Derivative Classifier: DBMoore

May 19, 1989

To: J. L. Steele, 773-42A

From: R. L. Nichols, 773-42A RLN

Program Plan for TNX Area Groundwater Characterization Wells (U)

Site Hydrogeology

The TNX Area post-Cretaceous hydrogeological section consists of an unconfined aquifer in recent to Pliestocene age sediments and a confined aquifer in tertiary aged sediments. The unconfined aquifer is a local water bearing reservoir and will not be correlated to a specific statigraphic unit at this time. Depth to the water table ranges from 25 feet at the New TNX Seepage Basin to 50 feet at the Old TNX Seepage Basin. The unconfined aquifer is 45 - 50 feet thick and outcrops in the swamp to the west of TNX. The hydraulic gradient in the unconfined aquifer decreases westerly across the TNX Area from 0.05 to 0.01. The unconfined aquifer is separated from the underlying confined aquifer by a sandy silt aquitard (A1) which is approximately 5 - 10 feet thick. Bledsoe (1989) reported an increase in hydraulic head across this unit of approximately 8 feet which results in an upward gradient between the unconfined and confined aquifer.

The confined Tertiary aquifer (C1) at TNX is 25 - 30 feet thick and can generally be found 60 to 90 feet below the surface. The C1 aquifer is part of the aquifer commonly refered to as the "Congaree" which occurs in the Congaree Formation. The C1 aquifer lies on the Lower Tertiary aquitard (A2) which is 45 - 55 feet thick and is commonly refered to as the " Ellenton Formation". Currently there is an upward gradient across A2 with a head differential of 28 feet, Bledsoe (1989). Regional hydrogeolgic models indicate that the C1 aquifer discharges to the Savannah River producing westward groundwater flow in C1.

Proposed Monitoring Wells

Unconfined

Nine monitoring wells will be installed in the unconfined aquifer to characterize groundwater flow and chemistry in the TNX Area. Seven of the proposed monitoring wells (TNX 1D - 7D) will be screened in the top of the unconfined aquifer with at least 5 feet of the screen above the water table. The remaining 2 wells (XSB 1B, TBG 5B) will be screened in the lower portion of the unconfined aquifer. Figures 1 and 2 illustrate the screen locations for unconfined wells. Table 1 lists well identification numbers, SRP coordinates, estimated depth, and screen intervals for each well.

Confined

Two monitoring wells (XSB 1A, TBG 5A) will be installed in the confined aquifer C1. Figures 1 and 2 illustrate the screen locations for both wells in the C1 aquifer. Table 1 lists well identification numbers, SRP coordinates, Lat Lon coordinates, estimated depth, and screen intervals for each well. The wells screened in C1 will be used to assess vertical gradients within the TNX area and groundwater chemistry.

Aquifer Test Wells

Two, 6" wells (P26 DP and P26 AP) will be installed at the P26 well cluster for use as pumping wells in aquifer tests. Wells in the P26 cluster will serve as observation wells in the pump test. One of the pumping wells will be screened over the entire unconfined aquifer and the other well will be screened over the entire C1 aquifer. Figures 1 and 2 illustrate the screen locations for both wells. Table 1 lists well identification numbers, SRP coordinates, estimated depth, and screen intervals for each well.

Well Points

Nine well points will be installed in the TNX Swamp. Each well point will be constructed of 2" 316 Stainless steel casing and screen. 10' screens will be used in all well points and the top of the screen will be installed above the water table whenever possible. Table 1 lists well identification numbers, SRP coordinates, estimated depth, and screen intervals for each well.

Drilling

The seven water table wells (TNX 1D-7D) will be augured to locate the water table and then completed using mud rotary techniques. All drilling procedures will comply with DPSOP 254 Chapter V Section A.

Wells installed below the water table (TBG 5A,B, XSB 1A,B, and P26 DP,AP) according DPSOP Chapter 5 Section B. The deepest well in each cluster will be drilled and completed first.

