



Tony Atkinson, Principal Safety Consultant - ABB Consulting

Individual, team and organisational human factors

Why are we concentrating on maintenance*?

- Lots of studies performed in this area, findings include: -
 - 56% of forced outages occurred less than a week after a planned or maintenance shutdown
 - 20% of all system failures in fossil power plants occur due to human failures
 - 55% - 65% of all problems associated with maintenance are related to human performance
- Maintenance errors are dangerous and expensive

* Or repair, calibration, testing, modification etc.



Resistance is Futile!

- The BAD News is that..
 - Human errors are inevitable
 - Everyone makes them



But don't worry

- The GOOD news is that
 - No one actually intends them to happen (mostly)
 - They don't occur as a result of random events in peoples minds
 - Human errors are the consequence of local circumstances
 - The task
 - The tools and equipment
 - The workplace and environment



Traditionally...

- Punish, council and train people
- Write new procedure or work instruction to make sure it doesn't happen again
- Unfortunately, research by behavioural psychologists show that neither of these approaches is likely to be successful



Better Way of handling Human Error

- Errors are a combination of human behaviour and task conditions
- Treat human errors as normal, expected and foreseeable
- Manage the errors by changing the conditions under which the work is carried out

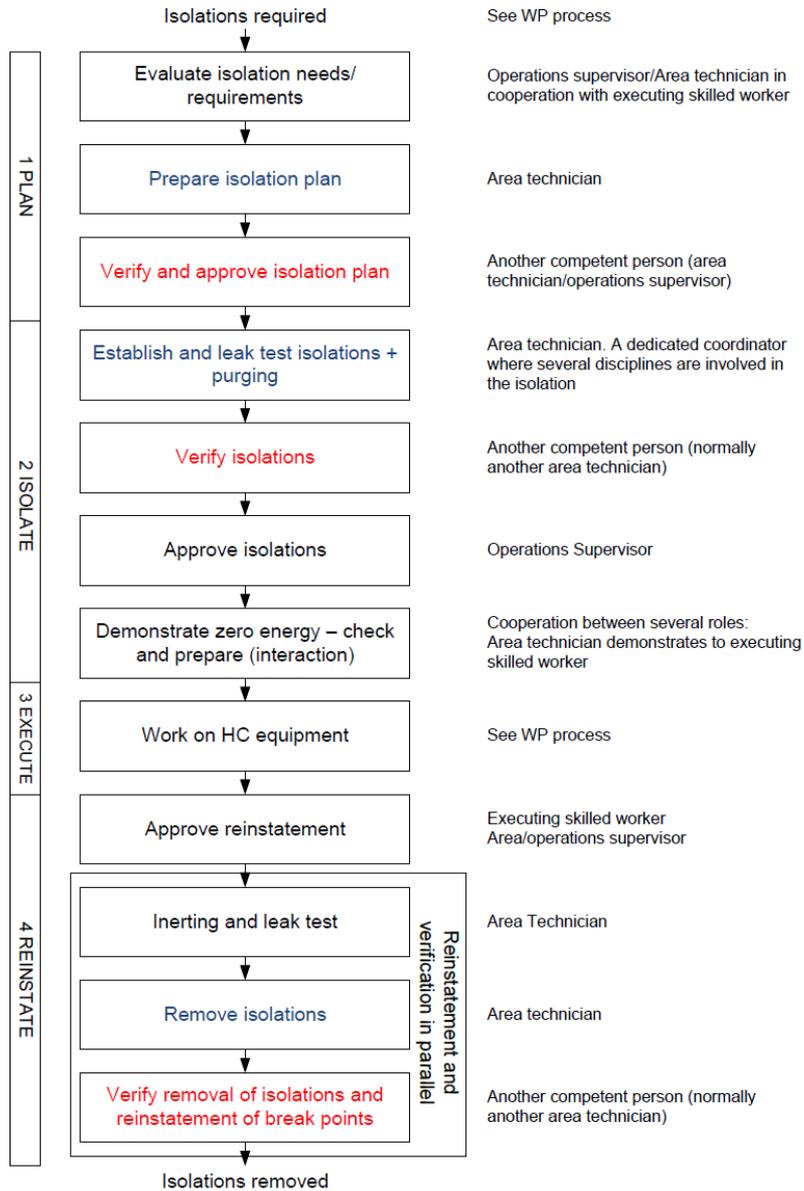


Figure 1 Steps to be taken for isolation and reinstatement when working on hydrocarbon equipment.

