Sampling Methodology

Samples are collected from monitoring wells using either dedicated Teflon® well bailers or bladder pumps. (Dedicated bailers are equipped with Teflon® -coated stainless steel leaders.)

The method of collection depends on well construction, water depth, and the water-yielding characteristics of the well. Bailers are used in wells with low standing water volume; bladder pumps are used in wells with good water-yielding characteristics.

To ensure that only representative groundwater is sampled, three well volumes are removed (purged) from the well before the actual samples are collected. If three well volumes cannot be removed because of limited recharge, purging the well to dryness provides sufficient purging. Conductivity and pH are measured before sampling and after sampling, if sufficient water is still available, to confirm the geochemical stability of the groundwater during sampling.

The bailer, a tube with a check valve at the bottom and the top, is lowered into the well until it reaches the desired point in the water column. The bailer is lowered slowly to ensure that the water column is not agitated and is then withdrawn from the well with a sample and emptied into a sample container. The bailer, bailer line, and bottom-emptying device used to drain the bailer are dedicated to the well, i.e., are used exclusively for that well at all times.

Bladder pumps use compressed air to gently squeeze a Teflon® bladder that is encased in a stainless steel tube located near the bottom of the well. When the pressure is released, new groundwater flows into the bladder. A series of check valves ensures that the water flows only in one direction. The drive air is always separated from the sample and is expelled to the surface by a separate line.

Bladder pumps reduce mixing and agitation of the water in the well. Each bladder pump system is dedicated to an individual well to reduce the likelihood of sample contamination from external materials or cross contamination. The compressor and air control box can be used from well to well because they do not contact the sample.

Immediately after the samples are collected they are put into a cooler and returned to the Project's Environmental Laboratory. The samples are preserved with chemicals, if necessary, and stored under controlled conditions to minimize chemical and/or biological changes after sample collection. The samples are then either packaged for expedited delivery to an off-site contract laboratory or kept in controlled storage to await on-site testing.

Table 3-2
Groundwater Monitoring Network: Super Solid Waste Management Units

SSWMUs and Constituent SWMUs	*Well ID Number*	*Hydrogeologic Unit Monitored*[1]	*Analytes Measured in 1996*[2]	*Well Position in SSWMU*[3]	*Well Depth (ft) Below Grade*
SSWMU #1 - Low-level Waste Treatment Facilities:					
	*103**	*S*	*G,M*	*D*	*21.0*
• *Former Lagoon 1*	*104*	*S*	*G,M,SV,V*	*U*	*23.0*
• *LLWTF Lagoons*	*105*	*S*	*G,M,V*	*D*	*28.0*
• *LLWTF Building*	*106*	*S*	*G,M,V*	*D*	*14.5*
• *Interceptors*	*107*	*T*	*G,M,V*	*D*	*28.0*
• *Neutralization Pit*	*108*	*T*	*G,M,V*	*D*	*33.0*
	109	*T*	*p*	*D*	*33.0*
	*110**	*T*	*G,M,V*	*D*	*33.0*
	*111**	*S*	*G, S, SV,M,V*	*D*	*11.0*
	114	*T*	*p*	*D*	*29.0*
	115	*T*	*p*	*U*	*28.0*
	*116**	*S*	*G,M, S,V*	*U*	*11.0*
	8604	*S*	*G,M,V*	*U*	*22.6*
	*8605**	*S*	*G, S,SV,M,V*	*D*	*12.0*
	WNSP008	*French Drain Monitoring Point*	*V*		
SSWMU #2 - Miscellaneous Small Units:					
	201	*S*	*M*	*U*	*20.0*
• *Sludge Ponds*	*202*	*TS*	*p*	*U*	*38.0*
• *Solvent Dike*	*203*	*S*	*p*	*D*	*18.0*
• *Equalization Mixing Basin*	*204**	*TS*		*U*	*43.0*
• *Paper Incinerator*	*205*	*S*	*M*	*D*	*11.0*
	206	*TS*		*D*	*37.8*
	207	*S, (T)*	*p*	*D*	*11.0*
	208	*TS*	*V*	*D*	*23.0*
	8606	*S*	*p*	*D*	*12.1*

** Monitoring for certain parameters is required by the RCRA 3008(h) Order on Consent.*

[1] Hydrogeologic units monitored are: WT (weathered Lavery till); T (unweathered Lavery till); S (sand and gravel); K (Kent recessional sequence); TS (till-sand). Units enclosed in parentheses indicate the hydrogeologic unit is only a secondary monitoring unit.

[2] See Table 3-1 for a description of codes and analytes. The parameters listed in this table, Table 3-2, are in addition to the contamination indicator parameters (I) and radiological indicator parameters (RI) routinely scheduled for 1996.

p: Analytical monitoring discontinued after May 1995. Well measured for potentiometric (water-level) data only.

[3] Well position in SSWMU: U (upgradient); D (downgradient); B (background); C (crossgradient).

Table 3-2 *(continued)*
Groundwater Monitoring Network: Super Solid Waste Management Units

SSWMUs and Constituent SWMUs	*Well ID Number*	*Hydrogeologic Unit Monitored*[1]	*Analytes Measured in 1996*[2]	*Well Position in SSWMU*[3]	*Well Depth (ft) Below Grade*
SSWMU #3 - Liquid Waste Treatment System:					
	*301**	*S*	*M*	*B*	*16.0*
• *Liquid Waste Treatment System*	*302*	*TS*	*M*	*U*	*28.0*
• *Cement Solidification System*	*305*	*S*	*p*	*D*	*31.0*
• *Main Process Bldg. (specific areas)*	*307*	*S*	*p*	*D*	*16.0*
	NB1S	*S, (WT)*	*M*	*B*	*13.0*
SSWMU #4 - HLW Storage and Processing Area:					
	*401**	*S, (T)*	*M,R*	*B*	*16.0*
• *Vitrification Facility*	*402*	*TS*		*U*	*29.0*
• *Vitrification Test Tanks*	*403*	*S*	*M,V*	*U*	*13.0*
• *HLW Tanks*	*404*	*TS*	*p*	*U*	*36.5*
• *Supernatant Treatment System*	*405*	*T*		*C*	*12.5*
	*406**	*S*	*M,R,V*	*D*	*16.8*
	*408**	*S*	*M,R,V*	*D*	*38.0*
	409	*T*		*D*	*55.0*
SSWMU #5 - Maintenance Shop Leach Field:					
	*501**	*S*	*M,S,V*	*U*	*33.0*
• *Maintenance Shop Leach Field*	*502**	*S*	*M,S,SM,V*	*D*	*18.0*

** Monitoring for certain parameters is required by the RCRA 3008(h) Order on Consent.*

[1] *Hydrogeologic units monitored are: WT (weathered Lavery till); T (unweathered Lavery till); S (sand and gravel); K (Kent recessional sequence); TS (till-sand). Units enclosed in parentheses indicate the hydrogeologic unit is only a secondary monitoring unit.*

[2] *See Table 3-1 for a description of codes and analytes. The parameters listed in this table, Table 3-2, are in addition to the contamination indicator parameters (I) and radiological indicator parameters (RI) routinely scheduled for 1996.*

p: Analytical monitoring discontinued after May 1995. Well measured for potentiometric (water-level) data only.

[3] *Well position in SSWMU: U (upgradient); D (downgradient); B (background); C (crossgradient).*

Table 3-2 (continued)
Groundwater Monitoring Network: Super Solid Waste Management Units

SSWMUs and Constituent SWMUs	*Well ID Number*	*Hydrogeologic Unit Monitored*[1]	*Analytes Measured in 1996*[2]	*Well Position in SSWMU*[3]	*Well Depth (ft) Below Grade*
SSWMU #6 - Low-level Waste Storage Area:					
	601	S	p	D	6.0
• Hardstands (old & new)	602	S	M,S	D	13.0
• Lag Storage	603	S	p	U	13.0
• Lag Storage Additions	604	S	M	D	11.0
(LSAs 1, 2, 3, 4)	605	S, (T)	M,S	D	11.0
	8607*	S	M,S	U	17.6
	8608	S	P	U	19.0
	8609*	S	M,S,V	U	24.7
SSWMU #7 - CPC Waste Storage Area:					
	701	TS	p	U	28.0
• CPC Waste Storage Area	702	T	p	C	38.0
	703	T	p	D	21.0
	704	T	M,V	D	15.5
	705	T	p	C	21.0
	706	S	M	B	11.0
	707	T, (WT)	M	D	11.0
SSWMU #8 - Construction and Demolition Debris Landfill					
	801*	S	G,M,S,V	U	17.5
• Former Construction and Demolition	802	S, (T)	G,M,V	D	11.0
Debris Landfill	803*	S	G,M,SV,V	D	18.0
	804*	S	G,M,V	D	9.0
	8603*	S	G,M S,R	U	24.8
	8612*	S	G,M,SV,V	D	18.1

* Monitoring for certain parameters is required by the RCRA 3008(h) Order on Consent.

[1] Hydrogeologic units monitored are: WT (weathered Lavery till); T (unweathered Lavery till); S (sand and gravel); K (Kent recessional sequence); TS (till-sand). Units enclosed in parentheses indicate the hydrogeologic unit is only a secondary monitoring unit.

[2] See Table 3-1 for a description of codes and analytes. The parameters listed in this table, Table 3-2, are in addition to the contamination indicator parameters (I) and radiological indicator parameters (RI) routinely scheduled for 1996.

p: Analytical monitoring discontinued after May 1995. Well measured for potentiometric (water-level) data only.

[3] Well position in SSWMU: U (upgradient); D (downgradient); B (background); C (crossgradient).

Table 3-2 *(continued)*
Groundwater Monitoring Network: Super Solid Waste Management Units

SSWMUs and Constituent SWMUs	*Well ID Number*	*Hydrogeologic Unit Monitored*[1]	*Analytes Measured in 1996*[2]	*Well Position in SSWMU*[3]	*Well Depth (ft) Below Grade*
SSWMU #9 - NRC-licensed Disposal Area:					
	*901**	*K, (T)*	*M*	*U*	*136.0*
• *NRC-licensed Disposal Area*	*902**	*K, (T)*	*M*	*U*	*128.0*
• *Container Storage Area*	*903**	*K, (T)*	*M*	*D*	*133.0*
• *Trench Interceptor Project*	*904*	*T*	*p*	*D*	*26.0*
	905	*S*	*p*	*D*	*23.0*
	*906**	*WT*	*M*	*D*	*10.0*
	907	*WT, (T)*	*p*	*D*	*16.0*
	*908**	*WT, (T)*	*M*	*U*	*21.0*
	*909**	*WT, (T)*	*E,M,R*	*D*	*23.0*
	*910**	*T*	*M*	*D*	*29.6*
	*8610**	*K*		*D*	*114.0*
	*8611**	*K*	*M*	*D*	*120.0*
	*NDATR**	*Interceptor Trench Manhole Sump*	*E,R*	*D*	

** Monitoring for certain parameters is required by the RCRA 3008(h) Order on Consent.*

[1] Hydrogeologic units monitored are: WT (weathered Lavery till); T (unweathered Lavery till); S (sand and gravel); K (Kent recessional sequence); TS (till-sand). Units enclosed in parentheses indicate the hydrogeologic unit is only a secondary monitoring unit.

[2] See Table 3-1 for a description of codes and analytes. The parameters listed in this table, Table 3-2, are in addition to the contamination indicator parameters (I) and radiological indicator parameters (RI) routinely scheduled for 1996.

p: Analytical monitoring discontinued after May 1995. Well measured for potentiometric (water-level) data only.

[3] Well position in SSWMU: U (upgradient); D (downgradient); B (background); C (crossgradient).

