JIG Joint Inspection Group

JIG Common Process Business Risk Assessment and Risk Management for JV Operations

Last Updated 15th August 2012

Why carry out a Business Risk Assessment ?

- *"From the Board room down companies must ask themselves these three questions:*
  - ***do we understand what could go wrong ?***
  - ***do we know what our systems are to prevent this happening ? and***
  - ***are we getting the right information to assure us they are working effectively ?"***

Kevin Myers, HSE's Deputy Chief Executive July 2010 following the Buncefield terminal explosion in the UK in December 2005.

What do we mean by Business Risk and Risk Management ?

- **Business risks** affect the ability of a JV to deliver its business objectives.
  - All areas of a JV's business activity should be considered to identify key business risks including: HSSE/Operations, Financial Control, People, Customer Service, Legal Compliance.
  - All JVs should periodically review their business risk in order to ensure they are effectively managing the key risks.
- **Risk management** is the identification, assessment, and prioritization of risks (defined in ISO 31000 as *the effect of uncertainty on objectives*, whether positive or negative) followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events or to maximize the realization of opportunities.

JIG Business Risk Assessment – Typical Aviation Fuelling Risks Considered (1 of 3)

1. **HSSE - Crisis Management - Emergency Response** including Pandemic Response Plan (PRP) / Business Continuity Plan (BCP) e.g. product quality incident at an international airport resulting in grounding of planes.
2. **HSSE - Aircraft Incident - Fire - Pressurised fuelling vehicle hose end/ aircraft adaptor parting from each other** during fuelling leading to an uncontained pressurised release of fuel, which then could be ignited potentially leading to multiple injuries/fatalities. Industry standards have been raised significantly after the Denver Fire incident.
3. **HSSE - Aircraft Incident - Fire resulting from ignition of wing vent spill from pressurised refuelling of aircraft**. Does not include overwing refuellings. Generally, fuelling operator does not have control of the events leading to a wing vent spill, or the control of ignition sources.
4. **HSSE - Aircraft Incident - Fire resulting from the ignition of jet fuel released under pressure from the failure of a component in the hydrant pit valve to refuelling vehicle system** e.g. hydrant pit valve, pit valve coupler, hoses, and connections.
5. **HSSE - Aircraft Incident - Fire with fatalities as a result of refuelling vehicle hitting plane wing, drive away incident or vehicle to vehicle collision releasing product which then ignites and affects the aircraft**
6. **HSSE - Aircraft Incident - Product Quality - Contaminated fuel** delivered to aircraft causes in-flight engine failure and crash. Avgas contamination identified as a significant Major Accident Risk (MAR) risk (due to vulnerability of piston engine technology) but this scenario extended to include jet fuel contamination which is also a MAR risk but considered to be well controlled and therefore less of a risk than avgas contamination. This risk assessment is based on the avgas contamination risk only. Many of the controls are common between avgas and jet. Excludes FSII and water slugs which is considered separately.
7. **HSSE - Aircraft Incident - Product Quality - Engine failure due to fuel starvation** as a result of (i) blockage/restriction of aircraft fuel system due to : ice, particulate, microbiological debris, cold flow property of fuel (e.g. contamination with diesel fuel), (ii) slug of water from aircraft fuel tanks (due to poor aircraft maintenance or water delivered from fuelling vehicle), (iii) vapour locked fuel system due to contamination with high vapour pressure products (e.g. gasoline / petrol).
8. **HSSE - Aircraft Incident - Product Quality - Lack of FSII** allows water to freeze resulting in fuel starvation and engine failure. Note for most military contracts supplier may not be required to inject FSII, this scenario reflects the occasional times that supplier is contractually required to inject FSII at point of delivery. NB. Military use limits permit concentration of 0.07 to 0.20 % by volume.
9. **HSSE - Aircraft Incident - Product Quality - Misfuelling -** Delivery of Jet fuel to a spark ignition piston engine plane or Avgas to a compression ignition engine plane can lead to engine failure and Aircraft Incident. Usually limited to General Aviation aircraft carrying less than 10 passengers.
10. **HSSE - Depot fire - Large spills due to fixed storage loss of containment** (not due to component failure)

Business Risks may be: HSSE, Financial Control, People, Customer Service or Legal Compliance.

