



**January 22, 2021**

Ms. Cheryl L. McCormick, Chief  
Department of Finance  
Office of State Audits and Evaluations  
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Dear Ms. McCormick:

**CALIFORNIA GEOLOGIC ENERGY MANAGEMENT DIVISION, UNDERGROUND INJECTION CONTROL AND WELL STIMULATION TREATMENT PROGRAMS, CORRECTIVE ACTION PLAN - DEPARTMENT OF CONSERVATION RESPONSE TO PERFORMANCE AUDIT REPORT**

On behalf of the Department of Conservation (DOC) and its California Geologic Energy Management Division (CalGEM), please accept this Corrective Action Plan in response to the performance audit of CalGEM's Underground Injection Control (UIC) and Well Stimulation Treatment (WST) programs.

Thank you once again to the California Department of Finance, Office of State Audits and Evaluations (OSAE) for completing the audit requested by the Governor's Office on November 19, 2019. The purpose of this audit was to confirm whether CalGEM's permit reviews in the UIC and WST programs meet legal and regulatory requirements and to identify improvement opportunities.

After reviewing the audit closely, we appreciate that the audit's findings validated current CalGEM practices and suggested several process improvements. As noted below, many process improvements identified in the audit are now in place or will be in place soon. In fact, CalGEM began implementing improvements to its UIC and WST processes, including strengthening internal controls, before it received the audit's final report.

OSAE's final audit report, which was issued on Nov 23, 2020, included findings and recommendations for UIC project approvals, UIC well permits, and WST permits. As requested, CalGEM is submitting this Corrective Action Plan (CAP) within 60 days of that final report release.

CalGEM has implemented the major recommendations presented in the OSAE report. All UIC projects are now forwarded to headquarters to ensure consistent documentation. The use of placeholder permits has been discontinued. The Well Stimulation permitting program has been enhanced to provide greater transparency. This CAP describes tasks designed to document the improvements to CalGEM processes and procedures as well as their completion schedule. The completed improvements include:

- **All UIC projects are now routed through headquarters.** This is to ensure consistent documentation within the UIC project approval process. CalGEM now requires all projects to be forwarded to headquarters for review. Project approval letters (PALs) and well permits are now approved through appropriate delegation of authorities. A memorandum of agreement between the State Water Resource Control Board (SWRCB) and CalGEM has been revised and completed for UIC projects and well permitting review policies and procedures. These new procedures will be memorialized in an updated new standard operating procedures (SOPs).
- **New standardized templates have been instituted.** These templates will increase program transparency by strengthening UIC project review documentation, maintaining consistency across projects. They capture additional PAL details, including the injector well list, and are now fully incorporated into WellSTAR, which is also now available for public access.
- **Placeholder projects have been discontinued.** The use of placeholder projects and issuance of associated well permits has been discontinued per the new UIC regulations that went into effect on April 1, 2019. There are 33 legacy placeholder projects. CalGEM is conducting a project by project review for all placeholder projects. CalGEM will rescind any permits that are not associated with appropriate project approvals.

- **Interagency review process has been enhanced for infill wells.** CalGEM is collaborating with SWRCB to formalize a checklist to document that project modifications or expansions are not approved through infill well reviews. CalGEM and SWRCB continue to review each new infill injection well on a case by case basis under the joint agency memorandum of agreement.
- **Documentation and transparency have been enhanced for WST permit approvals.** CalGEM has implemented OSAE's recommendations for review documentation for verification of 2X Axial Dimensional Stimulation Area (ADSA), including retention of supporting information. The recommendation to document risk assessment clarification is also completed.

CalGEM's CAP focuses on formalizing the above improvements by developing SOPs for the UIC and WST processes and procedures to ensure consistent, sustained, and transparent implementation of these practices. CalGEM has scheduled completion of the remaining tasks as quickly as possible based on available staff.

The most significant recommendations in the OSAE report have been acted upon. Most of the remaining tasks concern formalizing these changes in written SOPs. Some also involve reviewing past projects and permits to ensure conformity with new procedures. Many of the remaining tasks must be done sequentially or when the most efficient regulatory practices have been vetted. The full plan of implementation will be completed in 2022.