Table 3-2 (continued)
Groundwater Monitoring Network: Super Solid Waste Management Units

SSWMUs and Constituent SWMUs	*Well ID Number*	*Hydrogeologic Unit Monitored*[1]	*Analytes Measured in 1996*[2]	*Well Position in SSWMU*[3]	*Well Depth (ft) Below Grade*
SSWMU #10 - IRTS Drum Cell:					
	1001	*K, (T)*	*p*	*U*	*116.0*
• *IRTS Drum Cell*	*1002*	*K, (T)*	*p*	*D*	*113.0*
• *Background (south plateau)*	*1003*	*K*	*p*	*D*	*138.0*
	1004	*K, (T)*	*p*	*D*	*108.0*
	*1005**	*WT, (T)*	*M*	*U*	*19.0*
	*1006**	*WT, (T)*	*M*	*D*	*20.0*
	1007	*WT, (T)*		*D*	*23.0*
	1008B	*K, (T)*	*M*	*B*	*51.0*
	*1008C**	*WT, (T)*	*M*	*B*	*18.0*
SSWMU #11 - State-licensed Disposal Area:					
	1101A	*WT, (T)*	*See*	*U*	*16.0*
• *State-licensed Disposal Area (SDA)[NYSERDA]*	*1101B*	*T*	*Appendix F*	*U*	*30.0*
	1101C	*K*		*U*	*110.0*
	1102A	*WT, (T)*		*D*	*17.0*
NOTE: The SDA is sampled by NYSERDA under an independent monitoring program	*1102B*	*T*		*D*	*31.0*
	1103A	*WT, (T)*		*D*	*16.0*
	1103B	*T*		*D*	*26.0*
	1103C	*K*		*D*	*111.0*
	1104A	*WT, (T)*		*D*	*19.0*
	1104B	*T*		*D*	*36.0*
	1104C	*K*		*D*	*114.0*
	1105A	*WT, (T)*		*D*	*21.0*
	1105B	*T*		*D*	*36.0*
	1106A	*K*		*U*	*16.0*
	1106B	*T*		*U*	*31.0*
	1107A	*T*		*D*	*19.0*
	1108A	*WT, (T)*		*U*	*16.0*
	1109A	*T*		*U*	*16.0*
	1109B	*WT, (T)*		*U*	*31.0*
	1110A	*WT, (T)*		*D*	*20.0*
	1111A	*WT, (T)*		*D*	*21.0*

** Monitoring for certain parameters is required by the RCRA 3008(h) Order on Consent.*

[1] Hydrogeologic units monitored are: WT (weathered Lavery till); T (unweathered Lavery till); S (sand and gravel); K (Kent recessional sequence); TS (till-sand). Units enclosed in parentheses indicate the hydrogeologic unit is only a secondary monitoring unit.

[2] See Table 3-1 for a description of codes and analytes. The parameters listed in this table, Table 3-2, are in addition to the contamination indicator parameters (I) and radiological indicator parameters (RI) routinely scheduled for 1996.

p: Analytical monitoring discontinued after May 1995. Well measured for potentiometric (water-level) data only.

[3] Well position in SSWMU: U (upgradient); D (downgradient); B (background); C (crossgradient).

Table 3 - 2 (concluded)
Groundwater Monitoring Network: Super Solid Waste Management Units

SSWMUs and Constituent SWMUs	*Well ID Number*	*Hydrogeologic Unit Monitored*[1]	*Analytes Measured in 1996*[2]	*Well Position in SSWMU*[3]	*Well Depth (ft) Below Grade*
Motor Fuel Storage Area (Monitors underground storage tanks. Not a SSWMU.)	*R8613A*	*S, (T)*	*p*	*C*	*8.0*
	R8613B	*S*	*p*	*C*	*8.0*
	R8613C	*S*	*p*	*D*	*6.5*

Main Plant Area Well Points (Monitor groundwater in various locations north and east of the main plant)	*Well Point ID Number*	*Hydrogeologic Unit Monitored*[1]	*Sampling Agenda*	*Well Depth (ft) Below Grade*
	WP-A	*S*	*RI*	*33*
	WP-C	*S*	*RI*	*23*
	WP-D	*S*	*RI*	*26*
	WP-E	*S*	*RI*	*22*
	WP-F	*S*	*RI*	*36*
	WP-G	*S*	*RI*	*34*
	WP-H	*S*	*RI*	*17*

North Plateau Groundwater Seeps (Monitor groundwater emanating from seeps along the north plateau edge. Not in a SSWMU.)	*Seep ID Number*	*Hydrogeologic Unit Monitored*	*Sampling Agenda*
	SP02	*S*	*RI*
	SP04	*S*	*RI*
	SP05	*S*	*RI*
	SP06	*S*	*RI*
	SP11	*S*	*RI*
	SP12	*S*	*I, RI, V*
	SP18	*S*	*RI*
	SP23	*S*	*RI*
	GSEEP	*S*	*G, M, V*

** Monitoring for certain parameters is required by the RCRA 3008(h) Order on Consent.*

[1] Hydrogeologic units monitored are: WT (weathered Lavery till); T (unweathered Lavery till); S (sand and gravel); K (Kent recessional sequence); TS (till-sand). Units enclosed in parentheses indicate the hydrogeologic unit is only a secondary monitoring unit.

[2] See Table 3-1 for a description of codes and analytes. The parameters listed in this table, Table 3-2, are in addition to the contamination indicator parameters (I) and radiological indicator parameters (RI) routinely scheduled for 1996.

p: Analytical monitoring discontinued after May 1995. Well measured for potentiometric (water-level) data only.

[3] Well position in SSWMU: U (upgradient); D (downgradient); B (background); C (crossgradient).

