

Enquiries Kirstin Pratt
Telephone (07) 3330 5615
Your reference PEN100084007 / Nockatunga
Our reference 316537 / BNE40538



**Queensland
Government**

13 September 2010

Department of
**Environment and Resource
Management**

Santos QNT Pty Ltd
Ground Floor
60 Flinders Street
ADELAIDE SA 5000

Dear Mr Nathan Childs,

The Department of Environment and Resource Management (DERM) acknowledges receipt of the annual return submitted by Santos QNT Pty Ltd for environmental authority PEN100084007 on 10 June 2010 and supporting information on 15 September 2010.

Santos QNT Pty Ltd indicated in the annual return that the conditions of the environmental authority were not fully complied with. Santos QNT Pty Ltd identified that two incidents occurred on the project area between 1 January 2009 and 31 May 2010 (13/09/09 and 02/04/10) involving spills of crude oil and produced formation water. DERM acknowledges that both incidents were relatively minor and actions were taken to remediate the affected areas. DERM was not notified of these incidents. Santos QNT Pty Ltd advised that DERM is notified of spills that are greater than 200L to land or 80L to water.

DERM draws your attention to the following conditions of PEN100084007:

Condition 11 – Waste management

The holder of the environmental authority must:

- (a) ensure that petroleum activities do not result in the release or likely release of contaminants to land or waters that results in material or serious environmental harm, unless the release is explicitly authorised under the EP Act.
- (b) remove and dispose of all regulated waste to a licensed waste disposal facility or recycling facility.

Condition 16 – Associated Water

- (a) The holder of the environmental authority must ensure that associated water is not released to land or waters, other than to an appropriately designed and engineered containment facility built for the purposes of separation and recovery of oil from water.
- (b) The holder of the environmental authority must ensure that all associated water is processed through an oil water separator system prior to release to a containment facility.

- (c) Despite 16 (a) the holder of the environmental authority may apply to the administering authority to allow associated water that meets a nominated set of water quality standards to:
- i. be released to land or waters; or
 - ii. be used for a specified purpose, provided the potential user has given written advice about the proposed use and environmental safeguards that will be implemented to prevent material or serious environmental harm.

Condition 21 - Notification

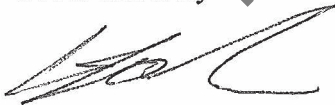
The holder of the environmental authority must record and initially notify the administering authority as soon as practicable of any emergency or incident that causes non-compliance with the conditions of the authority.

As the conditions are written, Santos QNT Pty was required to notify DERM of the incident involving the spill of produced formation water on 13 September 2010 as a minimum. DERM does not intend to take any further actions regarding these incidents given the apparent minor environmental impacts. However, Santos QNT Pty Ltd is reminded of their responsibility to take all measures necessary to ensure compliance with the conditions of PEN100084007 as a breach of conditions is a serious offence for which there are heavy penalties.

DERM requests that Santos QNT Pty Ltd confirm that the non-compliance with the environmental authority conditions of PEN100084007 identified in the annual return relate to the two incidents mentioned in this letter only. Please provide a response to this question by 20 September 2010.

If you wish to discuss this matter further please contact Kirstin Pratt on telephone (07) 3330 5615.

Yours sincerely



Louise Jordan
Manager
Petroleum and Gas Unit
Environment and Natural Resource Regulation
Department of Environment and Resource Management

Queensland Cooper Basin Operations: Environmental Incidents 1 Jan 2009 – 31 May 2010

Date	IMS Report #	Site	Occurrence	Well / Location	Tenure	Environmental Authority	Substance	Total Uncont Vol. (m ³)	Water %	Area Impact (m ²)	Mechanism Root Cause	Loss Mechanism	Action	Status	Consequence	Risk	Regulator Notified [‡]	Date Notified
9/01/09	37378	Jackson	Flowline leaking	Naccowlah West 13	PL25	PEN100046407	Produced Formation Water Crude Oil	0.015	90	2	Corrosion	Line	Clamp installed	Closed	Minor	Low	-	-
12/02/09	38786	Ballera	Leak from engine oil filter bleed valve	Ballera Plant	PL61	PEN100046407	Lubrication Oil/Hydraulic Fluid	0.01	0	8	Mech Failure	Valve	Valve closed, area cleaned up	Closed	Negligible	Low	-	-
13/02/09	38794	Jackson	Flowline failed	Vega North 1	PL131	PEN100046407	LPG/Condensate Gas Produced Formation Water	0.16	99	2	Mech Failure	Line	Line isolated and repaired	Closed	Negligible	Low	-	-
16/02/09	38928	Jackson	Failed gate valve and ball valve	Wilson 1	PL23	PEN100046407	Produced Formation Water Crude Oil	41.8*	95	600	Mech Failure	Valve	Valve closed, area cleaned up	Closed	Moderate	Low	DME DERM	16/02/09
22/02/09	39209	Jackson	Flowline leak	Jackson 2	PL23	PEN100046407	Crude Oil Produced Formation Water	0.05 (0.7) [†]	5 (80) [†]	20	Mech Failure	Line	Process isolated, spill cleaned up	Closed	Moderate	Low	-	-
14/04/09	41132	Jackson	Flowline leak	Naccowlah West 14	PL25	PEN100046407	Crude Oil Produced Formation Water	0.02	25	5	Corrosion	Line	Flowline replaced	Closed	Moderate	Low	-	-
24/04/09	41471	Tarbat	Leaking needle valve	Endeavour 18	PL57	PEN100046407	Crude Oil	0.003	0	0	Mech Failure	Fitting	Camlock replaced	Closed	Negligible	Low	-	-
26/04/09	41535	Tarbat	Leak in isolated power fluid line	Tintaburra 1	PL29	PEN100046407	Produced Formation Water	0.1	100 (0.05) [†]	1.5	Corrosion	Line	Section of pipe replaced	Closed	Negligible	Low	-	-
8/05/09	41904	Jackson/ Tarbat	Auto drain drum leak	Jackson	PL23	PEN100046407	Produced Formation Water LPG/Condensate	0.06	40	16	Corrosion	Storage	Drum replaced	Closed	Negligible	Low	-	-
25/06/09	43202	Cook	Flowline leak	Cook 4	PL97	PEN100046407	Produced Formation Water Crude Oil	0.28	87	48	Corrosion	Line	Clamped, repaired, spill cleaned	Closed	Minor	Low	DME DERM	24/06/09
12/07/09	43684	Jackson	Gearbox leak	Jackson South 1	PL24	PEN100046407	Lubrication oil	<0.001	0	nil	Mechanical Electrical	Fitting	Gearbox repaired	Closed	Minor	Low	-	-
26/07/09	44044	Jackson	Stuffing box packing failure	Jackson 31	PL23	PEN100046407	Crude Oil Produced Formation Water	0.45 (0.48) [†]	99	120	Other	Other	Packers replaced, spill cleaned up	Closed	Negligible	Low	DME DERM	27/07/09
26/07/09	44032	Ballera field	Leaking chemical at production skid	Wippo East 1	PL182	PEN200032207	Cortron	<0.001	0	Nil	Corrosion	Fitting	Leak repaired	Closed	Minor	Low	-	-
7/08/09	44306	Naccowlah	Oil leak from valve	Naccowlah load-out facility	PL26	PEN100046407	Crude Oil	<0.001	0	0.1	Design Factor	Valve	Area cleaned, thermal pressure relieved	Closed	Negligible	Low	-	-
16/08/09	44467	Tarbat	Weeping connection in flowline	Endeavour 35	PL57	PEN100046407	Crude Oil	<0.001	0	0.5	Mechanical/Electrical	Fitting	Fitting tightened	Closed	Negligible	Low	-	-
2/09/09	44874	Jackson	Frac tank fitting split	Jackson 50	PL23	PEN100046407	Crude Oil	0.02	0	0.5	Other	Fitting	Area cleaned	Closed	Negligible	Low	-	-
13/09/09	45109	Nockatunga	Loadout pump oil leak from shut down switch	Nockatunga load-out facility	PL33	PEN100084007	Crude Oil	<0.001	0	0.5	Design Factor	Fitting	Area cleaned, switch replaced	Closed	Negligible	Low	-	-
18/09/09	45209	Jackson	Water leak from evap pond pipe	Jarrar evap ponds	PL77	PEN100046407	Produced Formation Water	0.10	100	20	Other	Fitting	Line repaired	Closed	Negligible	Low	-	-
29/10/09	46119	Ballera	Fuel filter nipple failed, crude oil spill to grade	Cook 5	PL97	PEN100046407	Crude oil	2 (2.5) [†]	0	10 (25) [†]	Design Factor	Fitting	Area cleaned	Closed	Minor	Low	DME DERM	29/10/09
15/11/09	46605	Ballera	Overhead engine oil tank overflow	Munkah-Wackett compressor K-034	PL60	PEN100046407	Lubricating oil/Hydraulic Fluid	0.02	0	11	Human Intervention	Storage	Area cleaned	Closed	Minor	Low	-	-
25/12/09	47692	Ballera	Sump overflow during prolonged rainfall event	Ballera Plant	PL61	PEN100046407	Storm water Lubricating Oil/Hydraulic Fluid	0.1	50	10	Other	Storage	Area cleaned	Closed	Negligible	Low	-	-
13/01/10	48116	Mulberry	Volume of crude lost during transport	Mulberry 6	PL39	PEN100046407	Crude oil	0.0318	0	1.5	Other	Storage	Contaminated soil removed	Closed	Negligible	Low	-	-
13/01/10	48131	Ballera	Produced Formation Water leaking from flowline	Yawa 1	PL111	PEN200039507	Produced Formation Water	0.0181	100	7.25	Mech Failure	Line	Line depressurised and repaired	Closed	Negligible	Low	-	-
20/01/10	48332	Jackson	Flowline failure	Jackson 38	PL23	PEN100046407	Crude Oil Produced Formation Water	16	91.1	15	Corrosion	Line	Line isolated, suck truck removed fluid	Closed	Minor	Low	DME DERM	20/01/10
28/01/010	48532	Jackson	Tanker unloading facility sump overflow	Jackson satellite	PL23	PEN100046407	Crude Oil Produced Formation Water	1.2	99.3	40	Design Factor	Valve	Suck truck removed spilt fluid	Open	Negligible	Low	DME DERM	20/01/10
06/02/10	48761	Tarbat	Production Header weeping	Tintaburra facility	PL29	PEN100046407	Crude Oil	<0.001	0	nil	Corrosion	Fitting	Repairs underway	Closed	Negligible	Low	-	-
23/02/10	49291	Watson	Leak in return fuel line	Watson facility	PL35	PEN100046407	Crude Oil	0.233	0	40	Design Factor	Line	Clean up underway	Closed	Negligible	Low	DME DERM	23/02/10
26/02/10	49392	Jackson	Fuel bowser bleed off drain incorrectly plumbed to unbunded pit	Jackson satellite	PL23	PEN100046407	Diesel	<0.001	0	nil	Human Intervention	Storage	Clean up completed	Closed	Minor	Low	-	-
01/03/10 18/04/10	49498	Ballera	Transfer of water from interceptor pond during prolonged rainfall event	Ballera Plant	PL61	PEN100046407	Storm Water/process water	1289kL transferred to Airport Pond			Design Factor	Storage	TEP in place with DERM	Open	Negligible	Low	DERM	03/03/10

Queensland Cooper Basin Operations: Environmental Incidents 1 Jan 2009 – 31 May 2010

Date	IMS Report #	Site	Occurrence	Well / Location	Tenure	Environmental Authority	Substance	Total Uncont Vol. (m ³)	Water %	Area Impact (m ²)	Mechanism Root Cause	Loss Mechanism	Action	Status	Consequence	Risk	Regulator Notified [‡]	Date Notified
8/03/10	49657	Jackson	Mulberry field well testing facility thermal PSV failure	Wilson 4	PL23	PEN100046407	Crude Oil Produced Formation Water	1	88 (56) [†]	50 (44) [†]	Mech Electrical	Fitting	Clean up completed	Closed	Minor	Low	DME DERM	8/03/10
9/03/10	49691	Tickalara	Overflow from cellar at well head	Jackson 9	PL23	PEN100046407	Crude Oil	0.03	0	40	Other	Fitting	Suck truck removed all liquids to landfarm	Closed	Negligible	Low	-	-
2/04/10	50303	Nockatunga	Joint on flowline failed	Currambar 1	PL244	PEN100084007	Crude Oil Produced Formation Water	0.105	95	140	Electrical	Line	Clean up completed and joint repaired	Closed	Minor	Low	-	-
25/04/10	50769	Jackson	Test tank overflow, contained in earthen bund	Jackson satellite	PL23	PEN100046407	Crude oil	4.8	0	64	Mech Electrical	Storage	Clean up underway using suck truck	Closed	Negligible	Low	-	-
16/05/10	51227	Ballera	25 truck tyres dumped by unknown persons in Santos field area	Challum & Munkah-Wackett compression	PL59 & PL60	PEN100046407	Tyres	N/A	N/A	N/A	Human Intervention	Storage	Tyres were collected and disposed of appropriately	Closed	Negligible	Low	-	-

†Note: values in brackets indicate the initial volume estimated, which has been previously reported in the Incident Summary. The first number in the column is the actual volume estimate, calculated after further investigation of the incident.
*A clerical error in the previously reported Annual Return Incident Summary resulted in this being reported as 1.8. The DERM notification made at the time of the incident reported the correct volume.
‡ Incident notification threshold >200L contaminant to ground or >80L to water in accordance with prior agreement with DERM.

RTI DL RELEASE - EHP

RTI DL RELEASE - EHP

Santos Limited
ABN 80 007 550 923
Santos Centre
Ground Floor
60 Flinders Street
Adelaide SA 5000
GPO Box 2455
Adelaide SA 5001
Telephone: (08) 8116 5000

Santos

5 October 2012

Steven Tarte
Manager, Energy Assessments Unit
Department of Environment and Heritage Protection
GPO Box 2454
BRISBANE QLD 4001
steven.tarte@ehp.qld.gov.au

Dear Steven,

RE: Follow-up report on Jackson 15 flowline leak

I refer to the Incident Notification Form submitted to EHP on 13 September 2012 in relation to a leak from the Jackson 15 flowline. In that notification Santos indicated that a follow-up report would be submitted to EHP outlining the results of the site investigation and sampling.

A Santos Environmental Adviser undertook a site investigation on 4 September 2012 consisting of soil sampling in the shallow zone at twelve locations across the spill site. The surface area impacted by the released fluids (estimated 76m², 98.4% produced formation water) was approximately 600m².

On 2 October 2012 the site was sufficiently dry to enable backhoe access for commencement of delineation and clean-up. The source of the leak was identified as a pinhole caused by external corrosion underneath the 'yellow jacket' shroud around the steel flowline. The potential for corrosion of 'yellow jacket' shrouded steel pipelines was assessed as part of the environmental evaluation conducted for PEN100046407 – refer to implementation action 5.3.4 which is in progress. Approximately 200 m³ of soil has been removed from the spill zone and relocated to the Jackson landfarm for treatment.

The findings from the initial site investigation and corresponding remediation activities are detailed below. Analytical results and photos (Figures 1 and 2) are attached for reference.

Vicinity of the source (samples 1, 9, 12): Some pockets of visible surface hydrocarbon contamination and low to slightly elevated TPH in soil samples. Excavation revealed that fluids from the pinhole were captured in the yellow jacket around the flowline, with no vertical migration below the depth (1.5 metres) of the flowline. Contaminated soil was removed and relocated to the Jackson landfarm for processing.

Immediately downstream of the source (samples 2, 3, 8): Some pockets of visible surface hydrocarbon contamination, and low to moderate TPH in soil samples (except for sample 8 which was characterised by pronounced surface staining and elevated TPH). Delineation revealed vertical migration to approximately 1 metre. Removal of soil in this area is continuing as of 4 October 2012 with further soil removal pending availability of machinery. Contaminated soil to be taken to Jackson landfarm for processing.

Remaining impacted area (samples 4-7, 10, 11): Minimal observed hydrocarbon impact on the surface, and low to slightly elevated TPH in soil samples. All contaminated soil was removed from this area and trucked to Jackson landfarm for processing.

Validation soil samples have been taken to ensure all contaminated material has been removed. If you have any further queries please do not hesitate to contact me on (08) 8116 5755 or joe.gugliotta@santos.com.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Joe Gugliotta', with a horizontal line extending to the right.

Joe Gugliotta
Manager Cooper Basin Oil
Santos Limited

RTI DL RELEASE - EHP

Figure 1: Jackson 15 flowline leak – source location and immediate vicinity shortly after following removal of oil on surface by vacuum truck and absorbent pads

