6	241.6	334.6	18	244.4	241.7	2.8	0.66	243.8	0.16
MSB 88D	3687157.8	432843.1	212.2	192.1	234.9	15	205.9	204.0	1.9	0.55	205.1	0.14
MWD 1D	3684764.8	443749.1	272.9	227.8	327.9	7	272.4	264.2	8.3	2.71	268.0	1.02
MWD 2D	3684833.3	443758.9	267.5	247.5	322.5	7	271.9	265.3	6.6	2.17	269.0	0.82
MWD 5D	3684739.3	443910.2	269.5	249.5	323.0	7	271.0	264.8	6.1	2.03	268.2	0.77

Well ID	UTM N	UTM E	Sz top	Sz bot.	Gr. Elev.	No.	Max.	Min.	Range	Std. Dev.	Mean WL	StdErr_Mean
MWD 8	3684880.5	443662.2	273.7	253.7	323.7	7	272.4	266.3	6.0	2.02	269.7	0.76
NBG 1	3683347.8	436779.6	232.3	200.9	309.5	31	226.6	223.1	3.5	1.08	224.5	0.19
NBG 2	3683312.5	436835.0	233.6	203.6	310.6	30	227.1	223.5	3.6	1.12	225.0	0.20
NBG 3	3683292.8	436890.8	233.5	202.1	310.5	29	220.7	215.0	5.7	1.97	217.5	0.37
NBG 4	3683340.3	436954.6	227.5	196.1	304.5	30	220.3	214.6	5.7	1.88	217.2	0.34
NBG 5	3683374.0	437000.3	226.4	194.9	301.4	30	221.5	214.9	6.6	2.13	217.9	0.39
NPM 4DD	3679412.0	440903.2	306.4	296.4	311.3	9	310.3	297.6	12.7	4.57	306.0	1.52
NPM 19A	3679983.5	440612.7	268.2	248.2	327.0	10	273.9	266.8	7.1	2.23	270.6	0.71
NPM 34A	3679218.3	440698.4	289.8	279.8	320.3	10	293.5	286.3	7.2	2.11	290.6	0.67
P 19D	3678542.0	442603.1	273.2	253.2	297.7	1	267.1	267.1	0.0	-	267.1	
P 26D	3675114.8	429265.5	121.9	101.8	151.8	36	123.2	112.7	10.5	2.74	118.0	0.46
P 29D	3683131.0	432756.8	173.9	153.9	266.4	3	170.0	167.7	2.3	1.23	169.1	0.71
PAC 1	3676847.8	446363.4	283.9	253.9	293.9	28	287.5	282.3	5.2	1.29	284.9	0.24
PAC 2	3676884.8	446422.3	277.9	247.9	282.9	27	274.1	268.2	5.9	1.72	271.1	0.33
PAC 3	3676877.5	446382.4	282.9	252.9	287.9	28	277.4	268.4	9.0	2.28	271.4	0.43
PAC 4	3676855.5	446399.1	280.6	250.6	289.6	27	286.1	282.5	3.6	0.92	284.5	0.18
PAC 5	3676879.8	446398.0	275.1	255.1	287.1	28	280.0	269.3	10.7	2.39	275.2	0.45
PAC 6	3676882.3	446391.6	275.2	255.2	287.2	27	278.0	270.6	7.5	1.93	274.7	0.37
PCB 1A	3676162.8	446227.8	293.5	263.5	303.5	24	286.2	276.0	10.2	2.72	280.4	0.56
PCB 2A	3676089.8	446213.5	287.8	257.8	302.8	24	285.3	274.7	10.5	2.75	279.3	0.56
PCB 3A	3676109.3	446129.4	292.7	262.7	302.7	27	291.3	277.5	13.8	2.97	281.6	0.57
PCB 4A	3676177.5	446153.3	292.9	262.9	307.9	25	284.7	274.9	9.9	2.68	279.5	0.54
PDB 4	3676444.0	445854.6	286.2	266.2	317.1	9	281.7	278.1	3.6	1.37	279.3	0.46
PDB 5	3676597.5	445728.1	284.2	264.2	317.2	10	279.8	276.4	3.3	1.24	277.9	0.39
PRP 1A	3676625.5	445122.9	262.9	232.9	282.9	26	255.1	244.6	10.5	2.41	249.3	0.47
PRP 2	3676670.5	445164.1	264.1	234.1	284.1	26	269.5	250.6	19.0	5.03	256.0	0.99
PRP 3	3676612.5	445182.3	258.6	228.6	278.6	25	264.2	250.5	13.7	3.67	255.8	0.73
PRP 4	3676661.8	445214.5	262.9	232.9	282.9	27	264.9	254.2	10.7	2.69	257.9	0.52
PSB 1A	3676398.0	445706.3	287.4	257.4	327.4	34	280.9	272.2	8.6	2.82	276.5	0.48
PSB 2A	3676356.0	445652.2	287.2	257.2	322.2	34	281.6	271.6	10.0	2.92	276.5	0.50
PSB 3A	3676294.5	445574.1	286.5	256.5	316.5	34	280.1	270.1	10.0	3.06	275.3	0.52
