Documentation of Periodic Review

Document Number: EP-DIV-SOP-20006 Revision: 0-IPC-1

Title: Pressure Monitoring of Packer Systems in Monitoring Wells

Due Date for Review: 11/3/14 Responsible Line Manager: Mike Alexander Z#: 102267

Editorial Review and Validation are suggested methods of evaluation, but are not required.

Evaluation	YES	NO	N/A
1. Editorial Review performed?	☐	☒	☐
2. Validation performed?	☐	☒	☐

Evaluation Results	YES	NO	N/A
3. Is the document, in its entirety, still needed for operations at the facility? (If No, skip questions 4 – 7 and select "Cancellation" or "Revision."	☒	☐	☐
4. Is the document technically accurate?	☒	☐	☐
5. Is the document usable in its current form?	☒	☐	☐
6. Are the references current and complete? (If "No," a Minor revision should be considered)	☐	☐	☒
7. Does the document satisfy the format requirements?	☐	☒	☐

Integrated Work Document (IWD) – Equivalent Evaluation Results	YES	NO	N/A
8. Is the P300 Hazard Grading Matrix for this document still accurate?	☐	☒	☐
9. Is the document still acceptable as P300 Part 1, *Activity Specific Information*?	☐	☐	☒
10. Is this document still acceptable as P300 Part 2, *Work-Area Information*?	☐	☐	☒
11. Is this document still acceptable as P300 Part 3, *Validation and Work Release Information*?	☐	☐	☒
12. Is this document still acceptable as P300 Part 4, *Post-Job Review*?	☐	☐	☒

H.Ku A

13. Based on this evaluation, the following action is required.

☐	None	The document is extended in accordance with its periodic review cycle.
☑	Revision	Initiate a revision in accordance with the governing procedure.
☐	Cancellation	Initiate cancellation in accordance with the governing procedure.

14. Periodic Review Evaluation Performed By:

Stephen White	/ [signature]	/ 208872	/ 3/11/15
Name (print)	Signature	Z number	Date

Comments: Needs a couple of editorial fixes. Section 2.1, 3rd paragraph needs work.

Responsible Line Manager (RLM) Approval:

Mike Alexander	/ [signature]	/ 102267	/ 3-18-14
RLM/Representative (print)	Signature	Z number	Date

Facility Operations Director (FOD) Concurrence (if required):

N/A	/ N/A	/N/A	/N/A
FOD/Representative (print)	Signature	Z number	Date

Immediate Procedure Change (IPC) Cover		
Section 1 – Originator Request		
Document No.: EP-DIV-SOP-20006	Revision No.: 0	IPC No.: 1
Title: Pressure Monitoring of Packer systems in Monitoring Wells		
Description of need and requested action (revisions attached with changes tracked): Clarify maintenance of packer pressure settings for temporary packers, which are maintained separately from Baski packer pressure settings.		

Originator Name (print):	Organization:	Z#:	Date:
Tim J. Goering	ADEP-ET	140890	12/22/11

Section 2 –Reviews

Discipline:	Name:	Signature:	Date:
Engineering	Alan S. MacGregor		12.22.11
Field Services	Steven G. Pearson		1/4/12
Corrective Actions	Steven M. Paris		12/22/11

USQ/USI Number: EWMO-12-009D ☐ N/A

Section 3– Final Approvals

FOD Concurrence:	Print Name and Title:	Z#:	Date:

☒ Permanent ☐ Limited Use	Effective Date: 12/23/11 Expiration Date:

Comments:

Responsible Manager Signature:	Print Name and Title: Craig Douglass, RLM CAP	Z#: 216051	Date: 1/5/12

Identifier: **EP-DIV-SOP-20006**	Revision: **0, IPC-1**	
Effective Date: 01/10/12	Next Review Date: 11/3/14	

Environmental Programs Directorate
Corrective Actions Projects

Standard Operating Procedure

for

Pressure Monitoring of Packer Systems in Monitoring Wells

APPROVAL SIGNATURES:

Subject Matter Expert:	**Organization**	**Signature**	**Date**
Alan S. MacGregor	ET-ER	/s/Alan MacGregor	10-25-11
Responsible Line Manager:	**Organization**	**Signature**	**Date**
Craig Douglass	CAP	/s/Craig Douglass	11-1-11

1.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) states the responsibilities and describes the process for monitoring and maintenance of BASKI™ sampling system packers and temporary packers installed in water wells that are owned by the Environmental Programs Directorate. This procedure applies to packers which have a liquid inflation chamber as well as to packers of an older design which are inflated only by nitrogen. This procedure also applies to temporary packers of any manufacture.