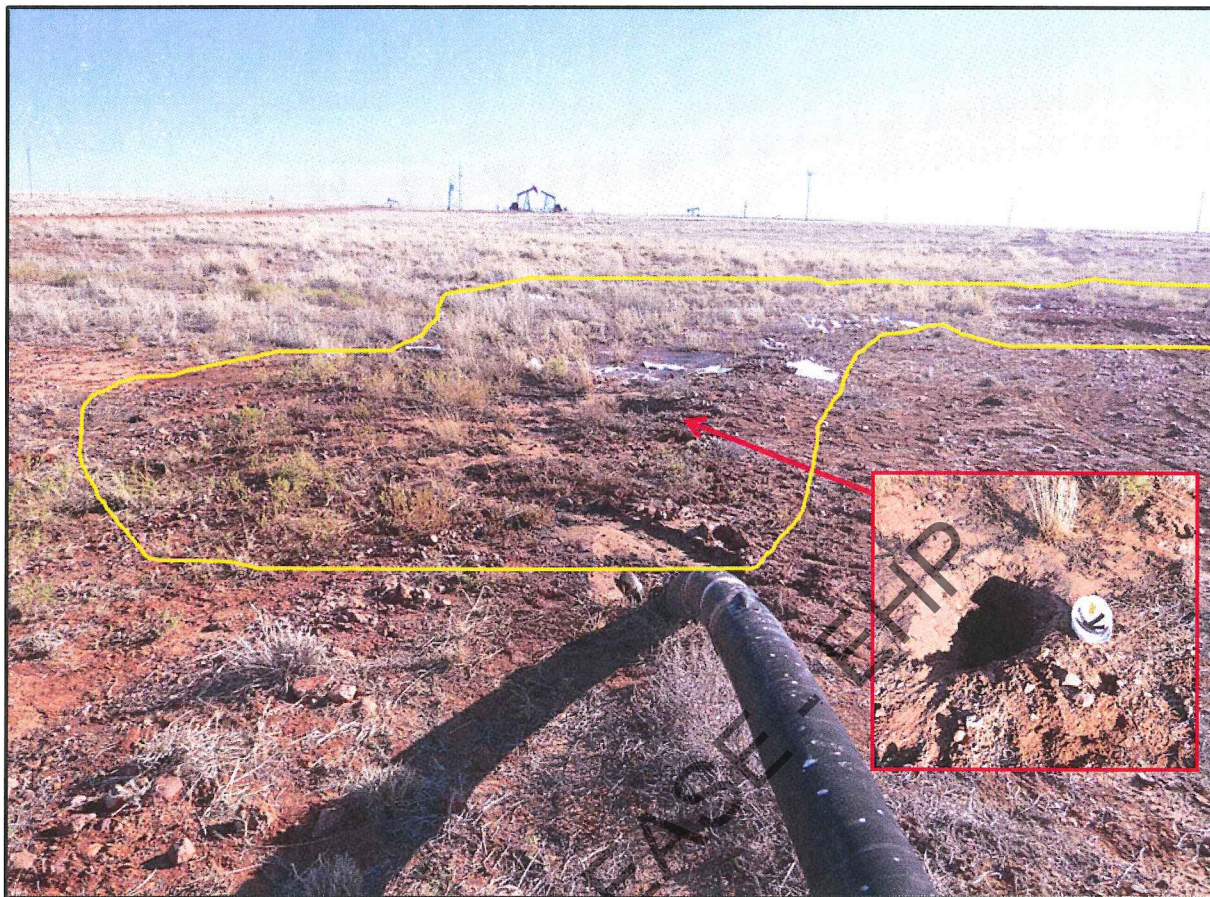


Figure 2: Jackson 15 flowline leak – indicative of surface impact





Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: EM1211621	Page	: 1 of 6
Amendment	: 2		
Client	: SANTOS LTD	Laboratory	: Environmental Division Melbourne
Contact	: MR OWEN DAVIES	Contact	: Jodie Hancock
Address	: GROUND FLOOR SANTOS CENTRE 60 FLINDERS STREET ADELAIDE SA, AUSTRALIA 5001	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: owen.davies@santos.com	E-mail	: Jodie.Hancock@alsenviro.com
Telephone	: +61 08 8116 5000	Telephone	: +61 7 3243 7128
Facsimile	: +61 08 8116 5050	Facsimile	: +61 7 3243 7218
Project	: Jackson 15	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: 879002-830	Date Samples Received	: 02-OCT-2012
C-O-C number	: ---	Issue Date	: 05-OCT-2012
Sampler	: OD		
Site	: ---		
Quote number	: EN/039/11	No. of samples received	: 13
		No. of samples analysed	: 13

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Herman Lin	Laboratory Coordinator	Melbourne Inorganics
Xingbin Lin	Senior Organic Chemist	Melbourne Organics

Environmental Division Melbourne
Part of the ALS Laboratory Group
4 Westall Rd Springvale VIC Australia 3171
Tel. +61-3-8549 9600 Fax. +61-3-8549 9601 www.alsglobal.com
A Campbell Brothers Limited Company

Page : 2 of 6
Work Order : EM1211621 Amendment 2
Client : SANTOS LTD
Project : Jackson 15



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- 5-10-2012 This report has been amended to correct Project Name. All analysis results are as per the previous report.

RTI DL RELEASE - EMP



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	J15FL_1_300mm_4/0 9/12	J15FL_2_300mm_4/0 9/12	J15FL_3_200mm_4/0 9/12	J15FL_3_700mm_4/0 9/12	J15FL_4_300mm_4/0 9/12
				04-SEP-2012 15:00	04-SEP-2012 15:00	04-SEP-2012 15:00	04-SEP-2012 15:00	04-SEP-2012 15:00
				EM1211621-001	EM1211621-002	EM1211621-003	EM1211621-004	EM1211621-005
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	22.1	20.3	17.8	18.8	19.6
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	19	<10	<10	152	<10
C10 - C14 Fraction	----	50	mg/kg	190	<50	<50	1070	<50
C15 - C28 Fraction	----	100	mg/kg	900	370	180	5370	140
C29 - C36 Fraction	----	100	mg/kg	100	<100	<100	680	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	1190	370	180	7120	140
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft								
C6 - C10 Fraction	----	10	mg/kg	25	<10	<10	258	<10
>C10 - C16 Fraction	----	50	mg/kg	350	110	<50	1820	<50
>C16 - C34 Fraction	----	100	mg/kg	850	360	240	5340	160
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	200	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	1200	470	240	7360	160
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	81.6	81.9	93.8	93.0	93.4
Toluene-D8	2037-26-5	0.1	%	89.6	86.4	96.9	95.3	94.1
4-Bromofluorobenzene	460-00-4	0.1	%	75.7	87.4	98.2	98.0	93.1

Page : 4 of 6
 Work Order : EM1211621 Amendment 2
 Client : SANTOS LTD
 Project : Jackson 15



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				J15FL_5_200mm_4/0 9/12	J15FL_6_200mm_4/0 9/12	J15FL_7_200mm_4/0 9/12	J15FL_8_200mm_4/0 9/12	J15FL_9_150mm_4/0 9/12
				04-SEP-2012 15:00	04-SEP-2012 15:00	04-SEP-2012 15:00	04-SEP-2012 15:00	04-SEP-2012 15:00
Compound	CAS Number	LOR	Unit	EM1211621-006	EM1211621-007	EM1211621-008	EM1211621-009	EM1211621-010
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	26.2	22.4	26.5	19.0	21.1
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	191	<10	771	<10
C10 - C14 Fraction	----	50	mg/kg	100	410	250	8940	<50
C15 - C28 Fraction	----	100	mg/kg	710	2240	2180	40200	210
C29 - C36 Fraction	----	100	mg/kg	<100	260	270	5300	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	810	2910	2700	54400	210
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft								
C6 - C10 Fraction	----	10	mg/kg	<10	282	<10	1200	<10
>C10 - C16 Fraction	----	50	mg/kg	240	720	580	14600	60
>C16 - C34 Fraction	----	100	mg/kg	680	2200	2180	42700	250
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	1870	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	920	2920	2760	59200	310
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	81.9	74.4	84.9	92.0	84.9
Toluene-D8	2037-26-5	0.1	%	84.3	72.4	84.3	79.1	85.2
4-Bromofluorobenzene	460-00-4	0.1	%	84.8	83.0	84.2	95.7	88.7



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Compound	CAS Number	LOR	Unit	J15FL_10_200mm_4/ 09/12	J15FL_11_100mm_4/ 09/12	J15FL_12_700mm_4/ 09/12	----	----
				04-SEP-2012 15:00	04-SEP-2012 15:00	04-SEP-2012 15:00	----	----
				EM1211621-011	EM1211621-012	EM1211621-013	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	26.8	26.2	24.9	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	108	<10	240	----	----
C10 - C14 Fraction	----	50	mg/kg	680	<50	990	----	----
C15 - C28 Fraction	----	100	mg/kg	3990	330	2420	----	----
C29 - C36 Fraction	----	100	mg/kg	570	110	220	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	5240	440	3630	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft								
C6 - C10 Fraction	----	10	mg/kg	189	<10	377	----	----
>C10 - C16 Fraction	----	50	mg/kg	1260	100	1550	----	----
>C16 - C34 Fraction	----	100	mg/kg	4230	380	2180	----	----
>C34 - C40 Fraction	----	100	mg/kg	270	110	<100	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	5760	590	3730	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	93.8	85.4	82.7	----	----
Toluene-D8	2037-26-5	0.1	%	94.7	86.2	85.0	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	94.5	89.2	84.5	----	----

Page : 6 of 6
Work Order : EM1211621 Amendment 2
Client : SANTOS LTD
Project : Jackson 15



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	57	129
Toluene-D8	2037-26-5	58	120
4-Bromofluorobenzene	460-00-4	56	126

RTI DL RELEASE - EHP

16 March 2011

Ahmad Rahman
Manager, Petroleum and Gas Unit
Department of Environment and Resource Management
GPO Box 2854
BRISBANE QLD 4001

Dear Ahmad,

RE: Jackson Evaporation Pond #3 release – follow-up report

I refer to the Incident Notification Form submitted to DERM on Thursday 24 February 2011. In that notification Santos indicated that a follow-up report would be submitted to DERM on 16 March 2011 outlining the findings from our investigation into the incident and the associated actions that would be taken to minimise the risk of a reoccurrence.