PSB 4A	3676234.5	445525.9	285.5	255.5	310.5	34	279.3	268.8	10.5	3.37	274.5	0.58
PSB 5A	3676258.0	445606.6	292.3	262.3	317.3	35	280.7	270.5	10.3	3.23	275.8	0.55
PSB 6A	3676323.3	445698.4	292.1	262.1	322.1	33	281.5	272.5	9.0	2.98	277.3	0.52
PSB 7A	3676410.5	445757.5	289.0	259.0	329.0	34	280.8	272.6	8.2	2.69	277.0	0.46
PSS 1D	3676927.0	449705.3	202.1	182.1	217.5	26	206.4	192.3	14.2	3.9	198.2	0.76
PSS 2D	3676641.0	449965.1	197.1	177.1	226.6	26	204.2	190.6	13.6	3.64	195.3	0.71
PSS 3D	3676666.3	450032.9	198.5	178.5	231.8	12	204.2	194.9	9.3	3.12	198.0	0.90
RAC 1	3681098.3	446215.4	277.3	247.3	282.3	23	276.3	269.3	6.9	1.92	274.2	0.40
RAC 2	3681075.8	446226.2	273.4	243.4	278.4	22	273.8	268.9	4.9	1.32	272.8	0.28
RAC 3	3681093.0	446255.8	272.3	242.3	277.3	23	274.1	268.0	6.1	1.54	272.6	0.32
RAC 4	3681071.3	446242.0	268.2	238.2	277.2	23	273.7	267.8	5.8	1.65	271.9	0.34
RBW 1D	3682744.5	444891.6	263.1	243.0	284.1	3	259.5	258.1	1.4	0.78	259.0	0.45
RBW 2D	3681487.3	444879.3	304.9	284.9	324.9	3	298.5	296.1	2.4	1.25	297.6	0.72
RCP 1D	3681494.5	445796.2	281.3	261.3	294.8	12	285.0	277.8	7.3	2.2	281.8	0.64
RDB 1D	3681637.8	445926.0	285.5	265.5	290.5	25	288.5	282.7	5.8	1.29	286.1	0.26
RDB 2D	3681573.0	445949.7	285.7	265.7	290.7	24	287.6	282.4	5.2	1.1	285.2	0.22
RDB 3D	3681594.5	445978.1	285.8	265.8	290.8	25	285.9	279.4	6.5	1.6	283.1	0.32
RRP 1	3681155.3	446575.0	272.4	242.4	282.4	23	273.5	260.8	12.7	3.31	266.2	0.69
RRP 2	3681166.8	446640.2	272.5	242.5	282.5	22	270.8	259.7	11.1	3.35	265.0	0.71
RRP 3	3681130.3	446675.5	268.1	238.1	278.1	24	270.6	258.7	12.0	3.73	265.2	0.76
RRP 4	3681104.8	446645.1	268.3	238.3	278.3	23	271.4	258.8	12.6	3.42	264.5	0.71
RSA 7	3681939.3	445838.9	289.5	269.6	310.5	21	300.4	275.2	25.2	7.92	289.8	1.73
RSA 8	3681977.0	445889.3	285.5	265.6	310.2	21	297.3	272.3	25.0	7.59	286.7	1.66
RSA 9	3682029.0	445932.0	284.5	264.6	309.7	24	296.7	273.2	23.5	7.17	283.9	1.46
RSA 10	3682000.3	445867.3	288.7	268.8	309.7	21	292.3	272.8	19.5	5.14	282.0	1.12
RSB 7	3681820.3	445868.4	292.6	272.7	307.2	23	293.5	279.3	14.2	4.24	286.4	0.88
RSB 8	3681824.5	445915.8	294.3	274.3	304.3	19	295.8	281.0	14.8	4.22	288.6	0.97
RSC 2	3681910.3	445552.0	281.9	261.9	299.9	18	284.6	273.0	11.6	3.42	279.0	0.81
RSC 3	3682012.8	445598.5	278.6	258.6	299.6	18	283.3	270.0	13.3	3.88	277.8	0.91
RSC 4	3682127.3	445665.1	288.6	268.6	298.6	20	291.3	273.1	18.2	5.99	281.3	1.34
RSC 5	3682197.0	445760.3	278.3	258.3	302.3	21	284.4	266.2	18.2	5.14	274.5	1.12
RSC 6	3682160.5	445862.6	287.7	267.7	300.7	21	296.1	273.9	22.2	7.76	286.4	1.69
RSC 7	3682060.3	445935.6	283.4	263.4	306.4	19	293.1	267.8	25.3	7.51	283.4	1.72
RSC 8	3681965.8	446003.5	299.3	271.3	307.3	22	303.2	283.8	19.4	6.65	293.5	1.42
RSC 9	3682115.8	445472.8	271.6	251.6	299.6	17	279.3	263.6	15.7	3.87	272.3	0.94
RSC 10	3682352.3	445641.6	275.5	255.5	293.5	18	277.9	262.4	15.5	4.06	272.3	0.96
RSD 1	3681756.5	445911.3	287.7	267.9	298.7	27	291.4	280.5	10.9	3.15	286.7	0.61

Well ID	UTM N	UTM E	Sz top	Sz bot.	Gr. Elev.	No.	Max.	Min.	Range	Std. Dev.	Mean WL	StdErr_Mean
RSD 3	3681699.5	445827.4	289.1	269.3	298.9	27	292.1	277.3	14.8	3.5	287.5	0.67
RSD 4	3681778.0	445940.7	290.6	270.6	299.6	23	292.0	283.6	8.4	2.56	288.6	0.53
RSD 5	3681787.0	445953.9	289.6	269.6	299.6	23	292.6	282.7	9.9	2.84	287.4	0.59
RSD 6	3681796.3	445965.8	290.1	270.1	300.1	23	291.5	282.3	9.2	2.59	287.1	0.54
RSD 7	3681770.8	445955.0	287.3	267.3	291.3	24	288.9	280.4	8.5	2.44	285.3	0.50
RSD 8	3681779.8	445967.7	287.3	267.3	291.3	23	289.0	281.0	8.0	2.36	285.6	0.49
RSE 1B	3681767.8	445776.2	295.7	275.7	301.7	24	296.3	278.3	18.0	4.16	290.3	0.85
RSE 1C	3681765.0	445772.9	288.5	268.5	301.5	24	297.7	273.3	24.4	5.75	289.6	1.17
RSE 3A	3681739.0	445884.8	288.0	268.2	299.2	25	291.0	271.0	20.0	4.14	285.5	0.83
RSE 10	3681964.5	445689.6	290.5	270.7	303.2	22	292.7	274.0	18.7	5.82	282.6	1.24
RSE 18	3681920.0	445718.6	288.1	268.1	305.1	22	287.1	274.1	13.0	3.9	280.1	0.83
RSE 19	3681929.0	445693.9	282.5	262.5	302.5	22	293.8	274.2	19.6	5.94	281.6	1.27
RSP 1D	3681509.0	445862.2	289.7	274.7	291.8	2	290.9	288.5	2.4	1.68	289.7	1.19
RSP 4D	3681928.3	446127.3	285.2	265.2	298.2	4	280.4	279.6	0.7	0.4	280.0	0.20
RSP 5D	3682303.5	445982.0	283.5	263.4	294.4	4	277.4	275.2	2.1	1.14	276.2	0.57
RSP 6D	3682276.0	445656.8	276.0	255.9	297.9	3	269.6	269.1	0.5	0.27	269.4	0.16
RSP 7D	3682038.3	445427.3	278.4	258.5	302.5	3	272.0	271.4	0.6	0.28	271.7	0.16
SBG 2	3684166.0	440352.5	235.9	205.9	287.9	24	241.1	235.2	5.9	1.84	238.0	0.38
SBG 3	3684010.0	440588.9	236.6	206.6	284.6	25	240.3	230.4	9.9	2.11	237.6	0.42
SCA 2	3683945.0	440421.8	245.9	215.9	286.9	19	244.3	239.6	4.8	1.58	242.2	0.36
SCA 3	3683949.3	440371.3	240.3	220.3	285.3	10	242.9	239.4	3.4	1.06	241.3	0.34
SCA 3A	3683950.8	440370.3	277.1	267.1	285.3	16	274.6	267.3	7.3	1.94	271.1	0.49
SCA 4	3683922.5	440387.9	240.4	220.4	283.9	16	243.4	237.6	5.8	1.48	241.5	0.37
SCA 4A	3683923.0	440389.0	275.3	265.3	283.9	12	270.1	265.2	4.9	1.47	268.8	0.42
SCA 5	3683993.0	440362.1	243.7	223.7	286.1	17	242.7	239.1	3.7	1.02	241.3	0.25
SCA 6	3683898.8	440433.1	241.1	221.3	283.8	16	243.5	239.8	3.8	1.03	242.0	0.26
SLP 1	3683680.8	440520.8	248.0	228.0	283.0	24	248.7	242.2	6.5	1.79	245.4	0.37
SLW 1	3682958.0	431945.2	180.0	160.0	302.0	3	175.8	174.7	1.1	0.6	175.1	0.35
SLW 2	3683190.8	431702.3	197.0	171.9	302.3	3	192.0	191.2	0.8	0.38	191.6	0.22
SLW 5	3682564.3	431404.9	194.6	174.6	239.6	3	197.4	196.1	1.3	0.67	196.7	0.39
SLW 6	3682381.5	431570.9	199.1	179.1	249.1	3	203.8	202.7	1.2	0.59	203.1	0.34
SLW 7	3682736.3	431277.9	174.1	154.1	229.1	3	176.5	175.5	1.0	0.58	175.8	0.33
SLW 8	3683088.0	431262.2	195.3	165.3	255.3	3	196.9	195.5	1.4	0.78	196.0	0.45
