ICAM
Investigation Report

Business Unit: Rail

Date of Incident: Tuesday 14th October 2008

Brief Description of Incident:

Employee engaged in transporting herbicide spraying plant, consisting of Hino truck towing a trailer, containing a quad bike and spray buggy, injured his back whilst attempting to unhitch buggy from bike. Employee suffered serious injury and required transporting to Cootamundra hospital by ambulance.

Report Prepared By: Don Butterworth

Date of Report 4th November 2008

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1. Scope of Investigation:

The scope of this investigation includes an analysis of contributory factors associated with the incident in question. During the course of investigation other relevant findings, which may not have directly contributed to the incident, have also been duly noted.

2. Investigation Team Members:

The following persons were directly engaged in the investigation process:

Name	***Position***
Don Butterworth	Operations & Compliance Manager

3. Incident Description & Sequence of Events:

On the 14th October 2008 at approximately 0800hrs an employee was engaged in transporting herbicide spray plant, consisting of Hino truck towing a trailer which contained a quad bike and spray buggy. When traversing a railway crossing, at low speed, 10km from Cootamundra, the trailer disengaged from the truck due to loss of retaining nut on tow ball. Vehicle was pulled over to the side of the Olympic Highway whilst an assessment was carried out.

Employee decided to replace truck tow ball with the one off the quad bike and limp the truck and trailer into Cootamundra where a replacement truck tow ball could be sourced..

Whilst attempting to unhitch buggy from bike whilst still on trailer, employee suffered serious injury to his back. Due to severe incapacity from his injury, his position on the left hand side of the vehicle and lack of mobile phone coverage it was approx. 4 hours before assistance arrived and arranged transport of employee by ambulance to Cootamundra hospital.

Items of plant being towed

Towing arrangement for quad bike & buggy

The sequence of events before, during and immediately following this incident are described below:

Event Sequence	***Date***	***Approx Time***	***Event Description:***
1.	11/10/08	0600 - 1600	Employee travels from Geelong – Yass, transporting spray plant. Overnight Yass
2.	12/10/08	0600 - 1600	Employee travels from Yass – Culcairn. Conducts spraying operations Culcairn (NSW), Overnight Wagga
3.	13/10/08	0600 - 1600	Employee travels from Wagga – Table top. Conducts spraying operations Table Top (NSW). Fills spray buggy with 400 litres (400kg) of water for next day's spraying. Overnight Wagga
4.	14/10/08	0600	Departs Wagga (NSW) transporting plant to Cootamundra.
5.	14/10/08	0710	Traversing Railway crossing approx 10km from destination, trailer becomes detached from truck, safety chains held trailer in place. Speed at the time was approx 20kph due to curvature in road.
6.	14/10/08	0715	Employee pulls over to the side of the road and assesses the situation deciding to replace truck tow ball retaining nut with one off the quad bike on the trailer. It is considered that this will suffice to tow trailer into Cootamundra where a replacement tow ball can be sourced
7.	14/10/08	0740	Quad bike retaining nut is found to be the wrong size for the truck, it is decided to take the whole tow ball off bike and place on truck. This involves disconnecting the spray buggy from quad bike.
8.	14/10/08	0800	Employee whilst attempting to unhitch spray buggy, total weight of 750kg, sprains back and becomes incapacitated.
10.	14/10/08	0800 - 1200	Due to severe incapacity from his injury, his position on the left hand side of the vehicle and lack of mobile phone coverage the employee was unable to summon assistance.
11.	14/10/08	1200	Employee eventually gets a message through his mobile phone to a fellow employee who arranges assistance.
12.	14/10/08	1210	Fellow employee arrives on scene and calls ambulance.
13.	14/10/08	1230	Ambulance arrives and transports injured employee to Cootamundra hospital..