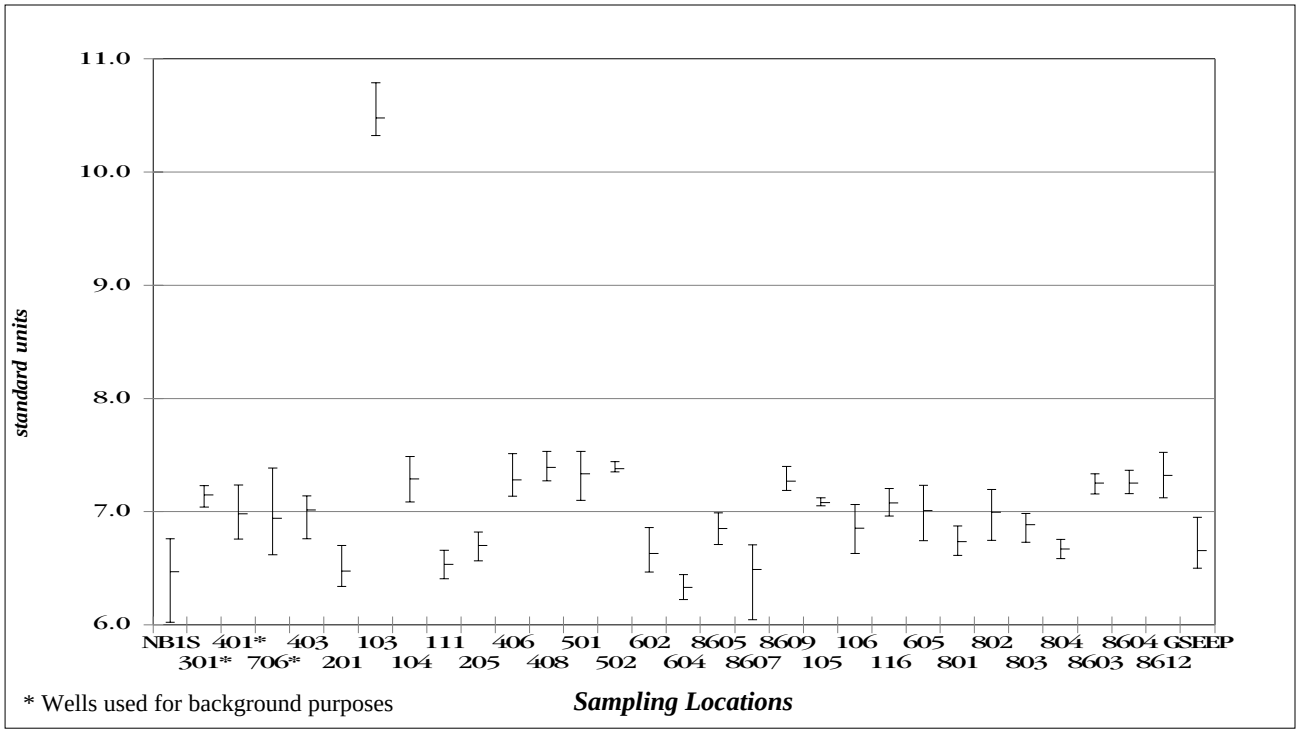

Figure 3-7. pH in Groundwater Samples from the Sand and Gravel Unit

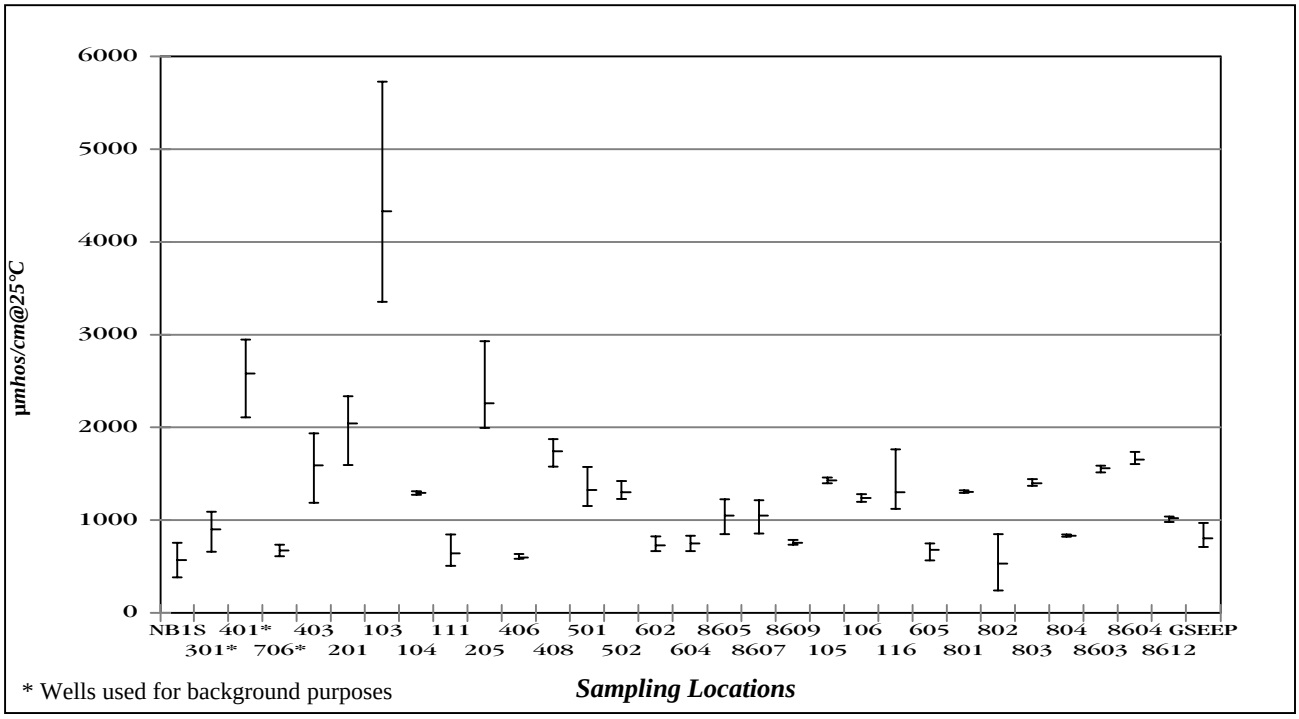

Figure 3-8. Conductivity in Groundwater Samples from the Sand and Gravel Unit

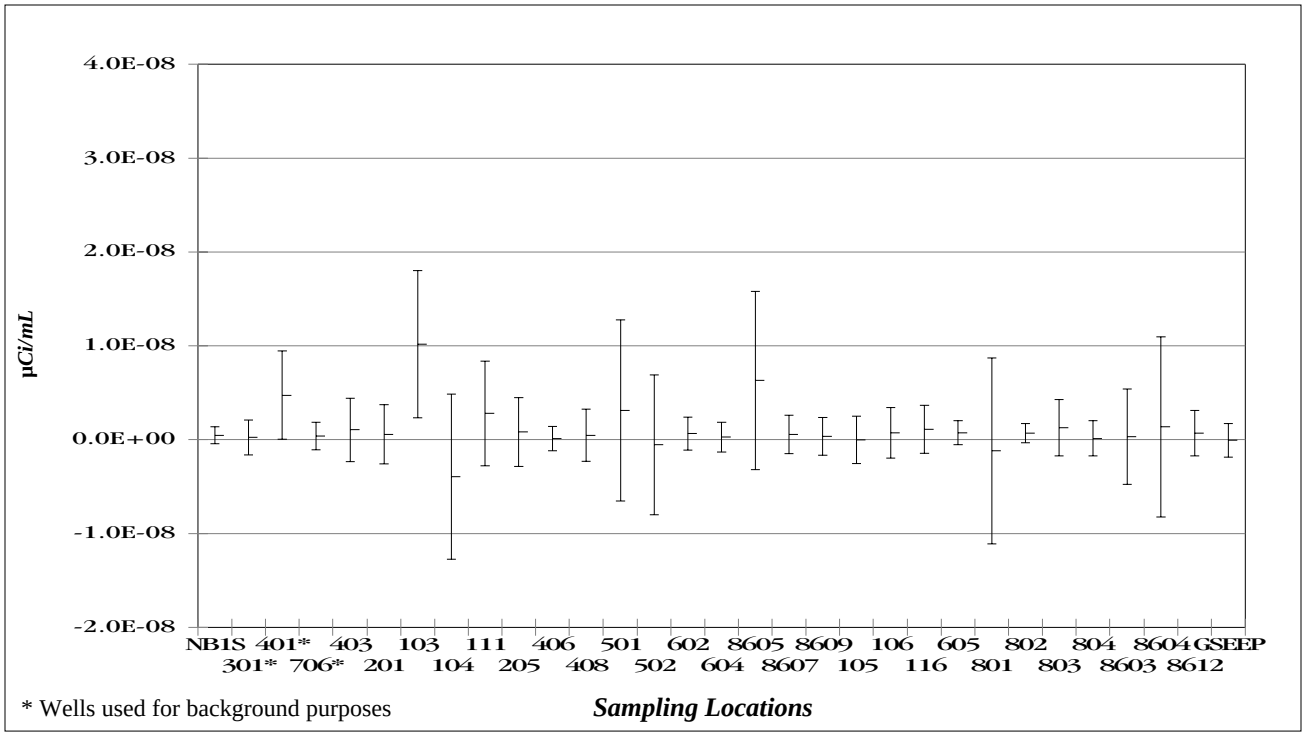

Figure 3-9. Gross Alpha in Groundwater Samples from the Sand and Gravel Unit

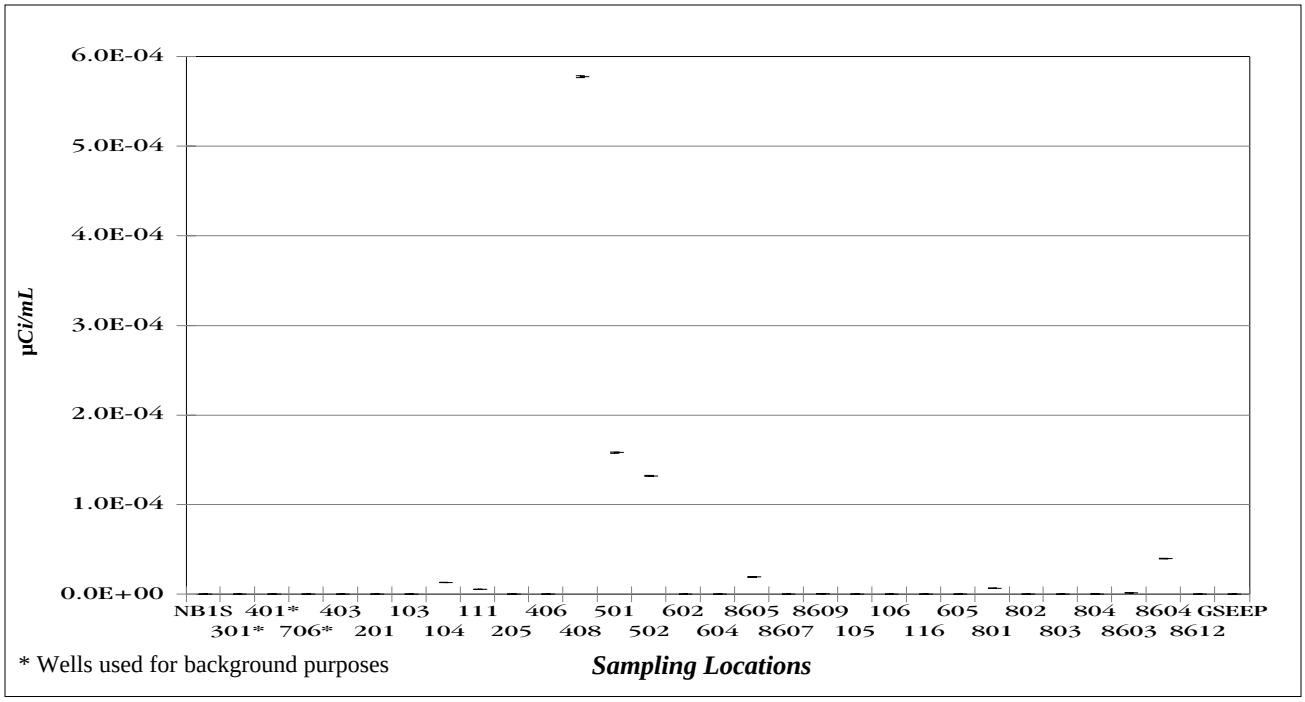

Figure 3-10. Gross Beta in Groundwater Samples from the Sand and Gravel Unit
(Figs. 3-10a and 3-10b follow with magnified scale.)

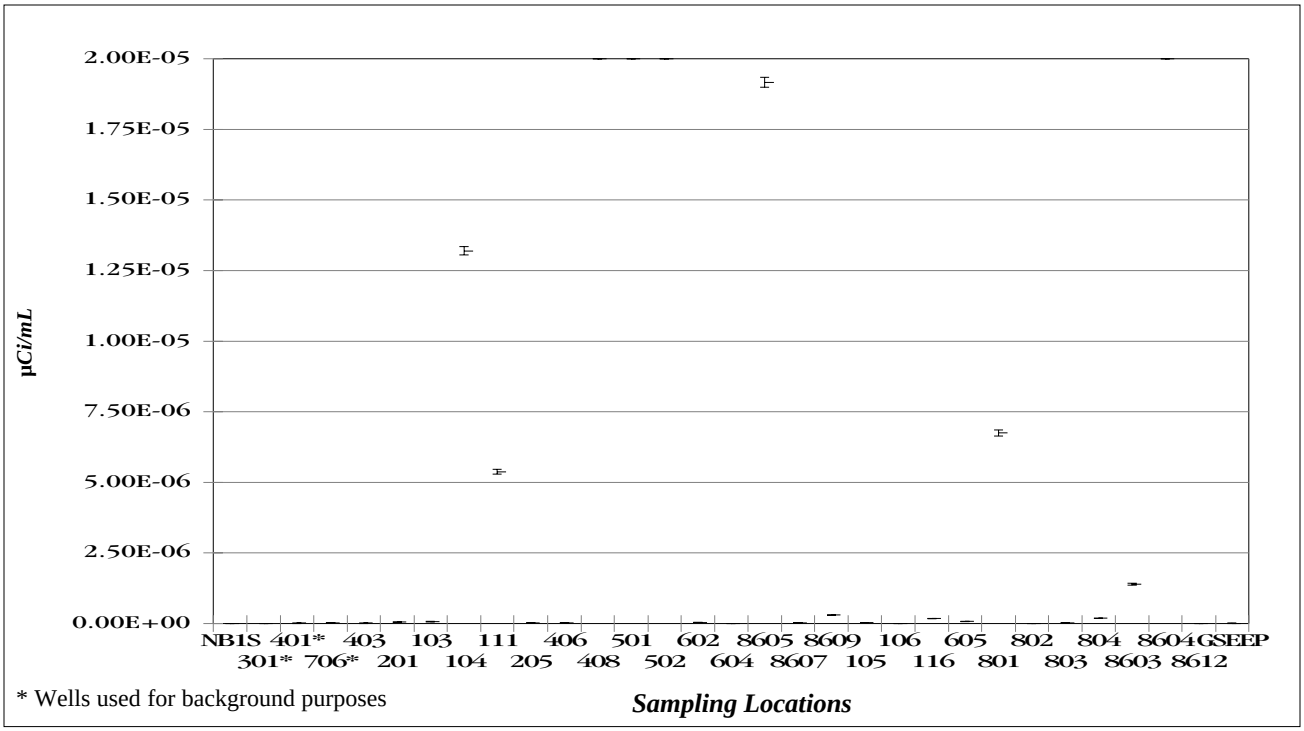

Figure 3-10a. Gross Beta in Groundwater Samples from the Sand and Gravel Unit (magnified scale of Fig. 3-10)

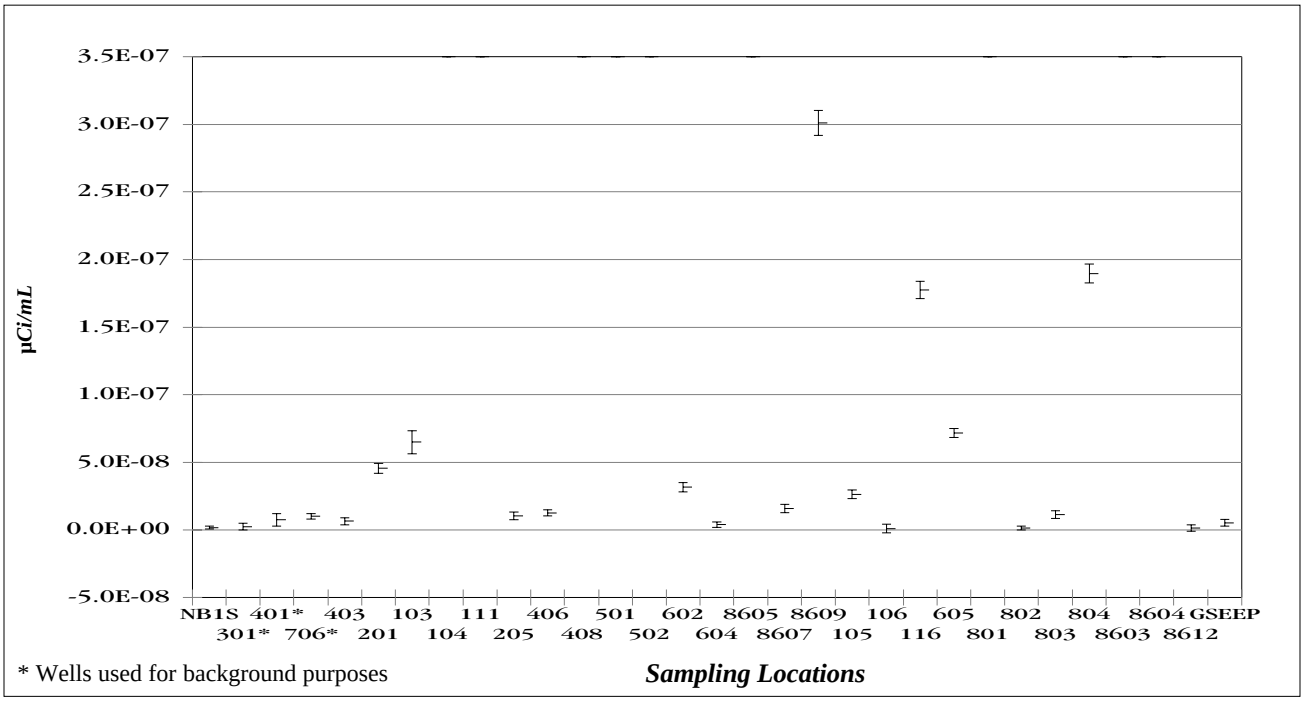

Figure 3-10b. Gross Beta in Groundwater Samples from the Sand and Gravel Unit (magnified scale of Fig. 3-10a)

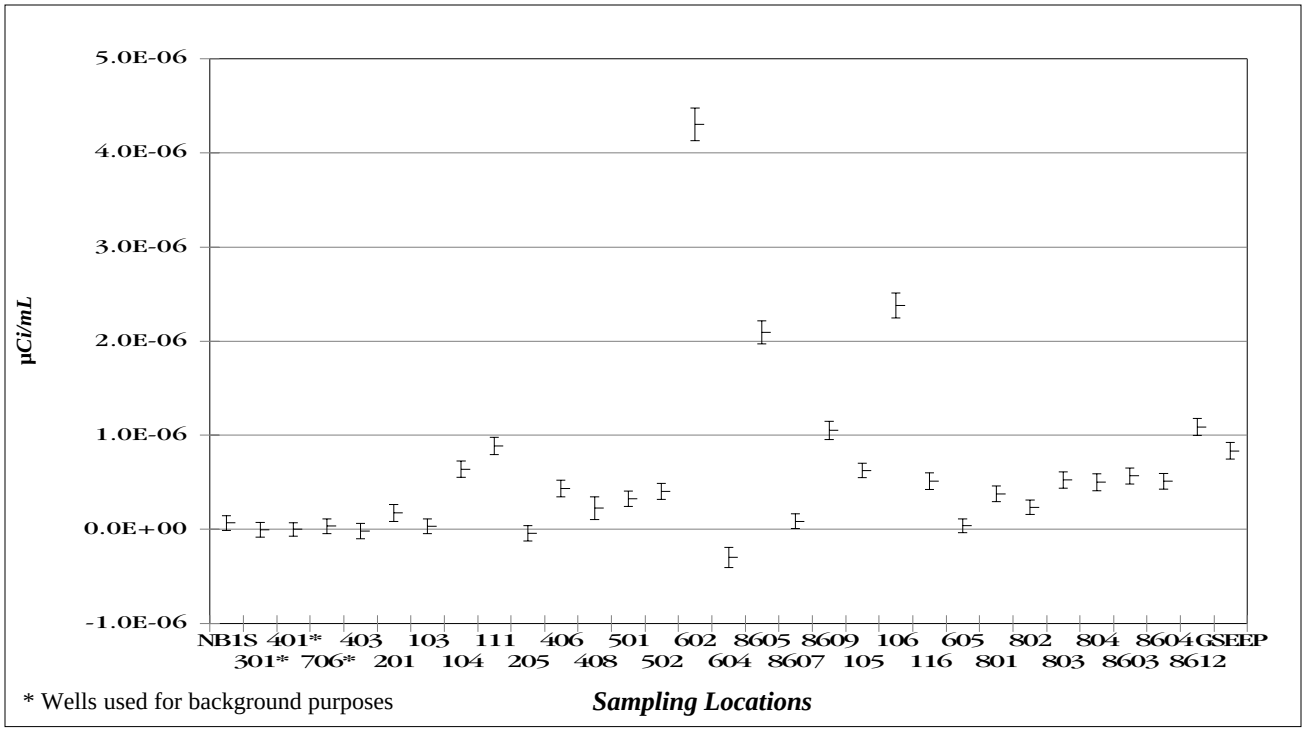

Figure 3-11. Tritium Activity in Groundwater Samples from the Sand and Gravel Unit (Fig. 3-11a follows with magnified scale.)

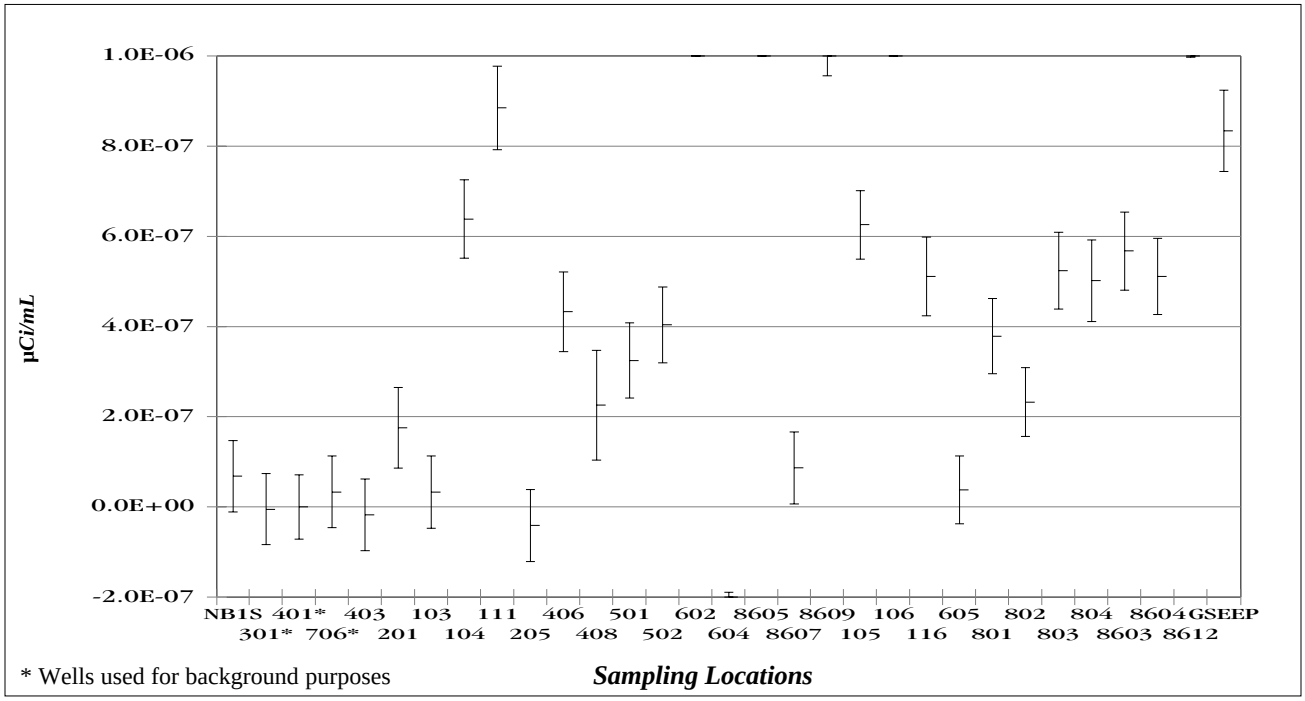

Figure 3-11a. Tritium Activity in Groundwater Samples from the Sand and Gravel Unit (magnified scale of Fig. 3-11)

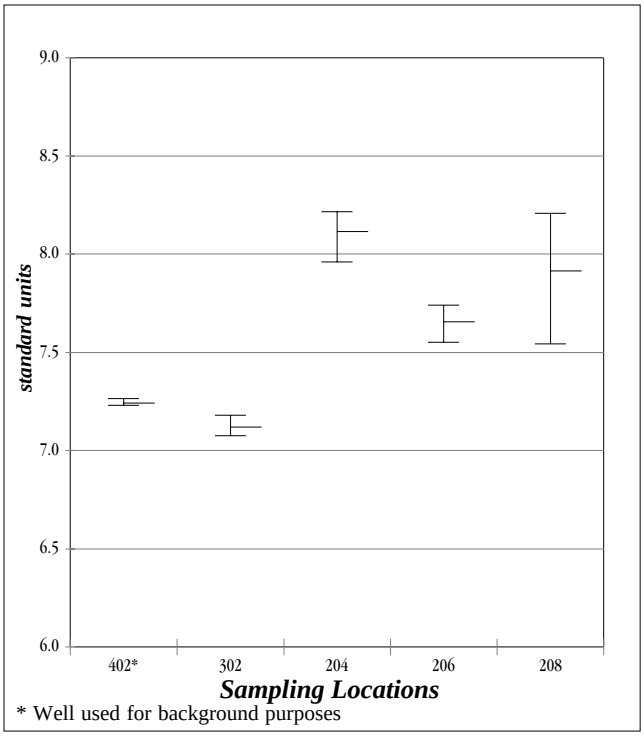

Figure 3-12. pH of Groundwater Samples from the Till-Sand Unit

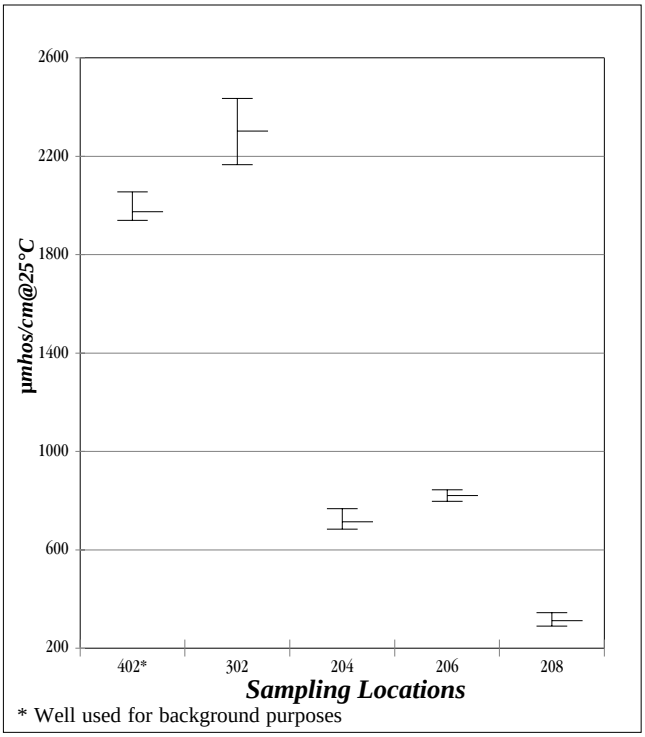

Figure 3-13. Conductivity of Groundwater Samples from the Till-Sand Unit

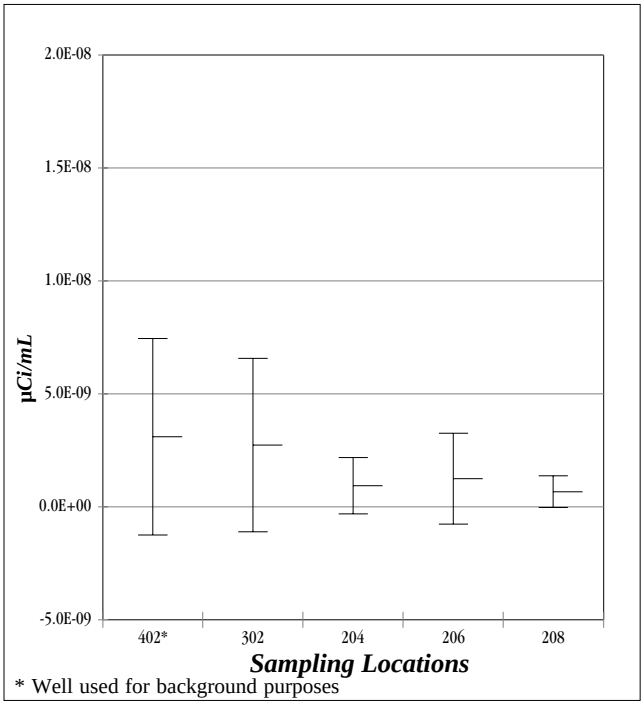

Figure 3-14. Gross Alpha in Groundwater Samples from the Till-Sand Unit

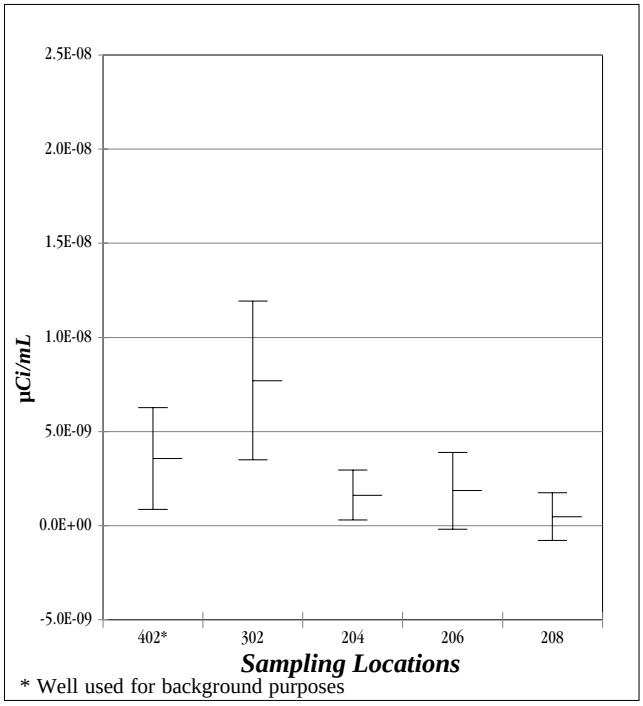

Figure 3-15. Gross Beta in Groundwater Samples from the Till-Sand Unit

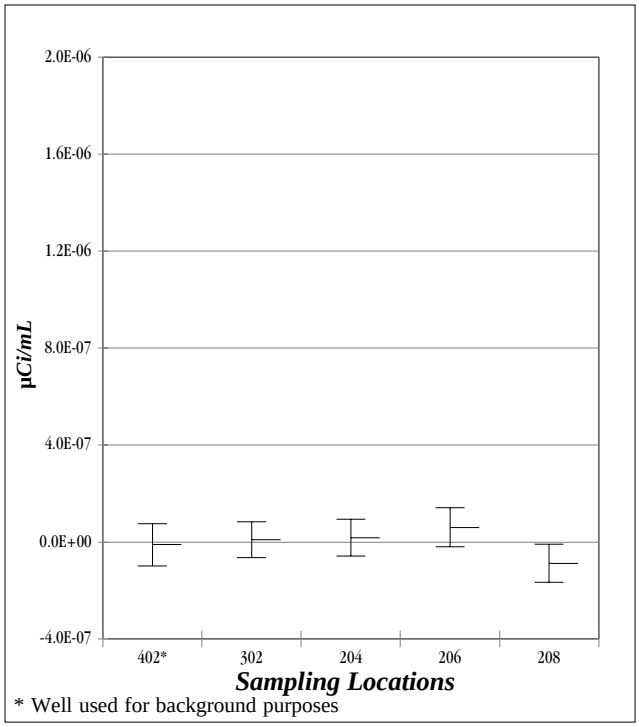

Figure 3-16. Tritium Activity in Groundwater Samples from the Till-Sand Unit

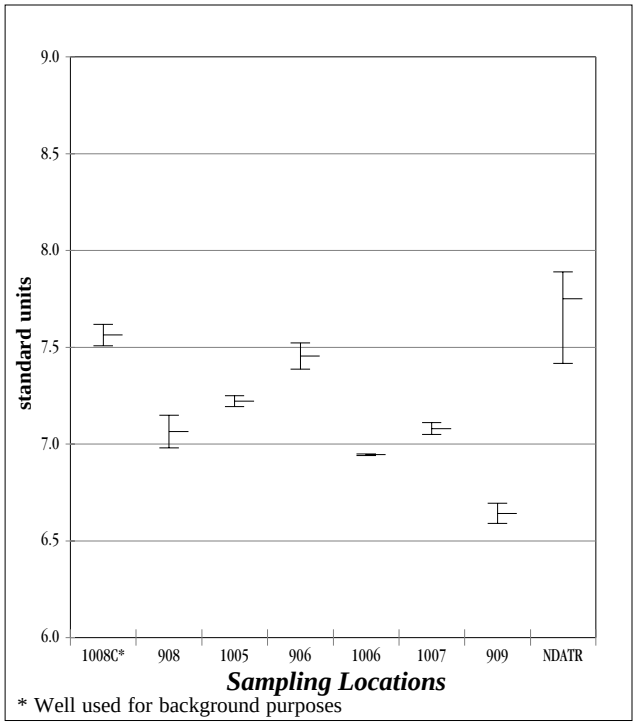

Figure 3-17. pH of Groundwater Samples from the Weathered Lavery Till Unit

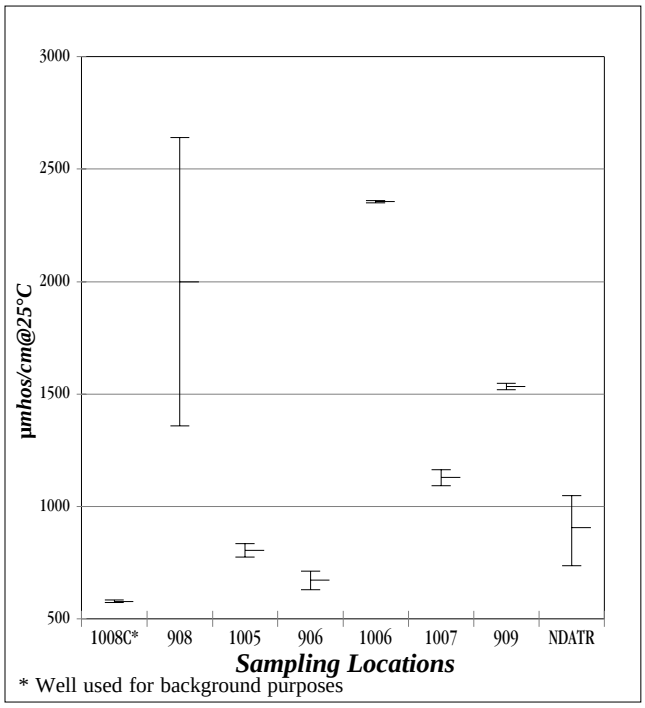

Figure 3-18. Conductivity of Groundwater Samples from the Weathered Lavery Till Unit

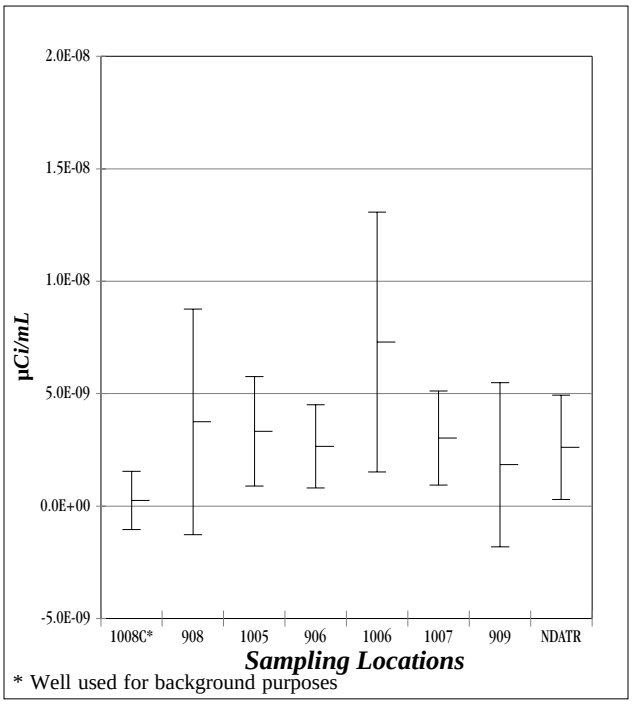

Figure 3-19. Gross Alpha in Groundwater Samples from the Weathered Lavery Till Unit

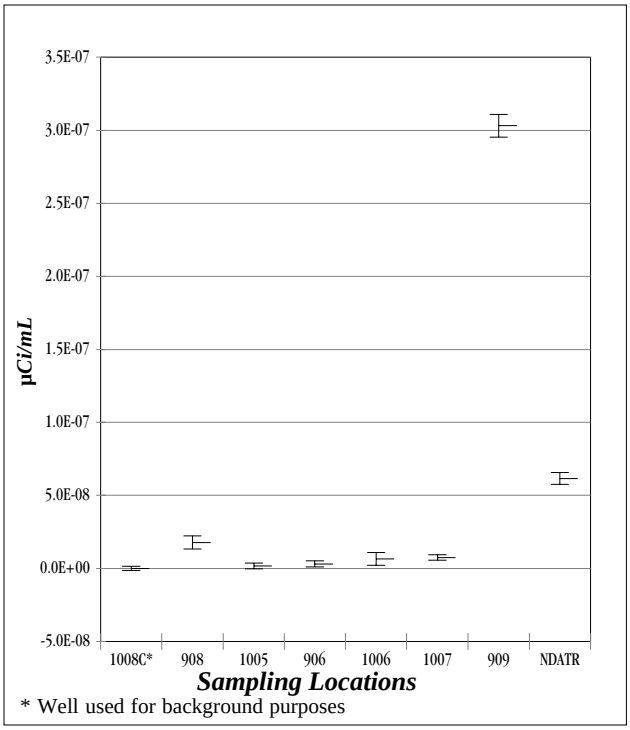

Figure 3-20. Gross Beta in Groundwater Samples from the Weathered Lavery Till Unit (Fig. 3-20a follows with magnified scale)

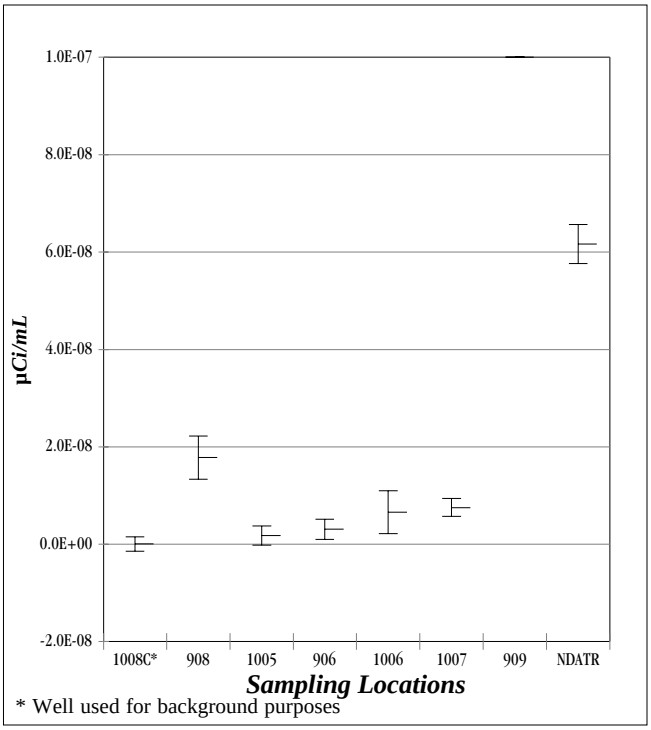

Figure 3-20a. Gross Beta in Groundwater Samples from the Weathered Lavery Till Unit (magnified scale of Fig. 3-20)

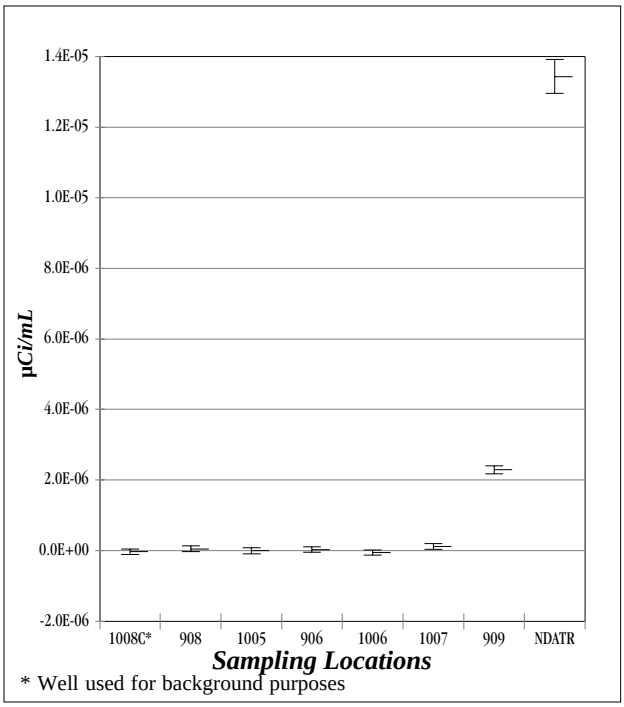

Figure 3-21. Tritium Activity in Groundwater Samples from the Weathered Lavery Till Unit (Fig. 3-21a follows with magnified scale)

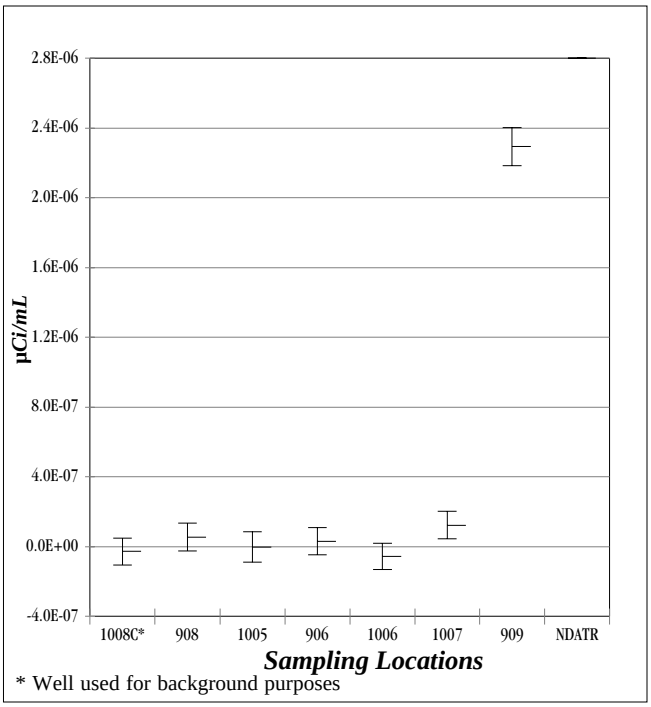

Figure 3-21a. Tritium Activity in Groundwater Samples from the Weathered Lavery Till Unit (magnified scale of Fig. 3-21)