JIG Business Risk Assessment – Typical Aviation Fuelling Risks Considered (2 of 3)

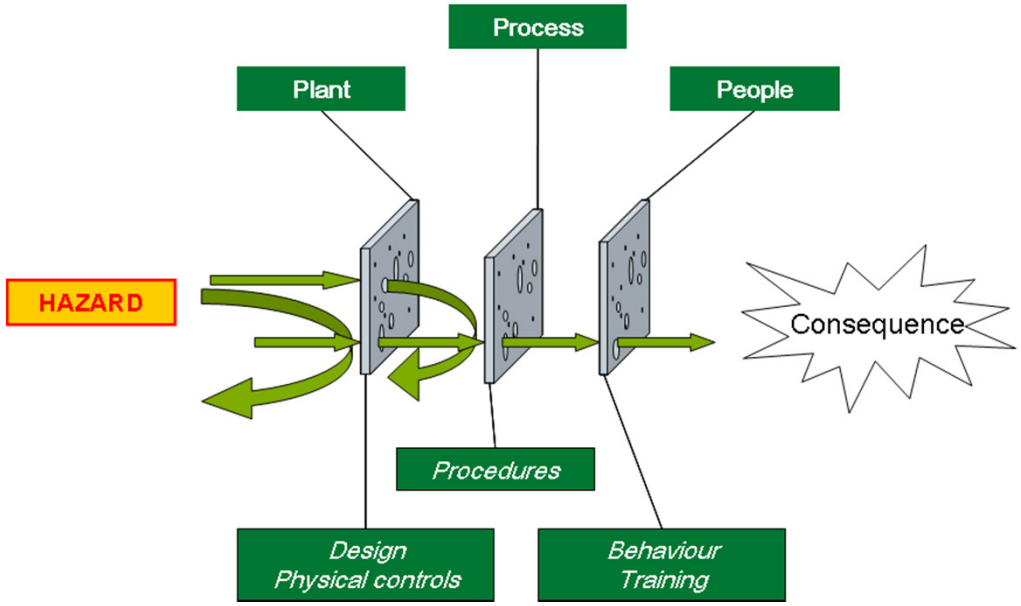
11. **HSSE - Depot Fire - Large Spills within a depot from recovery tank overfills, sampling valves left open resulting in a fire**. Although the initial fire may be small it could effect the surrounding facilities.
12. **HSSE - Depot Fire - Large Spills within a depot from vehicle** overfill, vehicle rollover, vehicle collision resulting in a fire
13. **HSSE - Depot Fire - Spills due to component failure** e.g. hose/fitting/gasket failure, filter vessels, corroded pipework resulting in a fire.
    Loading Island at FFD.
14. **HSSE - Environmental risk - Discharge of hydrocarbon to public drain**
15. **HSSE - Environmental risk - Leak from underground tanks**
16. **HSSE - Environmental risk - Leaks from hydrants**
17. **HSSE - Environmental risk - Leaks from over ground tanks**
18. **HSSE - Environmental risk - Overfill during filling of tanks**
19. **HSSE - Environmental risk - Spill during discharge or filling of vehicles**
20. **HSSE - Fire/Spill - Cross country pipeline loss of containment** leading to an environmental incident or fire.
21. **HSSE - Personal Injuries - usually to a single individual resulting from a slip, trip or fall** including from a working at height position. Injuries can range from bruising, grazing to potential fatality from working at height. Note - This risk covers routine activities - non routine project engineering working at height issues are addressed separately.
22. **HSSE - Personal Injuries, Spills, Fire and Equipment Damage caused by Non Routine Activities**
23. **HSSE - Personal injury - Driving** – 1. Potential for serious incidents arising from driving of company vehicles through own employees as part of the into plane service. 2. Potential for serious incident arising from company controlled road bridging activities (by company employees or contracted to 3rd parties).
24. **HSSE - Personal Injury / Health - Exposures (asbestos, benzene, lead etc.)** - usually to single individual resulting from a high occupational exposure of hydrocarbons e.g. constant exposure during fuelling at an airport. Or physical injury caused whilst travelling e.g. back injury, disease
25. **HSSE - Personal injury caused by Manual Handling** - usually to single individual resulting from lifting/moving an object(s) using poor technique.
26. **HSSE - Security - unauthorised use of JV facilities (e.g. by terrorists)**. This would have a significant adverse public reaction to JV and participants. The major risk is considered to be reputational. Note that the main examples are using JV depot to access airside on a one off basis and using a 'sleeper' member of the work force to commit a terrorist act either directly or part of a larger conspiracy.

