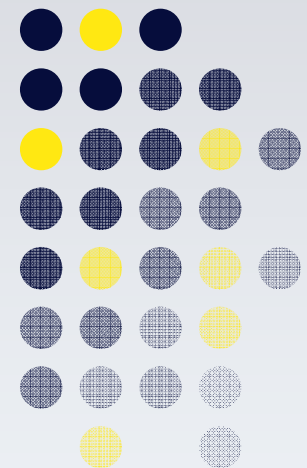
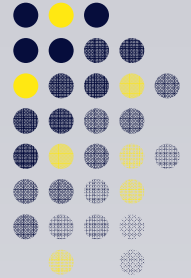


Managing Quality Variations

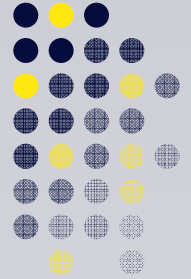
Mukund Unavane
Spiral Software Limited
COQG Meeting, Chicago
8th June 2007





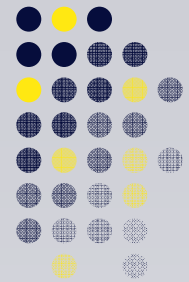
Introduction to Spiral

- Founded in 1998, based in Cambridge, UK
- Crude oil tools support assay work up and database maintenance process through to final delivery into planning and simulation tools
- Spiral tools adopted by over 50 companies on over 160 sites, including global implementations by Shell, BP and Chevron
- One major application is helping clients optimise feedstock selection, making best use of data to control risk and even derive benefit from cargo quality variations



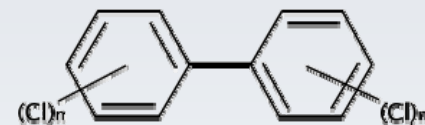
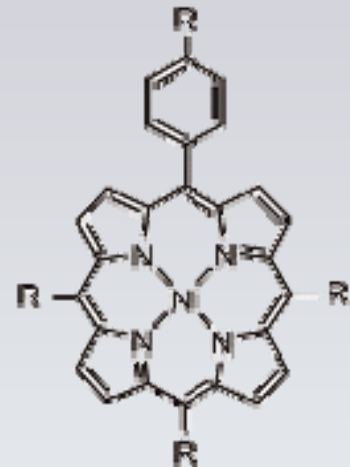
Crude Oil Contaminants

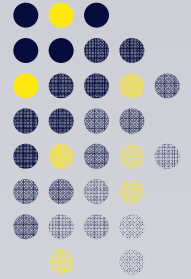
- Crude oil can be characterised in terms of “properties” (yield distribution, density, viscosity, pour point etc.)
- Contaminants can broadly be characterised as materials in crude oil which have a negative impact on processing.
- Contaminants can have major impact on processing:
 - e.g. Sulphur content: fuels fall outside legal specification
 - e.g. Metals: catalysts can be poisoned
 - e.g. Organic chlorides: corrosion in reformer units



Crude Oil Contaminants - II

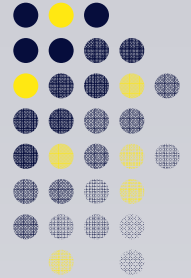
- Crude oil contaminants can be:
 - **Intrinsic to the crude** (present in the crude reservoir)
 - E.g. Metal content
 - Vanadium and nickel may be present as complex molecules in the crude reservoir.
 - **Extrinsic to the crude** (introduced during extraction or transport)
 - E.g. Organic chlorides
 - Solvents containing organic chlorides may be used at production sites to help dissolve paraffins. These are introduced during





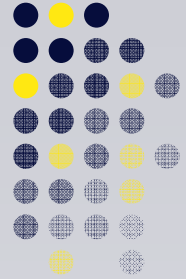
Example workflow 1:

- *Managing extrinsic contaminants*
 - A key user has set up a “Crude Approval Grid” based on the amount of Organic Chloride in the crude naphtha
 - Laboratory measures organic chloride content for a new cargo and enters it into CSi
 - Relevant users in the trading, scheduling and planning organisations are immediately alerted to the change in organic chloride content



Example workflow 2:

- *Managing intrinsic contaminants*
 - The laboratory finds that vanadium content for a new cargo has increased compared with the reference crude.
 - The laboratory enters this data into *CSi*
 - The crude scheduler is alerted to the change in cargo metal content
 - The scheduler uses *BlendExplorer* to update the blend to meet the metal contaminant specifications for the refinery feed



Demonstration:

