




Implementation Workshops

Underground Injection Control (UIC) Regulations

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Agenda



- 09:00-09:10 **Welcome and Introduction**
- 09:10-09:25 **1720.1. Definition**
- 09:25-09:40 **1724.6. Approval of Underground Injection Projects (PAL)**
- 09:40-10:10 **1724.7. Project Data Requirements**
- 10:10-10:20 **1724.7.1. Casing Diagrams**
- 10:20-10:35 Break
- 10:35-10:45 **1724.7.2. Liquid Analysis**
- 10:45-10:55 **1724.8. Evaluation of Wells Within the Area of Review**
- 10:55-11:30 **1724.10. Filing, Notification, Operating, and Testing Requirements**
- 11:30-13:00 Lunch Break

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- 13:00-13:30 **1724.10.1. Mechanical Integrity Testing Part I**
- 13:30-14:00 **1724.10.2. Mechanical Integrity Testing Part II**
- 14:00-14:15 **1724.10.3. Maximum Allowable Surface Injection Pressure**
- 14:15-14:25 **1724.10.4. Continuous Pressure Monitoring**
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- 15:10-15:30 **1724.12. Surface Expression Containment**
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- 15:50-16:00 Wrap Up and Next Steps

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Welcome and Introduction





- **Welcome and House Keeping**
- **Why are we here?**
 - Review new UIC Regulations effective as of 4/1/2019
 - Ensure operators are aware of what to expect as of 4/1/2019.
 - Resources:
 - Website: www.conservation.ca.gov
 - Email: UIC.Implementation@conservation.ca.gov

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Welcome and Introduction




- **Note:**
 - These slides flag many important aspects of the updated UIC regulations, but the slides are not intended to be a comprehensive summary of UIC requirements.
 - Some existing requirements have not changed.
 - New items are **highlighted in yellow.**

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1720.1. Definition



- Area of Review
- Injection Zone
- Low-energy seep
- Low-use cyclic steam injection well
- Surface expression
- Surface expression containment measure
- Underground Source of Drinking Water (USDW)
- Water source well
- Water supply well



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1724.6. Approval of Underground Injection Projects



- **Notable Requirements:**
 - Every UIC project now requires a Project Approval Letter (PAL)
 - Including Cyclic Steam project
 - Including identification of **injection zones**
 - Every project gets reviewed at least once every 3 years.
 - New operator meets with DOGGR by 60 days after project transfer.





Questions?

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1724.7. Project Data Requirements




- **1724.7 (a) Data to support Injection fluid confinement**
- **Engineering study**
 - [Area of Review](#) (AOR) Determination
 - Flood pattern
 - Planned well-drilling and P&A program
 - Maps
 - All [water supply wells](#)
 - All wells within and adjacent to AOR




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1724.7. Project Data Requirements




- **1724.7 (a) Data to support Injection fluid confinement**
 - **Geologic study**
 - Reservoir characteristic
 - Reservoir fluid data
 - Structural Map
 - Isopach map
 - Cross Section
 - 2 required, through at least 2 wells and 1 injector
 - Identify base of freshwater and base of underground source of drinking water (USDW)
 - Electric log




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1724.7. Project Data Requirements




- **1724.7 (a) Data to support Injection fluid confinement**
 - **Injection plan**
 - Statement of primary purpose
 - Facility map
 - Project duration
 - Identify all wells (The depth of [water source wells](#) shall also be provided.)
 - Monitoring system
 - Injection method
 - Cathodic Protection
 - Identification of sources of injection fluid




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1724.7. Project Data Requirements



- **1724.7 (a)(4)-(5) Data to support Injection fluid confinement**
 - Data to support maximum allowable surface injection Pressure (MASIP) determination
 - Offset operator notification
- **1724.7 (b) Project file must include an up-to-date list of wells associated with project.**
- **1724.7 (c) Data shall be submitted digitally**
- **1724.7 (d) Cover page signed by appropriate CA licensed professionals**



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Project Data Requirements Questions?

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1724.7.1. Casing Diagrams



- **Notable casing diagrams requirements**
 - Base of freshwater
 - **Base of the lowermost USDW penetrated by the well**
 - Depths and names of the formations, zones and markers penetrated by the well
- **Graphical or flat-file data set**



Casing Diagrams Questions?



