1. INTRODUCTION: WHERE ARE WE CURRENTLY WITH OFFSHORE OIL AND GAS SAFETY?

- Health, safety and environment (HSE) is a major consideration for offshore petroleum exploration and production activity.
- Hydrocarbon (HC) leaks or releases (HCRs) are important initiating events for major accidents in the oil and gas industry (Kongsvik et al., 2011; HSE, 2009).
- There is a complex interwoven human, technical, and operational factors which come to play in determining safety levels on offshore installations.
- Safety climate is generally considered within the leading or lagging indicator framework (Hopkins, 2009; Cox and Flin, 1998; Payne et al., 2010; Flinn et al., 2000).

2. RESEARCH MOTIVATION AND HYPOTHESIS

- Post Piper Alpha Offshore safety regulations have overwhelmingly been seen by the UK offshore industry as having had a positive impact.
  - Evidential reduction in injuries, fatalities, dangerous occurrences and hydrocarbon releases.
  - Industry managers generally support both the Safety Case concept and the principal role of the Safety Case Regulations in the construction of a goal-setting approach to offshore safety.

Research Hypothesis:

- The hypothesis of the present research is that Hydrocarbon Release (HCRs) incidents are a function of:
  - The features of the installation or complexity of the well which generally increases the exposure to risk.
  - Environment created onsite by the companies (operating procedures, company policy, etc).
  - The overall operating environment in the industry (macro developments and regulatory proactiveness).

3. METHODOLOGY: GENERALIZED LINEAR MODELS OF HCR counts/injury rates regressed against delineated independent variables hypothesized above which affect HCR outcomes.

   - Poison/Negative Binomial models with extended variants for count outcomes

Estimation model:

   \[ \ln(\eta_{ij}) = \beta_0 + \beta_1 \Delta + \beta_2 \text{oil} + \cdots + \beta_5 \text{age} + \ln(\delta_{ij}) \]

and (1) a set of year effects or (2) an overall fitted trend (T) \( t = \text{YEAR1995, YEAR1996, YEAR1997, . . . , YEAR2011} \)

4. SOME MODEL RESULTS

   - Table listing parameter estimates for the additive Log Linear Model of HCRs by Location, Installation Type, Water Range, Age, Season, Year, and Time Trend

   - Observed vs. fitted values for HCRs

5. CONCLUSIONS AND FUTURE RESEARCH

- The preliminary finding for the trend model suggests an overall downward reduction in HCR release incidents post the implementation 1992 Cullen safety case regime and subsidiary regulations in-line with expectation.
- There is a 3.2% overall decrease in the number of hydrocarbon releases or a reduction in this number by any Exp (-0.0319) which translates to 0.97 releases per installation over the 17 year period from 1995 to 2011.
- Research still in progress (Model is being refined with more specifications and predictive ability)