Jackson Evaporation Pond #3 provides the final stage of treatment for the produced water generated in the Jackson oil facility. Water is discharged from the pond to Jackson Creek at authorised release point W1 as per the conditions of Environmental Authority PEN100046407.

On 21 February 2011, the area operator identified the southern wall of the pond had been breached via some minor erosion channels over the top of the wall (see Attachment 1), with an estimated total release of approximately 1000m³ of water.

The incident investigation identified the following key causal factors.

- ***Tumbleweed and reeds partially blocked the weir box.***

Reeds were growing around the vicinity of the weir box on the pond and some had fallen/collapsed into the weir box, along with tumbleweed. This reduced the flow out of the pond causing the level to rise.

The 3 monthly Workplace EHS Inspection Checklist for the facility includes pond wall inspections, but doesn't include an item to check for, and arrange removal of, reeds or other vegetation inside the ponds in the vicinity of outlet lines (i.e. the hazard may not be recognised during inspections).

- ***Weir box blockage and rising pond level not detected.***

The operational surveillance work instruction for this facility specifies checks at the discharge point of the pond, but does not specify checking the pond level or checking the pond weir box for potential restrictions. This was based on the pond discharge being a gravity fed weir arrangement (i.e. no mechanical equipment, such as a pump shutting down, could cause a level increase), and a blockage due to tumbleweed and reeds had not been anticipated.

Santos will undertake the following mitigating actions based on these findings.

1. Immediately issue a Standing Order to Jackson facility operators for daily checks of the weir box and pond level at Jackson Evaporation Pond #3. Completed on 24 February 2011.

2. Issue an internal Environmental Bulletin on the incident to relevant operational staff across the Cooper Basin, including a requirement to check other ponds for the same potential hazard. Due date 25 March 2011.
3. Santos Work Instruction for operational surveillance at Jackson to be revised to specify a daily check of Evaporation Pond #3 weir box, recording of the pond level and any subsequent action to be taken (e.g. check flows in/out of pond, check for blockages in pond outlet, clear reeds/debris etc.). Due date 15 April 2011.
4. Install a level marker in Jackson Evaporation Pond #3 to allow recording of levels observed during daily operational surveillance (design freeboard is approximately 600mm, minimum freeboard trigger to be set at 300mm). Due date 30 April 2011
5. Santos 3 monthly Workplace EHS Inspection Checklist for SWQ facilities to be revised to include an item to check for, and arrange removal of, reeds or other vegetation inside the ponds in the vicinity of outlet lines. Due date 15 April 2011
6. Investigate options for modifications or additional barriers at pond outlets to reduce the likelihood of blockages by foreign material for this and similar SWQ ponds. Due date 30 April 2011.
7. Remove all remaining reeds from the vicinity of inlet point for the weir box (reeds in immediate vicinity that could be reached by hand have been removed). Will be conducted as soon as conditions are dry enough for equipment access (has been delayed by further rain fall events, but action 1 is in place to mitigate until then).
8. Repair erosion damage to dam bund wall caused by the breach. Will be conducted after conditions are dry enough for equipment access (has been delayed by further rain fall events).

I trust that this further information is of assistance to DERM. If you have any further queries, please do not hesitate to contact me on (08) 8116 7574.

Yours sincerely



Nathan Childs
Manager Production Operations SWQ/NT

Attachment 1 – Photos

Examples of minor erosion channels where water has flowed over the pond wall



Reeds growing in the vicinity of the weir box



Enquiries Wade Micke
Telephone (07) 3330 5980
Your reference
Our reference CR50827



**Queensland
Government**

Department of
Environment and Resource
Management

17 March 2011

Mr Nathan Childs
Santos Ltd
Santos Centre
60 Flinders Street
ADELAIDE SA 5000

Re: Contravention of Environmental Authority PEN100046407

Dear Mr Childs

Thank you for your letter of 16 March 2011 regarding the overflow of water from Evaporation Pond number 3 at the Jackson Oil Field on 21 February 2011.

You are advised that, DERM proposes to take no further action in relation to this matter. The following factors and subsequent actions have been taken into account by DERM in considering the appropriateness of the response by Santos Ltd in regard to this incident:

- The circumstances surrounding this non-compliance including the maintenance of pond infrastructure;
- The nature of the spill and the receiving environment;
- The expeditious notification of this incident to DERM and overall cooperation in relation to this matter; and
- The commitment by Santos to undertake appropriate remedial actions to avoid similar incidents occurring in the future.

Should DERM obtain evidence that Santos Ltd have not taken appropriate action to prevent or minimise the recurrence of a similar incident, it will consider taking further action under the Act.

If you wish to discuss this matter further please contact Wade Micke on telephone 3330 5980.

Yours sincerely

Ahmad Rahman
Manager
Petroleum and Gas Unit

CSI Call Back Sheet

Phone Message ☐ Call Back Message ☐

Date 17/09/2010 Time 1:44:47 PM

CSI Reference Laura Thomas

For Operational Area Pollution

For Operational Area Comment Has been contained

For Staff Member

Caller Details

From - DERM (including QPWS) ☐

Person Nathan Childs

Company Santos

Contact Number 0439819926

Email

Crow/Project Number

Reason for Call

Location-Jackson Oil field - Jackson 38 Beam Pump incident 11.00am 16/09/10 - Beam pump tripped, shutdown downstream non return valve has failed which has allowed crude oil backflow to the beam pump which resulted in a crude release-combined volume 300litres 12% hydrocarbon has now been contained

1050 km West of Brisbane
South East Queensland.
contained & isolated Valves repaired

ID 4559

Best time to call back

Today 10-30 to 11-30am ☐

Today 2-30 to 3-30pm ☐

Tomorrow 2-30 to 3-30pm ☐

Tomorrow 10-30 to 11-30am ☐

Alternative ☐

Alternative Date

Alternative Time

Message

Please call ☒

Check your email ☐

Returned your call ☐

Will call again ☐

Please reply by email ☐

Action Taken

Finalised by

Finalised by name:

This enquiry is ongoing ☐

This enquiry has been referred ☐

Referred to Louise (Brisbane)

Referred to Comment

Action Taken - Contact Attempts

Contact Attempt One

Date 17/09

Actioning Officer Nathan

Comment

Tried calling 2:50pm.
Waiting for call back as per
region.

Contact Attempt Two

Date

Actioning Officer

Comment

Contact Attempt Three

Date

Actioning Officer

Contact attempt 3 Comment

Complaint/Report Details

Complaint/Report Ref: CR49666

Priority/Sensitive: N

Complainant						
Ref	Name	Address	Phone	Mobile	Fax	Email
600642	Santos QNT Pty Ltd	Santos Centre Ground Floor 60 Flinders Street ADELAIDE SA 5000	08 8116 5000		08 8116 5050	sofia.oliver@santos.com

Alleged Source						
Ref	Name	Address	Phone	Mobile	Fax	Email
600642	Santos QNT Pty Ltd	Santos Centre Ground Floor 60 Flinders Street ADELAIDE SA 5000	08 8116 5000		08 8116 5050	sofia.oliver@santos.com

Incident Location		
Name	Risk Level	Address
ATP259		

Type: Incident

Nature: Land : Chem/Oil/Fuel

Received Date: 17-SEP-10

Receiving Officer: LOSADA, Vanessa

Receiving Office: ES - Gas and Petroleum - Southern - Bne

Status: Received

Origin: Notification by source

Notification Method: Telephone call - business hours

Project Manager: JORDAN, Louise

Responsible Office: ES - Gas and Petroleum - Southern - Bne

Description			
Event On/From Date: 16-SEP-10	Event On/From Time: 11:00 AM	Received Time: 05:00 PM	
Event To Date:	Event To Time:	Ongoing: Y	Print Related Permits:
<div><div>Description</div><div>Beam pump number 38 tripped and shutdown, resulting in the failure of the non return valve. Crude Oil back-flowed into the beam pump resulting in a 300 litre release of production oil / formation water mixture (12% Hydrocarbon equating to 36 Litres of actual oil). The oil/water mixture was released onto the ground at the base of the well-head, covering an approximate soil area of 20m3. The actual incident was observed by Santos field operators as a result of routine surveillance conducted on the morning of 17 September 2010. Electronic data associated with the equipment, indicated that the incident actually occurred at approximately 1100am on 16 September 2010. A vacuum truck attended the site this morning, removing the free fluid. The contaminated soil was also removed and taken to a licensed receiving facility at Jackson for remediation purposes. The area surrounding the well head is also being raked and treated with a compound called 'beyond organics' in an effort to further remediate residual contaminated soil. There are no surrounding water bodies. The topography is flat. There is no exposure to cattle. Santos has contacted the Nockatunga Station (Pastoralist) and has advised of the spill. Santos has advised via their contact with Nockatunga Station that there is no exposure to cattle. Santos is conducting an internal review regarding the malfunction of the non return valve. Santos will provide written details to DERM on Monday 20 September 2010.</div></div>			