JIG Business Risk Assessment – Typical Aviation Fuelling Risks Considered (3 of 3)

27. **Customer Service - Operational disruption - Major breakdown due to maintenance issues**
28. **Customer Service - Operational disruption due to Poor HSSE performance of Operator or failure of Airport facility to meet minimum HSSE standards of at least one partner**
29. **Customer Service - Operational disruptions of services due to incidents/accidents within Airport facility or neighbouring facilities**
30. **Customer Service - Operational disruption due to security of supply (e.g. Stock Out due to scheduling problems or insufficient storage capacity)**
31. **People - Operational disruptions due to Operational and Mgt constraints e.g. insufficient personnel, industrial relations (strikes), equipment resources.**
32. **Financial Control - Bank Account Fraud**
33. **Financial Control - High Operational Stock losses**
34. **Financial Control - operational budget overspend control**
35. **Financial Control - capital budget overspend control**
36. **Financial Control - cash flow control / dividend payments**
37. **Financial Control - Theft of Assets**
38. **Financial Control - Theft of Cash**
39. **Financial Control - Theft of Stock**
40. **Legal Compliance - HSE Legislation - non compliance. JV may not be complying with local legislation which could result in the termination of the licence to operate with positional reputational exposure**
41. **Legal Compliance - Competition Law non compliance - resulting in fines, claims and reputational impact.**
42. **Legal Compliance - Business Principles - Anti-Bribery & Corruption, Money Laundering non compliance - fines**
43. **Legal Compliance - Adherence to JV Agreements e.g. Incorrect Allocation of Costs**
44. **Legal Compliance - Financial Loss - Employee Claims**

‘Swiss Cheese’ Barrier Model: Plant, Process, People.

Barrier Model - Swiss Cheese



Current State	Future State: STRONG	Future State: WEAK
STRONG	• Maintaining high quality procedures, standards and practices to keep strong barriers strong. • Functional audits and critical barrier checks at front line to provide assurance.	• Barriers may become weak due to emerging risks and changing activities. • Develop actions to address emerging risks and changing activities.
WEAK	• Weak or degraded barriers. • Develop actions to barriers strong.	• Some weak barriers may remain weak where there are adequate strong barriers in place to control the risk. • No Action.

Review Informed by :

- •Incident Trends
- •Audit compliance trends
- •Near Miss Trends
- •Technical Competence

Assessment of barriers to deliver continuous risk reduction and move towards operational compliance that is “systematic and in control”

JIG Business Risk Assessment Tool

- A number of tools are available that can be used for risk assessment and risk management.
- The JIG Business Risk Assessment and Risk Management Tool provides a qualitative, systematic approach to managing business risk within typical aviation storage, hydrant and into plane JV operations.
- Larger / more complex JV operations may need to employ risk assessment specialists who are capable of completing a more detailed, JV specific, quantitative risk assessment techniques to adequately demonstrate that the JV's major risks have been identified and are being adequately controlled.
- The JIG Business Risk Assessment Tool is intended for use by individuals who are familiar with risk assessment and are capable with the assistance of local JV personnel of assessing the type and effectiveness of existing: plant, procedure and people control measures / barriers the JV has in place.

Que 1 - Do we understand what could go wrong ?

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JV Business Risk Assessment Action Plan

8. Unhide All | 0. Help Sheet for Completing Risk Assessment | 2c. Help Risk Scoring Guidelines | 2a. Help Plant, Procedure, People: Action Guidelines

Airport	??
JV Name	??
Operator	??
Assessment Completed by:	??
Completed date:	09/12/10
Assessment Approved by:	Board Chairman ??
Approved date:	dd/mm/yy ??
Next Review Due	dd/mm/yy ?? (Recommend annual review & approval)

Control Measures / Barrier Guidelines

2a1. Plant - Example Strong Barriers

2a2. Procedures - Example Strong Barriers

2a3. People - Example Strong Barriers

2a4. Mitigation Factors - Examples

Risk Ranking

Likelihood score 1 Low to 5 High

Impact score 1 Low to 5 High

Risk = Likelihood x Impact

H >= 15 High Risk (Unacceptable)

M >5 & <15 Medium Risk (ALARP)

