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**GRI White Paper #9**

**On the Topic of Geomembrane Warranties**

by

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### **On the Topic of Geomembrane Warranties**

#### Introduction

GSI began its research efforts on geomembrane durability and lifetime prediction in 1985 and it cumulated in a lifetime prediction of 450-years for a soil or waste covered HDPE geomembrane (see GSI White Paper #6). In 1995 we began our efforts in developing and writing generic specifications. In this regard the following specifications are the topic of this White Paper.

- GRI-GM13 Specification for HDPE Geomembranes
- GRI-GM17 Specification for LLDPE Geomembranes
- GRI-GM18 Specification for fPP Geomembranes
- GRI-GM21 Specification for EPDM Geomembranes

All of the above specifications contained a suggested warranty for 5-years duration. This White Paper attempts to explain why the warranties appeared in the specifications in the first place, as well as why they have been removed as of July 10, 2006.

#### Background

Geomembranes are certainly related to, and have somewhat followed, the use of polymeric waterproofing membranes in the roofing industry; particularly flat roofs on commercial and industrial buildings. The roofing industry has given a 20-year warranty for its products for many years. It should be recognized however, that roofing membranes are either fully exposed to sunlight and high temperatures, or covered with a thin layer of gravel or light paving material. Thus, ultraviolet light and/or extremely high temperatures are always present. If, and when, degradation of a roofing membrane occurs, repairs or replacement material can usually be readily made. Thus, a 20-year material warranty is considered worthwhile since the field lifetime of roofing membranes

is often challenged within this time frame. In such exposed and generally high temperature roofing environments, lifetime is decidedly shorter than in the buried environments that geomembranes usually are placed without UV exposure and typically at 20°C temperatures or lower. Obviously, the exposed conditions are in drastic contrast to covered geomembranes when 450-years of halflife are anticipated. As a result, a 20-year warranty for a geomembrane is of little value since it only represents 4.4% (20/450) of the anticipated halflife of the material.

#### Wasteful Burden for Manufacturers

With the advent of major geomembrane use in the USA in 1980's, owners and specifiers began requesting 20-year warranties of geomembranes as was the custom for roofing membranes. Yet, to our knowledge there has never been a degradation issue (such as oxidation, hydrolysis, etc.) on covered geomembranes to date. This cannot be said for punctured or torn geomembranes (these are installation issues) or for containment of aggressive liquids as in some surface impoundments (these are chemical compatibility issues).

The implications of a 20-year warranty in the eyes of a geomembrane manufacturer's insurance company is clearly a financial burden due to the required escrowed money that must be sequestered for the 20-year period. Thus, the paradox is readily seen in that funds must be sequestered for an event that will simply never occur within the allocated time frame. It is indeed a financial burden for manufacturers with no benefit to the owners, specifiers, or anyone else involved in the process.

After discussions with the manufacturers' group within GSI it was decided to suggest a warranty on our geomembrane specifications with a 5-year time frame instead of 20-years. This was done on the geomembrane specifications noted in the introduction

(beginning with the HDPE geomembrane specification in 1997) and clearly had the effect of lowering the amount of escrowed funds required of the manufacturers. And yet one must ask, “What does a warranty for 5-years represent for a material with a halflife of 450-years durability prediction”? In short, the entire scenario is foolish at best, and financially wasteful at worst.

An added point bears mentioning and concerns geomembrane installation warranties (in contrast to the material, per se). In this regard it is customary to require a 1-year installation warranty. While this time frame is curious in comparison to the longer material warranty, the entire process of warranties in light of the rigor of manufacturing quality control (MQC), manufacturing quality assurance (MQA), construction quality control (CQC), and construction quality assurance (CQA) is simply an outmoded and useless activity.

#### GSI's Response

In light of this discussion, GSI has entirely removed its warranties from the four specifications mentioned in the introduction as of July 10, 2006. They were added appendages from the outset and they never provided any realistic added security for the user. In each of the four specifications a note has been added accordingly in the respective revision schedule. Additional discussion on the warranty issue is available from the authors at the following e-mail addresses.

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