Running Sheet Summary						
			Accrued Time:	0 hrs 30 mins		
First Action	Date Commenced	Due Date	Action Type	Officer Involved	Outcome	Date Completed
Y	20-SEP-10	20-SEP-10	Letter - other	LOSADA, Vanessa	Action Required - awaiting response	

Related Complaints/Reports				
Ref	Complainant	Alleged Source	Incident Location	Received Date
CR49485	Santos QNT Pty Ltd	Santos QNT Pty Ltd	ATP259	26-AUG-10

Complaint/Report Details

Complaint/Report Ref: CR49666

Priority/Sensitive: N

- **Complainant**

Complainant						
Ref	Name	Address	Phone	Mobile	Fax	Email
600642	Santos QNT Pty Ltd	Santos Centre Ground Floor 60 Flinders Street ADELAIDE SA 5000	08 8116 5000		08 8116 5050	sofia.oliver@santos.com

Alleged Source

Alleged Source						
Ref	Name	Address	Phone	Mobile	Fax	Email
600642	Santos QNT Pty Ltd	Santos Centre Ground Floor 60 Flinders Street ADELAIDE SA 5000	08 8116 5000		08 8116 5050	sofia.oliver@santos.com

Incident Location

Incident Location		
Name	Risk Level	Address
PL23		

Type: Incident

Nature: Land : Chem/Oil/Fuel

Received Date: 17-SEP-10

Receiving Officer: LOSADA, Vanessa

Receiving Office: ES - Gas and Petroleum - Southern - Bne

Status: Received

Origin: Notification by source

Notification Method: Telephone call - business hours

Project Manager: JORDAN, Louise

Responsible Office: ES - Gas and Petroleum - Southern - Bne

- **Description****Event On/From Date:** 16-SEP-10

Event On/From Time: 11:00 AM

Received Time: 05:00 PM

Event To Date:

Event To Time:

Ongoing: Y

Print Related Permits:

Description

Beam pump number 38 tripped and shutdown, resulting in the failure of the non return valve. Crude Oil back-flowed into the beam pump resulting in a 300 litre release of production oil / formation water mixture (12% Hydrocarbon equating to 36 Litres of actual oil). The oil/water mixture was released onto the ground at the base of the well-head, covering an approximate soil area of 20m³. The actual incident was observed by Santos field operators as a result of routine surveillance conducted on the morning of 17 September 2010. Electronic data associated with the equipment, indicated that the incident actually occurred at approximately 1100am on 16 September 2010. A vacuum truck attended the site this morning, removing the free fluid. The contaminated soil was also removed and taken to a licensed receiving facility at Jackson for remediation purposes. The area surrounding the well head is also being raked and treated with a compound called 'beyond organics' in an effort to further remediate residual contaminated soil. There are no surrounding water bodies. The topography is flat. There is no exposure to cattle. Santos has contacted the Nockatunga Station (Pastoralist) and has advised of the spill. Santos has advised via their contact with Nockatunga Station that there is no exposure to cattle. Santos is conducting an internal review regarding the malfunction of the non return valve. Santos will provide written details to DERM on Monday 20 September 2010.

Running Sheet Summary

Accrued Time: 0 hrs 30 mins

Running Sheet Summary		Accrued Time: 0 hrs 30 mins				
First Action	Date Commenced	Due Date	Action Type	Officer Involved	Outcome	Date Completed
Y	20-SEP-10	20-SEP-10	Letter - other	LOSADA, Vanessa	Action Required - awaiting response	

Complaint/Report Details

Complaint/Report Ref:CR49666

Priority/Sensitive:N

Complainant						
Ref	Name	Address	Phone	Mobile	Fax	Email
600642	Santos QNT Pty Ltd	Santos Centre Ground Floor 60 Flinders Street ADELAIDE SA 5000	08 8116 5111			sofia.oliver@santos.com

Alleged Source						
Ref	Name	Address	Phone	Mobile	Fax	Email
600642	Santos QNT Pty Ltd	Santos Centre Ground Floor 60 Flinders Street ADELAIDE SA 5000	08 8116 5111			sofia.oliver@santos.com

Incident Location		
Name	Risk Level	Address
PL23		

Type:

Incident

Nature:

Land : Chem/Oil/Fuel

Received Date:

17-SEP-10

Receiving Officer:

LOSADA, Vanessa

Receiving Office:

ES - Gas and Petroleum - Southern - Bne

Status:

Finalised

Origin:

Notification by source

Notification Method:

Telephone call - business hours

Project Manager:

JORDAN, Louise

Responsible Office:

ES - Gas and Petroleum - Southern - Bne

Description			
Event On/From Date:	16-SEP-10	Event On/From Time:	11:00 AM
Event To Date:		Event To Time:	
Received Time:	05:00 PM	Ongoing:	N
Print Related Permits:			
<div><div>Description</div><div>Beam pump number 38 tripped and shutdown, resulting in the failure of the non return valve. Crude Oil back-flowed into the beam pump resulting in a 300 litre release of production oil / formation water mixture (12% Hydrocarbon equating to 36 Litres of actual oil). The oil/water mixture was released onto the ground at the base of the well-head, covering an approximate soil area of 20m3. The actual incident was observed by Santos field operators as a result of routine surveillance conducted on the morning of 17 September 2010. Electronic data associated with the equipment, indicated that the incident actually occurred at approximately 1100am on 16 September 2010. A vacuum truck attended the site this morning, removing the free fluid. The contaminated soil was also removed and taken to a licensed receiving facility at Jackson for remediation purposes. The area surrounding the well head is also being raked and treated with a compound called 'beyond organics' in an effort to further remediate residual contaminated soil. There are no surrounding water bodies. The topography is flat. There is no exposure to cattle. Santos has contacted the Nockatunga Station (Pastoralist) and has advised of the spill. Santos has advised via their contact with Nockatunga Station that there is no exposure to cattle. Santos is conducting an internal review regarding the malfunction of the non return valve. Santos will provide written details to DERM on Monday 20 September 2010.</div><div>On reviewing Santos, submitted information (10/11/2010), DERM has determined that a warning letter will be issued in this instance (WARN2942). A draft letter has been completed and is awaiting signature.</div><div>This matter is now considered finalised.</div></div>			

Enforcement Measure			
Type	Ref	Issued/Received Date	Status
Warning	WARN2942	07-DEC-10	

Running Sheet Summary						
		Accrued Time:	2 hrs 15 mins			
First Action	Date Commenced	Due Date	Action Type	Officer Involved	Outcome	Date Completed
Y	20-SEP-10	20-SEP-10	Letter - other	LOSADA, Vanessa	Action Required - awaiting response	21-SEP-10
	12-OCT-10	22-OCT-10	Letter - other	LOSADA, Vanessa	Action Required - awaiting response	18-OCT-10
	19-OCT-10	09-NOV-10	Email Received	LOSADA, Vanessa	Action Required - awaiting response	10-NOV-10
	10-NOV-10	06-DEC-10	Letter - received	LOSADA, Vanessa	Enf Measure - Warning	06-DEC-10

Complaint/Report Details

Related Complaints/Reports				
Ref	Complainant	Alleged Source	Incident Location	Received Date
CR50078	Santos QNT Pty Ltd	Santos QNT Pty Ltd	PL23	15-NOV-10

RTI DL RELEASE - EHP

Running Sheet Summary

Complaint/Report Ref: CR49666

Complainant

Ref	Name	Address	Phone	Mobile	Fax	Email
600642	Santos QNT Pty Ltd	Santos Centre Ground Floor 60 Flinders Street ADELAIDE SA 5000	08 8116 5111			sofia.oliver@santos.com

Alleged Source

Ref	Name	Address	Phone	Mobile	Fax	Email
600642	Santos QNT Pty Ltd	Santos Centre Ground Floor 60 Flinders Street ADELAIDE SA 5000	08 8116 5111			sofia.oliver@santos.com

Incident Location

Name	Risk Level	Address
PL23		

Source Ref: CR49666

Action Source Ref:

Date Commenced: 20-SEP-10

Officer Involved: LOSADA, Vanessa

Responsible Office: ES - Gas and Petroleum - Southern - Bne

Action Type: Letter - other

Inspection Type:

Enforcement Measure Type:

Referral To:

Action: Written Notification by Santos to be submitted to DERM

Time Spent Hours:

Time Spent Minutes: 30

Outcome: Action Required - awaiting response

Outcome Description: Santos submitted written notification and report on incident. Report is attached but letter with photographs was too large to upload, an electronic copy can be found in H:\Strategic Projects\Petroleum and Gas\Companies\Santos\Bubble Licence 150 029\Bubble Licence Incidents\PL23 17092010 Incident; and a hard copy in file BNE40795 vol16.

