

Directive 059

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Well Drilling and Completion Data Filing Requirements

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1 Introduction

1.1 Purpose of This Directive

The Alberta Energy Regulator (AER) collects well drilling, completion, reconditioning (i.e., servicing), and abandonment data to maintain an accurate record of each well drilled in the province, both for its own use and for the use of the industry in performing drilling, completion, and servicing operations in a safe and efficient manner.

This directive has been developed to assist industry in completing and submitting daily operations records and well data in a timely manner. It should be used in conjunction with *Manual 027: Well Drilling and Completion Data Submission System Guidance*. See the *Directive 059* webpage for updates and ongoing *Directive 059* initiatives. For questions on items not covered in this directive or the AER website, call the *Directive 059* help line at 403-297-8952 (option 2) or send an email to Directive059Help@aer.ca or fax to 403-297-7303.

1.2 AER Requirements

Following AER requirements is mandatory for the responsible duty holder as specified in legislation (e.g., licensee, operator, company, applicant, approval holder, or permit holder). The term “must” indicates a requirement, while terms such as “should,” “recommends,” and “expects” indicate a recommended practice.

Each requirement unique to this directive is numbered.

Information on compliance and enforcement can be found on the AER website.

1.3 What’s New in This Edition

The directive has been restructured and procedural guidance moved to a new manual. Information related to daily records of operation and personal information, which used to reside in *Bulletin 2010-43*, has been incorporated. Duplicative drillstem test data submission requirements have been removed but remain in [Directive 040: Pressure and Deliverability Testing Oil and Gas Wells](#).

Because geothermal resource development licensees must meet the requirements in this directive, references to the [Geothermal Resource Development Rules](#) have been made.

2 General Reporting Requirements

Under section 12.010 of the [Oil and Gas Conservation Rules \(OGCR\)](#) and section 88 of the [Geothermal Resource Development Rules \(GRDR\)](#), a licensee must keep and file records and reports of daily operations on wells that are in the process of being drilled, completed, reconditioned, or abandoned in accordance with this directive. Under section 6.030 of the *OGCR* and section 19 of the *GRDR*, a licensee must also submit directional survey data, where applicable, to the AER.

2.1 Record of Daily Operations

- 1) During the drilling (including presetting surface casing), completion, reconditioning, or abandonment of a well, a licensee must keep a complete record of daily operations containing complete data on all operations carried out on the well, including the following:

a) drilling (including presetting surface casing)	i) casing repair
b) fishing	j) vent flow repair
c) shooting	k) reconditioning (i.e., servicing)
d) perforating	l) downhole and/or surface abandonment
e) acidizing	m) re-entry or resumption of drilling
f) fracturing	n) reabandonment
g) surveying	o) any suspension of operations
h) testing	
- 2) Licensees must keep this record on site at the well or at its field office for the duration of the operation.

See sections 2.5 and 7 for the minimum submission requirements for the daily record of operations.

2.2 Submitting Electronic Drilling Data

- 3) Licensees must submit summary electronic drilling data to the AER within 30 calendar days from the conclusion of an operation. This includes operations where surface or intermediate casing is preset.

2.3 Submitting Electronic Completion or Abandonment Data

- 4) Licensees must submit summary electronic completion or abandonment data to the AER within 30 calendar days from the conclusion of a completion or abandonment operation or prior to a well status change required for a volumetric submission to Petrinex.

2.4 Submitting Electronic Fracture Fluid and Fracturing Water Source Data

- 5) Licensees must submit summary electronic fracture fluid composition and fracture fluid water source data to the AER within 30 calendar days from the conclusion of an operation.
- 6) If fracture fluid reports have been previously submitted and then changed (e.g., to correct data), the submission must be amended to replace the previous file with the new file containing the new data.

2.5 Submitting Daily Records of Operation

- 7) Licensees must electronically submit reports of daily operations to the AER no more than seven calendar days after the acceptance of electronic summary data for drilling, completion (including fracture fluid composition, but excluding fracture fluid water source), reconditioning, and abandonment operations.
- 8) The AER will not accept reports of daily operations that contain personal information (as defined by the [Personal Information Protection Act \[PIPA\]](#)) other than the name and contact information of the person submitting the report. A list of crew members conducting operations on site may be included in the daily record of operations; however, no other personal information about these individuals should be provided. Licensees must remove all other personal information and confirm that the report does not contain personal information other than what is required by the AER.
- 9) By submitting a daily record of operations, licensees acknowledge that any personal information submitted to the AER must be compliant with the submitter's obligations under applicable privacy protection legislation (e.g., *PIPA*). The submitter must be authorized to provide the personal information to the AER. By submitting this information, the submitter acknowledges that the information submitted may be disclosed as part of an AER proceeding and may be placed on the public record or publicly disseminated. Where statutory confidentiality applies, the submitter acknowledges that the AER may make all or any portion of the information submitted publicly available on expiry of statutory confidentiality status. The submitter confirms the information submitted is accurate and includes a complete representation of all the information that is required to be submitted. The submitter is aware that providing false or misleading information to the AER may result in enforcement action and acknowledges that submission of complete and accurate information is the sole responsibility of the regulated party.

The AER may take enforcement action against any licensee failing to remove personal information from a daily record of operations, and the licensee will be required to submit the revised daily record of operations in compliance with this directive.

2.6 Submitting Gross Completion Intervals

- 10) Licensees must report gross completion intervals (GCIs) through Petrinex and are responsible for submitting correct and accurate GCIs (see section 6).