SRW 1	3687141.0	429317.6	230.2	200.2	313.2	28	214.9	210.5	4.4	1.09	213.2	0.21
SRW 2	3687167.0	429381.7	228.6	198.6	318.6	40	217.3	211.3	6.0	1.84	214.2	0.29
SRW 4	3687075.0	429443.0	230.1	200.1	318.1	31	215.5	211.9	3.6	0.96	213.9	0.17
SRW 5	3687022.8	429340.8	224.6	194.6	307.6	41	217.3	202.9	14.4	2.48	211.3	0.39
SRW 6	3687068.8	429308.7	222.6	192.6	305.6	40	214.5	203.4	11.1	2.25	211.5	0.36
SRW 7	3686996.8	429241.4	217.5	197.5	296.7	39	213.5	207.0	6.5	1.76	210.6	0.28
SRW 8	3686894.8	429138.3	215.7	195.7	286.7	40	211.6	205.6	6.0	1.62	208.7	0.26
SRW 9	3686705.5	428986.9	196.3	166.3	251.3	40	203.4	184.2	19.2	3.08	199.0	0.49
SRW 10	3686962.3	429273.4	223.0	193.0	301.0	4	214.5	213.5	1.0	0.44	213.8	0.22
SRW 11	3687024.8	429201.3	220.6	190.6	293.6	39	213.4	206.7	6.7	1.9	210.1	0.30
SRW 12C	3686697.5	428741.9	198.9	179.1	234.3	41	200.9	191.7	9.3	2.19	195.8	0.34
SRW 13C	3686816.3	429280.9	225.4	195.8	295.9	41	212.4	202.1	10.3	2.21	209.2	0.35
SRW 14C	3686931.3	429522.8	228.3	198.6	325.3	5	217.2	217.1	0.1	0.04	217.2	0.02
SRW 15C	3687357.8	429098.8	217.3	187.7	317.3	41	215.1	209.5	5.6	1.59	212.5	0.25
SRW 16C	3687397.3	429671.9	235.7	205.7	345.3	43	217.7	211.9	5.8	1.57	215.1	0.24
TBG 1	3674819.3	429138.9	109.1	89.1	149.1	41	102.9	98.3	4.6	1.25	100.7	0.20
TBG 3	3674801.0	429168.4	108.9	88.9	148.9	34	106.0	100.0	6.0	1.59	103.2	0.27
TBG 4	3674787.0	429178.6	109.3	89.3	149.3	30	104.7	100.5	4.2	1.42	103.0	0.26
TBG 5	3674808.8	429229.4	112.4	92.4	147.4	29	106.1	100.1	6.0	1.77	102.6	0.33
TBG 6	3674860.3	429167.8	109.1	89.1	145.9	31	104.6	100.0	4.6	1.29	102.7	0.23
TBG 7	3674861.0	429264.2	104.7	84.7	144.7	38	109.2	102.1	7.1	2	105.6	0.32
TNX 1D	3674786.5	428998.7	99.6	79.6	154.1	34	100.9	97.8	3.1	0.71	99.6	0.12
TNX 2D	3674762.8	429049.5	102.8	82.8	152.8	34	100.8	97.6	3.2	0.82	99.4	0.14
TNX 3D	3674755.3	429150.9	104.9	84.9	151.9	35	101.8	97.3	4.6	1.21	99.7	0.20
TNX 4D	3674730.0	429237.2	105.5	85.5	147.5	37	106.2	100.1	6.1	1.61	103.2	0.26
TNX 5D	3674753.3	429273.2	108.5	88.5	147.0	37	108.7	101.7	7.0	1.87	105.1	0.31
TNX 6D	3674696.5	429339.0	109.8	89.8	148.2	37	110.2	101.7	8.4	1.98	105.4	0.33
TNX 7D	3674885.5	429070.2	103.6	83.6	148.6	37	102.7	98.9	3.8	0.91	101.2	0.15
TNX 8D	3674439.5	429051.0	94.0	74.0	98.0	34	96.1	91.6	4.5	1.01	94.0	0.17
TNX 9D	3674484.8	429009.7	95.4	75.4	99.4	40	96.0	92.3	3.7	0.89	93.8	0.14
TNX 10D	3674539.8	428977.6	97.0	77.0	100.0	32	96.2	92.4	3.8	0.93	94.0	0.16
TNX 11D	3674588.8	428941.4	93.2	73.2	97.7	35	96.4	92.7	3.7	0.92	94.1	0.16
TNX 12D	3674689.0	428872.5	93.1	73.1	97.1	34	96.5	93.6	2.9	0.64	95.0	0.11
TNX 13D	3674460.0	428949.6	89.9	87.9	93.4	5	92.8	91.4	1.3	0.55	92.0	0.25
TNX 14D	3674488.0	428941.5	87.8	85.8	92.1	4	92.3	92.0	0.3	0.16	92.1	0.08

