Introduction In many work environments with sensitive and complex technologies, human error due to the unfortunate events is very important. So it is necessary to recognize and find root causes of human errors to prevent and limit the consequences of them. This study aimed to identify operator’s human error in one of the sensitive units of oil refinery.

Methods This study was taken to identify, assess and control human errors in Tar unit of Isfahan oil refinery. Data collected using by task observation and interviewing with safety authorities, unit and shift supervisors and operators to hierarchical task analysis (HTA) and human error identification by SHERPA technique.

Results With analyses SHERPA work sheets, 198 human errors were identified respectively 134 (67.64%) action errors, 23 (12.12%) retrieval error and 6 (3.03%) selection errors. ‘Performance monitoring’ and ‘communication’ Critical tasks was the main tasks of control room operators. 64% of human error in the control room operators of the occurrence probability of ‘low’ and 36% probability of occurrence of ‘moderate’ were estimated. Also, 59% of the identified errors of control room operators have no required recovery but only 29% of their outcomes were sensitive.

Conclusions The results showed SHERPA technique can be used serve as an effective technique to detect human errors in oil refineries and petrochemical.