The aggregate extraction industry generates large amounts of residues that are basically in the form of sludge. These are the result of the cleaning process, with water, in which the materials extracted from the soil are subject to. In fact, this water, used in order to free the aggregates from the smallest fractions that they have, are driven to a raft in where the particles that are in suspension are decanted. The result of this decantation is, on one hand; the production of large volume of sludge that rest stored, and on the other hand; the significant water flows that are returned to the aquifer of where they have been previously pumped. Therefore, the result of the aggregate treatment in industrial plants is the generation of sizeable volumes of sludges that are deposed in rafts. The main derived problems from this deposition are:

1. The space that sludge residues takes out of the global space of the aggregates extraction plant is enormous.
2. Raft is a difficult element to make up when the extraction has finished and the restoration must be made.
3. Sludge decantation creates a clayey impervious layer which modifies soil properties and as a result, the flow net.
4. After leaching the aggregates, water is returned to terrain. Consequently, the circuit of the water used to cleaning aggregates is opened, that is to say, there is no reutilization of hydraulic resources. For this reason the aggregate extraction industry has to face up to an important economical cost.

In this thesis, for the purpose of minimizing all these problems, a study of the reutilization of the generated residues, by using it to make ceramics, has been done. In this regard, the residue that has been studied comes from the aggregate extraction plant named “Planta d’àrids del Corb” from the company SORIGUÉ SA. This plant extracts gravels from an alluvial terrain of Segre in the Plana del Corb.

To start with, the residue has been sampled and classified according to environmental rules in Catalonia. Afterwards, some analyses have been made in order to characterize the residue and to conclude if using it as a ceramic raw material can be profitable. From these analyses, the following characteristics have been studied: grain size distribution, textural classification, weight lost at different temperatures and mineralogical and chemical composition of the residue. In addition, some cooking experiences have been done to some pressed and fired samples made with the residue, so as to know their ceramic properties (the linear changes that occurred on firing the samples, the water absorption that they can suffer and the optimum temperature of firing). The results of these analyses indicate that the residue is suitable for manufacturing ceramic. It is recommended, however, that the residue should be mixed with some siliceous clay (for instance, with kaolinite).

After doing these analyses, a study of the feasibility of taking off the residue stored in rafts in order to carry it to a ceramic factory has been done. The result of this study has been negative because it is impossible to recover the sludge from the rafts because of plasticity and humidity. For this reason, one solution has been proposed: to take off the residue, as a liquid with particles in suspension, directly on the exit of the cyclone before being driven to the raft. In order to separate the particles that are on suspension in the water, some machines would have to be installed in the plant. These are: a thickener/decanter and a filter press. With these equipments, two important facts are achieved: an effective process water recovery and a perfect solid separation. The advantage of this process is that water remains clean and reusable, and solids are extracted in a suitable state (dehydrated clayey cakes with only 20% of humidity) to be stored without much environmental impact.

After presenting this technical improvement, an environmental study and an economical study have been carried out. The economical study has been made to analyse the profitability of the investment that the firm SORIGUÉ would have to face up to buy the new equipment. The results of both studies have been positive.