2.7 Submitting Other Reports

- 11) The AER may, if deemed necessary, require a licensee to file additional information relating to the operations of the well for audit purposes or for clarifying electronically submitted drilling and completion data (i.e., well schematics).

3 Electronic Well Drilling and Completion Data Submissions

- 12) Licensees must submit electronic summaries of well drilling and completion data of daily operations via the designated information submission system. Details on how to submit well drilling and completion data can be found in [*Manual 027: Well Drilling and Completion Data Submission System Guidance*](#).

3.1 Well Event Sequences

- 13) The current information system can only accept nine event sequences. Select which drilling and producing event sequences to record in the following order:
 - a) first drill leg
 - b) longest drill leg
 - c) actively producing/injecting legs
- 14) Licensees must submit an amendment request using the designated information submission system with additional information stating the actual number of drill legs and which drill legs were reported and which were not.

Licensees should also note that event sequences are assigned chronologically. If multiple pools are completed in the same operation, the lower pool is deemed to be completed first. If a lower pool is completed later, the lower pool carries the subsequent event sequence.

3.1.1 Drilling Activities

Once a new well licence is approved, the system creates a “/0” event sequence. If presetting surface casing, the “/0” event sequence will be used when the well is eventually drilled to licensed total depth. For multileg wells, the first drill leg is given the “/0” event sequence. Each subsequent drill leg will be given the next highest event sequence by the licensee.

Ghost holes do not require a well event sequence (see appendix 1 for a definition).

Upon approval of re-entry operations, the system creates an event sequence other than “/0.” If a licensee other than the previous licensee is re-entering the well, the AER will issue a new licence number and assign the initial event sequence. The initial event sequence for this new licence will be the next highest event sequence.

If additional legs are drilled on a nonabandoned well that has been re-entered or on which drilling has resumed, new event sequences are assigned by the licensee for each of the additional legs.

- 15) For a drill leg that has been cased and cemented, regardless of depth, an event sequence must be assigned.
- 16) For a drill leg that is uncased, uncemented, and encounters hydrocarbon, an event sequence must be assigned regardless of depth.

A well that is uncased, uncemented, and does not encounter hydrocarbon, and is less than 150 m, does not require a well event sequence.

3.1.2 Completion Activities (All Wells)

- 17) When completing a well, use the first event sequence for the initial set of perforations. This initial set must include all unsegregated perforations.

3.1.3 Segregated Wells

- 18) After the initial completion, additional event sequences are required if
 - a) setting a packer with additional completions in a different pool or
 - b) performing a production test on a different pool in the wellbore to report the test results to the correct pool.
- 19) A new event sequence is required
 - a) if the completion operation is in a new pool and is not the first completion of the wellbore;
 - b) if a new completion operation is in a new pool not identified by the AER as belonging to Development Entity No. 1, Development Entity No. 2, or self-declared commingling pools; or
 - c) if a drill leg is deepened into a new pool.

3.1.4 Commingled Wells

Additional event sequences are optional if the well is commingled in the wellbore and completed within pools identified by the AER as belonging to Development Entity No. 1, Development Entity No. 2, or self-declared commingling pools.

- 20) If previous event sequences were created and the pool is now commingled, the event sequence numbers remain unchanged and the status of the well must be changed to “COMMINGLED.”

For wells with a previously approved MU order where production is allocated to each pool based on a percentage, the well event sequences remain unchanged and the status of the well is not changed to “COMMINGLED.”

3.2 Licence Operation

- 21) Licensees must submit the following data once per submission, except for “Submitter Reference,” which is optional for the licensees’ reference purposes:
- a) licence number
 - b) operation start date
 - c) operation end date

3.3 Well Operation

- 22) Licensees must indicate the appropriate well operation
- a) presetting surface casing
 - b) drilling
 - c) deepening
 - d) completion
 - e) surface abandonment

If, for any reason, a drilling operation is suspended (i.e., rig is released from site) without finishing the intended operation, advise the AER of the suspension by telephone at 403-297-8952 (option 2) or by email to WellDataServices@aer.ca. Do not submit data for any operation until the final drilling operation to licensed total depth is complete.

If the drilling operation results in more than nine drill legs such that there are insufficient event sequences to report all the data, email WellDataServices@aer.ca with the same data for the sequences greater than 9 as you would submit for sequences 0–9.

3.4 Presetting Surface or Intermediate Casing

- 23) Licensees must provide the following data when submitting a presetting operation:
- a) spud date
 - b) casing
 - c) casing cementing
 - d) initial status code (preset only)
 - e) well incident data
 - f) core data, if applicable

For batch drilling on a pad where multiple wells will have surface casing preset in turn then intermediate casing in turn and finally drilled to licensed depth in turn, and the period between presetting and drilling to licensed depth is more than 30 days, the licensee may request the drilling submission requirement within 30 days be waived if the following requirements are met:

- The rigs remain on site for the entire drilling process until all wells are drilled to licensed total depth.
- If the rig is released before the end of the entire operation, then the drilling data for all wells that have been preset will be submitted within 30 days of the date when the rig was released.
- Wells which have been drilled to licensed total depth before rig release will have the drilling data submitted within 30 days of the end of each well’s drilling operation (i.e., reaching total depth).