4. Incident Risk Assessment

In accordance with the Downer EDI Works Risk Assessment Matrix (figure 1 below), the "Actual" and "Potential" risk ratings for this incident are discussed below (refer to Appendix 1 for consequence and likelihood ratings):

Figure 1: Risk Assessment Matrix

		LIKELIHOOD				
		1. Rare	2. Unlikely	3. Possible	4. Likely	5. Almost Certain
CONSEQUENCES	6 - Catastrophic	B	B	A	A	A
	5 - Extreme	C	B	B	A	A
	4 - Severe	C	C	B	B	A
	3 - High	D	C	C	B	B
	2 - Medium	D	D	C	C	B
	1 - Low	D	D	D	C	C

	Risk Action Levels	
A	▪Immediately stop the process; ▪Senior Management decision/action required	** ***Note:*** *Contractors and suppliers rated* ***A, B or C*** *are deemed* ***"Critical"*** *and require further evaluation prior to gaining "Approved Supplier" status*
B	▪Take immediate action to further control the risk; ▪Line Manager/Foreman decision/action required.	
C	Review for improvement opportunities.	
D	Monitor risk, reduce if practicable.	

Actual Risk Rating for Incident		
Consequence	***Likelihood***	***Risk Level***
3 - High	3 - Possible	C - Medium Risk
Rationale for Risk Rating: Hospitalisation of employee resulted.		

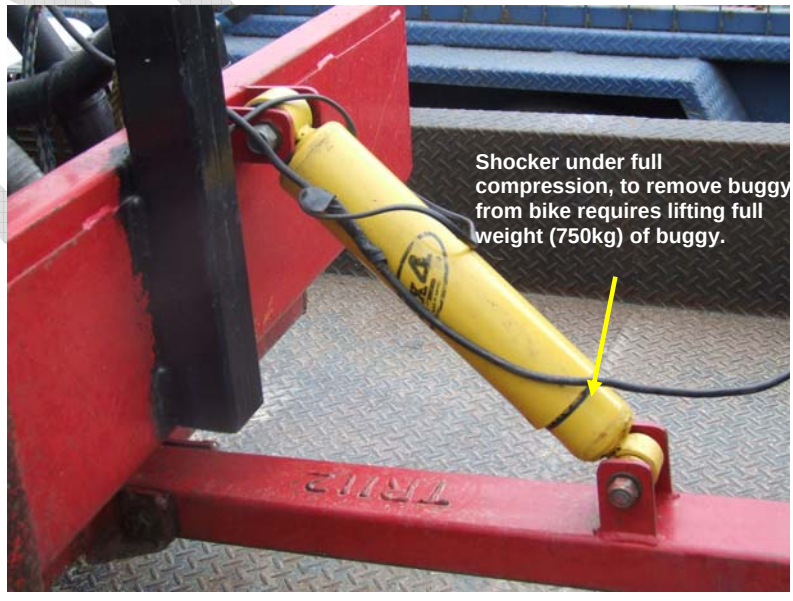
Potential Risk Rating for Incident		
Consequence	***Likelihood***	***Risk Level***
4 - Severe	3 - Possible	D - High
Rationale for Risk Rating: Risk of injury causing irreversible impairment to employee.		

5. Contributory Factors

The Incident Cause Analysis Method (ICAM) has been applied to identify the contributory factors of this incident. These findings are described below:

Organisational Factors	• The provision of communication equipment inadequate for the area to be worked, resulting in undue delay in employee receiving medical attention, and may have exacerbated the injury. • Inadequate JSA for the task. JSA did not provide a procedure for the removal of the spray buggy from the quad bike. • Lack of follow-up or audit regime to ensure minor maintenance tasks required were being conducted. No pre-start documentation. • Replacement of shock absorbers on Spray Buggy by operators, negated the advantage the original shock absorber gave for assistance in removing buggy from bike. Plant department although advised had no input into the modification. • The problem with removing buggy from bike was already recognised as another operator had set his equipment up for this eventuality, but a medium of passing this information on to other operators was not present. There is no evidence of a toolbox meeting being held for herbicide/vegetation employees.
Individual / Team Actions	• Employee failed to conduct a pre-start inspection of towing vehicle over a period of time as the hole on the tow bar was elongated indicating a problem had existed for some time. • Employees original assessment was flawed as a quick trip into Cootamundra for a new tow ball would have solved all problems. • Spray buggy had 2 deflated tyres on trailer further distributing total weight onto drawbar. Tyres had been deflated for a period of days.