L 1-5 Low Risk

Blank - Risk not yet assessed

Risk Assessment Summary

3a. Check Barriers Effective

6. Sort by Risk Ref No

7. Sort by Relative Risk

Verified Status as @ 10/12/10

3c. List All Checks

3d. Overdues Only

3e. Sort by Days Overdue

Ref No	Risk (What could go wrong)	2a. Existing Risk Control Measures / Barriers (Systems to prevent things going wrong)	2b. Existing Risk L x I = R			2c. Additional Risk Reduction Action(s) / Barriers (2c1. Report All Risks / 2c2. Report All Actions / 2c3. Report Only Outstanding Actions)	2d. Risk After Actions L x I = R			2e. Action Party	2f. Target date	2g. Action Closed Date	3a. Critical Checks to Ensure Controls / Barriers Remain Effective (Assurance that systems are in place and remain effective)	3b. Freq (Months)	3c. Last Verified	3d. Overdue Days	MAR
R 2.0	**HSSE - Depot fire - Large spill due to fixed storage loss of containment** (not due to component failure)	1.0 Plant Barriers: • 1.1 Design Standards, • 1.2 Plant Inspections, • 1.3 Plant Maintenance. • 1.4 Protective Systems, • 1.5 Acceptable Standards checklist defined. 2.0 Procedure Barriers: 2.1 Hazard Identification/Risk Assessment Procedures , 2.2 Operating Procedures , 2.3 Control of Work (CoW) 3.0 People Barriers: 3.1 Competence - For routine activities, 3.2 Resource and Capability , 3.3 Motivation , 3.4 Enforcement of Standard/Practice/Procedures (SPP) 4.0 Mitigation Factors. • 4.1 On airport fire service as first responders. • 4.2 On airport paramedics to deal with possible injuries. • 4.3 Bund drain valves locked at all times to maintain product containment within bunded area. • 4.4 Fuel Farm storage tank deluge system in place. • 4.5 Reaction and response times of emergency services regularly tested and could be on site within 3 minutes. • 4.6 On airport Fire Service hold adequate amounts of fire fighting foam to deal with fire until outside services arrive. • 4.7 Effectiveness of secondary (bunds) and tertiary containment systems.	2	4	8	1.3 Plant Maintenance - tank integrity inspection overdue. EXAMPLE Column M RED = Action overdue	2	4	8	Ops Manager	01/02/11	Enter Date Closed dd/mm/yy	• Review the Site Specific Task Breakdown (SSTB) for the high and high high level alarm and shut off test for at least one tank. • Carry out a Task Observation of the functionality test being carried out on at least one tank to ensure that the test is carried out correctly and in line with the SSTB. • Check high level alarms and shut off valve inspection and maintenance records to ensure that all devices related to tank overfill prevention have been tested within the required period. • Check the training records for all staff that have this task listed in their Job Task Assessment to ensure their training is up to date.	3	01/10/10	-2	MAR

Business Risk (HSSE, Financial, People, Customer Service, Legal Compliance).

Business Risk marked MAR if a Major Accident Risk.

Que 2 - Do we know what our systems are to prevent this happening ?

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JV Business Risk Assessment Action Plan

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Current existing strong barriers: Plant, Procedures, People.
Mitigating measures to reduce risk impact.

Current risk level with existing strong barriers.

2c Are there additional barriers we can introduce to reduce risk further ?

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JV Business Risk Assessment Action Plan

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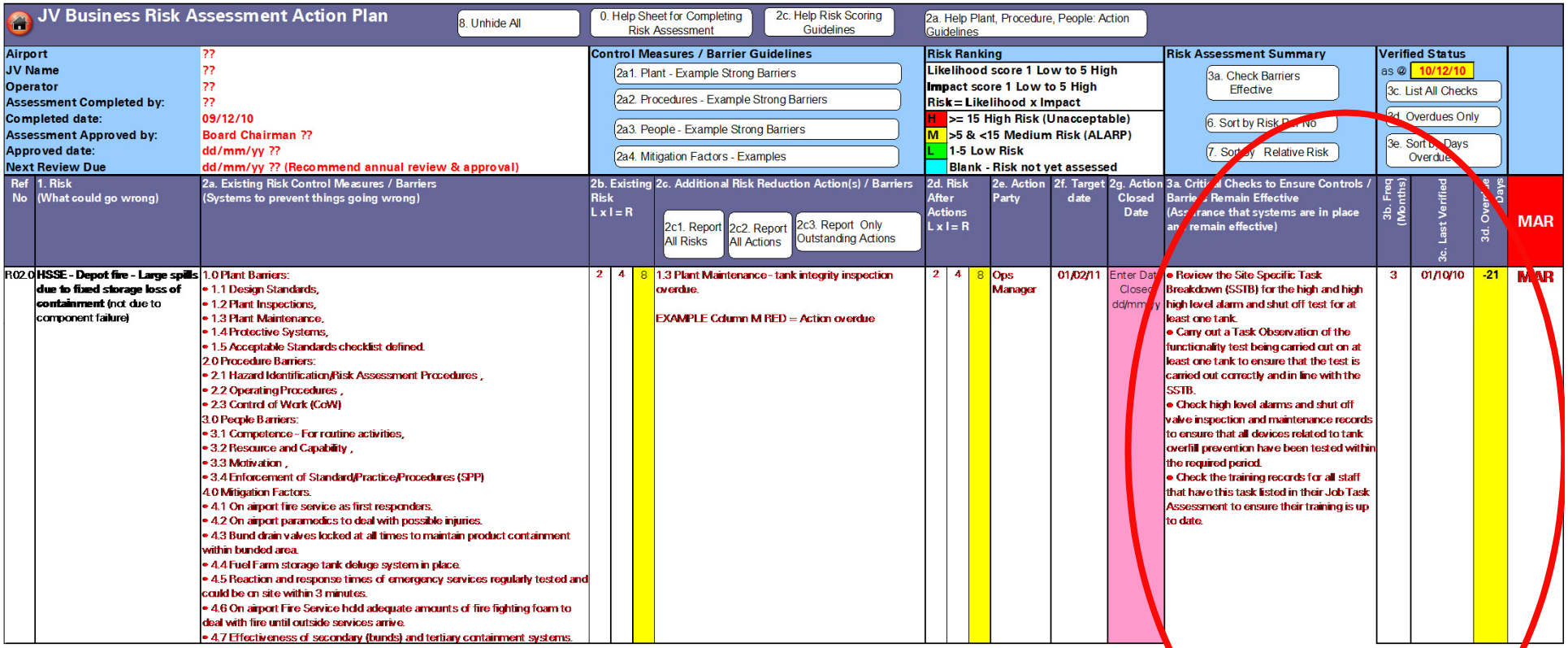
Additional (or missing) barriers introduced to further reduce risk to acceptable level.