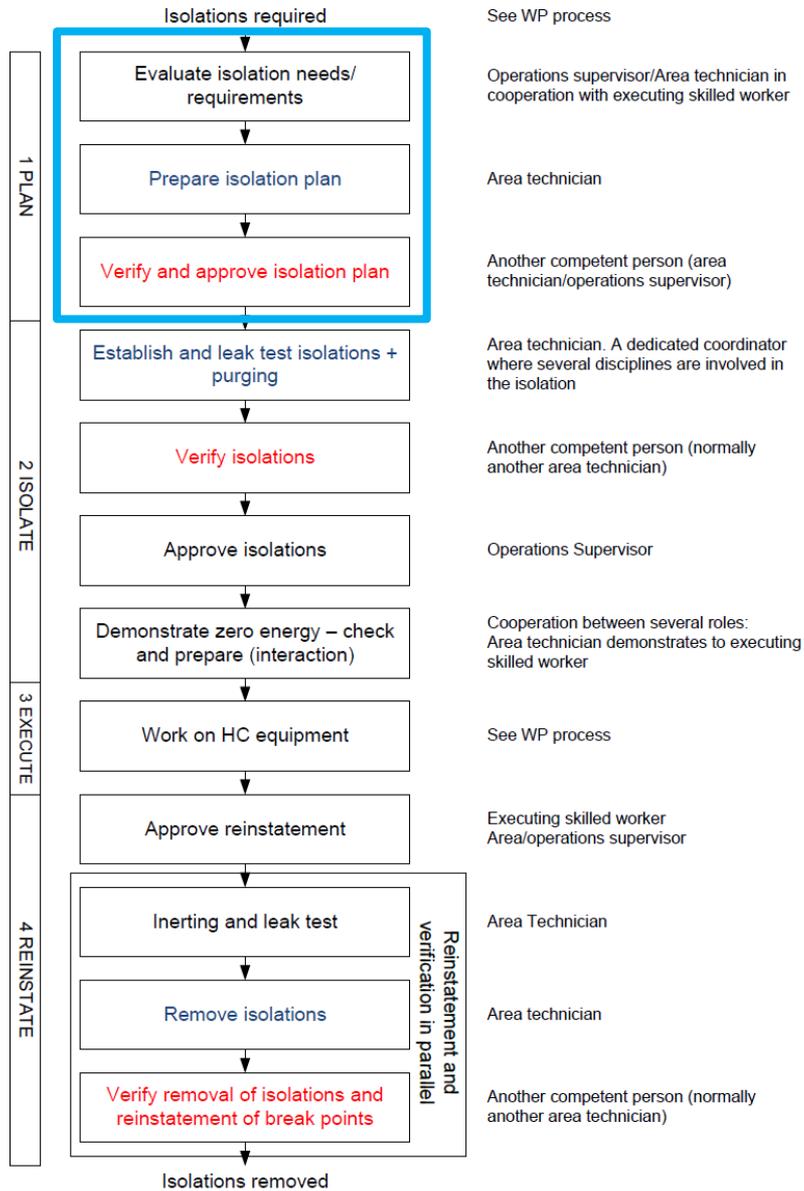


Figure 1 Steps to be taken for isolation and reinstatement when working on hydrocarbon equipment.