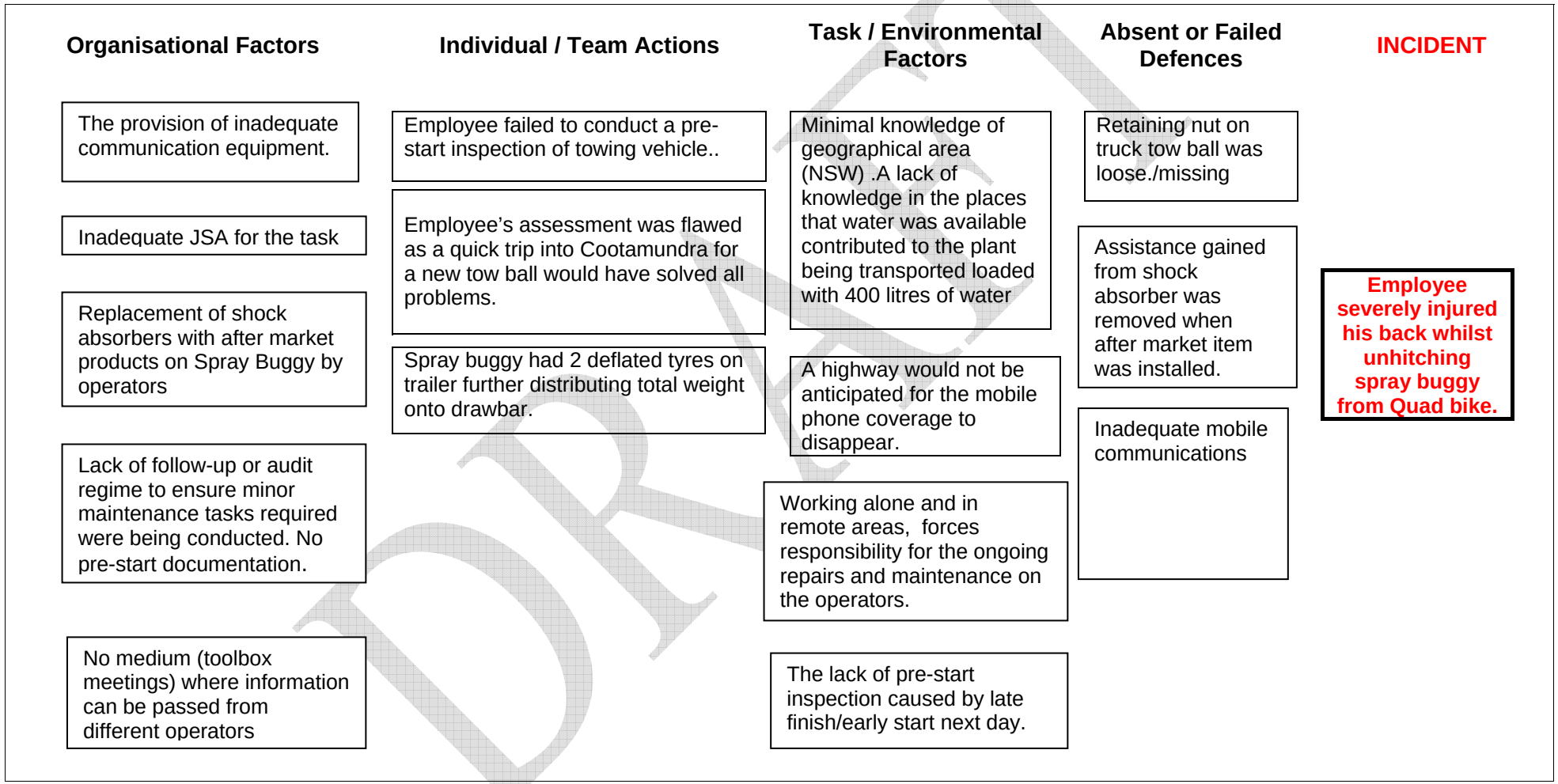
Task / Environmental Factors	• The lack of pre-start inspection of plant was instigated by previous shift finishing in the dark followed by early start next day. • Minimal knowledge of geographical area (NSW) deflected focus from safe operation of plant. A lack of knowledge in the places that water was available for the spraying operations contributed to the plant being transported with 400 litres of water in the spray buggy. • Being on a main highway it would not be expected for the mobile phone coverage to disappear. • Consistent puncturing of tyres during spraying operations made it impractical to constantly halt operations to fix them. • Working alone and in sometime remote areas , responsibility for the ongoing repairs/maintenance was wholly on the operators.
Absent or Failed Defences	• Retaining nut on truck tow ball was loose./missing indicating lack of pre-start checks/inspections. • Assistance gained from standard shock absorber was removed when after market shocker was installed. • Deflated tyres distributed total load of buggy to drawbar and subsequently to tow ball and hitch. • Inadequate mobile communications for the area being worked.