Resultant acceptable risk level with all barriers and additional barriers in place and effective.

Que 3 Are we getting the right information to assure us they are working effectively ?



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Critical barrier checks completed by site manager at agreed frequency to provide assurance to JV Manager and JV Board that systems we think are in place are in place and effective.

Business Risk Assessment - Conclusion

- Completion of the business risk assessment and the regular critical barrier checks to confirm systems remain in place should establish a strong risk management process within the JV.
- **Business risk assessment provides assurance that the JV is operating within acceptable risk levels.**
- **Business risk management helps a JV deliver its business objectives by preventing things going wrong**.
- **The business risk assessment should be reviewed when there is a significant change in the JV's activities or at least at regular intervals** dictated by the JV Board to confirm that the JV continues to operate within a risk level that is acceptable to the JV Management Team and the JV Board.

JIG Business Risk Assessment Implementation Plan and Review Cycle

- **First JIG Business Risk Assessment (Implementation Plan between 2011 and end 2014)**
  - JV Participants to agree date for each JV to complete its first JIG Business Risk Assessment (timing should be influenced by the risk involved in each JV's activities and availability of skilled facilitators to assist each JV to complete its first JIG Business Risk Assessment).
  - JV to complete the JIG Business Risk Assessment Tool (contained within CP 4.02) facilitated by a Lead Participant or 3rd party (individual competent in risk assessment) – typically 1 day JV Management preparation + 1 day facilitation.
  - JV Board/ Management Committee to consider risk levels and confirm they are acceptable or that additional barriers are required to further reduce risk to an acceptable level.
  - By the end of 2014, all JVs are expected to have completed their first JIG Business Risk Assessment and have the Business Risk Assessment Review Cycle embedded in their management system.
- **Ongoing JIG Business Risk Assessment Annual Review Cycle.** Once the JV has completed its first JIG Business Risk Assessment it should then be embedded in the JV Management System as follows:-
  - JV Manager to close out any additional risk reduction actions (barriers) by agreed target dates.
  - JV Manager to complete critical barriers checks at the agreed frequency for each risk.
  - JV Manager to provide assurance to JV Board/ Management Committee (copy of the Business Risk Assessment Tool) at least once annually.
  - JV Manager to ensure that the Business Risk Assessment remains valid and to submit to JV Board/ Management Committee to confirm operational risk levels identified remain at an acceptable level. (Annually or when JV activity significantly changes).
  - Business Risk Assessment to be reviewed with competent individual (Participant or 3rd party every three years).

Notes

1. The Lead Participant is expected to be the same participant that has been identified to lead the JV through replacement of the existing Aircraft Refuelling Indemnity (Tarbox) Agreements with updated versions which are currently being prepared by an Industry Tarbox Legal Committee.
2. The JIG Common Processes Committee is arranging to train Lead Participant facilitators to assist JVs to complete their JIG Business Risk Assessment.
3. Training for JV Managers is also being considered for inclusion in the next series of JIG Workshops