Well ID	UTM N	UTM E	Sz top	Sz bot.	Gr. Elev.	No.	Max.	Min.	Range	Std. Dev.	Mean WL	StdErr_Mean
TNX 15D	3674515.5	428933.1	87.9	85.9	92.5	8	92.5	87.4	5.1	1.73	91.6	0.61
TNX 16D	3674539.5	428919.4	88.1	86.1	92.7	9	92.7	87.6	5.0	1.46	91.4	0.49
TNX 17D	3674662.3	428843.4	91.7	89.7	94.0	5	93.7	92.9	0.9	0.39	93.3	0.17
TNX 18D	3674429.5	428956.4	86.9	84.9	91.2	4	92.1	91.4	0.8	0.31	91.7	0.16
TNX 19D	3674390.8	428966.0	86.9	84.9	91.2	5	92.7	89.5	3.2	1.21	91.5	0.54
TNX 20D	3674375.0	428969.0	88.2	86.2	91.4	5	93.4	89.7	3.7	1.32	91.5	0.59
TNX 21D	3674343.8	428994.6	88.9	86.9	92.5	5	93.0	89.9	3.2	1.22	91.8	0.55
TNX 22D	3674265.5	429022.9	87.8	85.8	90.5	5	91.0	88.7	2.3	0.89	90.2	0.40
TNX 23D	3674778.3	429090.4	104.8	84.8	152.8	6	100.8	97.6	3.3	1.39	99.3	0.57
TNX 24D	3674917.5	429218.2	114.8	99.8	140.8	8	109.7	108.3	1.4	0.55	109.0	0.19
TNX 26D	3674413.3	429101.4	90.1	87.8	97.1	9	96.1	92.9	3.2	1.08	94.0	0.36
TRW 1	3674719.8	429140.5	106.4	81.4	154.4	5	93.2	89.9	3.3	1.34	91.0	0.60
TRW 2	3674718.0	429087.8	112.2	77.2	152.5	2	92.6	89.3	3.3	2.3	90.9	1.63
TRW 3	3674772.5	429123.9	112.3	77.4	152.2	1	81.3	81.3	0.0	-	81.3	
TRW 4	3674827.0	429136.9	111.9	81.9	148.9	7	100.2	87.0	13.2	4.73	91.1	1.79
XSB 1D	3674696.0	429137.7	107.9	87.9	153.9	37	106.7	95.9	10.8	1.71	99.2	0.28
XSB 2D	3674678.8	429123.7	104.0	84.0	153.0	40	100.5	96.5	4.0	1.07	98.7	0.17
XSB 3A	3674650.8	429173.6	103.2	87.4	154.3	31	101.7	97.8	3.9	1.1	100.0	0.20
XSB 4D	3674657.5	429140.3	103.9	83.9	152.9	37	100.5	96.6	4.0	1.12	98.7	0.18
YSB 1A	3674874.3	429352.9	128.4	98.4	143.4	37	123.1	101.4	21.7	5.44	118.4	0.89
YSB 2A	3674844.3	429390.4	127.7	97.7	142.7	37	124.4	99.8	24.6	5.2	119.4	0.85
YSB 3A	3674790.0	429394.1	126.7	96.7	141.7	38	124.4	112.0	12.4	2.7	119.7	0.44
YSB 4A	3674827.0	429361.3	127.6	97.6	142.6	37	122.6	99.4	23.3	4.97	118.3	0.82
YSC 1D	3685217.8	439933.4	236.8	216.8	272.8	2	221.6	221.1	0.5	0.37	221.3	0.26
YSC 2D	3685303.3	439973.4	218.0	197.9	282.0	18	220.8	212.7	8.1	2.35	216.2	0.55
Z 2	3682110.3	437417.4	214.5	214.0	255.5	7	220.7	217.2	3.5	1.29	219.3	0.49
Z 9	3682368.0	436245.7	227.5	207.5	277.4	21	218.9	212.0	6.9	2.26	215.0	0.49
Z 20	3680240.5	435213.4	193.4	173.4	239.4	1	183.4	183.4	0.0	-	183.4	
