The natural environment of *Geobacter sulfurreducens* is oligotrophic and described as limiting in both electron donors and terminal electron acceptors (TEA). We examine here long-term batch cultures under limiting electron donors or the TEAs. The microorganism survived under long-term electron donor (acetate) starvation, maintaining a stable population of ~1-2× 10^8 cells $mL^{-1}$for >650 days. Proteins that varied in abundance with a high level of statistical significance ($p < 0.05$) for stages between mid-log to survival phase (acetate starved) were identified using mass spectroscopy. The most highly represented proteins that significantly increased in level in the survival phase cells are generally membrane-associated and are involved in energy metabolism and protein fate. These results document that changes in the outer and cytoplasmic membranes help *G. sulfurreducens* survive during starvation through detection and transport of nutrients into the cell. A sizeable portion of the identified proteins with unknown or hypothetical function further suggest that much of the biological process involved in survival have yet to be fully understood. *G. sulfurreducens* was also able to survive under long-term TEA-starvation conditions with iron citrate as TEA and maintained a stable population of 1.5-3 × 10^7 cells mL^{-1} for >650 days. We also found that survival phase cells from fumarate-limiting conditions were able to quickly resuscitate and reduce metal such as ferric iron as compared to the mid-log phase cells.