Break

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1724.7.2. Liquid Analysis



- Chemical analysis of injection fluid and Injection zone are still required
- Basic sample collection procedure now outlined
 - Reservoir fluid must be "Native" or from analogous reservoir
 - Injection fluid sampled after all additives, treatment or processing if any
- Constituents to be analyzed are now specified
- Analysis performed and submitted to WellSTAR by California Lab and reviewed by operator (WellSTAR Functionality Date April 30, 2019).



Liquid Analysis Questions?

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1724.8. Evaluation of Wells Within the Area of Review



- **Performance Standard**
 - Injection fluid shall not migrate outside the approved **injection zone**.
- **Minimum Evaluation Criteria**
 - All wells within the area of review that penetrate the injection zone shall be evaluated for potential conduits.
- **Identified deficiencies must be addressed though**
 - Physical remediation
 - Plugged & Abandoned wells to current standard.
 - Monitoring
 - Alternative findings for fluid confinement
 - DOGGR option to accept alternative demonstration of fluid confinement despite abandoned wells not plugged to current standards.



Area of Review Questions?

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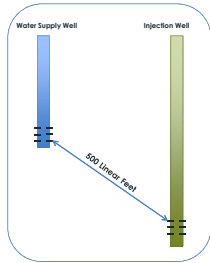


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1724.10. Filing, Notification, Operating, and Testing Requirements



- DOGGR approval needed when adding an injection well to a UIC project
- Annual reporting requirement on water treatment and fluid additives
 - An injection well with open perforations located within 500 linear feet of the screen or perforations of a [water supply well](#).



1724.10. Filing, Notification, Operating, and Testing Requirements



- Tubing and packer requirements:
 - Exemption criteria to include no threat to USDW (Not just freshwater).
 - Compliance date for wells previously exempted is 4/1/2021.
 - Exemptions for Cyclic steam and Steamflood remains unchanged.
 - Exemptions for air and gas quality pipeline injection no longer apply. They are govern by separate regulation.
 - No injection through tubing-casing annulus unless approved by DOGGR.
 - Packer set no more than 100' above the approved injection zone.
 - Option to use "technical equivalent" to packer with DOGGR approval.

1724.10. Filing, Notification, Operating, and Testing Requirements



- New requirement for Operators of Cyclic steam wells
 - Operators of cyclic steam injection wells to maintain records of the number, duration and fluid volume of all injection cycles performed on each cyclic steam injection well.



Filing, Notification and Operating Questions?



Lunch Break

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1724.10. Filing, Notification, Operating, and Testing Requirements



- **Mechanical Integrity Testing (MIT)**
 - **48 hours** advance notice to DOGGR
 - Test result submitted to DOGGR within 60 days
 - Injection well that is not tested as required by regulation shall automatically lose approval to inject
 - Remedial work or retesting shall be completed within **180 days** for wells that failed testing

1724.10.1. Mechanical Integrity Testing Part I



- **Mechanical Integrity Testing (MIT) Part I is a casing pressure test.**
- **Annual MIT part I for gas disposal wells** (every 5 years for all other injection wells)
- **Due date for injection wells previously exempted (wells with no tubing and packer): 4/1/2024.**
 - Unless it's gas disposal wells : **4/1/2020.**
- **The new regulations does not "reset" the schedules for MIT Part I.**
- **Failed test will automatically lose the approval for injection.**

1724.10.1. Mechanical Integrity Testing Part I



- MIT Part I applies to all injection wells (not just the wells with tubing and packer).
- New pressure testing parameters.
- Successful Pressure Test requires no more than 3% change, over a continuous 30 mins period.
 - Cyclic Steam: no more than 3% decline and 10% increase.





MIT Part I Questions?

