APPENDIX B: XERXES PRIMARY BACKFILL REQUIREMENTS

B1. GENERAL

B1.1. The backfill material surrounding an underground storage tank (UST) is a critical part of a proper tank installation. This document gives guidelines for choosing the primary backfill material to use when installing Xerxes fiberglass tanks.

B1.2. The Xerxes Installation Manual specifies that select rounded stones or crushed stones are to be used as primary backfill material.

B1.3. Primary backfill material is to be clean, free-flowing, and free of dirt, sand, large rocks, roots, organic materials, debris, ice and snow.

B1.4. No backfill material shall be frozen or contain lumps of frozen material at any time during placement.

B1.5. Another important characteristic of good backfill material is hardness or stability when exposed to water or loads. Most materials have no problems meeting the hardness requirement.

B1.5.1. Materials like soft limestone, sandstone, sea shells or shale should not be used as backfill because they break down over time.

B2. ACCEPTABLE BACKFILL MATERIALS

B2.1. Coarse aggregate is a technical term for the material (rounded stones and crushed stones) that meets Xerxes' backfill size requirements.

B2.2. ASTM International and The American Association of State Highway and Transportation Officials (AASHTO) have specifications for standard sizes of coarse aggregate.

B2.3. TABLE B1-1 gives the standard sizes of coarse aggregate that meet Xerxes' backfill material specifications for rounded stones and crushed stones. It identifies standard sieve sizes used to grade aggregate material. For each aggregate size, the amount of material finer than each laboratory sieve (square openings) is given as a percentage of the total weight of the sample.

NOTE: ASTM uses size numbers 6, 67, 7 and 8 to describe specific gradation profiles for materials that pass through a series of sieves. Do not confuse these gradation profiles with sieve sizes.

B2.3.1. The percentages give an indication of the particle size distribution or gradation within a given aggregate size. With aggregate size number 6 of rounded stones, for example, 20–55 percent of the sample (measured by weight) should pass through a 1/2-inch sieve. And, with aggregate size number 7 of crushed stones, 0–15 percent of the sample (measured by weight) should pass through a No. 4 sieve.

B2.4. Some material suppliers may produce materials that meet Xerxes' requirements but are not identified by a standard coarse aggregate size number. The supplier should be able to provide a specification that identifies the size or gradation of the material.

B2.4.1. If the material supplier is unable to supply a gradation report, an independent testing laboratory can perform a sieve analysis on a sample of the material according to the ASTM C 136 testing specifications. The test results can then be compared against the size requirements for rounded or crushed stones *shown in table B1-1.*

B3. ROUNDED STONES

B3.1. When using select rounded stones, the material is to be a mix of rounded particles, sizes between 1/8 inch and 3/4 inch.

B3.2. The rounded stones must conform to the specifications of ASTM C 33, sizes 6, 67 or 7.

B3.3. No more than 5 percent (by weight) of the backfill may pass through a #8 sieve. *See TABLE B1-1* for additional information about specifications.

NOTE: Generally, rounded stones that meet the gradation requirements are larger than allowable crushed stones.

B4. CRUSHED STONES

B4.1. When using crushed stones, the material is to be a mix of angular particles, sizes between 1/8 inch and 1/2 inch.

B4.2. The crushed stones must conform to the specifications of ASTM C 33, sizes 7 or 8.

B4.3. No more than 5 percent (by weight) of the backfill may pass through a #8 sieve. *See TABLE B1-1* for additional information about specifications.

TABLE B1-1—Percent of Stones Passing Through Sieve by Sieve Size

Sieve Size	Rounded Stones			Crushed Stones	
ASTM C 33 Size #	#6 Stone	#67 Stone	#7 Stone	#7 Stone	#8 Stone
1 inch [25 mm]	100 %	100 %	———	———	———
3/4 inch [19 mm]	90—100 %	90—100 %	100 %	100 %	———
1/2 inch [12.5 mm]	20—55 %	———	90—100 %	90—100 %	100 %
3/8 inch [9.5 mm]	0—15 %	20—55 %	40—70 %	40—70 %	85—100 %
No. 4 .0187 inch [4.75 mm]	0—5 %	0—10 %	0—15 %	0—15 %	10—30 %
No. 8 .094 inch [2.36 mm]	———	0—5 %	0—5 %	0—5 %	0—10 %