3.5 Drilling

24) Licensees must provide the following data for all drill event sequences when submitting a drilling, resumption, or re-entry operation:

- | | |
|-----------------------------|--------------------------------------|
| a) drilling contractor code | e) rig release date |
| b) rig number | f) kelly bushing elevation |
| c) spud date | g) total depth |
| d) finished drilling date | h) initial status code (see table 1) |

Table 1. Initial status codes (includes drilling and preset)

Code	Initial status	Definition
1	Drilled and cased (DRL&C)	A well that has been drilled and cased but not immediately put on production.
2	Abandoned (ABD)	A well that has either been drilled and had downhole abandonment work completed or has had both downhole and surface abandonment work completed. This status can apply to both completed and noncompleted wells.
3	Abandoned and whipstocked (ABDWHP)	For a portion of a well that has been drilled and abandoned and requires an event sequence to be created. A whipstocked leg is then drilled from the original wellbore. If a stratigraphic test well is drilled to locate a formation and abandoned prior to whipstocking to drill to the licensed target, an event sequence must be assigned.

Code	Initial status	Definition
4	Junked and abandoned (J&A)	<p>Use this status when a well is abandoned due to drilling or mechanical problems.</p> <p>If a well is drilled for the production of oil or gas, development of geothermal resources, injection to an underground formation, or as an evaluation or test hole and is abandoned at a total depth of 150 m or less and is cased and cemented, it is considered a well. Submit data for this drilling operation to the AER. If the rig is to be skidded and a new well spud, file an application for a new licence with the AER (see Directive 056).</p> <p>If a well is drilled for the production of oil or gas, development of geothermal resources, injection to an underground formation, or as an evaluation or test hole and is abandoned at a total depth of 150 m or less and is not cased and cemented, it is not considered a well. You are not required by the AER to submit data for this drilling operation. If the rig is skidded and the well is respud, the same licence may be used.</p> <p>If a well is drilled for the production of oil or gas, development of geothermal resources, injection to an underground formation, or as an evaluation or test hole and reaches a total depth greater than 150 m, submit all drilling and abandonment information with a status of junked and abandoned to the AER. If the rig is to be skidded and a new well spud, file an application for a new licence with the AER (see Directive 056).</p>
5	Drain (DRAIN)	<p>More than one event sequence (leg) in a multileg well is open to the same pool and is capable of production. The event sequence considered to be the main contributor of production carries the producing status. The other contributing events carry a drain status.</p> <p>In a resumption or re-entry operation, if one of the event sequences has previously produced and has been assigned a defined pool, it remains as the producing event sequence. The other event sequences carry a drain status.</p>
6	Preset	<p>A well that has had surface or intermediate casing set and in which drilling has not continued to licensed total depth.</p>

- 25) For resumption or re-entry operations, the total depth of the well must continue to be the original total depth of the well, even if all the abandonment plugs are not drilled out. If it is deepened during resumption or re-entry operations, it is the new deeper depth.
- 26) For resumption or re-entry operations, historical casings must be submitted.
- 27) If an open well is being re-entered or resumed and subsequently abandoned to whipstock, licensees must electronically submit the abandonment details for the event sequence being abandoned and the drilling details for the new event sequence drilled. Once received, the status of the abandoned event sequence will change to “Abandoned and Whipstocked (ABWHP).”
- 28) If re-entering or resuming an open well, any additional legs that are drilled and will produce from the same pool must be given an initial status of “DRAIN.”

3.6 Deepening

- 29) Licensees must provide the following data when submitting a deepening operation:
- a) finished drilling date
 - b) total depth

3.7 Casing

- 30) If casing is run, casing data must be submitted for preset, drilling, and deepening operations.
- 31) The licensee must also submit casing data in the following scenarios:
- a) Where conductor casing is run to 30 metres or deeper.
 - b) Where duplicate casing is run from the common portion of the wellbore to any event sequences of a multileg well.
- 32) Where an existing well is being re-entered or resumed, licensees must show historical common casings on the new drill legs.
- 33) If an open hole exists after the completion of drilling or completion operations, licensees must indicate all the applicable open-hole and multistage fracture intervals in the completion record.

See appendix 2 of *Manual 027* for submission examples.

- 34) The casing details that must be submitted include at least the following:
- a) casing date
 - b) casing code
 - c) casing liner outside diameter
 - d) casing grade steel process
 - e) casing grade yield strength
 - f) casing density
 - g) shoe set depth
 - h) liner top depth

3.8 Cementing

- 35) For cementing operations associated to a new casing string, the licensee must submit the following data:
- a) cement code
 - b) cement amount
 - c) cement unit code
 - d) interval top
 - e) interval base
- 36) Multiple cement records must be added to a single casing record if more than one cementing operation was required to cement the casing.

If re-entering or resuming an existing well, it is not required to submit historical cement details common to the new legs being drilled.

3.9 Core

For more information on requirements for submitting cores to the Core Research Centre, see Part 11, section 11.030, of the *OGCR* and section 81 of the *GRDR*.

- 37) Licensees must submit a core record for every core cut, except for cores cut in oil sands areas where contiguous individual cores can be reported as one core, including the following information:
- a) core number
 - b) sidewall
 - c) interval top
 - d) interval base
- 38) If additional cores are cut on a new leg (event), they must be numbered beginning at 1.
- 39) There must be a separate core record for each core whenever a drilled interval occurs between core runs.

3.10 Directional Drill Event (DDE)

Directional drill events (DDEs) were called “kickoff points” (KOPs) in previous editions of this directive.

- 40) When submitting a DDE, the following information must be provided:
- a) date
 - b) depth
 - c) reason code
- 41) Do not record instances of deviation less than five degrees. The only exception would be where a “Sidetrack Fish” DDE is required; this must be submitted regardless of deviation.