Due Date:20-SEP-10

Date Completed:21-SEP-10

First Action: Y

Source Ref: CR49666

Action Source Ref:

Date Commenced: 12-OCT-10

Officer Involved: LOSADA, Vanessa

Responsible Office: ES - Gas and Petroleum - Southern - Bne

Action Type: Letter - other

Inspection Type:

Enforcement Measure Type:

Referral To:

Action: DERM sent letter to Santos requiring further information and commitment to changes in the procedures and standards to avoid reoccurrence of this type of incident. A response is required by 22/10/2010

Time Spent Hours: 1

First Action: N

Running Sheet Summary

Time Spent Minutes:

Outcome: Action Required - awaiting response

Outcome Description: Santos sent the following email on 18 October 2010 : "Further to the attached notification and discussions with DERM on the 13th October, please find below Santos response to the letter from DERM dated 12th October 2010.
Santos has conducted a preliminary review of this incident and initiated a basic incident investigation to identify the root cause/s of the incident and opportunities to improve the integrity of the system to prevent a re-occurrence. As discussed with DERM during our face to face meeting on the 13th October the type of investigation utilised is dependent upon a number of factors including consequence, impact to the environment, and complexity of the incident. The incident investigation will be completed by Tuesday 9th November, at which time I will provide a summary of the investigation and recommended actions to prevent a re-occurrence.
In response to items 5-7 of DERM's letter of 12 October 2010, it is Santos's understanding, based on advice from DERM's Office of Waste Tracking, that if the material to be transported consists only of soil and no free liquid, that the soil is not a `regulated waste' pursuant to Schedule 7 of the Environmental Protection Regulation 2008. The contaminated soil at the Jackson 38 site was removed using a backhoe and transported to Jackson landfarm using a full bodied tiptruck. The removed soil was not sampled prior to being taken to the Jackson landfarm for treatment. Some recontouring using soil from the Jackson 38 site has already occurred and further material will be imported to the site from a nearby field borrow pit to assist with recontouring and top dressing the site.
Kind Regards,
Nathan"

If you have any queries relating to this matter please don't hesitate to contact me. I will also try and place a call with you later in the week to discuss further.

Due Date:22-OCT-10

Date Completed: 18-OCT-10

Source Ref: CR49666

Action Source Ref:

Date Commenced: 19-OCT-10

First Action: N

Officer Involved: LOSADA, Vanessa

Responsible Office: ES - Gas and Petroleum - Southern - Bne

Action Type: Email Received

Inspection Type:

Enforcement Measure Type:

Referral To:

Action: Santos sent email on 18 Octber 2010 informing DERM that root-cause investigation will be completed by 9 November 2010. At this date Santos will send summary of the investigation results.

Time Spent Hours:

Time Spent Minutes: 15

Outcome: Action Required - awaiting response

Outcome Description: Response received on 10/11/2010. Please see attached.

Due Date:09-NOV-10

Date Completed: 10-NOV-10

Source Ref: CR49666

Action Source Ref:

Date Commenced: 10-NOV-10

First Action: N

Running Sheet Summary

Officer Involved: LOSADA, Vanessa

Responsible Office: ES - Gas and Petroleum - Southern - Bne

Action Type: Letter - received

Inspection Type:

Enforcement Measure Type:

Referral To:

Action: On 10 November 2010, Santos provided a response stating that the investigation determined the root cause of the incident as being the lodgement of rod guide material in the non-return valve (NRV) on the discharge line that connects this pump to the local manifold. This prevented the NRV from fully closing after the pump had shut down due to a leaking rod packer, allowing a small flow of oil to continue through the packer.

Santos outlined that three layers of protection consisting of an environmental stuffing box (ESB) that shuts the pump down if the rod packers leak; a 700L well cellar capacity to collect fluid from a leaking packer; and routine operator surveillance of the well every 1 to 3 days, minimised the volume of contaminants released to land.

Santos also considers that lodgement of rod guide material in an NRV in such a way to cause it to fail to operate is a very low likelihood event.

Having reviewed their internal records for the past four years, Santos did not identify any similar incidents. Santos does not consider a preventative maintenance program as cost-effective.

However, Santos has recognised that rod guide material breakdown is undesirable and has commenced a program to introduce a higher resilience rod guide material, which will be utilised in new wells in the future, in existing wells where breakdown has occurred and a well repair is required (where cost effective).

Time Spent Hours:

Time Spent Minutes: 30

Outcome: Enf Measure - Warning

Outcome Description: On reviewing Santos' submitted information, DERM has determined that a warning letter will be issued in this instance (WARN2942). A draft letter has been completed and is awaiting signature.

This matter is now considered finalised.

Due Date:06-DEC-10

Date Completed:06-DEC-10

Running Sheet Summary

Complaint/Report Ref: CR49666

Complainant

Ref	Name	Address	Phone	Mobile	Fax	Email
600642	Santos QNT Pty Ltd	Santos Centre Ground Floor 60 Flinders Street ADELAIDE SA 5000	08 8116 5000		08 8116 5050	sofia.oliver@santos.com

Alleged Source

Ref	Name	Address	Phone	Mobile	Fax	Email
600642	Santos QNT Pty Ltd	Santos Centre Ground Floor 60 Flinders Street ADELAIDE SA 5000	08 8116 5000		08 8116 5050	sofia.oliver@santos.com

Incident Location

Name	Risk Level	Address
PL23		

Source Ref: CR49666

Action Source Ref:

Date Commenced: 20-SEP-10

Officer Involved: LOSADA, Vanessa

Responsible Office: ES - Gas and Petroleum - Southern - Bne

Action Type: Letter - other

Inspection Type:

Enforcement Measure Type:

Referral To:

Action: Written Notification by Santos to be submitted to DERM

Time Spent Hours:

Time Spent Minutes: 30

Outcome: Action Required - awaiting response

Outcome Description: Santos submitted written notification and report on incident. Report is attached but letter with photographs was too large to upload, an electronic copy can be found in H:\Strategic Projects\Petroleum and Gas\Companies\Santos\Bubble Licence 150 029\Bubble Licence Incidents\PL23 17092010 Incident; and a hard copy in file BNE40795 vol16.

Due Date:20-SEP-10

Date Completed:21-SEP-10

First Action: Y

Source Ref: CR49666

Action Source Ref:

Date Commenced: 12-OCT-10

Officer Involved: LOSADA, Vanessa

Responsible Office: ES - Gas and Petroleum - Southern - Bne

Action Type: Letter - other

Inspection Type:

Enforcement Measure Type:

Referral To:

Action: DERM sent letter to Santos requiring further information and commitment to changes in the procedures and standards to avoid reoccurrence of this type of incident. A response is required by 22/10/2010

Time Spent Hours: 1

First Action: N

Running Sheet Summary

Time Spent Minutes:

Outcome: Action Required - awaiting response

Outcome Description:

Due Date:22-OCT-10

Date Completed:

RTI DL RELEASE - EHP

Santos Ltd
ABN 80 007 550 923
Ground Floor Santos Centre
60 Flinders Street
Adelaide SA 5000
GPO Box 2455 Adelaide SA 5001
Telephone: 08 8116 5000
International: +61 8 8116 5000

Santos

Direct: 08 8116 7574

10 November 2010

Louise Jordan
Petroleum and Gas Unit
Department of Environment and Resource Management
GPO Box 2454
BRISBANE QLD 4001

Dear Louise,

RE: Santos Jackson #38 Beam Pump Oil Spill (PL23)

We refer to our correspondence with you regarding this incident, in particular your letter dated 12 October 2010 requesting clarification of certain matters. We also draw your attention to an e-mail sent to Wade Micke on 18 October 2010 in which items 5 to 7 of the letter were addressed.

As discussed in our meeting on 13 October 2010 and the above mentioned e-mail on 18 October, Santos has conducted an investigation into the incident with the findings generally aligned to the preliminary advice provided in our letter dated 20 September 2010.

The root cause was determined to be lodgement of rod guide material in the non-return valve (NRV) on the discharge line that connects this pump to the local manifold. This prevented the NRV from fully closing after the pump had shut down due to leaking rod packer, allowing a small flow of oil to continue through the packer. Rod guides provide lateral support to the polish rod inside the well bore to mitigate the rod rubbing against the well tubing.

Consistent with Santos' approach of employing multiple "layers of protection" to reduce the potential for incidents to occur, the following mechanisms were in place and effective at the beam pump:

- An environmental stuffing box (ESB) designed to automatically shut down the pump if the rod packers develop a leak.
- A well cellar (~700L capacity) to collect well fluid from a passing packer.
- Routine operator surveillance of the well every 1-3 days.

With the NRV failing to close, these controls were effective in minimising the volume that was spilt to ground (~36L of hydrocarbon). The incident investigation determined the incident had reached its full potential (severity).

Santos considers that lodgement of rod guide material in an NRV in such a way to cause it to fail to operate is a very low likelihood event and indeed have reviewed our internal records for the past four years and not identified any similar occurrences.