## UNDERGROUND INJECTION CONTROL

DOF OSAE Finding	DOF OSAE Recommendations	Implementation Task	Implementation start date	Finish	Current Status
<b>UIC Project Review and PAL Process</b>					
Finding 1 – Improve UIC Program Controls	A - Forward all UIC project reviews to HQ for review and approval.	A – SOP for UIC WellSTAR Project Review Process	Winter 2021	Fall 2021	All projects routed though HQ for approval. SOP pending.
	B - Update the MOA checklist, Manual of Instruction (MOI), and Memorandum of Expectation (MOE) policies and procedures for the review of UIC projects and well permits to be consistent with current statutes and regulations. Communicate updated policies and procedures to the Districts and monitor implementation.	B - MOA Checklist	Winter 2019	Fall 2020	MOA checklist is complete. MOI & MOE will be a compilation of SOPs.

	<p>C - Ensure authorized position levels approve UIC projects and well permits in accordance with statutes and regulations. Establish policies to document approval authority, communicate those policies to the Districts, and monitor implementation.</p>	<p>C – Developing SOP to document the approval authority and delegation of this authority</p>	<p>Mon 02/01/21 Winter 2021</p>	<p>Fri 07/16/21 Summer 2021</p>	
	<p>D - Update WellSTAR user groups to ensure permission levels are appropriately assigned to individuals designated for the approver role.</p>	<p>D – Incorporate modification of approval authority in the UIC WellSTAR Project Review Process</p>	<p>Summer 2021</p>	<p>Fall 2021</p>	

DOF OSAE Finding	DOF OSAE Recommendations	Implementation Task	Implementation start date	Finish	Current Status
Finding 2 - Strengthen UIC Project Review Documentation and Transparency	A - Update review policies and procedures to address the completion and retention of MOA checklists and AOR review files. Develop standardized templates to facilitate consistent documentation among the Districts and monitor consistency of implementation. Retain project review files to support review determinations.	A1 - MOA Checklist	Winter 2019	Fall 2020	Complete.
		A2 – Establish HQ oversight to ensure that each UIC project has an associated MOA checklist uploaded into WellSTAR	Winter 2021	Fall 2021	Incorporated into current practice and will be included in the consistent documentation SOP being developed in A3.
		A3 - SOP for Consistent documentation of the review work done during the UIC approval process	Winter 2021	Winter 2022	

		A4 - SOP for Water and Steam Injection AOR	Winter 2021	Winter 2022	
	B - Determine a standard method to reference the list of approved injection wells in the PAL and ensure the reference is consistent among all PALs. Consider updating regulations as needed.	B – Create SOP to incorporate injectors list in UIC PAL.	Winter 2021	Winter 2022	
	C - Consistently include clearly labeled project maps in the PAL. Ensure maps clearly identify the entire project location, area, proposed injection wells, and other pertinent information.	C - SOP for Maps that will identify data to include, labels, etc.	Winter 2021	Winter 2022	
	D - Consider providing public access to PALs and approved injection wells in WellSTAR to increase transparency of approved UIC projects.	D - Provide Public Access to WellSTAR that should include Well and UIC project and Well list– WellSTAR 5.1.3 released on Dec 2020	Fall 2020	Fall 2020	Complete.

DOF OSAE Finding	DOF OSAE Recommendations	Implementation Task	Implementation start date	Finish	Current Status
<b>Approval of UIC Well Permits</b>					
Finding 3 – Ensure Project Modifications or Expansions Are Not Approved Through Infill Well Reviews	A - Update review policies and procedures to address infill well review, tracking, and documentation. Communicate updated review policies and procedures to the Districts and monitor implementation	A - Infill (non-expansion) well checklists (One for water injection & One for Steam injection) are under development.	Fall 2020	Spring 2022	
	B - Notify and provide relevant key infill project documents to the Water Boards for review and comment; and ensure the Water Boards are consistently notified of approval letters issued aside from the UIC project review process.	B - Complete the Inter-agency checklist (including CalGEM's PE/PG signature and stamp requirement).	Winter 2021	Summer 2022	
	C - Define significant and minor project changes to establish a basis for determining when an addendum or revision to the PAL is required in accordance with UIC requirements.	C - SOP defining significant and minor project changes that will result in addendum or revision to the PAL	Winter 2021	Winter 2022	



	<p>D - Conduct periodic reviews of infill well approval letters issued by Districts. Periodic reviews should be conducted by HQ using a risk-based approach to ensure adequate oversight of well permitting activities at the Districts.</p>	<p>D1 - SOP for infill wells</p>	<p>Fall 2020</p>	<p>Spring 2022</p>	
		<p>D2 – Develop SOP for risk-based selection of infill well approval letter to ensure oversight of well permitting activities</p>	<p>Winter 2021</p>	<p>Winter 2022</p>	