Initial Drill Leg

- 42) If the inclination angle reaches 5 degrees and is less than 80 degrees, submit a DDE (reason: “Deviate”). The depth of the DDE must be the depth where the well inclination first becomes greater than or equal to 5 degrees. For slant wells, submit the DDE at 0 mKB.
- 43) If the inclination angle reaches 80 degrees, submit a DDE (reason: “Horizontal”). The depth of this DDE must be the depth where the well inclination first becomes greater than or equal to 80 degrees. If the inclination does not reach 80 degrees, a “Horizontal” DDE is not required.

Subsequent Drill Legs

- 44) Where a drill leg sidetracks from an existing leg, submit a DDE where the leg sidetracks regardless of the inclination angle.
- 45) The DDE reason must be “Deviate” if the maximum inclination angle of the sidetrack drill leg is less than 80 degrees and “Horizontal” if the maximum inclination angle is greater than or equal to 80 degrees.
- 46) Licensees must submit a DDE “Sidetrack fish” on the sidetrack leg, not the leg in which the fish was lost, if a fish is left in a hole and must be drilled around. If the sidetrack leg is drilled horizontally, submit another “Horizontal” DDE with the same depth and date as the “Sidetrack fish” DDE. This allows the AER to conduct a horizontal evaluation.
- 47) Licensees must duplicate DDEs from the common portion of the wellbore for each event sequence of a multileg well (e.g., if the bit passes through a common DDE on its way to the subject drill leg, then that common DDE must be recorded under the subject drill leg).
- 48) Licensees must submit historical DDEs that occurred on a re-entered or resumed wellbore.
- 49) Licensees must submit a directional survey (see section 5) for well event sequences where the inclination angle is five degrees or greater.

See appendix 2 of *Manual 027* for submission examples.

3.11 Plug Back

- 50) Licensees must submit data for all the following after performing a plug-back operation:
 - a) plug-back date
 - b) plug-back purpose code
 - c) interval top
 - d) interval base
 - e) cement amount
 - f) unit code
 - g) method code
 - h) log tag code
- 51) The licensee must only record packing devices or plugs left in a well at the end of an operation. Do not record cement plugs run in a leg of a well not considered a drill event sequence (i.e., a ghost hole).
- 52) When plugging is performed during drilling, the licensee must record plugs under “Plug Back.” When plugs are set as part of a non-drilling operation, the licensee must record them under “Completions.”

3.12 Operational Incident

- 53) Licensees must include an operational incident record for all *Directive 059* electronic submissions, including the following:
- a) occurrence type code
 - b) operation in progress code
 - c) occurrence date
 - d) occurrence depth
 - e) occurrence mud density
 - f) controlled date
 - g) controlled depth
 - h) controlled mud density
 - i) lost circulation total fluid
- 54) If no incidents were encountered during the operation, including kicks, blowouts, or circulation losses on the daily operations reports, a well incident record must be submitted to show that no incidents were encountered using occurrence type code 99, “No incident encountered.”

3.13 Completion

- 55) Licensees must submit the applicable information after performing a completion operation:
- a) completion date
 - b) operation type code
 - c) interval top
 - d) interval base
 - e) shots per metre
 - f) cement amount
 - g) cement unit code
 - h) abandonment code
 - i) log tag code
- 56) Licensees must submit data for completion operations for each event sequence for which completions were performed.
- 57) If completions (perforation, hydrajert perforation, casing vent production, slotted liner, open hole, or multistage fracture) have been isolated by a packing device capped with cement or cement plug, and the isolation device is drilled out causing completions below which had been isolated by the device to be open for production, the completions must be reported again by using the date the isolation device was drilled out.
- 58) When a slotted liner is run in a well, in addition to reporting it in the casing record, it is required to report it in the completion record showing the interval of the well covered by the slotted liner (from the shoe set depth of the previous casing to the shoe set depth of the liner).
- 59) If the slotted liner is not run all the way to total depth, the open-hole interval must also be recorded from the shoe set depth of the liner to total depth.

- 60) For every code 41 (Fracture) interval, a fracture fluid data submission is required (see section 4).
- 61) For every code 42 (Multi-Stage Fracture) interval, a fracture fluid data submission is required (see section 4).
- 62) For each closed code 42, a code 43 (Multi-Stage Fracture – port closed) must be recorded. The intervals used for code 43 must be the same as those recorded for code 42.
- 63) A packing device with no cement, code 55, used for zonal abandonment requires AER approval.

3.14 Packer

- 64) Licensees must submit the following data after setting or pulling a packer:
 - a) packer date
 - b) packer operation
 - c) packer code
- 65) Licensees must record packers on the drill event sequence. For example, if a packer is set in both the “/0” event sequence (drilling) and the “/2” event sequence (producing) in the same operation, both packers must be recorded on the “/0” event sequence.
- 66) Licensees must record the setting or pulling of any packers in the common wellbore of a multileg well on each drill event sequence that shares the common wellbore.
- 67) Do not report external casing packers. However, if the packers, as part of a completion assembly within a cased hole, enable different pools to be tested individually, then they must be recorded.

Do not record anything in packer data that has also been recorded in the completion record (e.g., packing devices capped with cement).