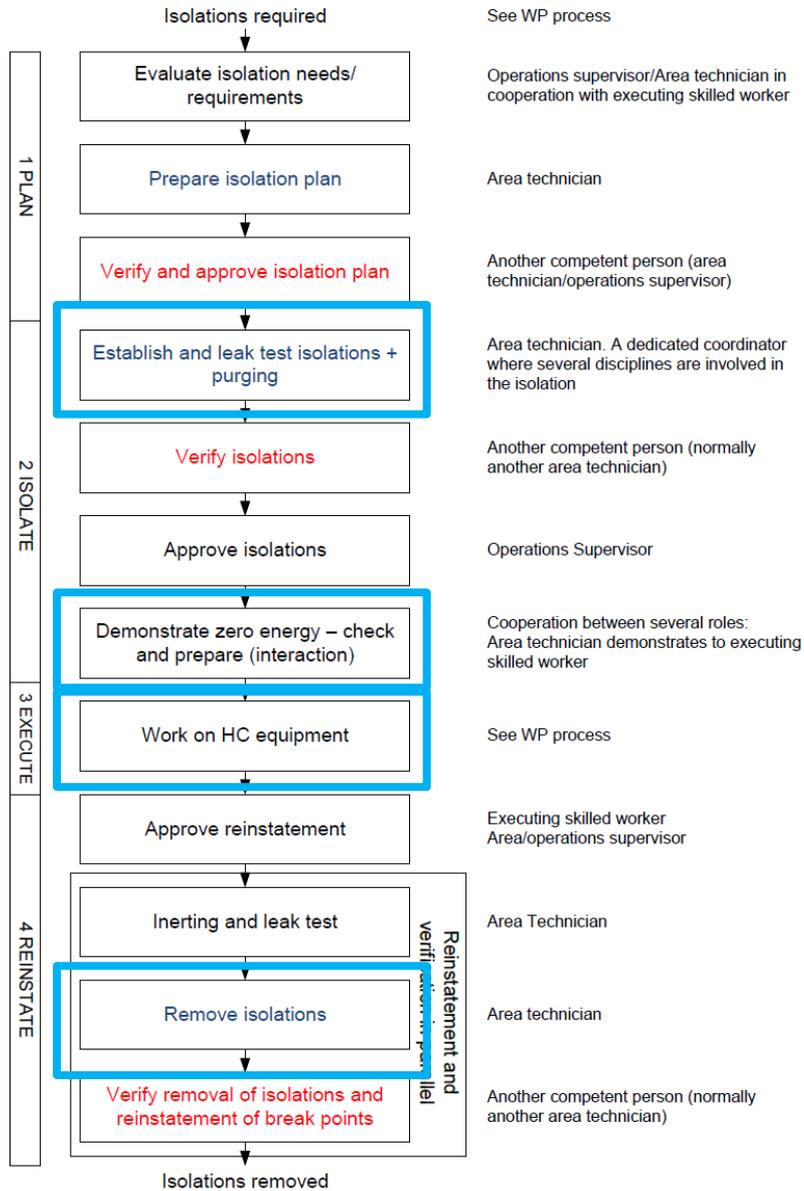


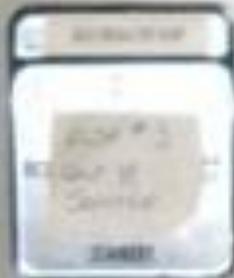
Figure 1 Steps to be taken for isolation and reinstatement when working on hydrocarbon equipment.