DOF OSAE Finding	DOF OSAE Recommendations	Implementation Task	Implementation start date	Finish	Current Status
Finding 4 – Discontinue Use of Placeholder Projects and Issuance of Associated Well Permits	A - Consider ceasing injection for all well permits approved under placeholder projects that cannot be merged with an existing UIC project with a valid PAL, until the projects can be properly reviewed under a PxP review	A - Work with PxP team at Inland & Coastal district office to prioritize the merging of Placeholder projects with existing steam injection UIC projects	Winter 2021	Fall 2022	
	B - Discontinue the use of placeholder project numbers to issue permits for injection wells. Consider rescinding permits for injection wells that are operating under placeholder project numbers that cannot be merged with an existing UIC project with a valid PAL.	B - Complete rescission of injection permits for wells that cannot be merged with existing steam injection projects.	Winter 2021	Fall 2022	Use of placeholder projects have been discontinued per the new UIC regulations.
	C - Identify the entire population of placeholder projects and prioritize the evaluation of these placeholder projects through the PxP review process. As needed, require operators to submit UIC project applications for	C – Complete the UIC project by project review of placeholder projects.	Winter 2021	Fall 2022	All placeholder projects identified and prioritized. CalGEM schedule shows project by project review to plan.

	review, approval, and issuance of a valid PAL.				
	D - Conduct periodic reviews of permits issued for injection wells by Districts for compliance with UIC requirements. Periodic reviews should be conducted by HQ using a risk-based approach to ensure adequate oversight of well permitting activities at the Districts.	D – Develop SOP to guide HQ review of 'districts' issued well permits on a risk-based basis for improved HQ oversight	Winter 2021	Winter 2022	

DOF OSAE Finding	DOF OSAE Recommendations	Implementation Task	Implementation start date	Finish	Current Status
Finding 5 – Improve Well Permit Detail and Review Documentation	A - Update review policies and procedures to address permits issued for injection wells, and documentation requirements including retention of key project review files to support review determinations.	A1 - SOP for injection well permitting	Fall 2020	Spring 2022	MOA Checklist & timeline shows schedule for Non-expansion checklist.
		A2 - Documentation requirement for injection wells are well defined	Fall 2020	Spring 2022	MOA Checklist & timeline shows schedule for Non-expansion checklist.
	B - Identify pertinent well and UIC project data to be included on all permits issued for injection wells, such as but not limited to, well type and project number.	B - SOP for pertinent well data to be included for injection well permit in WellSTAR	Winter 2021	Winter 2022	
	C - Ensure project files contain documentation and evidence to support completion of AOR review for the project and/or proposed injection well.	C1 - Ensure project files contain documentation to support completion of AOR review	Winter 2021	Winter 2022	CAP Same as 2A4
		C2- Documentation retention to support AOR review will be covered in AOR SOP	Winter 2021	Winter 2022	CAP Same as 2A4

	D - Verify proposed injection wells are within the approved existing UIC project area. Reject the NOI if the well is located outside the project area (i.e. section, township, and range).	D - Verify proposed injection wells are within the approved existing UIC project area	Fall 2020	Spring 2022	CAP Same as 2A4 & 3A
		D - Ensuring location of new injection well is within approved AOR will be covered under AOR SOP	Winter 2021	Winter 2022	CAP Same as 2A4
	E - Conduct periodic reviews of permits issued for injection by the Districts. Periodic reviews should be conducted by HQ using a risk-based approach to ensure adequate oversight of well permitting activities at the Districts.	E - SOP for risk-based ranking criteria to conduct periodic reviews of permits issued for injection by district	Winter 2021	Winter 2022	

## WELL STIMULATION TREATMENT

DOF OSAE Finding	DOF OSAE Recommendations	Implementation Task	Implementation start date	Finish	Current Status
Finding 6 – Strengthen ADSA Review Documentation	A - Update WST SOP to include documentation requirements for verification of operator's	A - Update the WST permitting process flowchart and SOP to include all the DOF report	Summer 2020	Winter 2021	SOP drafted and under review currently.