3.15 Surface Abandonment

- 68) After performing the surface abandonment of a well, licensees must submit the following within 30 calendar days from conclusion of the abandonment operation:

<ul style="list-style-type: none"> a) well type b) original surface abandonment date c) surface abandonment method d) oil sands area 	<ul style="list-style-type: none"> e) H₂S content f) routine abandonment g) groundwater base h) groundwater protection method i) reabandonment
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3.16 Amendment Request

- 69) To make a change to previously submitted drilling and completion data, excluding fracture fluid composition, water source data, and surface abandonment data, licensees must submit an amendment request electronically in the designated information submission system, providing at least the following information:
- a) licence number
 - b) unique well identifier (UWI)
 - c) details of the amendments to be made to the submitted data

4 Electronic Submission of Fracture Fluid Composition and Water Source Data

4.1 Fracture Fluid Composition Data

- 70) For each fracture operation that is submitted as a code 41 (Fracture) or code 42 (Multi-Stage fracture), licensees must submit the following fracture fluid composition data per fracture record:
- a) fracture scenario
 - b) service provider
 - c) fracture components
 - i) carrier fluid
 - carrier fluid type
 - volume (m³)
 - ii) proppant
 - proppant type
 - supplier
 - size
 - weight (metric tonnes)
 - iii) additive
 - trade name
 - supplier
 - purpose

- volume/weight (expressed at standard temperature and pressure of 15°C and 101.325 kPa)
 - unit of measure
- iv) component ingredients
- 71) Fracture components are the carrier fluids, proppants, and additives of the fracture fluid, which must be submitted per fractured interval.
 - 72) Each component-type record must have one or more component ingredients attached.
 - 73) For each component-type record, the maximum concentration of all ingredients must total a minimum of 100 per cent. (Concentration can exceed 100% when entering concentration as a range.)
 - 74) For each fractured interval record, the maximum concentration in the hydraulic fracturing fluid indicates the sum of the maximum concentration of all ingredients in all components and must be a minimum of 100 per cent. (Concentration can exceed 100% when entering concentration as a range.)
 - 75) For each component ingredient, submit the following information:
 - a) trade secret
 - i) whether the ingredient is considered a trade secret
 - ii) whether the ingredient is hazardous under the Government of Canada’s Workplace Hazardous Material Information System (WHMIS) or nonhazardous
 - iii) Hazardous Material Information Review Commission (HMIRC) number
 - b) nontrade secret
 - i) Chemical Abstract Service (CAS) number
 - ii) ingredient/family name
 - c) maximum concentration in component type (% by mass) (required for all ingredients whether a trade secret or not)—e.g., carrier, fluid, proppant, or additive
 - d) maximum concentration in hydraulic fracturing fluid (% by mass) (required for all ingredients whether a trade secret or not)

Fracture fluid composition data submitted by a licensee in accordance with this section will be treated as nonconfidential by the AER. Licensees are solely responsible for the identification and removal of information about any ingredients that are considered trade secrets. By submitting fracture fluid composition data, a licensee is confirming to the AER that the information reported under this section is not considered a trade secret by the licensee or a third party.

The AER may, at its discretion and at any time, require licensees to provide additional information about component ingredients used in hydraulic fracturing operations regardless of whether such information is considered or has been identified as a trade secret. This information will be collected, used, and disclosed in accordance with the [Freedom of Information and Protection of Privacy Act](#). Identification by a licensee of trade secret information under this directive does not mean that the information will be held in confidence or otherwise protected by the AER, nor does it mean that the information meets any criteria or legal test for establishing that the information is a trade secret or that it is confidential business, scientific, or technical information.

4.2 Fracture Fluid Water Source Data

76) For each UWI that has fracture operations submitted as code 41 (Fracture) or code 42 (Multi-Stage fracture), licensees must submit the following fracture fluid water source data according to water type:

- a) water type
- b) source information
 - i) latitude
 - ii) longitude
 - iii) dominion land survey (DLS) location
 - iv) major basin
 - v) major subwatershed
 - vi) name of water body
 - vii) name of geologic zone
 - viii) name of supplier
 - ix) name of facility
- c) water source administrative information
 - i) diversion authorization type (e.g., water act licence, water act temporary diversion licence, water resource licence)
 - ii) diversion authorization id for all nonsaline water types
 - iii) water well ID
 - iv) well UWI
 - v) reporting facility ID
 - vi) facility licence
- d) volume and quality
 - i) start date of diversion
 - ii) end date of diversion
 - iii) average daily diversion rate in cubic meters per day (m³/d)
 - iv) maximum diversion rate

v) total volume in cubic metres
(m³)

vi) total dissolved solids (TDS)
content in milligrams per
litre (mg/L)

For fracture operations that have not used water as part of the carrier fluid, fracture fluid source data does not have to be submitted.

See *Manual 027* to determine what source information data are applicable for each water type.

4.3 Wells with Greater than Nine Event Sequences

- 77) Drilling well event sequences greater than nine must have fracture fluid composition per fracture interval and water source data per UWI submitted through the designated information submission system.
- 78) The following data must be submitted by the licensee followed by the fracture fluid and water source data in accordance with sections 4.1 and 4.2:
- a) UWI for well event sequences greater than nine
 - b) well name
 - c) total depth
 - d) finish drill date
 - e) fracture intervals
 - i) perforation treatment type
 - ii) top depth
 - iii) base depth
 - iv) perforation treatment date
 - v) service provider

5 Directional Survey Submission

In drilling a nonvertical well (i.e., directional, horizontal, or slant), the licensee of the well may periodically use a downhole instrument to gather data, such as the measured depth, inclination, and azimuth, on the wellbore. Such surveys are plotted and maintained by the AER as an engineering and legal record of the well's trajectory, bottomhole location (UWI), and maximum true vertical depth (max TVD).