Consideration has been given to a preventative maintenance program for NRVs in similar service to further mitigate the risk of a re-occurrence. The assessment determined the following:

- The random and infrequent nature of such an NRV failure means a preventative maintenance regime is unlikely to materially reduce the risk of a re-occurrence i.e. a failure is just as likely to occur just after the check is complete as it was just before.

- The only effective check of the performance of an NRV would be through intrusive maintenance by removing each valve periodically. This type of activity introduces a number of inherent safety and environmental risks and indeed Santos tries to minimise intrusive maintenance where practicable. Santos has hundreds of NRVs in similar service in its SWQ operations.

The complexity and cost of such a preventative maintenance program is therefore assessed as being disproportionate to the level of risk mitigation achieved.

Santos recognises that rod guide material breakdown is undesirable and has commenced a program to introduce a higher resilience rod guide material which will be utilised in future new wells, and in existing wells where a breakdown has occurred and a well repair is economic.

At Jackson 38 the following additional activities have been completed post the incident on the 16th of September:

- Non return valve replaced with a new valve – proactive
- Well rod packers replaced
- Environmental stuffing box inspected
- Well head cellar emptied

With regards to questions 5 - 7 of your 12 October letter, and as conveyed to Wade Micke by e-mail on 18 October:

- It is Santos' understanding, based on advice from DERM's Office of Waste Tracking, that if the material to be transported consists only of soil and no free liquid, that the soil is not a 'regulated waste' pursuant to Schedule 7 of the *Environmental Protection Regulation 2008*. The contaminated soil at the Jackson 38 site was removed using a backhoe and transported to Jackson landfarm using a full bodied tip-truck.
- Recontouring and top dressing the site used clean soil from the Jackson 38 site with further clean soil imported to the site from a nearby field borrow pit.
- As the soil used to back-fill and top dress the site was sourced from a non-contaminated area, no sampling of that soil was undertaken. The excavated soil was not sampled prior to being taken to the Jackson landfarm for bioremediation.

In summary, the investigation into the incident at Jackson 38 has determined that most of the layers of protection in place were effective and that the incident reached its full impact potential at 300L (12% oil) contaminant to ground. Additional risk mitigation achieved through a preventative maintenance program on Jackson 38 NRV and NRVs in similar services is assessed as being low and disproportionate to the cost and complexity involved in such a program. Santos is proactively introducing a higher resilience rod guide material in new wells and is retrofitting existing wells (where economic) following well breakdowns. Santos is committed to reducing and mitigating risk in its operations.

Should DERM require any further information, please do not hesitate to contact me on (08) 8116 7574.

Yours sincerely

Nathan Childs
Manager Production Operations SWQ/NT

Santos Ltd
ABN 80 007 550 923
Ground Floor Santos Centre
60 Flinders Street
Adelaide SA 5000
GPO Box 2455 Adelaide SA 5001
Telephone: 08 8116 5000
International: +61 8 8116 5000

Santos

Direct: 08 8116 5964

20 September 2010

Louise Jordan
Petroleum and Gas Unit
Department of Environment and Resource Management
GPO Box 2454
BRISBANE QLD 4001

Dear Louise,

RE: Jackson #38 oil release

Please find below some information relating to the Jackson 38 oil release and Santos' proposed remediation of the site.

Tenure/Authorisation

Jackson #38 is located on Production Licence PL23.

Santos holds an integrated authority (PEN100046407) to undertake petroleum activities in this location.

Environment

The incident site is a gently undulating plain covered with low grasses. The closest waterway is an ephemeral tributary of the Jackson creek is located 1.1 km to the north.

Incident description

The release was discovered at Jackson #38 at 0830 hours on Thursday 16 September. Jackson #38 is a producing oil well with a beam pump. Currently, fluid from Jackson #38 is approximately 88% produced water. The pump has an environmental stuffing box (ESB) installed to minimise leaks from the pump shaft. The beam pump packers failed and released hydrocarbon to the ESB. As the ESB filled, as expected, it tripped the well closed, preventing a hydrocarbon release. The non-return valve (NRV) in the piping connecting Jackson #38 to the local manifold was passing, allowing backflow from other wells connected to the same manifold. Consequently the well head cellar filled and overflowed.

Photographs attached to this report show the extent of the release.

Incident response

Clean up of the release has been completed. Approximately 700L of fluid was recovered from the well head cellar and an additional 300L of free liquid was removed from grade. Contaminated soil has been removed from the site for transportation to the Jackson landfarm for treatment. The site has been recontoured, treated with Beyond Organic and top dressed.

Beyond Organic is a liquid fertiliser developed specifically for the bioremediation of hydrocarbon contaminated soils. Santos selected this product as it can be used safely on the organic beef accredited cattle leases on which Santos operates.

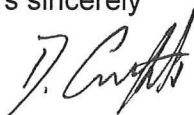
Incident investigation has identified that a piece of rod guide material had become lodged in the NRV seat preventing the valve from closing. The NRV has been scheduled for replacement.

Landholder liaison

The Station Manager at Kihee station has been notified of the release. No cattle have been found in the vicinity of the well.

Should DERM require any further information, please do not hesitate to Amy Slocombe, Environmental Adviser for South West Queensland, on (08) 8116 5964.

Yours sincerely

 (NATHAN CHILD) (NATHAN CHILD)

for **Nathan Childs**
Manager Production Operations SWQ/NT

RTI DL RELEASE - EHP

Photographs of Incident: Jackson #38 oil release



Overflowed cellar at Jackson #38. All free hydrocarbon has been removed.



Jackson #38 flow of hydrocarbon on lease area.



Jackson #38. Showing extent of soil contamination.



Aerial photograph showing location of Jackson #38

Photographs of Remediation Progress: Jackson #38 oil release







Enquiries Vanessa Losada
Telephone (07) 3330 5551
Your reference PL23
Our reference BNE40795 vol 16 / 150029 (Bubble Licence) / CR49666

Department of
**Environment and Resource
Management**

06 December 2010

Santos Ltd
Level 4
60 Flinders Street
Adelaide SA 5000

Attention: Mr Nathan Childs,

Dear Sir,

Re: Santos Jackson No. 38 Beam Pump Oil Spill (PL23)

Thank you for Santos' letters regarding the above mentioned spill, dated 20 September, 18 October and 10 November 2010, in response to the Department of Environment and Resource Management's (DERM) request dated 12 October 2010.

In reference to Santos' most recent correspondence, DERM has reviewed the information and in summary, has formed the view that Santos has identified the risk and has committed to implementing beneficial change by introducing a more resilient rod guide material.

DERM acknowledges the remedial actions undertaken by Santos regarding the removal and treatment of contaminated soil from the Jackson No. 38 Beam Pump (PL23). DERM is also aware that no waterways or landholders have been impacted.

It is noted that the land from which the contaminated soil was removed is not listed on the Environmental Management Register (EMR) and that as such, a contaminated soil disposal permit was not required.

It is a requirement of the *Environmental Protection Act 1994*, that if the owner or occupier of a site becomes aware a notifiable activity is being carried out on this land or that the land is contaminated with a hazardous contaminant, they must, within 30 days after becoming aware the activity is being carried out, give notice to DERM of that activity and/or contamination. Santos is strongly advised to engage with all relevant landowners prior to commencing the notification process.

As such, if Santos' Jackson No. 38 Beam Pump operations trigger a Notifiable Activity, Santos should formally notify DERM of all P&G sites where notifiable activities are conducted for listing on the EMR.

Notification forms are available from Permit and Licence Management on 1300 130 372 or alternatively, you may obtain the relevant forms on the DERM website at <http://www.derm.qld.gov.au/register/p00772aa.doc>.

DERM trusts that the measures outlined in Santos' recent letter will prevent this type of incident from reoccurring. DERM is satisfied that Santos will remediate the contaminated soil, rehabilitate the affected area of land and continue to liaise with the landholders in Nockatunga Station, as well as comply with conditions E2, E3, E4 and F12 of PEN100046407 (IA No.150 029; please refer to the copy attached to this letter). Additionally, if the soil needs to be transported to the Jackson landfarm, DERM expects that Santos or its contractor will use the appropriate vehicles to contain this material.

In this instance, DERM has decided to close this matter with a formal warning to Santos (WARN2942) for breaching condition F1 of PEN100046407 (IA No.150 029). As such, Section 430 of the *Environmental Protection Act 1994* states it is an offence to contravene a condition of an environmental authority. The maximum penalty for contravening a condition of the authority for a Level 1 Chapter 5A Activity is \$166 500.

If you have any queries in relation to this correspondence, please do not hesitate to contact Vanessa Losada on (07) 3330 5551.

Yours sincerely,



Jim Belford

**Delegate of Administering Authority
Environment and Natural Resource Regulation
Department of Environment and Resource Management**

Enquiries Vanessa Losada
Telephone (07) 3330 5551
Your reference PL23
Our reference BNE40795 vol 16 / 150029 (Bubble Licence) / CR49666

Department of
**Environment and Resource
Management**

12 October 2010

Santos Ltd
Level 4
60 Flinders Street
Adelaide SA 5000

Attention: Mr Nathan Childs,

Dear Sir,

Re: Santos Beam Pump No. 38 Oil Spill (PL23)

On 17 September 2010, the Department of Environment and Resource Management (DERM) received telephone notification from Santos regarding a production oil / formation water mixture release at Beam Pump number 38 in Jackson Oil Field. DERM also received subsequent written advice via email on 20 September 2010. The report into this incident, notifies DERM of a 300 Litre of production oil / formation water mixture release to 20 m² of land which was discovered on 16 September 2010 at 0830 hours.