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1724.10.2. Mechanical Integrity Testing Part II



- MIT Part II is a fluid migration survey.
- Initial 3 months after first (re)approved injection.
- Routine:
 - Disposal well: at least once **every year**
 - **Low-use cyclic steam well: at least once every 5 years**
 - **Steamflood with tubing and packer: at least once every 5 years**
 - All other wells: at least once **every 2 years**
- **As of 4/1/2019, MIT Part II testing requirements "reset" for all wells.**

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1724.10.2. Mechanical Integrity Testing Part II



- Situational-triggered MIT Part II
 - **One year after losing low-use cyclic steam well status.**
 - **An unplanned variance in injection pressure of more than 25%, within a 48 hours period.**
- DOGGR may approve alternative testing methods.
- MIT Part II options: RA Survey, Temp Survey, Noise log or other methods approved by DOGGR.
- Notify DOGGR if any anomalies are encountered during testing.


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MIT Part II

Questions?

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1724.10.3. Maximum Allowable Surface Injection Pressure 

- **MASIP determination methods**
 - Pressure value from a default formula (**MASIP = (IG - IFG) x TVD**)
 - Initial test pressure used during the most recent MIT part I.
- **DOGGR may allow alternative MASIP calculation (e.g. friction loss).**
- **DOGGR may approve a higher MASIP**
 - Possibly over fracture gradient if operator demonstrates higher MASIP is necessary for resource production and is safe.

**MASIP = Maximum Allowable Surface Injection Pressure
**IG = Injection Gradient, IFG = Injection Fluid Gradient, TVD = True Vertical Depth
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1724.10.3. Maximum Allowable Surface Injection Pressure 


- **Every injection well must have a MASIP supported by one of the following**
 - A well-specific step-rate test
 - **Step-rate tests standards and procedures are outlined in 1724.10.3(e).**
 - A DOGGR-approved estimated fracture gradient
 - Another method approved by DOGGR to determine fracture gradient

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MASIP
Questions?


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1724.10.4. Continuous Pressure Monitoring



- **Well-specific injection pressure shall be continuously recorded at all times** (not just when injection is occurring).
 - Operator may pause continuous injection pressure recording if/while injection lines are disconnected.
- **On or before the last day of each month, operators shall report to the Division the highest instantaneous injection pressure for each injection well in the last preceding calendar month.**

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1724.10.4. Continuous Pressure Monitoring



- The Division may waive the requirements of this section for an injection well if the operator demonstrates that the injection facilities are configured in a manner that effectively prevents injection into the injection well above the MASIP.
- Compliance date for new requirement is 4/1/2021.
 - Until then, the existing requirement continues.

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**Continuous Pressure Monitoring
Questions?**



Break

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1724.11. Surface Expression Prevention and Response



- Difference between "**Surface Expression**" and "**Low-energy Seep**".
- Operators shall develop a surface expression monitoring and prevention plan for review and approval by the Division, if
 - DOGGR determines the project has been known to cause a surface expression.
 - UIC projects that involve the application of steam to a diatomaceous formation unless it has been demonstrated to the Division's satisfaction on a project specific basis that surface expressions are not a concern.

1724.11. Surface Expression Prevention and Response



- Notable requirements apply to all UIC projects,
 - Operators shall immediately notify the Division if a surface expression occurs, increases in flow or size, or reactivates within the operator's lease.
 - The operator shall immediately cease injection in a well if there is a surface expression within 150 feet of its wellhead.
 - The distance increases if the surface expression continues.

1724.11. Surface Expression Prevention and Response



- As long as the Division concurs that a surface expression is a low-energy seep,
 - It is not subject to the requirement to cease injection.
 - It is subject to other requirements for prevention and response.
- The volume of any oil removed from the site of the surface expression shall be measured and reported to the Division.



**Surface Expression Prevention and Response
Questions?**

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1724.12. Surface Expression Containment



- **The installation and use of [surface expression containment measures](#)**
 - Shall provide the Division with notice.
 - Shall be designed and signed off by CA-licensed professional engineer, and file written report with DOGGR after completion.
 - Shall monitor and record the rate of flow of the surface expression and monitor the containment measures at least daily (unless DOGGR gives approval for less frequent schedule).