In accordance with section 6.030 of the *OGCR* and section 19 of the *GRDR*, licensees must submit the directional survey report to the AER if a well deviates from vertical.

The licensee of a well is not required to submit a directional survey report for

- producing events (i.e., pools) or
 - wells intended to be vertical that go off track and reach an inclination angle of at least five degrees and are then plugged back and straightened.
- 79) If a directional survey is run on a drill leg, licensees must submit the electronic data within 30 calendar days of the finished drilling date with data organized into an AER-prescribed format via the designated information submission system (see table 1 of *Manual 027*). Do not include other types of well information with the directional survey report (i.e., tour sheets, logs).
- 80) If the well consists of more than nine event sequences, the licensee must submit a directional survey report for all drill legs that require a directional survey.
- 81) If the last measurement taken is at an interval no more than 150 metres from the total depth, licensees must extrapolate the data from the directional survey to total depth.
- 82) When drilling on deepenings, re-entries, or resumptions:
- a) If deepening by 150 metres or more, the survey must be run to the new total depth.
 - b) If deepening by less than 150 metres and no directional survey was run, submit the original directional survey and the projected survey to the new total depth.
- 83) All directional surveys submitted to the AER must be final. The AER will not accept intermediate, interim, and proposal directional surveys or deviation surveys in place of a directional survey report.

5.1 Additional Requirements for Multilegged Wells

- 84) For subsequent drill legs (i.e., “/2,” “/3,” etc.), the licensee must include the upper portion of the directional survey (i.e., from kelly bushing to tie-on points) in the report it submits to the AER so that the record for each leg is complete from kelly bushing to total depth.

5.2 Minimum Reporting Requirements

- 85) When submitting a directional survey report, the licensee of a well must indicate the following:
- a) the well licence number
 - b) the UWI (at the time of submission)
 - c) the surface hole location based on the Alberta Township System, including the legal subdivision, section, township, range, and meridian

- d) the NAD83 coordinates of the surface hole location from the final site survey plan
- e) the convergence angle at the surface hole location (convergence angle must be calculated using standard Universal Transverse Mercator [UTM] algorithm)
- f) the survey company/organization's name
- g) the type of surveying tool used, e.g., measurement-while-drilling, gyroscope, single shot, etc.

5.3 Data Submission Requirements

- 86) For each directional survey point, vertex, or station, licensees must submit original directional survey measurements for the measured depth, the inclination angle, and the azimuth.
- 87) For each directional survey point, vertex, or station, the licensee of a well must submit the following:
 - a) the distance east or west, relative to the surface hole, with no false easting added (positive for east, negative for west)
 - b) the distance north or south, relative to the surface hole, with no false northing added (positive for north, negative for south)
 - c) the true vertical depth
- 88) Licensees must record the kelly bushing as a point, vertex, or station. The kelly bushing recorded must be the depth origin (i.e., depth is 0.0 m) of the directional survey.
- 89) Licensees must record ground surface as a point, vertex, or station. This is the location origin (i.e., local offset coordinates 0 m N/S, 0 m E/W) of the directional survey.
- 90) Licensees must record a point, vertex, or station at least every 150 m from the point at which directional survey tools are run.
- 91) Licensees must mark tie-on points. For wells with a preset surface hole, the tie-on point to drill directionally to total depth must be at ground surface where the inclination and the azimuth are assumed to be 0.
- 92) Licensees must project the final survey measurement to the total depth and record it as a point, vertex, or station.
- 93) Licensees must measure and calculate all coordinates from the centre of the well at the surface location.
- 94) Licensees must record the date the last survey measurement was taken.

5.4 Standards

- 95) Licensees must use the following standards in directional survey reports:
- a) International metric system units with linear units in metres to two decimal places and angular units of latitude and longitude in degrees to a minimum of six decimal places.
 - b) Azimuthal reference must be true north.
 - c) Survey calculation method must be minimum curvature.
 - d) Coordinate forward/inverse conversion between geographic coordinates (latitude and longitude) and projected coordinates (easting and northing) must use the standard UTM algorithm.

6 Gross Completion Intervals

- 96) Values for gross completion intervals (GCIs) must indicate completed intervals for casing vent production, perforations, open-hole completions, slotted liners, or multistage fractures open to pools or deposits that contribute to production or are being injected or tested. This information is submitted to Petrinex.
- 97) When reporting the values for GCIs, the licensee must
- a) submit the GCIs for each producing or injecting well event sequence;
 - b) submit the depth for the top and base of the GCIs for the well event sequence in metres from the kelly bushing (mKB);
 - c) report the top and base of the GCI and ensure that they align with the appropriate open casing vent production, perforation, slotted liner, open hole, or multistage fracture intervals and take packer data into account;
 - d) only report the completed interval (do not report pay, permeable, or porous intervals);
 - e) ensure that GCIs within Petrinex match the current open intervals when submitting completion data indicating open intervals for casing vent production, perforations, slotted liners, open holes, or multistage fractures; and
 - f) ensure that the GCI in Petrinex is updated to match the remaining open intervals when closing an open interval.

6.1 AER Review of GCI Values in Petrinex

- 98) The licensee of the well must review all GCI values in Petrinex within fifteen calendar days of the status being set to “REVIEW” by the AER and correct any errors that may exist.

6.2 GCI Reporting for Commingled Wells

- 99) If commingling multiple pools, the licensee must report the GCI from the top of the uppermost commingled pool to the bottom of the lowest commingled pool. All commingled well event sequences will have a common GCI.