2.0 BACKGROUND AND PRECAUTIONS

2.1 Background

These packers must be maintained within a range of pressures in order to 1) hydraulically isolate the water from various zones of a well, and 2) make it possible to sample water from each zone without cross contamination. For these reasons it is necessary to monitor packer pressures on a regular basis, especially shortly after installation, and to repressurize leaking packers to keep them within a safe range of pressures. Leaking packers will be repressurized during scheduled visits (see **4.4 Frequency**). A leak will be defined as "rapid" if the leak rate is sufficient to exhaust a standard nitrogen gas cylinder in less than one month. Rapidly-leaking packers will be equipped with a pressurized cylinder or tube trailer permanently connected and regularly checked.

Each packer has a minimum pressure needed to function properly, and a maximum pressure above which it may be permanently damaged. This pressure range is determined by the drilling/well maintenance subcontractor at the time the packer is installed, based on the detailed characteristics of each well and the positions of the screens.

The "target pressure," which is the desired pressure for the packer to operate, has been set at halfway between the minimum and maximum pressures. The "action pressure," which is the pressure below the packer which should not be allowed to drop, has been set at halfway between the minimum and target pressures. Wellhead pressure settings (packer pressure specifications) for Baski systems may be found at http://adep.lanl.gov/epdc/EPDCS/Facility%20Support%20Docs/Drawings/CAP-WELLS-DWG-102Y231909.pdf. Wellhead pressure settings (packer pressure specifications) for temporary packers are maintained by Field Services and updated as needed. IPC-1

2.2 Precautions

These instructions do not replace or supersede any other procedures of required documents (SOPs and IWDs). For example, documents pertaining to driving and towing, general field work, hand tool use, and pressure systems must be observed during packer maintenance.

3.0 EQUIPMENT AND TOOLS

For most situations, this task may be accomplished with a field truck carrying the following:

1) nitrogen gas cylinder(s) (> 2000 psig).
2) nitrogen regulator capable of supplying >400 psig.
3) pressure safety manifold with relief valve set at 400 psig.
4) approximately 20' of flexible tubing between safety manifold and wellhead, rated at >400 psig.
5) soap solution for leak testing.

This is a dedicated set of equipment consisting of regulator, safety manifold, and tubing, all with matching quick-disconnect fittings, and whip restrainers. All parts will be stored together and will not be used for other activities.

For situations in which a gas cylinder (or tube trailer) is permanently connected to the wellhead, the equipment is identical with the exception that the inflation tubing is of a more rugged and tamper-resistant design. In addition, permanently installed cylinders will be housed in locked cabinets to prevent tampering. Also, pressure relief devices on permanent installations shall be set to the Maximum Allowable Working Pressure (MAWP) for the packer system as furnished by the drilling/well maintenance subcontractor who installed the packer.

4.0 STEP-BY-STEP PROCESS DESCRIPTION

4.1 Procedure for Permanently Installed Gas Cylinder or Tube Trailer

All	1.	Read the primary pressure on the regulator supplying gas to the packer. This is the right-hand pressure gauge on the regulator. If the primary pressure has dropped below 800 psig, the cylinder must be changed.
	2.	Read the secondary pressure on the regulator (left hand gauge). If the secondary pressure has fallen below the minimum packer pressure, the condition must be reported in addition to changing the cylinder. This condition will necessitate that water level data be downloaded and reported by a Field Services Water Level specialist. See (**4.3 Reporting)**.
	3.	Close the packer valve at the wellhead, shut off the cylinder valve and bleed the manifold. Remove the regulator and replace the cylinder with a fresh one. [For tube trailers, close off the spent tube(s) and open up the valves on fresh tube(s)].
	4.	Reconnect and repressurize the manifold, then open the packer valve at the wellhead.
	5.	Verify that the packer pressure stabilizes near the target pressure and make any necessary adjustments.
	6.	Leak check any fittings that were changed or adjusted during the procedure (including the cylinder fitting), using soap solution.
	7.	Document the date and time of the visit, all pressure readings, and all other activities in the Packer Maintenance notebook. Field Services personnel will be responsible for entering the data into a spreadsheet.