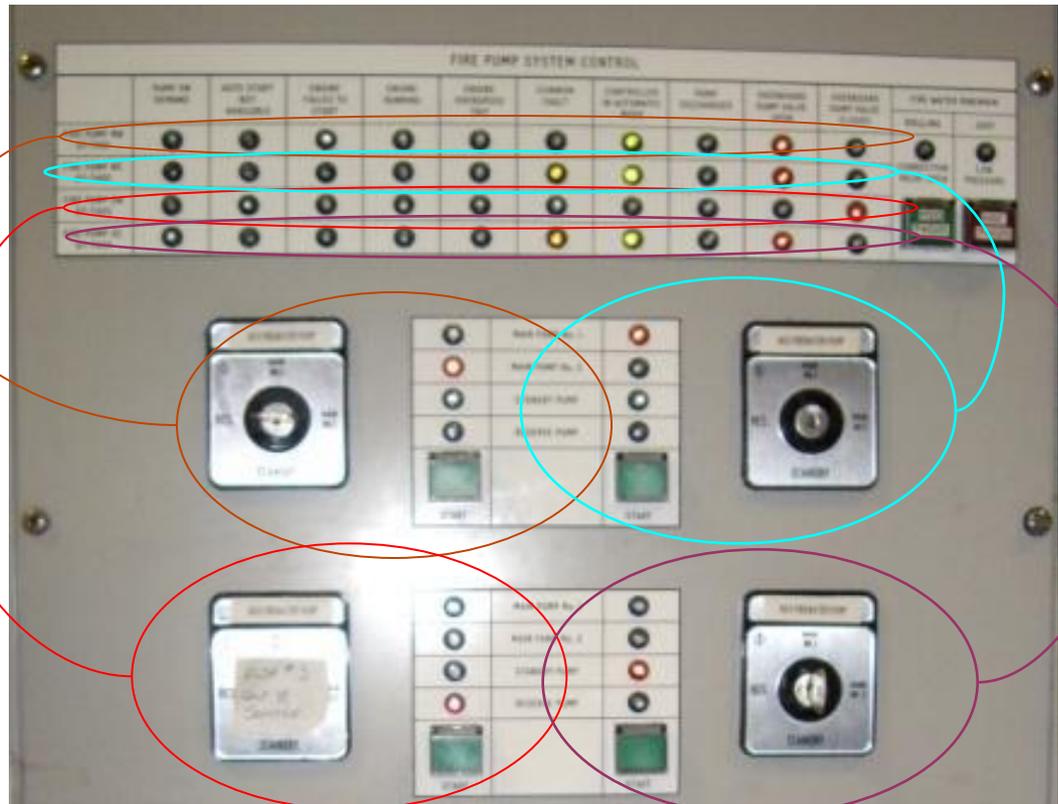


FIRE PUMP SYSTEM CONTROL

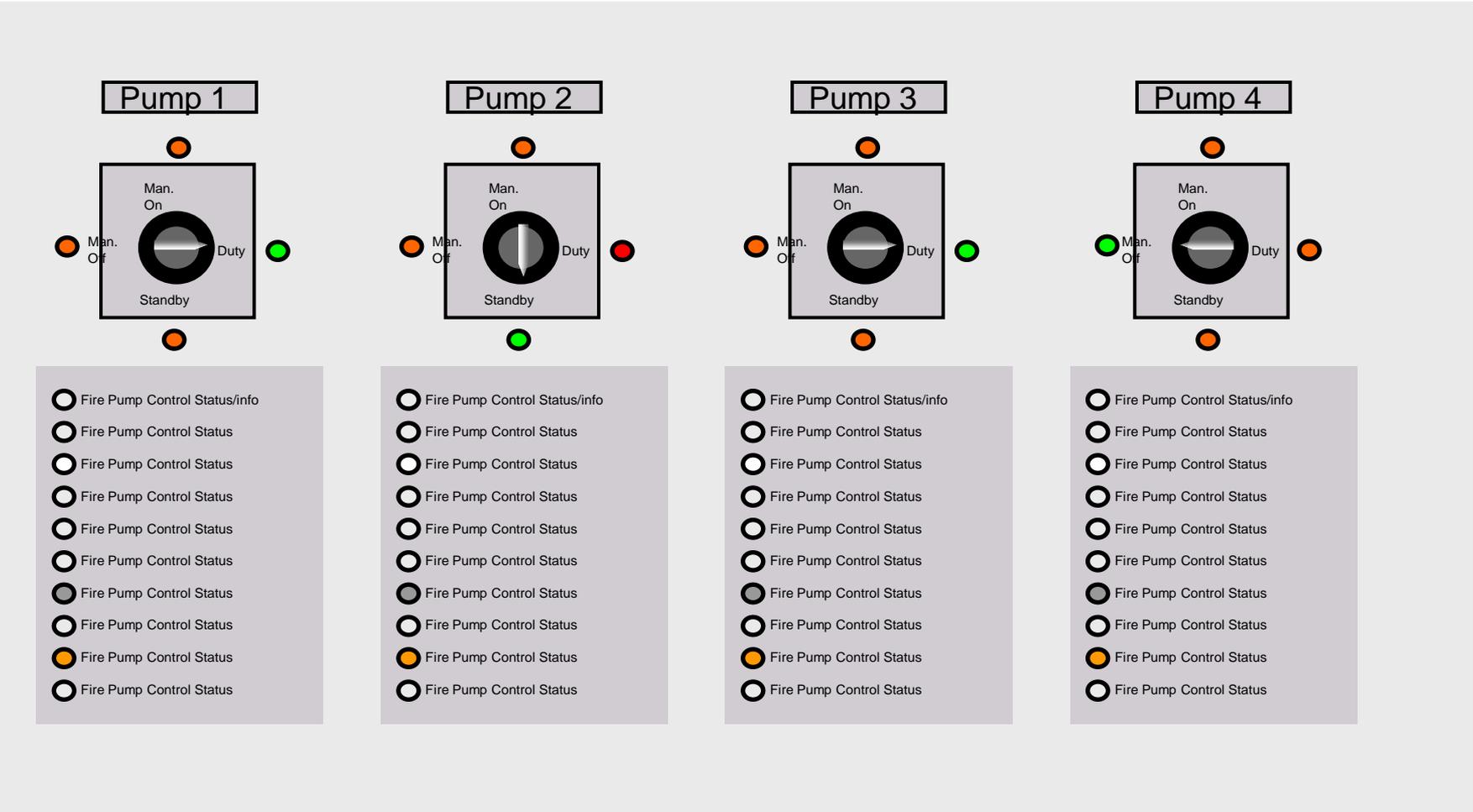
	PUMP ON OFF	AUTO START STOP	PUMP FAULT	PUMP RUNNING	PUMP STOPPED	PUMP FAULT	CONTROLLED BY AUTOMATIC MODE	PUMP DISCHARGED	PRESSURE PUMP VALVE OPEN	PRESSURE PUMP VALVE CLOSED	FIRE WATER PRESSURE	
											RELIEF	LOSS
FIRE PUMP No. 01	●	●	●	●	●	●	●	●	●	●	●	●
FIRE PUMP No. 02	●	●	●	●	●	●	●	●	●	●	●	●
FIRE PUMP No. 03	●	●	●	●	●	●	●	●	●	●	●	●
FIRE PUMP No. 04	●	●	●	●	●	●	●	●	●	●	●	●