Z 20B	3680241.3	435212.3	195.6	175.6	241.1	6	195.1	189.6	5.5	1.91	192.1	0.78
ZBG 1	3684777.5	440150.1	240.1	220.0	288.9	31	241.9	231.8	10.1	2.08	234.6	0.37
ZBG 1A	3684781.3	440153.0	281.0	276.0	287.8	7	282.6	276.2	6.4	2.35	279.6	0.89
ZBG 2	3685014.5	440689.6	230.9	210.9	275.8	33	226.3	217.8	8.5	2.52	221.9	0.44
ZDT 1	3683476.5	440920.4	247.0	227.0	263.0	27	241.6	238.7	2.9	0.73	240.0	0.14
ZDT 2	3683479.5	440897.5	245.1	225.1	263.1	27	243.3	240.3	3.0	0.85	241.5	0.16
ZW 2	3683784.3	436653.8	204.8	194.8	286.7	13	210.5	203.4	7.1	2.06	207.9	0.57
ZW 3	3684277.8	437308.3	205.1	194.6	257.9	13	204.4	198.2	6.2	1.87	201.2	0.52
ZW 4	3683425.5	437732.0	239.7	229.2	270.2	12	235.8	230.4	5.4	1.45	233.1	0.42
ZW 5	3682626.0	437617.4	231.0	221.0	273.5	17	230.3	225.3	5.0	1.24	227.5	0.30
ZW 6	3682244.0	436886.3	227.2	216.7	266.9	11	223.1	216.9	6.2	1.77	220.2	0.53
ZW 7	3682799.3	439599.0	264.8	254.5	270.1	12	268.0	263.6	4.4	1.54	266.0	0.44
ZW 9	3683193.3	439726.6	252.4	242.4	285.7	14	255.1	249.2	5.9	1.75	252.6	0.47
ZW 10	3683555.5	440217.0	252.2	242.2	297.6	19	263.4	245.6	17.8	3.95	250.6	0.91
NPM 2	3680130	440770	264.2	244.2	334.9	1	267	267				
NPM 3	3679389	440241	267.2	247.2	333.9	1	267.6	267.6				
NPM 4	3679409	440904	276.7	256.7	311.6	1	272.7	272.7				
NTS 2	3673765	440720	194.8	174.7	244.3	1	192.3	192.3				
NTS 1	3673374	440277	184.4	164.3	233.9	1	180.4	180.4				
NTW 3	3673867	438906	194.8	176.7	244.3	1	191.8	191.8				
NTW 4	3673606	439273	185.8	166	226.2	1	180.4	180.4				
NTW 2	3673354	438579	191.5	171.5	243.1	1	183.9	183.9				
NTW 1	3673385	438898	188.8	168.9	244.9	1	183.6	183.6				
NTN 2	3676803	438851	227.2	207.2	254.7	1	235.2	235.2				
NTN 1	3676361	438731	232.4	212.4	257.8	1	233.7	233.7				
NPN 1	3683283	443234	277.4	257.3	335	1	277.5	277.5				
NPN 2	3683761	443512	278	257.9	327.5	1	273.5	273.5				
NPN 3	3683458	442786	280.1	260	315.2	1	276.7	276.7				
NPN 4	3682987	443503	285.5	265.4	305.1	1	278.5	278.5				
EIS 1RP	3680880	443775			330	1	309	309				
EIS 2RP	3683585	447010			312	1	269	269				
EIS 3RP	3686555	449580			286	1	273	273				
EIS 4RP	3686175	455035			285	1	278	278				
EIS 5RP	3682680	450750			261	1	234	234				