DERM has reviewed the materials submitted thus far and requires further information, including:

- 1) Evidence that Santos' response will prevent a reoccurrence of this type of incident in the future. Santos' response should reflect willingness to change systems, standards and procedures so as to include a precautionary approach and avoid reoccurrence of spills.
- 2) Please provide details of Santos' commitment to audit, maintain, repair and/or replace existing non-return valves in this and other tenures where beam pumps and wellhead cellars exist.
- 3) Details on routine maintenance programs for the beam pumps and non-return valves and in particular, details of the most recent maintenance inspection carried out.
- 4) Details of whether these maintenance programs have changed after the incident. If so, how?
- 5) In Santos' 20 September 2010 letter it is outlined that: "Contaminated soil has been removed from the site for transportation to the Jackson landfarm for treatment". DERM considers hydrocarbon contaminated soil as a regulated waste as per Schedule 7 of the

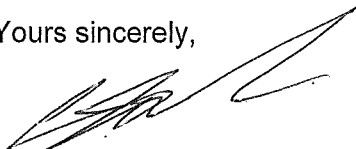
Environmental Protection Regulation 2008. Therefore, DERM requires verification that the soil has been transported in accordance with legislative requirements.

- 6) In Santos' 20 September 2010 letter you also outline that: "The site has been recontoured, treated with Beyond Organics and top dressed". Please provide details of the soil used to recontour and top dress the cleaned-up spill site (e.g. source of the soil, etc).
- 7) Copies of soil monitoring/sampling results not limited to:
 - a. Concentration of hydrocarbons in the soil used to clean-up the site; and
 - b. Types of hydrocarbons found in the soil samples including C chains and PAH speciation.

DERM is committed to achieving positive environmental outcomes and looks forward to your co-operation in addressing this matter promptly. DERM requests that **Santos Limited** treat this matter with urgency and provide a response to this letter by 22 October 2010.

If you have any queries in relation to this correspondence, please do not hesitate to contact Vanessa Losada on (07) 3330 5551.

Yours sincerely,



Louise Jordan
Delegate of Administering Authority
Environment and Natural Resource Regulation
Department of Environment and Resource Management

Running Sheet Summary

Complaint/Report Ref: CR49666

Complainant

Ref	Name	Address	Phone	Mobile	Fax	Email
600642	Santos QNT Pty Ltd	Santos Centre Ground Floor 60 Flinders Street ADELAIDE SA 5000	08 8116 5000		08 8116 5050	sofia.oliver@santos.com

Alleged Source

Ref	Name	Address	Phone	Mobile	Fax	Email
600642	Santos QNT Pty Ltd	Santos Centre Ground Floor 60 Flinders Street ADELAIDE SA 5000	08 8116 5000		08 8116 5050	sofia.oliver@santos.com

Incident Location

Name	Risk Level	Address
PL23		

Source Ref: CR49666

Action Source Ref:

Date Commenced: 20-SEP-10

Officer Involved: LOSADA, Vanessa

Responsible Office: ES - Gas and Petroleum - Southern - Bne

Action Type: Letter - other

Inspection Type:

Enforcement Measure Type:

Referral To:

Action: Written Notification by Santos to be submitted to DERM

Time Spent Hours:

Time Spent Minutes: 30

Outcome: Action Required - awaiting response

Outcome Description: Santos submitted written notification and repot on incident. Report is attached but letter with photographs was too large to upload, an electronic copy can be found in H:\Strategic Projects\Petroleum and Gas\Companies\Santos\Bubble Licence 150 029\Bubble Licence Incidents\PL23 17092010 Incident; and a hard copy in file BNE40795 vol16.

Due Date:20-SEP-10

Date Completed:21-SEP-10

First Action: Y

Source Ref: CR49666

Action Source Ref:

Date Commenced: 12-OCT-10

Officer Involved: LOSADA, Vanessa

Responsible Office: ES - Gas and Petroleum - Southern - Bne

Action Type: Letter - other

Inspection Type:

Enforcement Measure Type:

Referral To:

Action: DERM sent letter to Santos requiring further information and commitment to changes in the procedures and standards to avoid reoccurrence of this type of incident. A response is required by 22/10/2010

Time Spent Hours: 1

First Action: N

Running Sheet Summary

Time Spent Minutes:

Outcome: Action Required - awaiting response

Outcome Description: Santos sent the following email on 18 October 2010 : "Further to the attached notification and discussions with DERM on the 13th October, please find below Santos response to the letter from DERM dated 12th October 2010.
Santos has conducted a preliminary review of this incident and initiated a basic incident investigation to identify the root cause/s of the incident and opportunities to improve the integrity of the system to prevent a re-occurrence. As discussed with DERM during our face to face meeting on the 13th October the type of investigation utilised is dependent upon a number of factors including consequence, impact to the environment, and complexity of the incident. The incident investigation will be completed by Tuesday 9th November, at which time I will provide a summary of the investigation and recommended actions to prevent a re-occurrence.
In response to items 5-7 of DERM's letter of 12 October 2010, it is Santos's understanding, based on advice from DERM's Office of Waste Tracking, that if the material to be transported consists only of soil and no free liquid, that the soil is not a `regulated waste' pursuant to Schedule 7 of the Environmental Protection Regulation 2008. The contaminated soil at the Jackson 38 site was removed using a backhoe and transported to Jackson landfarm using a full bodied tiptruck. The removed soil was not sampled prior to being taken to the Jackson landfarm for treatment. Some recontouring using soil from the Jackson 38 site has already occurred and further material will be imported to the site from a nearby field borrow pit to assist with recontouring and top dressing the site.
Kind Regards,
Nathan"

If you have any queries relating to this matter please don't hesitate to contact me. I will also try and place a call with you later in the week to discuss further.

Due Date:22-OCT-10

Date Completed: 18-OCT-10

Source Ref: CR49666

Action Source Ref:

Date Commenced: 19-OCT-10

First Action: N

Officer Involved: LOSADA, Vanessa

Responsible Office: ES - Gas and Petroleum - Southern - Bne

Action Type: Email Received

Inspection Type:

Enforcement Measure Type:

Referral To:

Action: Santos sent email on 18 Octber 2010 informing DERM that root-cause investigation will be completed by 9 November 2010. At this date Santos will send summary of the investigation results.

Time Spent Hours:

Time Spent Minutes: 15

Outcome: Action Required - awaiting response

Outcome Description:

Due Date:09-NOV-10

Date Completed:

Running Sheet Summary

Complaint/Report Ref: CR49666

Complainant

Ref	Name	Address	Phone	Mobile	Fax	Email
600642	Santos QNT Pty Ltd	Santos Centre Ground Floor 60 Flinders Street ADELAIDE SA 5000	08 8116 5000		08 8116 5050	sofia.oliver@santos.com

Alleged Source

Ref	Name	Address	Phone	Mobile	Fax	Email
600642	Santos QNT Pty Ltd	Santos Centre Ground Floor 60 Flinders Street ADELAIDE SA 5000	08 8116 5000		08 8116 5050	sofia.oliver@santos.com

Incident Location

Name	Risk Level	Address
PL23		

Source Ref: CR49666

Action Source Ref:

Date Commenced: 20-SEP-10

Officer Involved: LOSADA, Vanessa

Responsible Office: ES - Gas and Petroleum - Southern - Bne

Action Type: Letter - other

Inspection Type:

Enforcement Measure Type:

Referral To:

Action: Written Notification by Santos to be submitted to DERM

Time Spent Hours:

Time Spent Minutes: 30

Outcome: Action Required - awaiting response

Outcome Description: Santos submitted written notification and repot on incident. Report is attached but letter with photographs was too large to upload, an electronic copy can be found in H:\Strategic Projects\Petroleum and Gas\Companies\Santos\Bubble Licence 150 029\Bubble Licence Incidents\PL23 17092010 Incident; and a hard copy in file BNE40795 vol16.

Due Date:20-SEP-10

Date Completed:21-SEP-10



Compliance Warning Details

Ref: WARN2942

Warning Type: Written

Warning No:

Issued Date: 07-DEC-10

Issuing Officer: BELFORD, Jim

Responsible Office: Ecoaccess Customer Service Unit

Offence Summary

Offence Code	Offence Description	Legislation	Offence On/From Date
EPA04	Contravention of condition of environmental authority - Corp	Environmental Protection Act 1994	16-SEP-10

Critical Dates

Due Date	Action	Reminder Date	Assigned To

Work Requests

Request Type	Requested By	Status	Advice Type	Outcome

RTI DL RELEASE - EHP