SECTION – B

1.0 Project Title: Water management during hydrofracking operations of shale gas field

2.0 Project Type:

- Lab Scale Product /Process/Technology Development

3.0 Introduction and Review of Literature:

3.1 Current status of work being done in other Institutions and Industries in the country:

About 2 – 5 million gallons of water is required for a well. After hydraulic fracturing about 10% – 40% of the total hydrofractured water will come back to the surface, which is known as "flowback water" [4, 5]. In this process a mixture of hydraulic fluids and propping agents is pumped at high pressure to the well bore. The hydraulic fluid is water with a propping agent which is usually sand. Besides, it consists some additives which are used for stabilizing the pH, antiscaling agents, friction reducers, biocides, etc. The compositions of the hydraulic fluid always vary, but generally it consists of 90% water, 9% propping agent and less than 1 % functional additives. The immediate challenges in exploration of shale gas are the high drilling and operation cost as well as pollution control. The last one has assumed a big magnitude in the recent time and there are examples of public protests at a few places. The environmental concerns are genuine and the only way to face the challenge is to develop and implement suitable technology for treatment of the huge quantity of waste water generated at a shale gas exploration site.

The waste water from shale gas wells contains a number of toxic substances and additives used in the light slurry used for fracking. The major contaminant are listed in Table 1 and also shown in the Fig. 1. For practical purposes, treatment of the waste water should aim at cleaning the water to an extent that a major part of it can be recycled. This will reduce the demand of fresh water besides preventing pollution. The treatment process should involve separation of the suspended materials (much of it comes from the fracking liquid itself) and removal of dissolved and toxic substances. Thus it is necessary

to use a combination of traditional as well as modern techniques especially to remove the salts and proprietary additives.

3.2 Current status of work being done on International scale:

Given above

References:

3.3 Details of previous work and ongoing work of PI and ...(Name of IIT) in this field and expertise available with PI/Group/Institution/Organization:

3.4 Patent search reports and the details of patents filed and granted to the PI/institute in the related field(s), if any:

None

4.0 <u>Project Objectives:</u>

- Development of a feasible technological water treatment solution to the water management problem of shale gas hydrofracking.
- Sequencing and performance optimization of various processes at laboratory scale.
- Transport phenomena based modeling of each process and overall integrated scheme followed by their validation.
- Scaling up and pilot study of treatment capacity 50 L/h.

5.0 <u>Relevance of the work / Benefit to ONGC:</u>

Water management during hydrofracking operations of shell gas field will be highly relevant and beneficial for shale gas production by OGC

6.0 <u>Project need and Justification:</u>

Development of strategy and technology for the water management during shale gas hydrofracking is the need as well as justification of this project