- Four pumps, each pump has:
 - operating switch
 - Pump availability information
 - Usage information for each pump



Grouping of information



Other industries face similar problems!



K901 COMPRESSOR
LOCAL GAUGE BOARD

PG-914

K-901
DISCHARGE LINE



PG-913

K-901 3RD STAGE
SUCTION LINE



PG-912

K-901 2ND STAGE
SUCTION LINE



PG-911

K-901 1ST STAGE
SUCTION LINE



TG-919

K-901
DISCHARGE LINE



TG-918

K-901 3RD STAGE
SUCTION LINE



TG-917

K-901 2ND STAGE
SUCTION LINE



TG-916

K-901 1ST STAGE
SUCTION LINE



12/01/2010

Technician's view



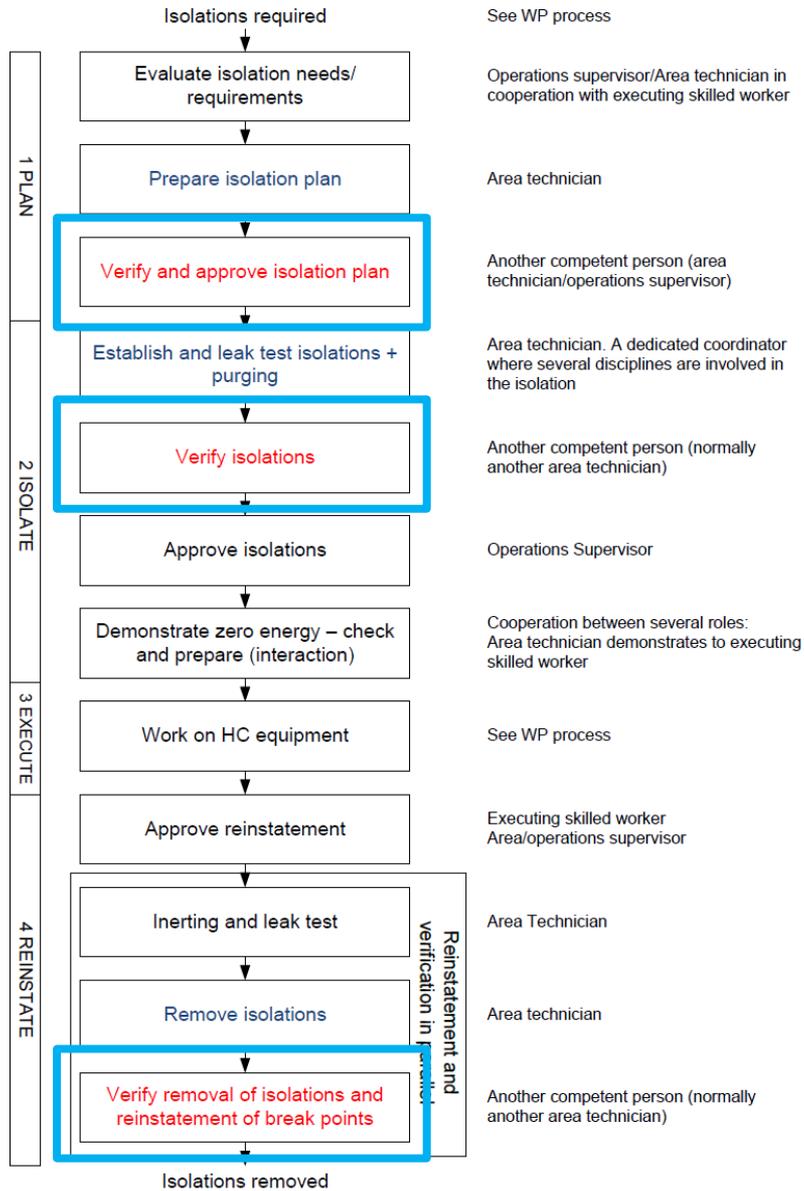


Figure 1 Steps to be taken for isolation and reinstatement when working on hydrocarbon equipment.

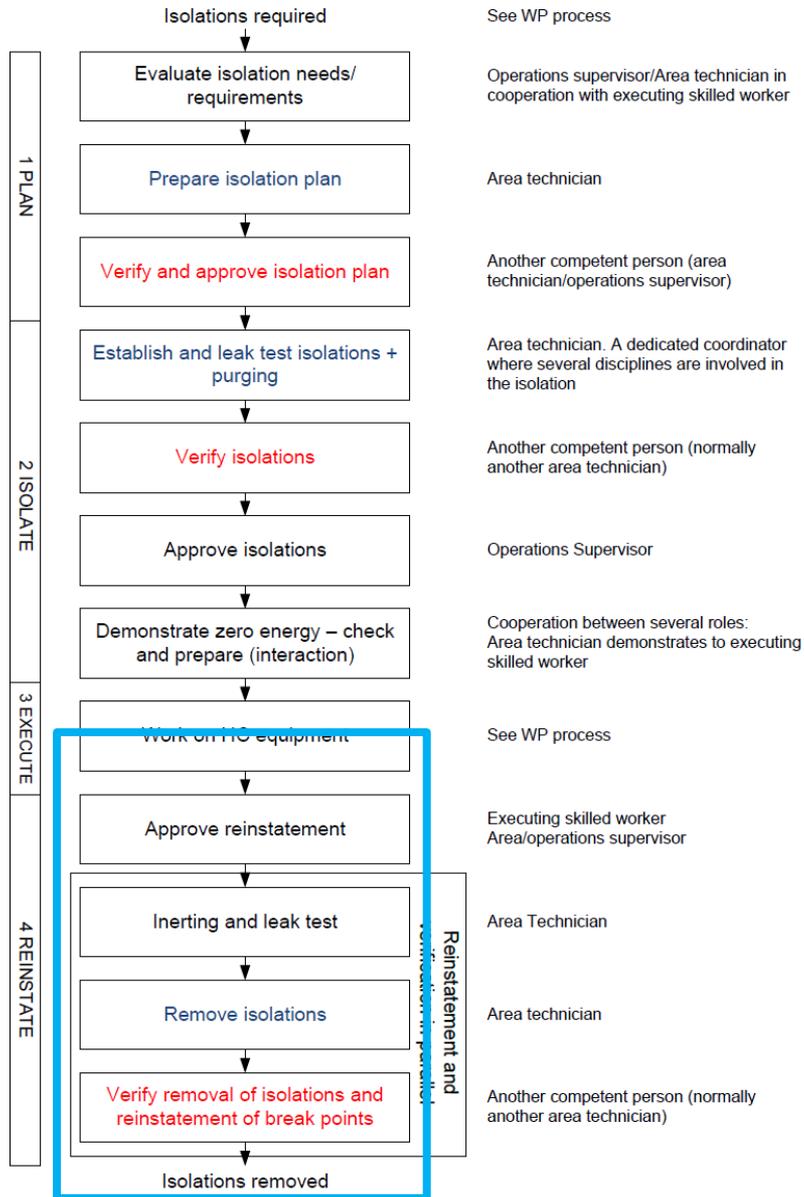


Figure 1 Steps to be taken for isolation and reinstatement when working on hydrocarbon equipment.