Well points will be installed manually using an end drive technique. Well points installed by the end drive technique require that the points have a drive plate so that the driving force is only applied on point and the screen and casing is pulled into place, see figure 3. Once the well point has been installed, standard DPSOP 254 concrete pads will be installed around the casing. The concrete pad dimensions will be modified to 3' X 3' X 0.5' to accommodate the smaller pumps that will be installed.

All wells will be goephysically logged prior to completion using the following tools: SP, Gamma Ray, Caliper, Single Point Resistivity, Long and Short Normal Resistivity. Geophysical logs should be available in hardcopy form immediately to facilitate screen zone selection and digital copies of the geophysical logs must be available within one week.

Development

The drilling contractor will have 1 drilling crew and 1 developing crew available for this project. Development of wells will begin within 4 days of installation of each well. Prompt development of the water table wells is necessary to ensure that the wells are thoroughly developed. After the wells have been developed pumps will be installed.

Sampling Pumps

Standard Grundfos 1/2 horsepower pumps will be installed in all of the monitoring wells. The well points will be sampled using dedicated bladder pumps.

Technical Oversight

Technical oversight will be performed by one of the approved task order environmental consultants.

Schedule

Installation of the proposed MLHWMF water table monitoring wells is scheduled to begin as soon as all of the appropriate approvals have been obtained. Results from the first round of samples collected from the new wells should be available by July 1989.

Safety

Standard Savannah River Site safety procedures for well installation, as described in DPSOP 254, will be followed.

Quality Assurance / Quality Control

The QA/QC methods for drilling presented in DPSOP 254 will be followed.

Table 1: TNX Area Proposed Monitoring Wells

Well ID	SRS Coordinates North	East	Latitude	Longitude	Surface Elevation	Water Table Elevationm	Depth to Water Table	Well Depth
TNX Area Wells								
TNX 1D	71615	16700	33.21137	81.76185	150	98	52	67
TNX 2D	71425	16800	33.21112	81.76122	154	98	56	71
TNX 3D	71235	17000	33.21102	81.76033	153	98	55	70
TNX 4D	71015	17210	33.21088	81.75935	148	101	47	62
TNX 5D	71020	17355	33.21113	81.75898	147	105	42	57
TNX 6D	70800	17390	33.21070	81.75846	147	105	42	57
TNX 7D	71738	17081	33.21227	81.76109	147	100	47	62
Well Clusters								
TBG 5A	71216	17354	33.21156	81.75936	152	NA	NA	105
TBG 5B	71206	17354	33.21154	81.75934	152	NA	NA	88
XSB 1A	71104	16973	33.21069	81.76014	145	NA	NA	97
XSB 1B	71104	16963	33.21067	81.76017	145	NA	NA	80
Pump Test Production Wells								
P26 DP	71980	18050	33.21439	81.75901	153	NA	NA	92
P26 AP	71980	18060	33.21440	81.75899	153	NA	NA	142
TNX Well Points								
TWP 1	70600	16165	33.20826	81.76129	99	99	NA	15
TWP 2	70800	16165	33.20870	81.76168	101	101	NA	15
TWP 3	71000	16165	33.20914	81.76207	100	100	NA	15
TWP 4	71200	16165	33.20958	81.76245	99	99	NA	15
TWP 5	71400	16165	33.21002	81.76284	100	100	NA	15
TWP 6	71600	16165	33.21047	81.76323	98	98	NA	15
TWP 7	71000	15965	33.20881	81.76259	96	96	NA	15
TWP 8	71000	15765	33.20849	81.76312	95	95	NA	15
TWP 9	71000	15565	33.20816	81.76364	95	95	NA	15

Figure 1: Geophysical Log for TNX-SB2

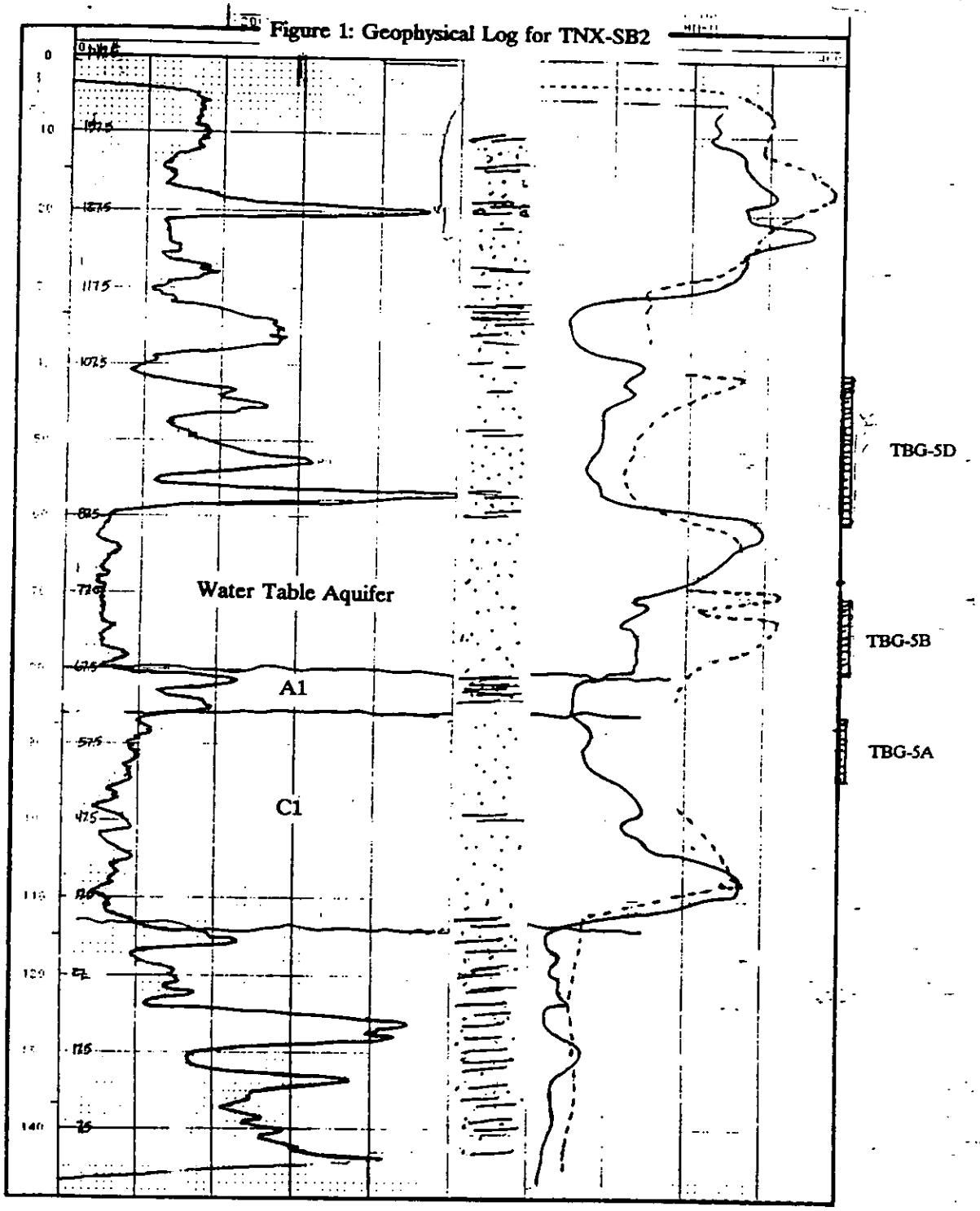
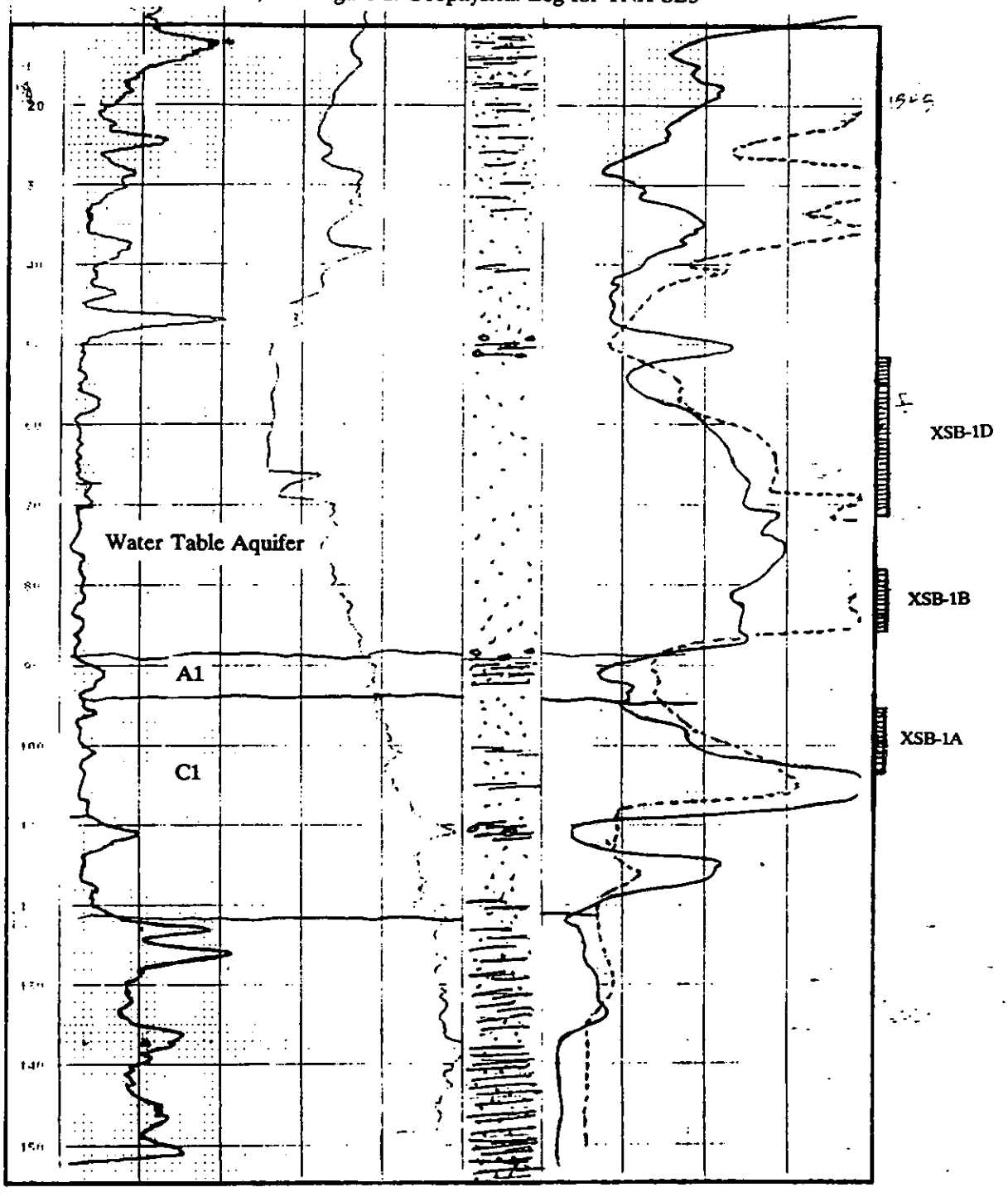