1724.12. Surface Expression Containment



- **The installation and use of surface expression containment measures**
 - Notify DOGGR if size/flow increases or moves or if containment measures becoming less effective.
 - Map and mark in field all containment measures. Restrict access to containment measures.
- **Other than a low-energy seep, is a violation of the prohibition in Section 1724.11(a) against UIC projects resulting in any surface expression**
 - Regardless of whether containment measures are properly implemented



**Surface Expression Containment
Questions?**

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1724.13. Universal Operating Restrictions and Incident Response



- **The operator shall cease injection into the affected injection well and immediately notify DOGGR, if:**
 - Not doing MIT part 1, or not giving required notice and results to DOGGR.
 - Failing MIT part 1, or any indication that well lacks mechanical integrity.
 - Visible surface damage/erosion of well location caused by injection.
 - Any indication injected fluids are not confined to approved injection zone.
 - Well becomes idle (unless operator requests & DOGGR approves for well to remain approved for injection for some longer period even while idle).

1724.13. Universal Operating Restrictions and Incident Response



- **Once injection stopped for any of these reasons, operator shall not resume injection in the well until DOGGR gives a written approval.**
- **Every day injection continues in violation of this section is a separate violation—has potential consequences for civil penalties, etc.**
 - The operator shall disconnect injection lines from the injection well if there is no current approval from DOGGR.



Universal Operating Restrictions Questions?

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Wrap Up and Next Steps



- Additional workshops will be held at a later date that will go into additional detail on some big sections.
- Website: www.conservation.ca.gov
- Email: UIC.Implementation@conservation.ca.gov

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Area of Review



(a) "Area of review" means an area around each injection well that is part of an underground injection project. The area of review shall be proposed by the operator as part of an underground injection project application or review, but may be specified by the Division depending on project-specific data and any other factors determined by the Division to ensure that the area of review is at least as broad as the area of influence. The area of review is either:

- (1) The calculated lateral distance encompassing within and beyond the intended injection zone to which the pressures or temperatures in the intended injection zone may cause the migration of the injection fluid or the reservoir fluid; or
- (2) A fixed one-quarter-mile radius



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Injection Zone



(g) "Injection zone" means the defined three-dimensional space with fixed boundaries where fluid injected by an underground injection project is anticipated to occupy or otherwise be located. The injection zone may include more than one formation or strata.



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Low-energy seep



(h) "Low-energy seep" means a surface expression for which the operator has demonstrated all of the following to the Division:

- (1) The fluid coming to the surface is low-energy and low-temperature;
- (2) The fluid coming to the surface is not injected fluid; and
- (3) The fluid coming to the surface is contained and monitored in a manner that prevents damage to life, health, property, and natural resources.



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Low-use cyclic steam injection well



- (i) "Low-use cyclic steam injection well" means a cyclic steam injection well that meets all of the following criteria:
- (1) In the past five calendar years, the well has not had more than 24 days of injection in a calendar year;
 - (2) In the past five calendar years, the well has not had a volume of more than 12,000 barrels of injection in a calendar year; and
 - (3) The well is not part of an underground injection project that has been known to cause surface expressions, as described in Section 1724.11 (b).

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Surface expression



(n) "Surface expression" means a flow, movement, or release from the subsurface to the surface of fluid or other material such as oil, water, steam, gas, formation solids, formation debris, material, or any combination thereof, that is outside of a wellbore and that appears to be caused by injection operations.

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Surface expression containment measure



- (o) "Surface expression containment measure" means an engineered measure to contain or collect the fluids or materials from a surface expression, including but not limited to, subsurface collection systems, collection wells, cisterns, culverts, French drains, collection boxes, earthen ditches, containment berms, or gas hoods or other gas collection systems.

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Underground Source of Drinking Water (USDW)



(q) "Underground source of drinking water" or "USDW" means an aquifer or its portion which has not been approved by the United States Environmental Protection Agency as an exempted aquifer pursuant to the Code of Federal Regulations, title 40, section 144.7, and which:

- (1) Supplies a public water system, as defined in Health and Safety Code section 116275; or
- (2) Contains a sufficient quantity of groundwater to supply a public water system, as defined in Health and Safety Code section 116275; and
 - (A) Currently supplies drinking water for human consumption; or
 - (B) Contains fewer than 10,000 mg/L TDS.



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Water source well



(r) "Water source well" means a well drilled within or adjacent to an oil or gas pool for the purpose of obtaining water to be used in production stimulation or repressuring operations.



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Water supply well



(s) "Water supply well" means a well that provides water for domestic, municipal, industrial, or irrigation purposes, but does not include a water source well.



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Thank You
