

# Developing Innovative Technology Solutions for Refineries:

An overview of JIP Concept

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# Presentation Outline

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- **Definition of Joint Industry Program**
- **JIP development methodology**
- **JIP projects**
- **Target market and applications**
- **Sponsors of JIPs- worldwide**

# Definition of JIP

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- **Program co-funded (sponsored) by a group of global operating companies:**
  - Oil & Gas companies
  - Chemical providers
  - Service providers
  - Engineering & design companies
  - Alloy manufacturers
- **Aggregated funding (\$1M to >\$2M) used to develop new data or information on a corrosion and materials problem area of high reliability and/or cost impact.**
- **Includes development of a software tool to automate assessment of service conditions, corrosion risk or materials selection.**
- **Normally a 2 to 3 year data development effort.**

# JIP Development Methodology

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- **Honeywell conducts a joint industry project to develop data for a specific corrosion problem defined as a key industry need through surveys and customer feedback (e.g., sour water corrosion in refineries) – *Typically a 2 – 3 year effort***
- **Programs sponsored by operating companies with global footprint (Shell, Exxon, Chevron, Aramco, BP, Petrobras, Reliance etc)**
- **Honeywell develops corrosion prediction / material selection / phase behavior model (sponsors get single user licenses)**
- **Honeywell develops commercial product and provides licensing / consulting services**
- **Over 15 JIP programs in the last 20 years**

# Target Markets and Applications

Modeling Application	Oil & Gas Upstream	Refining	Chemicals
Predict-Amine 2.0	✓	✓	
Predict-SW 3.0		✓	
Predict-Crude 1.0		✓	
Predict 5.0	✓	✓	
PredictPipe 3.0	✓		
Socrates 9.0	✓		
Strategy-A 4.0	✓		
Strategy-B 4.0		✓	
Corrosion Analyzer*	✓	✓	✓
Risk IT	✓		

\*For Phase behavior, ionic modeling and thermodynamic analyses – third party tool marketed and supported by Honeywell

**These systems offer two significant Benefits:**

- **Unique Honeywell IP and integrated technology know-how**
- **Enhanced safety and reliability, and economic opportunity**

**Honeywell**

# Joint Industry Projects

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<b>Program Detail</b>	<b>Approx Value</b>	<b>Timing</b>	<b>Outcome</b>
<b>Nap Acid Corrosivity JIP</b>	<b>\$2M</b>	<b>2007-2009</b>	<b>Predict-Crude</b>
<b>Sulfuric Acid Alkylation</b>	<b>\$1M</b>	<b>2006 - 2009</b>	<b>Predict-SAA</b>
<b>Ti-Alloy JIP</b>	<b>\$1M</b>	<b>2007-2009</b>	<b>Socrates-Ti</b>
<b>Lean Amine JIP</b>	<b>\$1M</b>	<b>2008 - 2010</b>	<b>Predict-LeanAmine</b>

# JIP Pipeline - 2

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<b>Program Detail</b>	<b>Value</b>	<b>Timing</b>	<b>Outcome</b>
<b>Sour Water Corrosion</b>	<b>\$8M</b>	<b>1998-2007</b>	<b>Predict-SW 3.0</b>
<b>Rich Amine</b>	<b>\$1M</b>	<b>2004 - 2007</b>	<b>Predict- Amine-2.0</b>
<b>Corrosion in CDU Overhead Systems</b>	<b>\$2M</b>	<b>2010-2012</b>	<b>Predict- Crude-OH</b>
<b>Nap Acid Corrosivity- Phase II</b>	<b>\$2M</b>	<b>2010 - 2012</b>	<b>Predict- Crude-PII</b>

# Sponsors of Existing JIPs

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## Downstream

- **Sour Water Ph I**
  - ExxonMobil
  - Chevron
  - BP
  - Flint Hills
  - Shell
  - ConocoPhillips
  - Petrobras
  - Sunoco
  - UOP
  - Saudi Aramco
  - Syncrude
  - Valero
  - TOTAL
  - KNPC (Kuwait)
  - Idemitsu
  - Lyondell-Citgo
  - Marathon

- **Sour Water Ph II**
  - ExxonMobil
  - Marathon
  - Chevron
  - Fluor
  - BP
  - Flint Hills
  - Petrobras
  - ConocoPhillips
  - Syncrude
  - Idemitsu

- **(Rich) Amine JIP**
  - ExxonMobil
  - Chevron
  - Fluor
  - BP
  - Flint Hills
  - Petrobras
  - ConocoPhillips
  - Huntsman\*
  - Saudi Aramco
  - BG International
  - Syncrude

## Upstream

- **2005 SSC JIP**
  - BP
  - Chevron
  - Fisher Controls
  - FMC
  - JFE
  - Occidental
  - Petrobras
  - Schlumberger
  - Shell
  - Sumitomo
  - Tenaris
  - TOTAL
  - Weatherford

# Sponsors of New JIPs

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## Downstream

- **Sulfur Acid JIP**
  - ExxonMobil
  - Chevron
  - BP
  - Flint Hills
  - Dupont/Stratco
  - Rhodia\*
  - **Reliance†**
  - Shell
  - CITGO†

- **Nap Acid JIP**
  - ExxonMobil
  - Marathon
  - Chevron
  - Fluor
  - UOP
  - BP
  - Baker Petrolite
  - Flint Hills
  - Petronas
  - Statoil
  - **Reliance†**
  - Nalco
  - Petrobras
  - Shell
  - Syncrude
  - **IOCL**

## Upstream

- **Ti-Alloy JIP**
  - BP
  - BHP Billiton
  - ExxonMobil
  - ConocoPhillips
  - Petronas
  - Petrobras
  - Chevron
  - Tetra Technologies
  - ATI Allvac
  - Titanium Engineers
  - TIMET