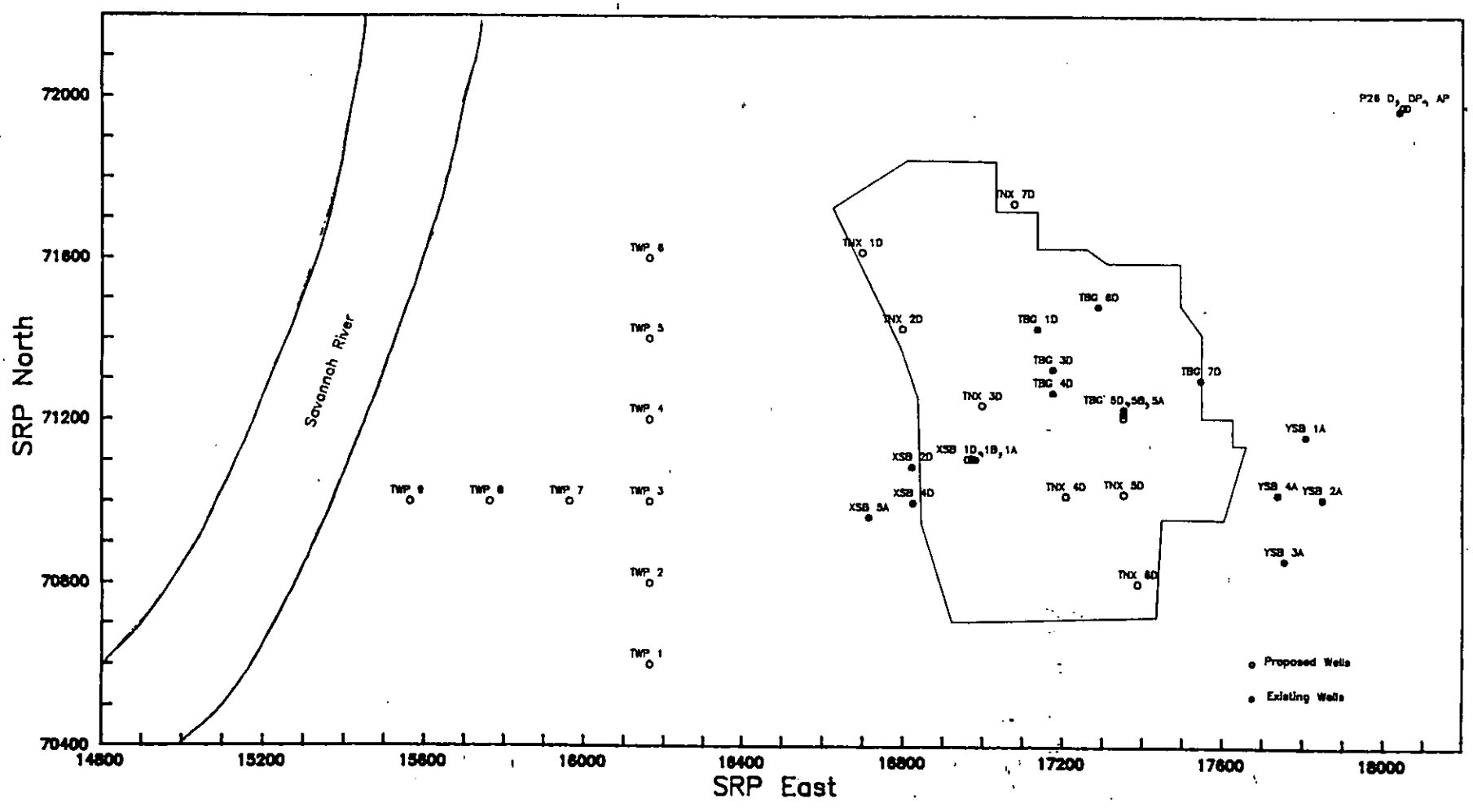