	2xADSA data, determination of ADSA locations, addressing high risk abandoned wells, and selection of monitoring wells.	recommendations. (SOP – Risk assessment section)			
	B - Update the risk assessment template to incorporate WST SOP updates noted in Recommendation A above.	B - Update the WST risk assessment template to include the verification of 2xADSA, mitigation measure of the high-risk P/A wells, and reason for the selection of monitoring wells. (SOP – Risk assessment section)	Summer 2020	Summer 2020	Risk assessment template has been updated (Figure 1 and Figure 3). Please see the Appendix section for a more detailed explanation of the update.
	C - Include all wells within the 2xADSA (penetrating or non-penetrating) in the risk assessment and identify the wells that do not require evaluation including documentation of the reasons why.	C - Update the WST risk assessment template to include all wells within the 2xADSA circle, including the non-penetrating wells. (SOP – Risk assessment section)	Summer 2020	Summer 2020	Risk assessment template has been updated (see Figures 1 and 4). Please see the Appendix section for a more detailed explanation of the update.
	D - Ensure sufficient review documentation and files are retained to support the evaluation of risk for the WST. The audit trail should facilitate the tracing of	D - Update the SOP and the risk assessment template to ensure the ADSA Narrative determination review process is consistent for all	Summer 2020	Summer 2020	Risk assessment template has been updated (see Figures 1 and 2). Please see the

ADSA Narrative review determinations to source files and documents completed by permit engineers.

applications, including those without any 2xADSA wells. Create the risk assessment template for each application and retain it for documentation.

Appendix section for a more detailed explanation of the update.

Please contact Yuvaraj Sivalingam (Yuvaraj.Sivalingam@conservation.ca.gov) or Nicholas Abu (Nicholas.Abu@conservation.ca.gov) or if you would like to discuss this CAP.

Sincerely,

 for

**David Shabazian**  
Director



**Uduak-Joe Ntuk**  
State Oil and Gas Supervisor

cc: Wade Crowfoot, Secretary, California Natural Resources Agency  
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## Appendix:

The new WST risk assessment template shown in Figure 1, includes updates recommended by the DOF OSAE audit performance report. A more detailed explanation of each new section is provided below. These updates have been incorporated into SOPs for WST permitting.

API	Well Type	Well Designation	Well Status	Previously Stimulated	ADSA Location	Damage Type	Damage Location	Perforation Location	Damage Location	USDW Present	Notes	Abandoned To Standards	As of	Is this an offset well monitored by permit conditions?
0402919103	Waterflood	518N-28	Plugged & Abandoned	Yes	B	None	None	C	None/AD/Above CDDepth	false	C/O R1130; diatomite @584	True	09/24/1998	False
0402910103	Steamflood	618P-28	Plugged & Abandoned	Yes	A	None	None	A	None/AD/Above CDDepth	false	C/O R1651	True	04/23/2004	False
040302958	Oil & Gas	518P-28	Plugged & Abandoned	Yes	C	Partial Casing or Hole	In Zone	C	None/AD/Above CDDepth	false	C/O R1618; partial casing @608; diatomite @593	True	04/20/2010	False
040303961	Oil & Gas	318S1-28	Plugged & Abandoned	Yes	A	Doublet	In Zone	A	None/AD/Above CDDepth	false	C/O R1185; doublet @1086; diatomite @588	True	04/20/2009	False
0403012327	Waterflood	518NR-28	Plugged & Abandoned	Yes	C	Partial Casing or Hole	In Zone	C	Below CDDepth/In Zone	false	C/O R1729; casing damage @730 & 787; diatomite @383	False	09/22/2011	False
0403022416	Oil & Gas	918V-28	Active	Yes	B	None	None			false	OG well; no MIT to determine mechanical integrity. Lies within fracture azimuth; selected for pressure monitoring during proposed stimulation of well 03067616.	False		True
040302418	Oil & Gas	918K-28	Plugged & Abandoned	Yes	B	Doublet	In and Out of Zone	Not in ADSA	Below CDDepth/In Zone	false	C/O R1699; doublet @300 & 716; diatomite @571	True	03/03/2010	False
0403041202	Steamflood	718DU-28	Active	Yes	C	None	None			false		False		False
0403041208	Steamflood	718DU-28	Active	Yes	B	None	None			false		False		False
040304365	Steamflood	718N6-28	Active	Yes	C	None	None			false		False		False
040304246	Steamflood	718N1-28	Active	Yes	C	None	None			false		False		False