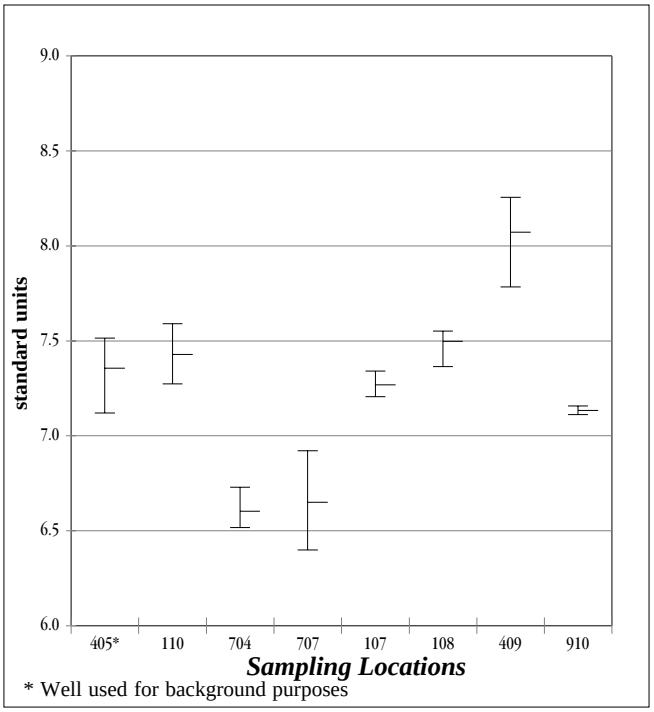

Figure 3-22. pH of Groundwater Samples from the Unweathered Lavery Till Unit

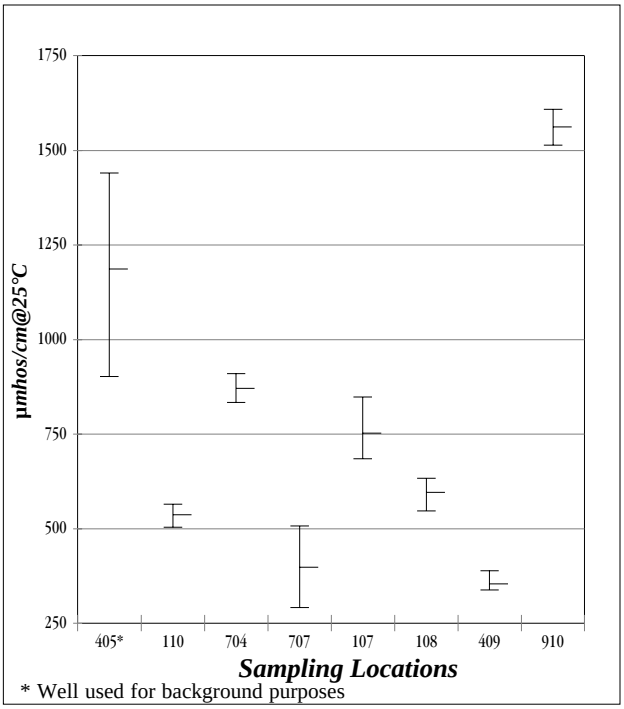

Figure 3-23. Conductivity of Groundwater Samples from the Unweathered Lavery Till Unit

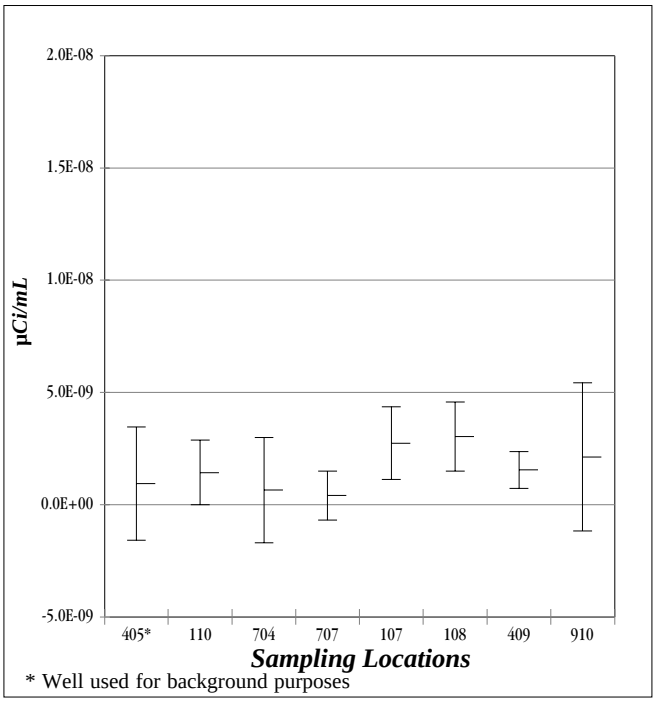

Figure 3-24. Gross Alpha in Groundwater Samples from the Unweathered Lavery Till Unit

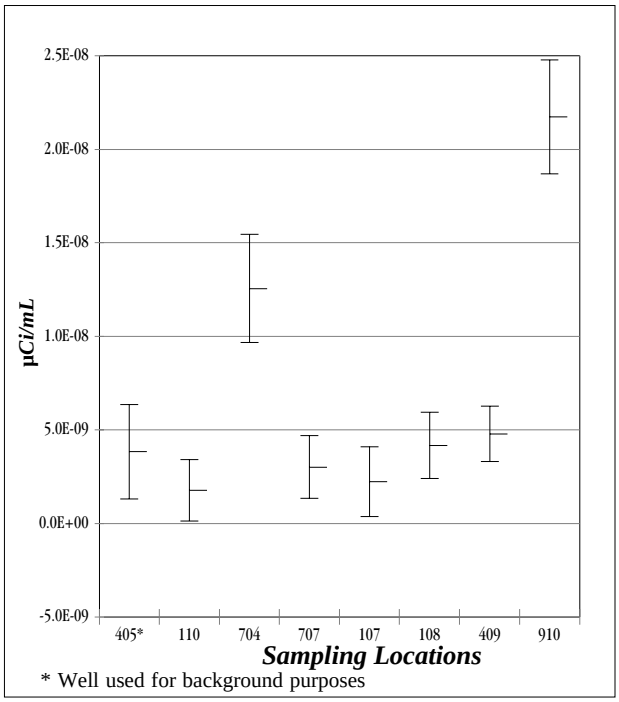

Figure 3-25. Gross Beta in Groundwater Samples from the Unweathered Lavery Till Unit

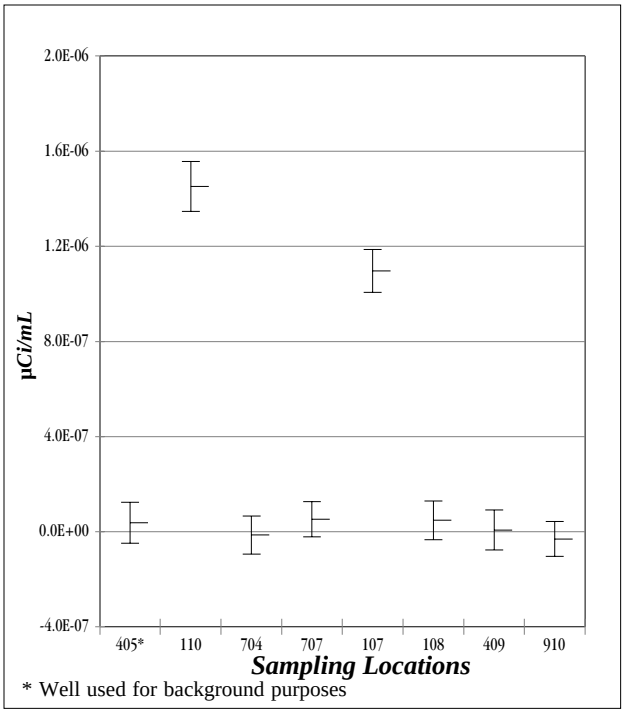

Figure 3-26. Tritium Activity in Groundwater Samples from the Unweathered Lavery Till Unit

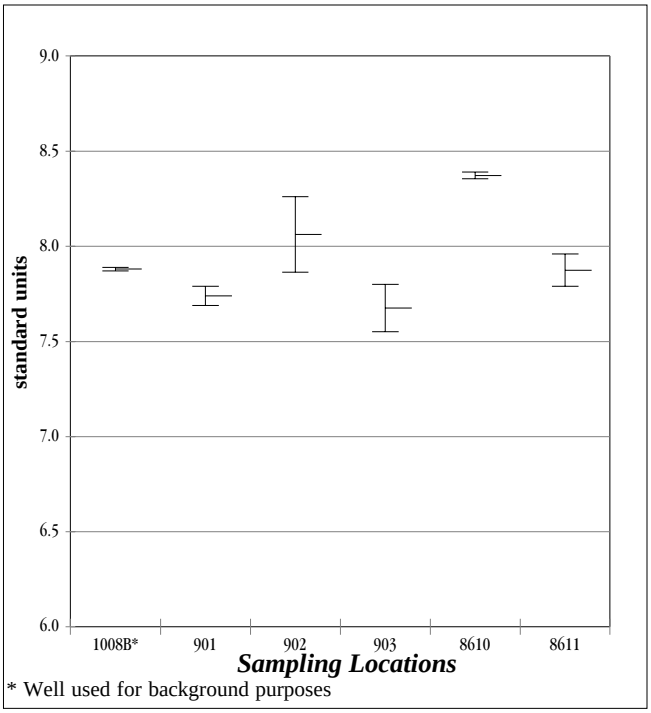

Figure 3-27. pH of Groundwater Samples from the Kent Recessional Sequence

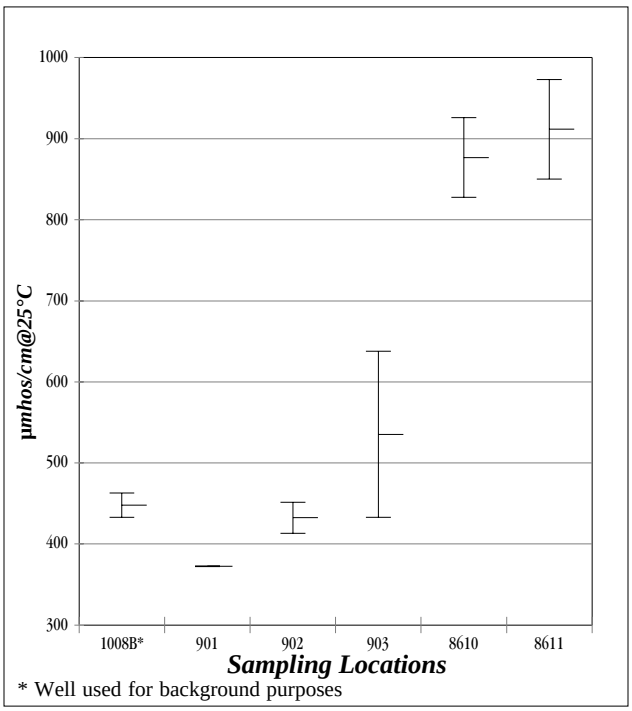

Figure 3-28. Conductivity of Groundwater Samples from the Kent Recessional Sequence

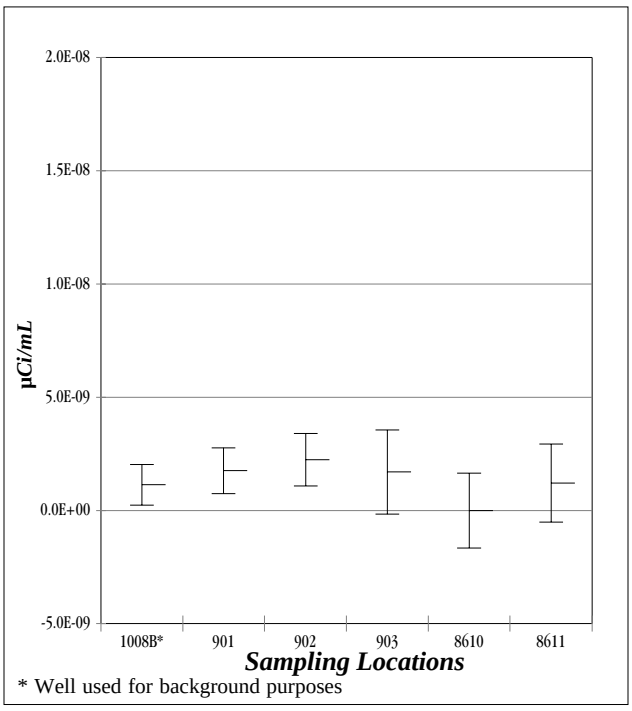

Figure 3-29. Gross Alpha in Groundwater Samples from the Kent Recessional Sequence