Figure 2: Geophysical Log for TNX-SB3



TNX Area Groundwater Monitoring Well Locations



WSRC-RP-89-269

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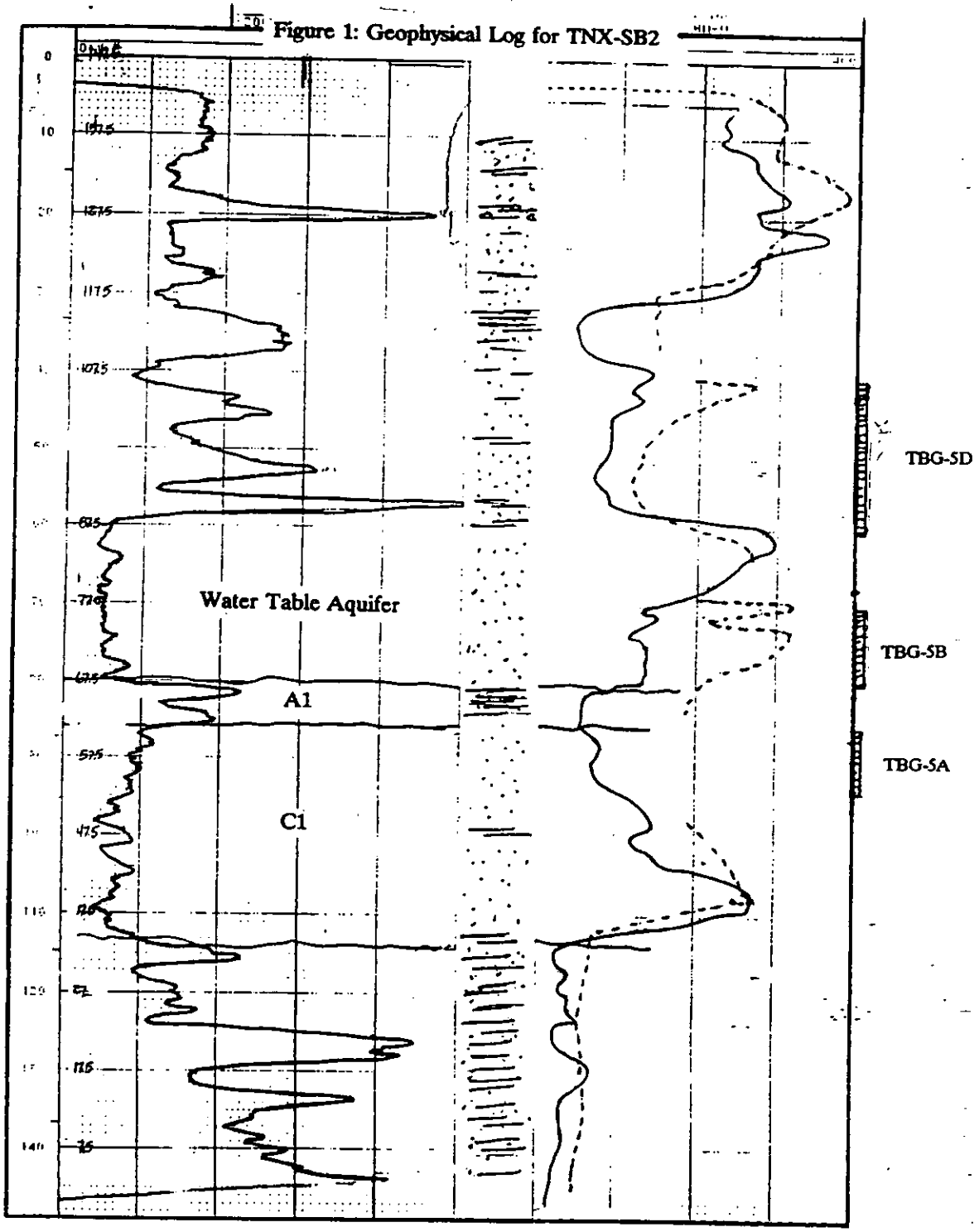
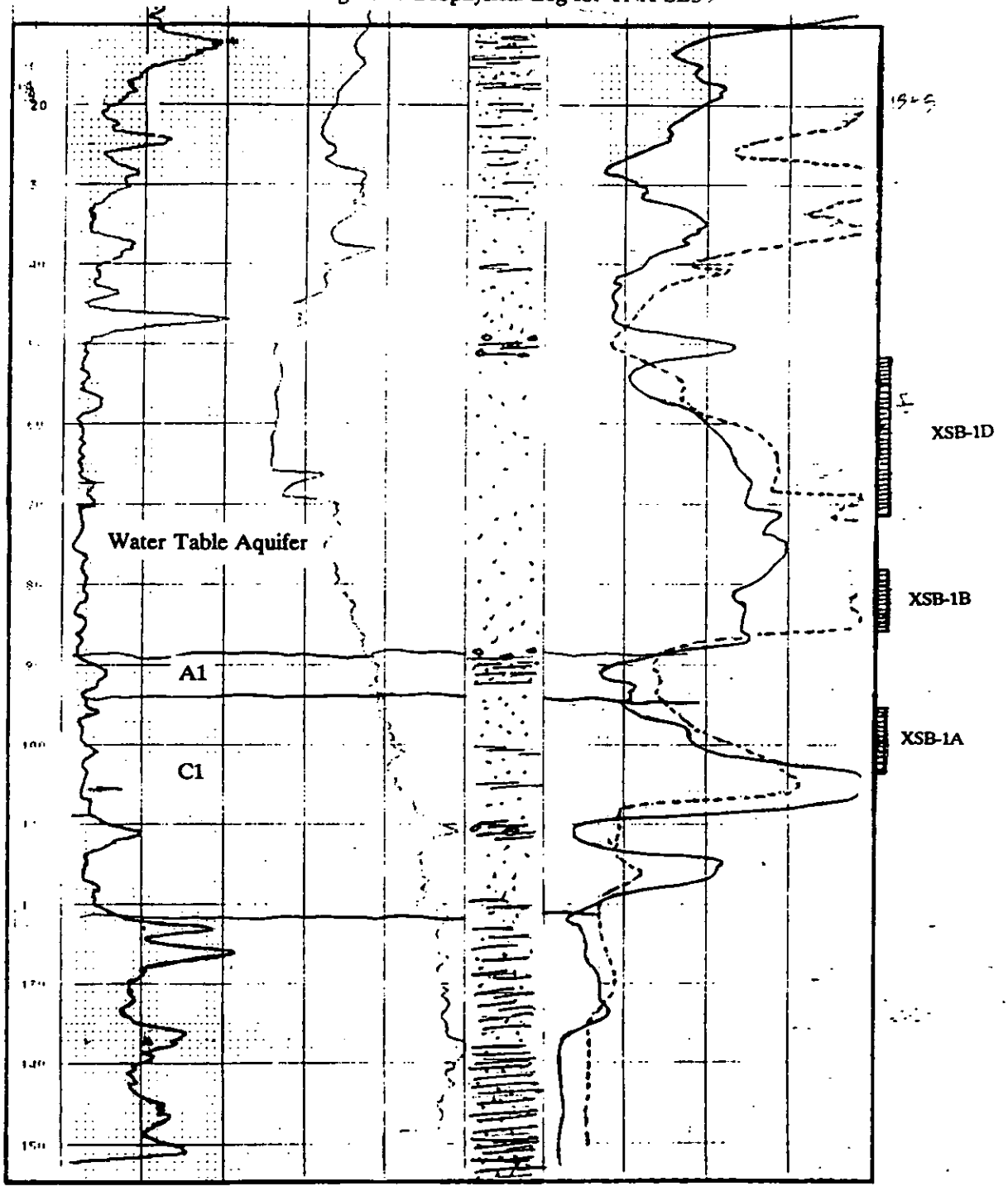


Figure 2: Geophysical Log for TNX-SB3



TNX Area Groundwater Monitoring Well Locations