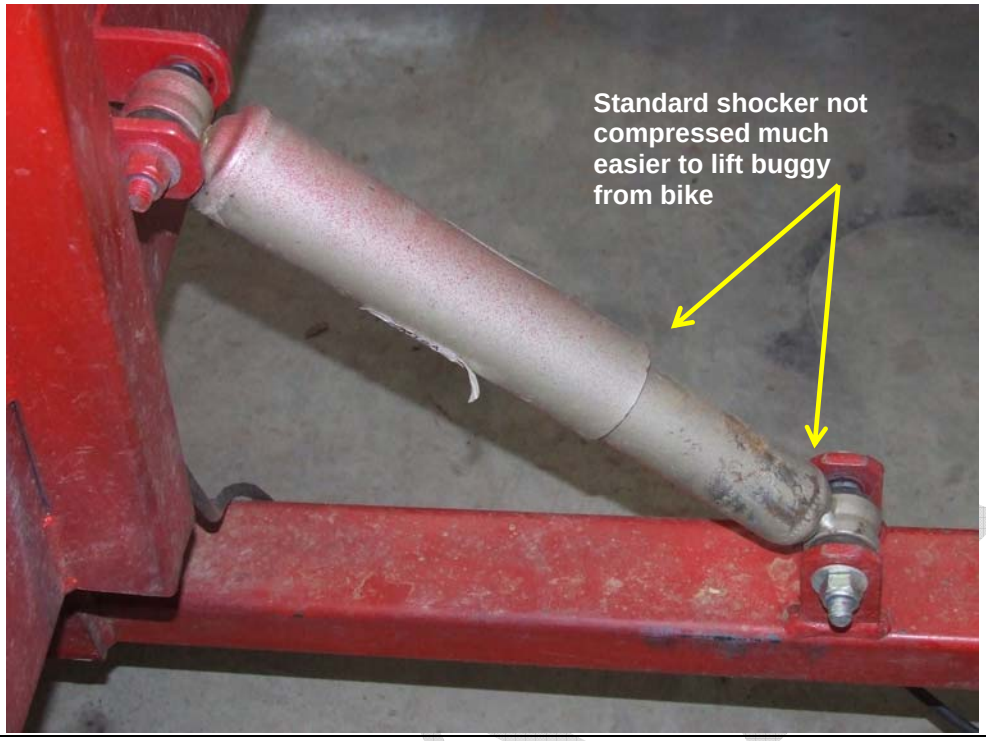


Example of modified Shock Absorber

5.1 ICAM Summary Chart

The chart below summarises the causative factors identified during the investigation process:





7. General Conclusions

In light of the investigation findings, the following general conclusions have been made:

1. Primary cause of the incident was a lack of pre-start check or ongoing maintenance to the vehicle which resulted in the trailer disengaging from the truck due to missing retaining nut/washer on tow ball.

2. The cause of the injury can be attributed to the following:

    - Incorrect assessment of problem by operator in trying to replace tow ball off truck with a smaller tow ball off bike, increasing the risk of further incidents.
    - Replacement of standard shock absorber, because of repeated/frequent failures, with an after market shock absorber. This negated the advantage the original shocker gave for removing spray buggy from bike.
    - An additional 440kg (400litres) of weight in the buggy due to lack of local knowledge of where the next available water supply was.
    - Deflated tyres on the buggy placed all weight of buggy on to drawbar (750kg). Tyres had been deflated for days due to repeated and frequent punctures.
    - No available mechanical method for removing buggy from bike.

3 The delay in attendance of assistance/medical staff can be attributed solely to the provision of inadequate mobile communication for the area being worked in. With the changeover to 3G and the black spots still experienced by digital networks when in country areas, make a 3G phone an essential communication device for all employees working outside of major cities.

8. Recommended Corrective Actions

The following corrective actions are recommended to prevent the occurrence of similar incidents in the future:

Action Required	***Responsibility***	***Priority Level*** 1 = High 2 = Medium 3 = Low
1. Implement a thorough review of all mobile phone communications ensuring that employees working alone/remotely are provided with the best available network service. All digital phones to be replaced with 3G network where appropriate	Line Managers and Supervisors.	1
2 Promulgate a "*safety first"* culture within Vegetation/Herbicide employees through a rigid system of Toolbox meetings and a systematic method of compliance inspections .	Supervisor	1
3. A pre-start checklist for Quad bike & Spray buggy be drawn up.	Supervisor	1
4. A systematic review of all operations involving spraying equipment to include solutions to repeated failures of tyres, shock absorbers. This review to be done in conjunction with Plant Department.	Manager Plant Department, Supervisor, employees.	1
5. Issue Safety Alert highlighting the requirement for Plant Department's permission before any repair/modification to any item of plant is carried out.	SEQ Manager	1

*** All agreed actions are to be recorded against the incident in the BIR system and monitored accordingly.*

9. Appendix 1: Downer EDI Works Infrastructure Risk Assessment Matrix

RISK ASSESSMENT MATRIX		LIKELIHOOD (Refer to Definitions right)				
		1. Rare	2. Unlikely	3. Possible	4. Likely	5. Almost Certain
CONSEQUENCES (Refer to Definitions Overleaf)	6 - Catastrophic	B	B	A	A	A
	5 - Extreme	C	B	B	A	A
	4 - Severe	C	C	B	B	A
	3 - High	D	C	C	B	B
	2 - Medium	D	D	C	C	B
	1 - Low	D	D	D	C	C

	Risk Action Levels
A - Extreme	▪Immediately stop the process; ▪Senior Management decision/action required.
B - High	▪Take immediate action to further control the risk; ▪Line Manager/Foreman decision/action required.
C - Medium	Review for improvement opportunities.
D - Low	Monitor risk, reduce if practicable.

Likelihood Definitions:
What is the likelihood of the selected consequences occurring?