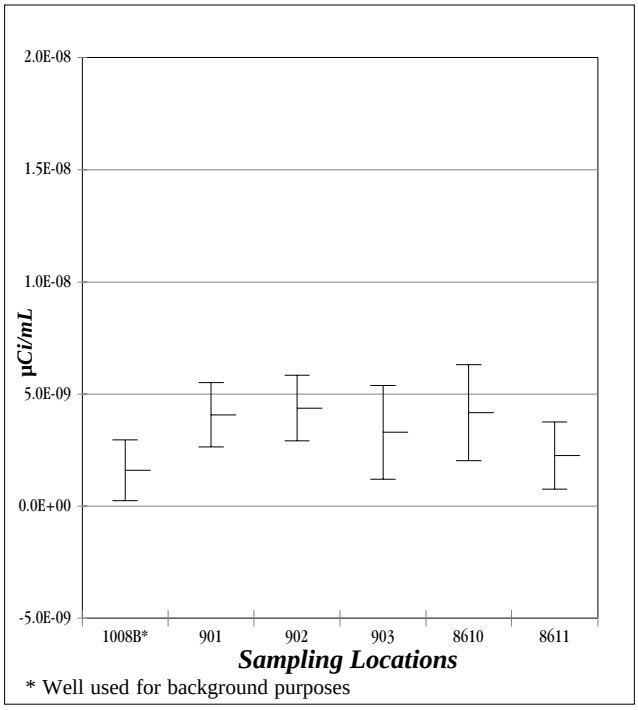

Figure 3-30. Gross Beta in Groundwater Samples from the Kent Recessional Sequence

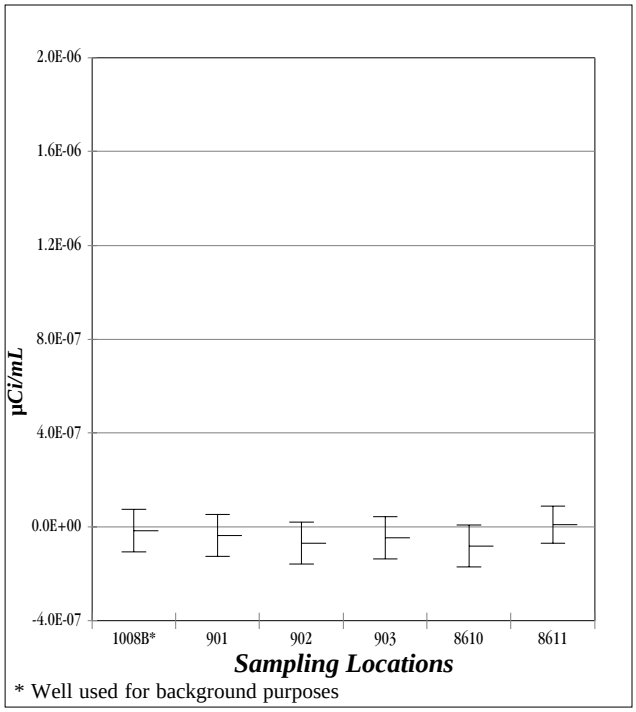

Figure 3-31. Tritium Activity in Groundwater Samples from the Kent Recessional Sequence

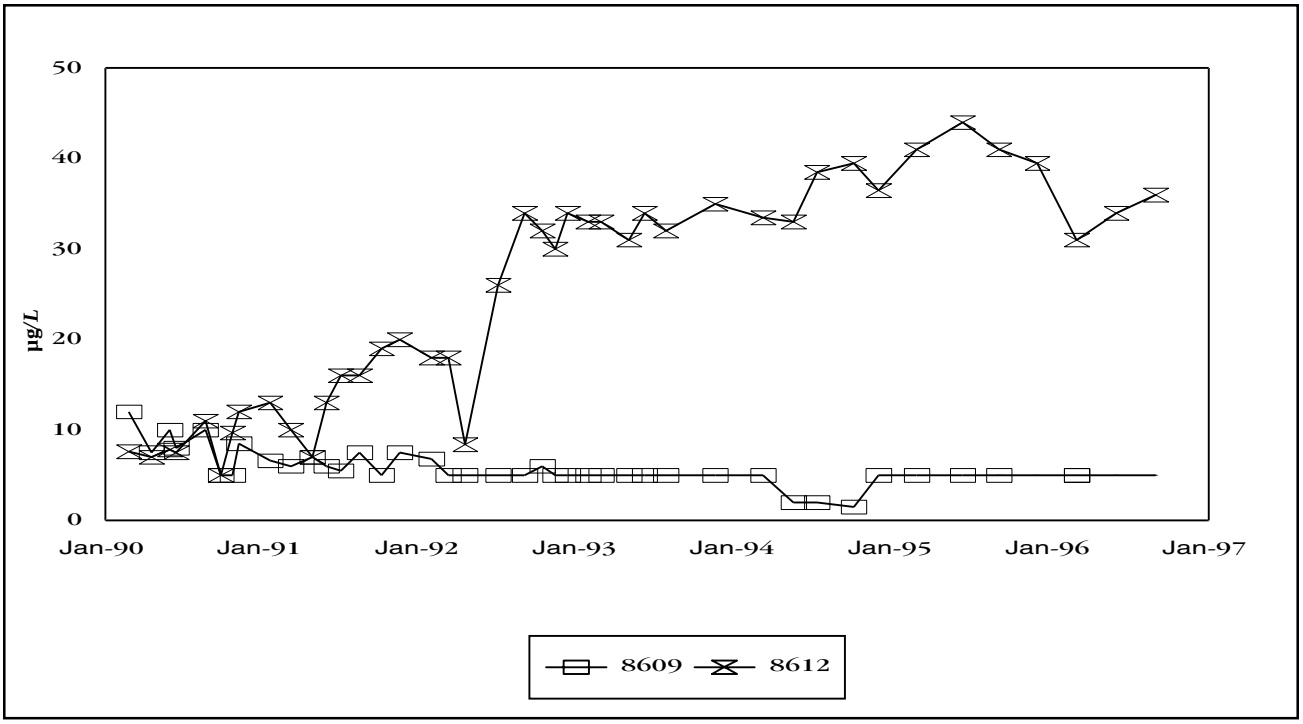

Figure 3-32. Seven-Year Trends (1990 through 1996) of 1,1-DCA at Selected Monitoring Locations

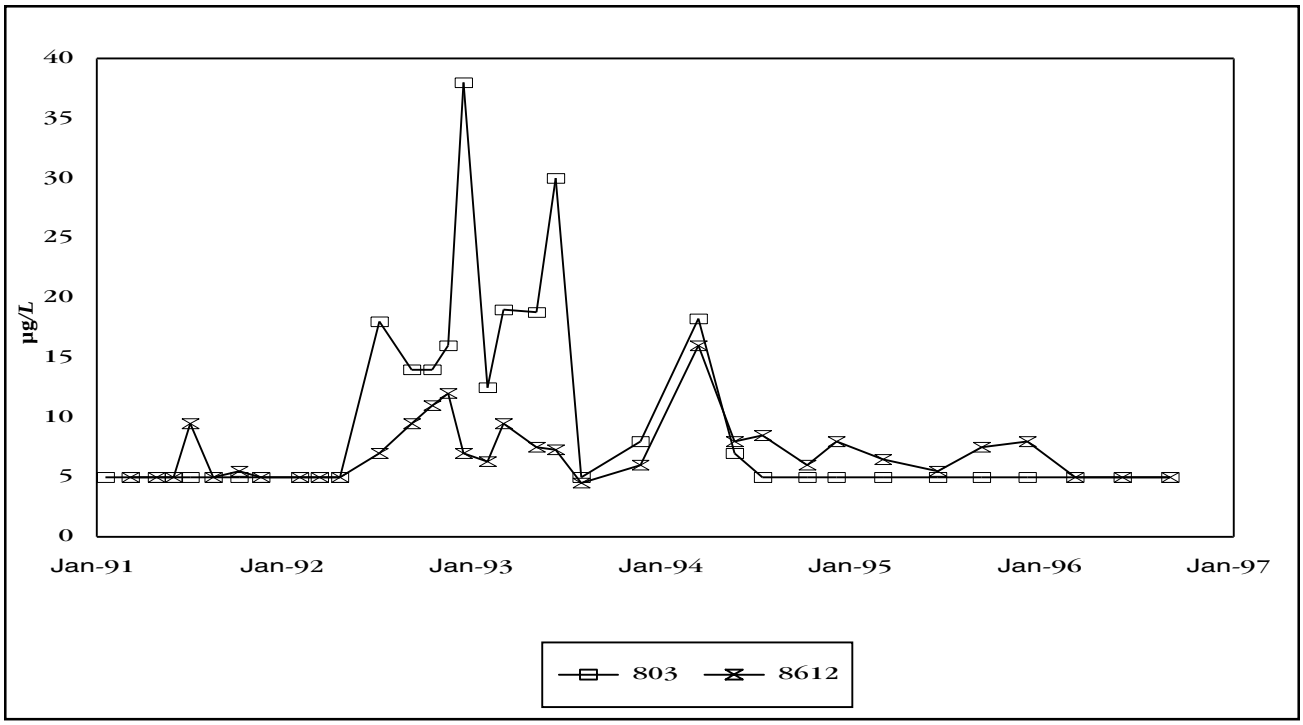

Figure 3-33. Six-Year Trends (1991 through 1996) of Dichlorodifluoromethane (DCDFMeth) at Selected Monitoring Locations

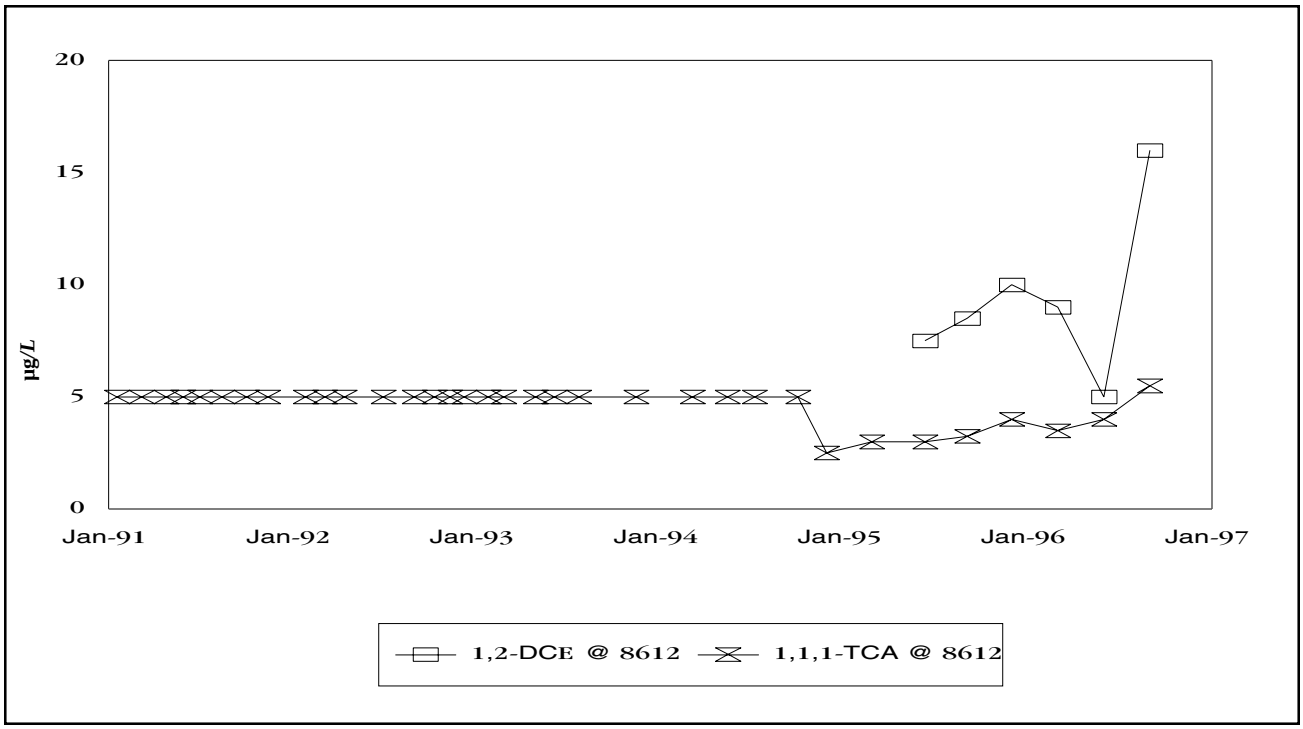

Figure 3-34. Six-Year Trends of 1,2-DCE and 1,1,1-TCA (1991 through 1996) at Selected Monitoring Locations