**Note:**  
0403022416 selected for pressure monitoring

Well(s) not intersecting the 2X ADSA of the Proposed Well		
API#	Well Name	Reasons
02931381	18A-28	Does not penetrate
03015788	918K-28	Does not penetrate
03019644	918P-28	Does not penetrate
03067616	518S2-28	New - Proposed WST Well, Not Drilled

**WST Application Group Sample: Well 030XXXX (First/Bottom Stage) – Field Name**

CoGen: 2X ADSA Map      Operator: 2X ADSA Map

**WST Application Group Sample: Well 030XXXX (Last/Top Stage) – Field Name**

Figure 1: New risk assessment template

A. Verification of 2xADSA data/maps:

Figure 2 below shows the 2XADSA verification maps. CalGEM WST engineer generates the map on the left using 'CalGEM's GIS map layer. The operator submits the map shown on the right side of the figure. This step verifies the recommendation in Part A of the report to document the data and map used for 2xADSA evaluation. The WST engineer then inserts the proposed fracture azimuth path along with the ADSA location zones (A, B, and C) on the map, which meets the recommendation to document how ADSA location zones are assigned. These steps were previously completed outside of the risk assessment template but not retained. This new procedure will ensure that documents and verification steps are preserved in the same risk assessment file going forward.

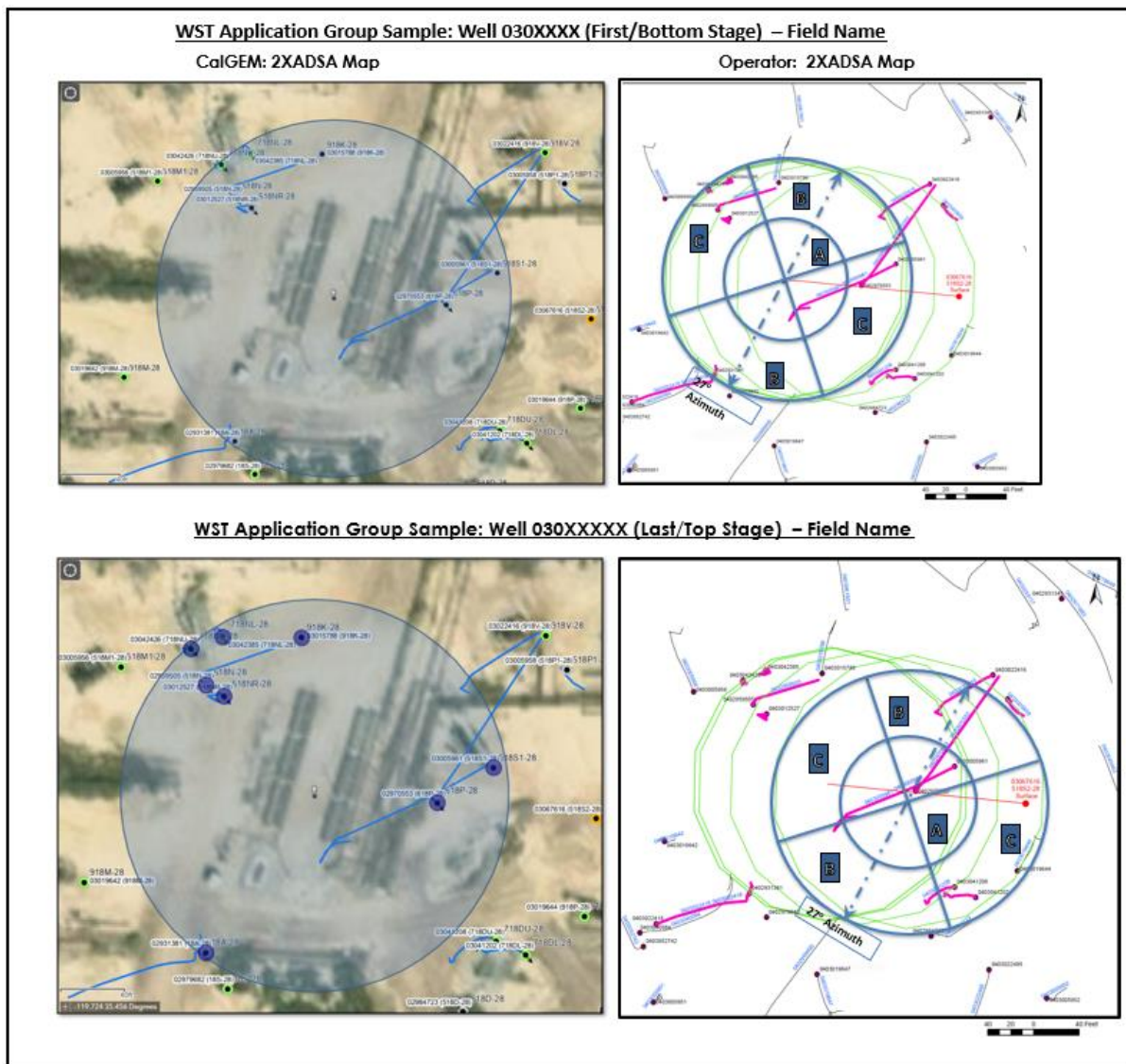


Figure 2: CalGEM Map and Operator (Aera) Map side by side comparison with ADSA location zones

B. Abandoned and non-abandoned wells risk assessment:

This section of the risk assessment has been updated with the new WellSTAR process. The wells in the 2xADSA are identified in the WellSTAR application system by the operator. WST engineers verify the wells as shown in previous steps and their well records as part of the risk assessment. Review notes are added to WellSTAR under each ADSA well along with the reason for selecting the monitoring well as recommended in the report. The engineer then downloads the reviewed ADSA wells' details into an Excel template, as shown below in Figure 3. This is added to the risk assessment file.

API	Well Type	Well Designation	Well Status	Previously Stimulated	ADSA Location	Damage Type	Damage Location	Perforation Location	Damage Location	USDW Present	Notes	Abandoned To Standards	As of	Is this an offset well monitored by permit conditions?