OSR 14-357# (Rev 12-11-96)
Stores: 26-12501.00

Westinghouse Savannah River Company
Document Approval Sheet

DRS Code L0420

Document No. WSRC-TR-98-00045

Title: The regional water table of the Savannah River Site and related hydrologic coverages.

Primary Author/Contact (Must be WSRC)	Location	Phone No.	Position	User ID
R. A. Hiergesell	773-42A Rm 251	5-5219	Prin. Scientist	08649

Organization Code: L0420

Organization (No Abbreviations): Savannah River Technology Section / Environmental Restoration Technologies Section

Other Authors:

Deadline Date for Approval:

Has an invention disclosure been submitted related to this information? ☐ Yes ☒ No

Disclosure No. (If Known) ____ Title ____ Date Submitted ____

Do you intend to submit an invention disclosure? ☐ Yes ☐ No If yes, projected date ____

Information Product Description

☒ Report Type
- ☐ Quarterly ☐ Annual ☐ Final ☐ Other ____
- ☐ Semiannual ☒ Technical ☐ Topical
- Report Dates ____ thru ____

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- ☐ Abstract ☐ Published Proceedings
- ☐ Conf Paper ☐ Other ____
- ☐ Slides

☐ Journal Article (Journal Name) ____
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☐ Software (Additional forms are required (ESTSC F1 and F2)).

References: ☒ In Public Literature ☐ Routing Concurrently ☒ Approved for Release ☐ Other ____

Conference/Meeting/Presentation

Meeting Title (No Abbreviations)

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R.A. Hiergesell — Author's Signature — Date 2/7/98

Approvals by Author's Organization

Derivative Classifier	Classification	Topic	Distribution
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Classification (Check One for Each)

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Overall	☐	☐	☐	☒
Abstract	☐	☐	☐	☐
Title	☐	☐	☐	☐

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STI Program Use Only

UC/C Number	Routing	Editor
SC-54	Class/EC/DOE	

NOTE OSR 17-8 must be completed in addition to this form when submitting information for review and approval.

Keywords: Watertable
groundwater
perennial stream
hydrogeology

Westinghouse
Savannah River Company

P.O. Box 616
Aiken, SC 29802

October 28, 1998

WSRC-TR-98-00045
MSD-STI-97-3433

Ms. W. F. Perrin, Technical Information Officer
U. S. Department of Energy - Savannah River Operations Office

Dear Ms. Perrin:

REQUEST FOR APPROVAL TO RELEASE SCIENTIFIC/TECHNICAL INFORMATION

The attached document is submitted for classification and technical approvals for the purpose of external release. Please complete Part II of this letter and return the letter to the undersigned by 12/10/98. The document has been reviewed for classification and export control by a WSRC Classification staff member and has been determined to be Unclassified.

Pat Dominey for
Jeanne E. Sellers, WSRC STI Program Manager

I. DETAILS OF REQUEST FOR RELEASE

Document Number:	WSRC-TR-98-00045
Author's Name:	R. A. Hiergesell
Location:	773-42A, 251 Phone 5-5219
Department:	SRTC/ER
Document Title:	The Regional Water Table of the Savannah River Site and Related Coverages
Presentation/Publication:	
Meeting/Journal:	OSTI Reportable
Location:	
Meeting Date:	

II. DOE-SR ACTION

Date Received by TIO 10/29/98

- [X] Approved for Release
- [ ] Approved Upon Completion of Changes
- [ ] Approved with Remarks
- [ ] Not Approved
- [ ] Revise and Resubmit to DOE-SR

Remarks: ______

W. F. Perrin, Technical Information Officer, DOE-SR

1/5/99
Date

OSR 25-82-W# (4-89)
Stores: 26-15460.00

DOE F 241.1
(7-98) p. 1 of 2
(Formerly DOE F 1332.15)
(All other versions are obsolete)

OMB Control No. 1910-1400

US DEPARTMENT OF ENERGY

ANNOUNCEMENT OF U. S. DEPARTMENT OF ENERGY (DOE) SCIENTIFIC AND TECHNICAL INFORMATION (STI)

RECORD STATUS (select one):
X New ..... Revised Data ..... Revised STI Product

Part I: STI PRODUCT DESCRIPTION

A. STI PRODUCT TYPE (select one)

X 1. **Technical Report**
a. Type: ☐ **Topical** ☐ **Semiannual** ☐ **Annual** ☒ **Final** Other (**specify**) ......
b. Reporting Period *(mm/dd/yyyy,* ...... thru ......