6.3 Drain Legs

- 100) When multiple well event sequences are producing from the same pool, there must be an active event sequence to which production is reported. Other event sequences are assigned a “DRAIN” status and each leg must have a GCI value equivalent to the open completed interval within that leg.

7 Minimum Data Submission Requirements for Daily Record of Operations

As stated in section 2.5, licensees must electronically submit reports of daily operations to the AER for drilling, completion (including fracture fluid composition, but excluding fracture fluid water source), reconditioning, and abandonment operations, using the requirements in this section as a minimum.

7.1 Abandonment or Plug Back

- 101) Licensees must submit the following data for abandonment or plug back:

- a) plug number, including the following:

- | | |
|-------------------------------------|------------------------------------|
| i) interval | iv) slurry weights |
| ii) plug setting | v) time and depth the plug is felt |
| iii) amount of cement and additives | vi) drilled-out depth |

- b) bridge plugs, including the following:

- i) setting depth
- ii) pressure test details
- iii) amount of cement in cap

- c) surface abandonment, including at least one of the following:

- i) cutting of casing
- ii) cement cap
- iii) welding on plate

7.2 Casing and Liners

102) Licensees must submit the following data for casing and liners. If mixed string is run, this information is required for each section:

- a) size
- b) setting depth
- c) liner top
- d) weight
- e) grade
- f) collar type
- g) new or used

7.3 Casing Cementing

103) Licensees must submit the following for casing cementing:

- a) amount and type of cement and additives
- b) slurry weight
- c) slurry volume
- d) returns to surface
- e) cement top (if determined)

7.4 Completion

104) Licensees must submit the following for completions:

- a) packers, including the following:
 - i) type
 - ii) setting depth
- b) perforations, including the following:
 - i) interval
 - ii) type
 - iii) number
 - iv) if notched, quantities of sand and fluid and treating pressure
 - v) dates and times
- c) acidizing, including the following:
 - i) interval
 - ii) type
 - iii) concentration
 - iv) volume of acid and additives
 - v) wash or squeeze
 - vi) feed rates
 - vii) pressures
 - viii) dates and times

- d) squeeze jobs, including the following:
 - i) interval
 - ii) amounts and types of materials squeezed
 - iii) feed rates
 - iv) pressures
 - v) dates and times
- 105) The following information must be submitted per fractured drill event sequence (drilling UWI):
- a) fracture configuration distinguishing through the casing or with a liner
 - b) carrier fluids
 - c) measurement of fracture extent and orientation (e.g., microseismic, tilt meter, etc.), if taken
 - d) service company job reports (including treatment pressure charts)
- 106) The following information must be provided per fracture stage:
- a) fracture configuration
 - b) service provider
 - c) carrier fluid, including the following:
 - i) type
 - ii) volume
 - d) propping agents, including the following:
 - i) types
 - ii) quantity
 - iii) size
 - e) additive information, including the following:
 - i) type
 - ii) name
 - iii) supplier
 - iv) purpose (e.g., plugging agents, cross linker, breaker, buffer, etc.)
 - v) whether designated as a trade secret

- f) additive ingredient information, including Chemical Abstract Service number (CAS#), ingredient concentration in additive (per cent by mass), and ingredient concentration in hydraulic fracturing carrier fluid (per cent by mass)
 - i) For an additive or additive ingredient that is deemed a trade secret and is hazardous, licensees must indicate the chemical family name and provide a Hazardous Material Information Review Commission (HMIRC) designation number as an alternative to providing the CAS number.
 - ii) For an additive or additive ingredient that is deemed a trade secret and is nonhazardous, licensees must indicate that it is a trade secret and provide the chemical family name as an alternative to providing the CAS number.
- g) feed rates, including the following:
 - i) maximum treatment rate
 - ii) average treatment rate
- h) pressures, including the following:
 - i) breakdown
 - ii) maximum treating pressure
 - iii) average treatment pressure
 - iv) instantaneous shut-in pressure, if determined

7.5 Cores

107) Licensees must submit the following for cores:

- a) for conventional core, the core number, interval, size, recovery, and analysis
- b) for sidewall cores, the depth and analysis

7.6 Drilling Information

108) Licensees must submit the following drilling information:

- a) spud date
- b) bit size
- c) depth of hole at beginning or end of each tour
- d) deviation surveys
- e) whipstock-setting depths
- f) fishing details
- g) total depth
- h) rig release date

7.7 Drilling Occurrences

- 109) Where circulation is lost, the depth and interval, mud density and volume of fluid lost, and amount and types of materials used must be submitted.
- 110) For each drilling occurrence, water, gas, or oil kick, licensees must submit depths, shut-in and circulating pressures, influx volume, and control procedures.

7.8 Formation Tests

- 111) Licensees must submit the following where formation tests have been conducted:

a) Drillstem tests, including the following:

- | | |
|----------------------|--|
| i) test number | iv) gas, oil, or water to surface times and flow rates |
| ii) interval | v) recovered volumes |
| iii) valve open time | vi) pressure data (chart and times) |

b) Wireline tests, including the following:

- | | |
|----------------|----------------------------|
| i) test number | iv) recovery pressure data |
| ii) depth | v) times |
| iii) duration | |

c) Flow tests, including the following:

- i) flow rates
- ii) depths
- iii) recoveries (BS&W, volumes, H₂S, API, salinities, and analysis)
- iv) fluid levels

d) Swab tests, including the following:

- i) depths
- ii) recoveries
- iii) fluid levels

7.9 Logs

- 112) Licensees must submit details of all types of logs run and corresponding intervals, including cased-hole cement bond logs.