Rating	*Criteria*
5. Almost Certain	▪ Over 90% probability; or ▪ "Happens Often"; or ▪ Could occur within "days to weeks"
4. Likely	▪ Greater than 50% probability; or ▪ "Could easily happen"; or ▪ Could occur within "weeks to months".
3. Possible	▪ Greater than 10% probability; or ▪ "Could happen, has occurred before"; or ▪ Could occur "within a year or so".
2. Unlikely	▪ Greater than 1% probability; or ▪ "Hasn't happened yet but could"; or ▪ Could occur "after several years"
1. Rare	▪ Less than 1% probability; or ▪ Conceivable, but only in extreme circumstances; or ▪ Exceptionally unlikely, even in the longer term; ▪ A "100 year event"

Consequence Definitions – *What are the likely consequences in the event of a failure?*								
Rating		**Health & Safety**	**Environment & Community**	**Legal & Compliance**	**Brand & Reputation**	**Management Impact**	**Financial Impact (Au$ EBIT)**	**Investment Return (Au$ NPV)**
Catastrophic	**6**	▪ Multiple fatalities or significant irreversible effects to 10's of people	▪ Very serious long term impairment of ecosystem or damage to a species; ▪ Complete loss of trust by affected community leading to social unrest & outrage.	▪ Major litigation with damages of $50m+ plus significant costs; ▪ Jailing of executive or Manager; ▪ Court or NGO imposed fine of $10m+	▪ Total loss of shareholder and customer support; ▪ Prolonged impact to share price; ▪ Group MD and/or Board members resign; ▪ International press reporting.	▪ Long-term significant impact on the business that requires considerable Executive Management time to handle over years; ▪ Leads to premature closure of the affected part of the Group.	▪ $100m+ loss or gain.	▪ $300m+ loss or gain.
Extreme	**5**	▪ Single fatality and/or severe irreversible disability to one or more persons	▪ Serious medium term environmental effects; ▪ Prolonged community outrage; ▪ Impact on the viability of the business	▪ Major litigation costing $10m+; ▪ Class action; ▪ Possibility of custodial sentence for Manager.	▪ Short-term impact on share price (months); ▪ Customers terminate contracts; ▪ Senior Executive leaves; ▪ Australia-wide press reporting.	▪ Critical event or disaster with significant impact on the business that requires considerable senior Divisional Management time to handle over many months.	▪ $10m - $99m loss or gain.	▪ $30m - $299m loss or gain.
Severe	**4**	▪ Moderate irreversible disability or impairment to one or more persons	▪ Moderate short-term effects but not affecting ecosystem function; ▪ Long-term community irritant leading to disruptive actions & requiring continual management attention	▪ Major breach of regulation with punitive fine; ▪ Significant litigation involving many weeks of Divisional Management time.	▪ Divisional CEO leaves; ▪ Customers register strong concerns and threaten contract termination; ▪ State-based media reporting.	▪ Will require the involvement of Divisional CEO and will take all the time of business-level managers for several weeks	▪ $1m - $9m loss or gain.	▪ $3m - $29m loss or gain.
High	**3**	▪ Hospitalisation required; ▪ Medium term largely irreversible disability to one or more persons	▪ Minor effects on biological or physiological environment; ▪ Short term community outrage or longer term unrest & dissention	▪ Serious breach of regulation with investigation or report to authority with prosecution and/or moderate fine possible.	▪ Manager disciplined; ▪ Customer complains strongly; ▪ Local media reporting.	▪ Significant event that can be managed with the careful management attention; ▪ Will take some business-level Management time over several weeks.	▪ $100k - $900k loss or gain.	▪ $300k - $2m loss or gain.
Medium	**2**	▪ Reversible disability requiring medical treatment	▪ Limited damage to minimal area or low significance; ▪ One-off community protest requiring intervention and management attention.	▪ Minor legal issues, non-compliances and breaches of regulation.	▪ Employee disciplined; ▪ Customer aware and affected.	▪ Will require some local management attention over several days.	▪ $10k - $99k loss or gain.	▪ $30k - $290k loss or gain.
Low	**1**	▪ No injury or minor first aid treatment required	▪ Small impact; ▪ One complaint	▪ Minor breach of regulation.	▪ No visible impact on the business.	▪ Impact of event absorbed in normal management activity.	▪ <$10k loss or gain	▪ <$30k loss or gain.