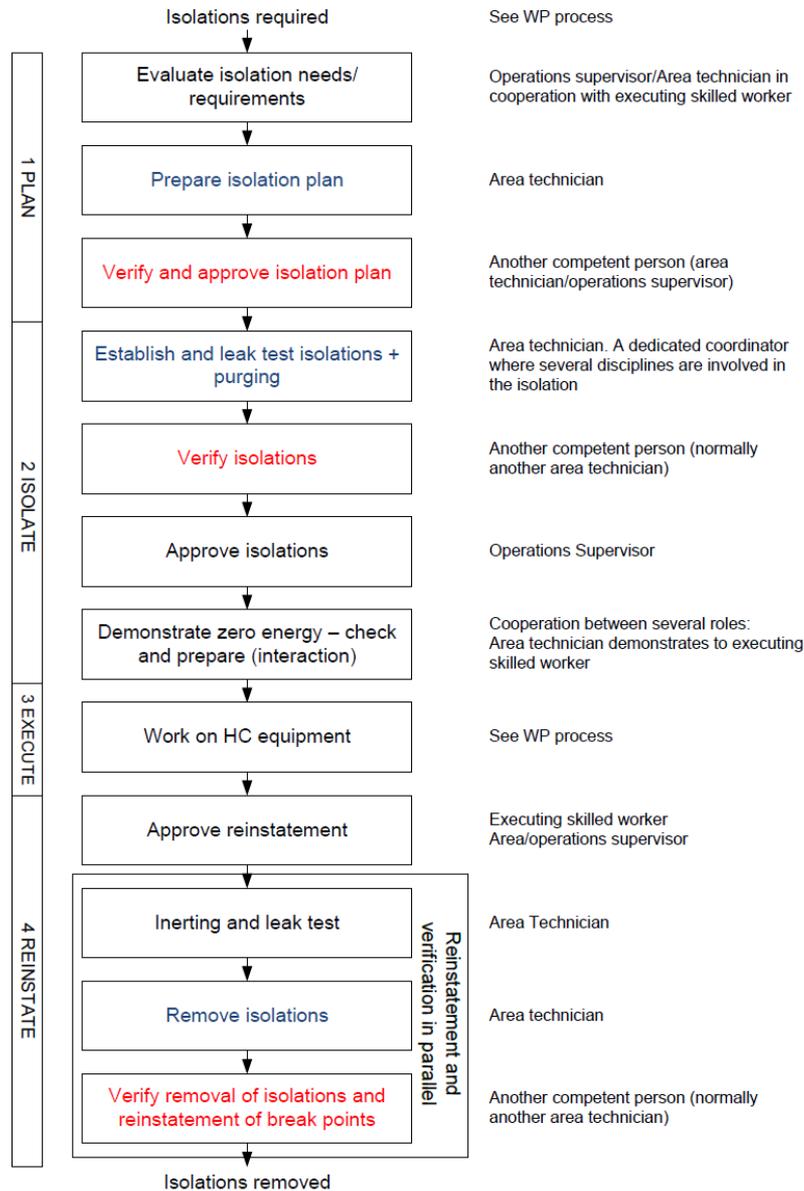


Figure 1 Steps to be taken for isolation and reinstatement when working on hydrocarbon equipment.

- Each step in this process has its own vulnerabilities
 - Most are predictable
 - Defences can be put in place
- The examples above are only a few of many possible factors that influence the success or otherwise of the task

So what can we do?

- Train people in human factors
 - Every extra pair of eyes is a chance to identify a problem before it happens
 - 'Fresh' pairs of eyes even more so
- Build a culture that is intolerant of error
 - Every 'recovery' is an opportunity to learn
- Employ experts
 - Examine tasks and processes
- Learn from other industries

Tony Atkinson
Principal Consultant (Human Factors)
tony.atkinson@gb.abb.com

Blog:
www.tinyurl.com/humanfactorsblog

Power and productivity
for a better world™