..... 2. **Conference**
a. Product Type: ..... Conference Proceedings ..... Conference Paper or Other (*abstracts, excerpts, etc.*) ___
b. Conference Information (*title, location, dates*) ___

..... 3. **Software Manual** (*The actual software package should be made available simultaneously. Follow instructions provided with ESTSC F 1 and ESTSC F 2.*)

..... 4. **Journal Article**
a. Type: X Announcement citation only ___ Preprint ___ Postprint
b. Journal Name ......
c. Volume ___ d. Issue ___ e. Serial identifier (*e.g., ISSN or CODEN*) ___

..... 5. **S&T Accomplishment Report**

..... 6. **Book**

..... 7. **Patent Application**
a. Date Filed *(mm/dd/yyyy)* ___/___/___
b. Date Priority *(mm/dd/yyyy)* ___/___/___
c. Patent Assignee ___

..... 8. **Thesis/Dissertation**

B. STI PRODUCT TITLE The Regional Water Table of the Savannah River Site and Related Coverages

C. AUTHOR(s) R. A. Hiergesell
E-mail Address(*es*):

D. STI PRODUCT IDENTIFIER
___ 1. Report Number(*s*) WSRC-TR-98-00045
___ 2. DOE Contract Number(*s*) DE-AC09-96SR18500
___ 3. R&D Project ID(s) ___
___ 4. Other Identifying Number(*s*) ___

E. ORIGINATING RESEARCH ORGANIZATION Savannah River Site

F. DATE OF PUBLICATION *(mm/dd/yyyy)* 1/5/1999

G. LANGUAGE (*if non-English*) English

(*Grantees and Awardees: Skip to Description/Abstract section at the end of Part I*)

H. SPONSORING ORGANIZATION ___

I. PUBLISHER NAME AND LOCATION (if other than research organization) ___

Availability *(refer requests to [if applicable])*

J. SUBJECT CATEGORIES *(list primary one first)* 54

Keywords Water Table, Groundwater, Perennial Stream, Hydrogeology

K. DESCRIPTION/ABSTRACT

A new regional-scale map of the water table configuration beneath the Savannah River Site and its surrounding area has been developed. This map is regarded as a more accurate representation of this surface than all previous maps.

US DEPARTMENT OF ENERGY

ANNOUNCEMENT OF U. S. DEPARTMENT OF ENERGY (DOE) SCIENTIFIC AND TECHNICAL INFORMATION (STI)

DOE F 241.1 (p. 2 of 2)

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1. Medium of STI product is: X... Paper ...... Electronic document ...... Computer medium ...... Audiovisual material
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   b. If electronic document is transmitted to OSTI, indicate: ☐ **html** ☐ **pdfn** ☐ **pdfi** ☐ **msword**
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   ___ MS Word–indicate Version (5.0 or greater) _________ platform/operating system _________ ___ Postscript
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   c. Declassification date (mm/dd/yyyy) ___/___/_____
   d. Declassification Status:
      ___ Declassified ___ Sanitized ___ Never classified
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.... 6. **Small Business Technology Transfer** (*STTR*) Release date (mm/dd/yyyy) ....

.... 7. **Proprietary/Trade Secret**

.... 8. **Patent Pending**

.... 9. **Protected data** _____ CRADA _____Other (specify) ______________ Release date (mm/dd/yyyy) ....

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.... 11. **Program-Directed Special Handling** (*specify*) ______________

.... 12. **Export Control/ITAR/EAR**

.... 13. **Unclassified Controlled Nuclear Information** (*UCNI*) ______________

.... 14. **Classified** Classification Level/Category of:
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15. **Other information relevant to access** (*specify; for OSTI internal use only*) ______________

B. OTHER (*information useful to include in published announcement record which is not suited for any other field on this form*)

C. CONTACT AND RELEASING OFFICIAL

1.Contact (*if appropriate, the organization or site contact to include in published citations who would receive any external questions about the content of the STI Product or the research information contained therein*)

Name and/or Position Kevin Schmidt, Manager STI Program & Site Support
E-mail ______________ Phone (803) 725-2765
Organization Westinghouse Savannah River Company

2. Releasing Official X I verify that all necessary reviews have been completed (e.g. Patent, Copyright, ECI, UCNI, etc.)

Released by (*name*) Kevin Schmidt Date (*mm/dd/yyyy*) 1/5/1999
E-Mail ______________ Phone ______________ (803) 725-2765