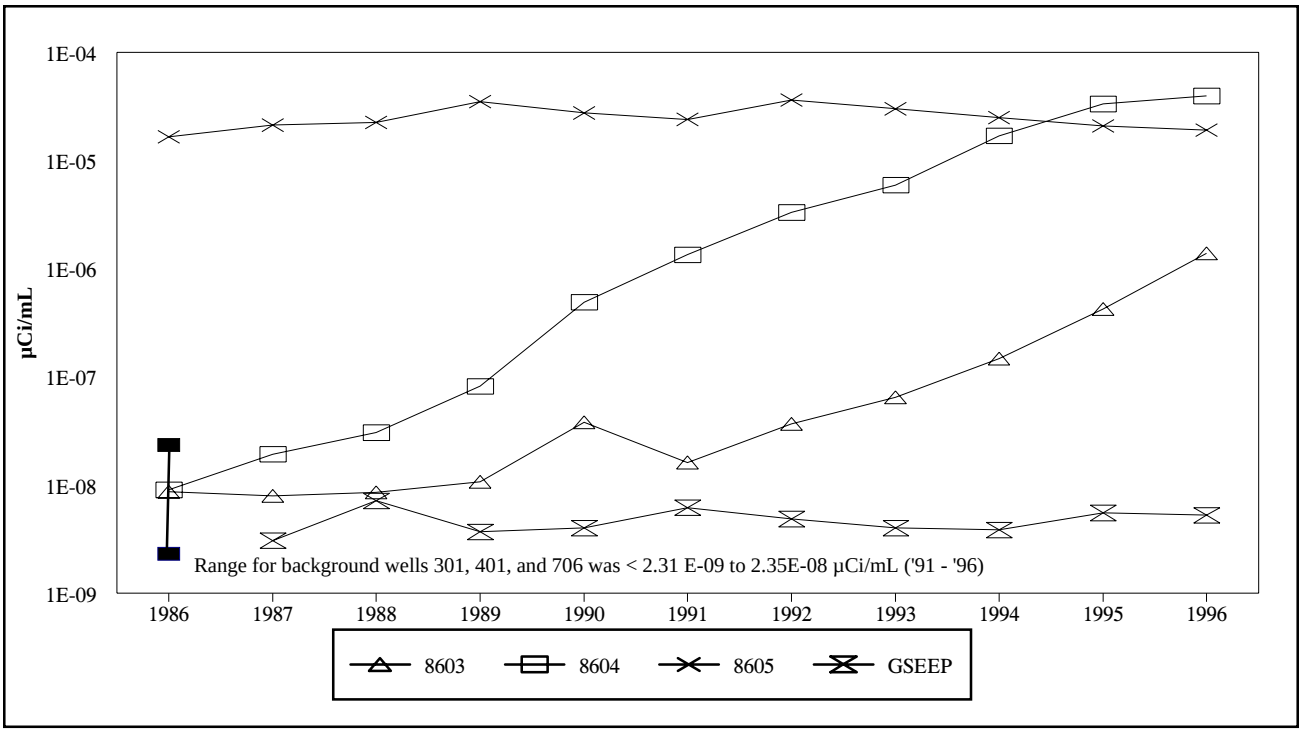

Figure 3-35. Eleven-Year Trends of Averaged Gross Beta Activity at Selected Locations in the Sand and Gravel Unit

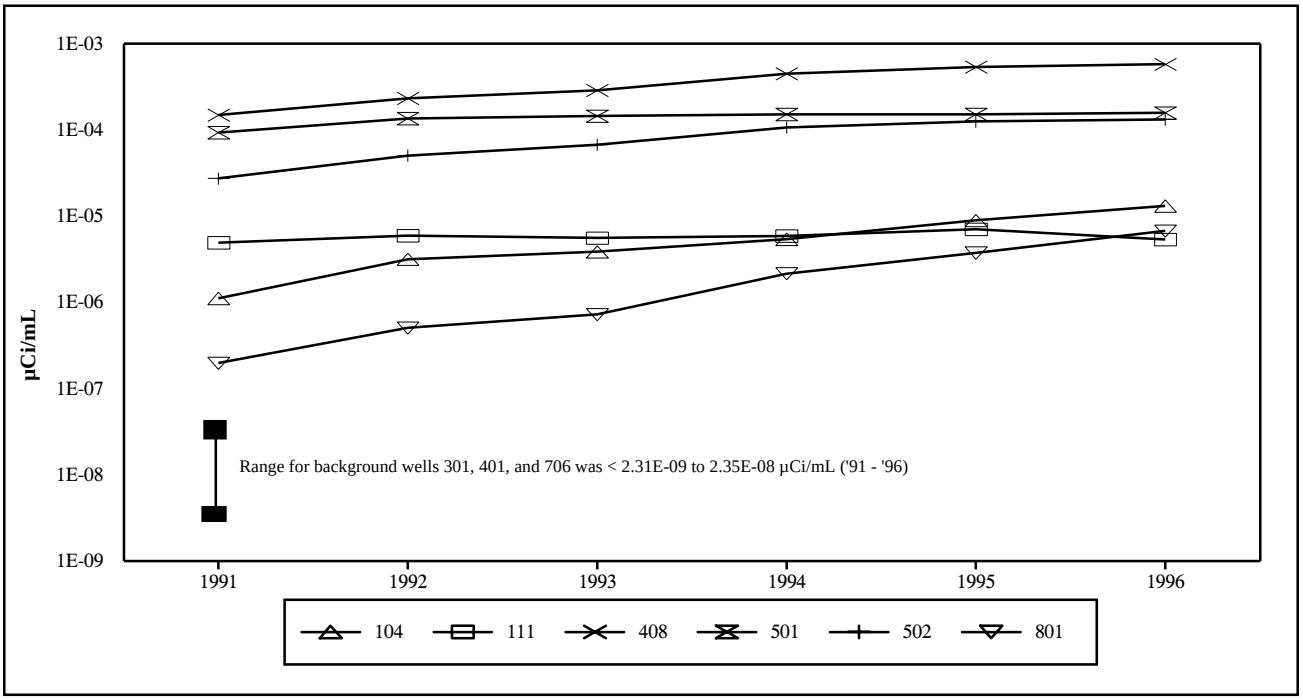

Figure 3-35a. Six-Year Trends of Averaged Gross Beta Activity at Selected Locations in the Sand and Gravel Unit

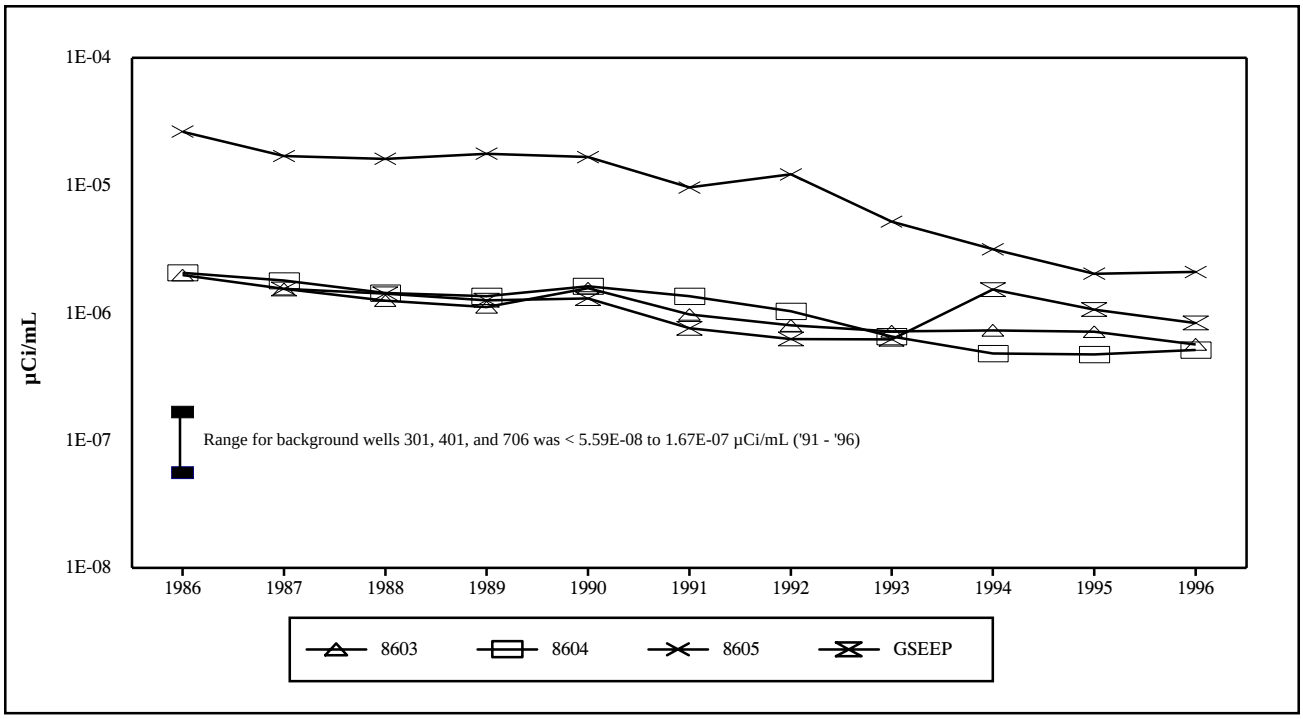

Figure 3-36. Eleven-Year Trends of Averaged Tritium Activity at Selected Locations in the Sand and Gravel Unit

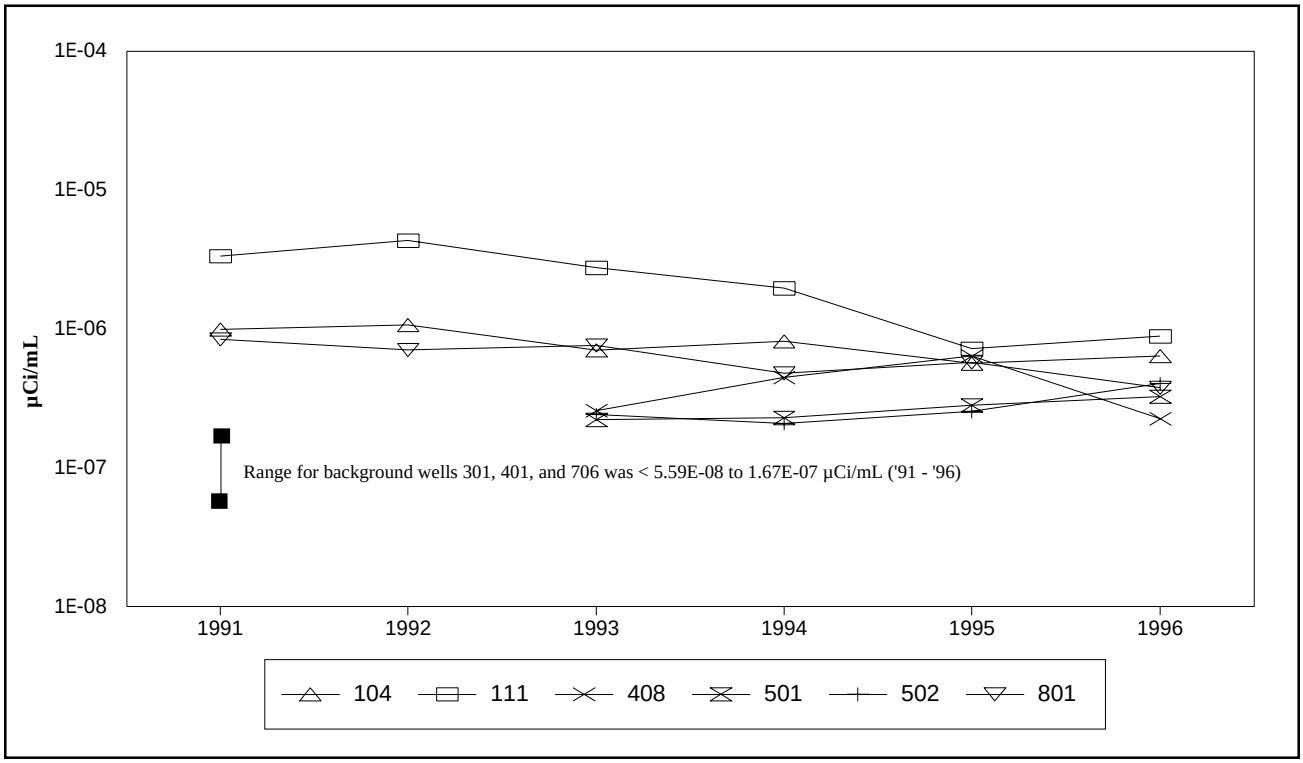

Figure 3-36a. Six-Year Trends of Averaged Tritium Activity at Selected Locations in the Sand and Gravel Unit