4.2 Procedure for Wells without Permanently Installed Gas Cylinder or Tube Trailer

All	1.	Open the well cap and read packer pressure.
	2.	If packer pressure has fallen below the minimum pressured, the water level data must be downloaded and reported by a Field Services water level specialist. See (**4.3 Reporting).**

All	3.	If packer pressure is below or only slightly above the action pressure, repressurization is required.
	4.	Attach regulator to a nitrogen cylinder.
	5.	Connect safety manifold, and tubing, using whip restraints, finishing at the quick-connect fitting above the packer valve.
	6.	Open cylinder valve and pressurize the line to the target pressure with the regulator.
	7.	Open the packer valve until the packer pressure gauge stabilizes. It should read the same as the pressure at the regulator, allowing for approximately ±5% inaccuracy of a typical gauge.
	8.	Close the packer valve.
	9.	Close the cylinder valve, bleed the system, and disconnect tubing, safety manifold, and regulator.
	10.	Leak check all fittings above the well cap.
	11.	Document the date and time of the visit, all pressure readings, and all other activities in the Packer Maintenance notebook. Field Services personnel will be responsible for entering the data into a spreadsheet.

4.3 Reporting

All	1.	See (**4.4 Frequency**) for a description of how the Packer Maintenance Table is created and updated. If packer pressure less than the minimum in the Packer Maintenance Table is observed, a chain of further actions and notifications is initiated. Refer to the Decision Tree for Packer Maintenance (Attachment 1). It will be the responsibility of the Project manager to determine if notifications outside of the laboratory (to ENV-RCRA, for example) are required.

4.4 Frequency

All	1.	Newly installed packers shall be checked daily for at least one week after installation to determine their characteristics. Once the characteristics are known, a schedule for revisiting the well will be determined and documented. This determination will be made during regularly scheduled consultations between Field Services, the Technical lead, and QA personnel. The pressure monitoring frequency/schedule for all packers is maintained and updated by Field Services. The relevant data for each packer (minimum, maximum, target and action pressures are maintained as described in Section 2.1. IPC-1

4.5 Records Management

All	1.	Field crews shall document packer pressure at time of inspection, nitrogen tank pressure at time of inspection, packer pressure following maintenance, and nitrogen tank pressure following maintenance. Any other activities will also be documented. Records will be kept in the Packer Maintenance notebook and later input into an Excel spreadsheet. The updated spreadsheet will be provided to the groundwater project manager on a weekly basis.
Field Services Personnel	2.	Maintains and submits records and/or documents generated to the Records Processing Facility according to EP-DIR-AP-10003, Records Management Procedure for ADEP Employees: • Packer Maintenance notebook. • Excel spreadsheet and/or any related documentation. • Packer Maintenance Table • Calendar for packer maintenance

5.0 ATTACHMENTS

Attachment 1 – Decision Tree for Packer Maintenance

6.0 REVISION HISTORY

Revision No. *[Enter current revision number, beginning with Rev.0]*	Effective Date *[DCC inserts effective date for revision]*	Description of Changes *[List specific changes made since the previous revision]*	Type of Change *[Technical (T) or Editorial (E)]*
0	4/14/10	Former Desk Instruction DSK-05 has been converted to a standard operating procedure to include reporting and record keeping.	T/E
0	11/3/11	New Document Control number assigned; Supersedes SOP-5260, R0; 1) Included a link to current wellhead pressure settings engineering drawing CAP-WELLS-DWG-102Y231909 in section 2.1 Introduction; 2) Deleted (Attachment A) example table Minimum and Maximum Packer Pressures for all Baski or Temporary Packers Installed as of 12/16/2009; 3) Renamed Attachment B, Decision Tree for Packer Maintenance to Attachment 1.	T/E
IPC-1	01/10/12	Added clarification of pressure setting maintenance for temporary packers.	T/E

Click here for "Required Read" credit.

ATTACHMENT 1	
EP-DIV-SOP-20006-1 **Decision Tree for Packer Maintenance**	Los Alamos NATIONAL LABORATORY EST.1943