0402959505	Waterflood	518N-28	Plugged & Abandoned	Yes	B	None	None	C	NoneAtOrAboveCODepth	false	C/O @ 1150'; diatomite @584'	True	08/24/1998	False
0402970553	Steamflood	618P-28	Plugged & Abandoned	Yes	A	None	None	A	NoneAtOrAboveCODepth	false	C/O @656'	True	04/23/2004	False
0403005958	Oil & Gas	518P1-28	Plugged & Abandoned	Yes	C	Parted Casing or Hole	In Zone	C	NoneAtOrAboveCODepth	false	C/O @618'; parted casing @608'; diatomite @593'	True	04/20/2010	False
0403005961	Oil & Gas	518S1-28	Plugged & Abandoned	Yes	A	Dogleg	In Zone	A	NoneAtOrAboveCODepth	false	C/O @1185'; dogleg @1088'; diatomite @588'	True	06/20/2019	False
0403012527	Waterflood	518NR-28	Plugged & Abandoned	Yes	C	Parted Casing or Hole	In Zone	C	BelowCODepthInZone	false	C/O @729'; casing damage @730' & 787'; diatomite @583'	False	09/22/2011	False
0403022416	Oil & Gas	918V-28	Active	Yes	B	None	None			false	OG well; no MIT to determine mechanical integrity. Lies within fracture azimuth; selected for pressure monitoring during proposed stimulation of well 03067616.	False		True
0403022418	Oil & Gas	918X-28	Plugged & Abandoned	Yes	B	Dogleg	In and Out of Zone	NotInADSA	BelowCODepthInZone	false	C/O @699'; dogleg @520' & 716'; diatomite @571'	True	05/03/2010	False
0403041202	Steamflood	718DL-28	Active	Yes	C	None	None			false		False		False
0403041208	Steamflood	718DU-28	Active	Yes	B	None	None			false		False		False
0403042385	Steamflood	718NL-28	Active	Yes	C	None	None			false		False		False
0403042426	Steamflood	718NU-28	Active	Yes	C	None	None			false		False		False

Note: 0403022416 Selected for pressure monitoring

Figure 3: Risk assessment of wells in the 2xADSA with selected monitoring well highlighted

True = Yes      False = No

C. Wells not intersecting the 2xADSA zone but are within the 2xADSA surface map:

Figure 4 below shows the inclusion of wells that do not intersect the 2XADSA zone but within the surface map as recommended in the report. This has now been added to the current risk assessment template and will provide additional verification and documentation of why the wells are not evaluated as part of the risk assessment.

Well(s) not intersecting the 2XADSA of the Proposed Well		
API#	Well Name	Reasons
02931381	18A-28	Does not penetrate
03015788	918K-28	Does not penetrate
03019644	918P-28	Does not penetrate
03067616	518S2-28	New - Proposed WST Well, Not Drilled

Figure 4: New section to show wells, not in the 2xADSA