7.10 Tests

- 113) Licensees must submit details of all BOP and choke manifold pressure tests, including the following:
- a) test duration
 - b) initial and final test pressures
 - c) daily mechanical tests (including equipment tested)
- 114) Licensees must submit air shut-off tests, including the following:
- a) details of any predrill-out
 - b) weekly shutdown of mechanical tests
- 115) Licensees must submit BOP drills, including the following:
- a) details of all predrill-out
 - b) weekly drills, including the following:
 - i) mode of operation (drilling, tripping, or out of the hole)
 - ii) equipment used
 - iii) training requirements

7.11 Well Data

- 116) Licensees must submit the following information:
- a) well name
 - b) location
 - c) contractor
 - d) rig number
 - e) kelly bushing elevation (KB)
 - f) surveyed ground elevation

7.12 Workover Details

- 117) Licensees must submit artificial lift details, including pump type.

Appendix 1 Definitions

abandoned	<p>A well that has either been drilled and had downhole abandonment work completed or has had both downhole and surface abandonment work completed.</p> <p>Non-initial well status for a well that has been drilled and had some other well operation performed (i.e., production, injection, testing) and then subsequently abandoned downhole and at surface.</p>
blowout	<p>Operational incident where an unintended flow of wellbore fluids (oil, gas, water, or other substance) at surface that cannot be controlled by existing wellhead and blowout prevention equipment or a flow from one pool to another pools (underground blowout) that cannot be controlled by increasing the fluid density. Control can only be regained by installing additional or replacing existing wellhead and blowout prevention equipment to allow shut in or permit the circulation of control fluids or by drilling a relief well.</p>
common directional drill events (common DDE)	<p>The shared directional drill events that indicate shared portions of the wellbores for each event sequence of a multileg well</p>
downhole abandonment	<p>Abandonment status for the complete downhole abandonment of all pools and legs associated with the well.</p>
drill leg	<p>A physical wellbore drilled from the well’s surface location to total depth. One well can have multiple drill legs. Drill legs in multileg wells can share the same section of wellbore.</p>
drilling occurrence	<p>An operational incident where circulation is lost, blowouts or kicks occur.</p> <p>Synonymous with “well incident” and “operational incident.”</p>
event sequence	<p>The last component of a UWI. It can be either a drill event sequence or producing event sequence. A drill event sequence can also act as a producing event sequence. A producing event sequence may only act as a producing event sequence. A drill event sequence denotes the physical drill leg.</p> <p>A drill event sequence is an administrative construct to allow submission of the associated data and infrastructure (e.g., spud date, total depth, casing, and completions).</p> <p>A producing event sequence is an administrative construct to allow submission of production, injection, storage, or disposal data.</p>
finish drill date	<p>The date drilling operations for each drill leg are completed.</p>
ghost hole	<p>An uncased section of well that cannot be re-entered for mechanical reasons or due to conditions within the formation and for which none of the following have been completed:</p> <ul style="list-style-type: none"> • cores

	<ul style="list-style-type: none"> • a directional survey • drillstem tests • logs (electric wireline or mud logs)
historical casing	Casings in pre-existing wellbores prior to a re-entry or resumption operations.
kicks	Operational incident where any unexpected entry of water, gas, oil, or other formation fluid into a wellbore that is under control and can be circulated out.
lost circulation	Operational incident where a loss of circulation occurs when drilling fluids flow from the wellbore into the formation
maximum true vertical depth (max tvd)	The deepest vertical depth reached by the drill leg.
packer	A device used to isolate the annulus from production tubing in the wellbore to allow separate production, injection, or treatment.
perforation	Holes made through the casing and cement into a formation using a perforating gun or pneumatic drill to expose the formation.
Petrinex	A joint strategic organization supporting Canada’s upstream, midstream, and downstream petroleum industry and is currently represented by the Government of Alberta (Alberta Department of Energy) and the Alberta Energy Regulator (AER), among others. It provides exchange of key volumetric, royalty, and commercial information associated with the upstream petroleum sector.
plug back	Refers to the procedure where a wellbore, section of wellbore, or completion is isolated by a cement plug, cement squeeze, packing device capped with cement, or packing device.
preset surface casing	When surface casing has been preset and the drilling operations have not been completed to the licensed total depth within the initial drilling operation. This can also apply to intermediate casing.
reabandonment	When a previously abandoned well is drilled out and a new cement plug set.
re-entry	The re-entry of an abandoned wellbore by a company other than the original licence holder under a new licence.
resumption	Re-entry of an existing wellbore by the licensee under the existing licence, whether abandoned or not, for the purpose of deepening, whipstocking, recompleting (abandoned well only), or horizontal recompletion under the existing licence.
rig release date	The date the drilling contractor is released from the well site.

spud date	The date that drilling operations start.
surface abandonment	Abandonment status where casing strings have been cut and the well permanently capped at surface.
total depth (TD)	The maximum measured depth (MD) reached when drilling the wellbore measured along the wellbore.
unique well identifier (UWI)	A new unique well identifier is issued through the approval of a well licence. It will have the next available event sequence.
well status	The initial status of the original well after receiving the electronic drilling data for the well (see table 1).
zonal abandonment	Abandonment of a single-pool completion within a cased hole or the downhole abandonment of an open-hole interval in a cased hole.