Chapter 4.1 Completing Well Activity Details

4.1 Well Activity Tab

Applicants applying for a well permit or a geothermal well permit must complete the well activity tab in the Application Management System. The well tab is made up of three components: well area overview, well details (further broken down to include well specifications, well hazard, flaring and exemption sections) and well land details.

This chapter is separated into two sections: ERAA Wells and Geothermal Wells including an overview of well permitting, guidance regarding well planning and design, details related to well-specific application requirements and detailed instructions for completing the data fields of the wells tab of the Application Management System.

Please Note:
This manual is written as a whole and provided to industry in sections to allow permit holders to access activity chapters. It is prudent of the permit holder to review the manual in its entirety and be aware of the content in other sections of the manual.

ERAA Wells

4.1.1 Wells Defined

Wells are an energy resource activity as defined in ERAA, and are specifically defined in the Petroleum and Natural Gas Act as:

A hole in the ground:

a) Made or being made by drilling, boring or any other method to obtain petroleum or natural gas.

b) Made or being made by drilling, boring or any other method to explore for, develop or use a storage reservoir for the storage or disposal of

petroleum, natural gas, water produced in relation to the production of petroleum or natural gas, waste or any other prescribed substance.

c) Used, drilled or being drilled to inject natural gas, water produced in relation to the production of petroleum or natural gas or other substances into an underground formation in connection with the production of petroleum or natural gas.

d) Used to dispose of petroleum, natural gas, water produced in relation to the production of petroleum or natural gas, waste or any other prescribed substance into a storage reservoir, or

e) Used, drilled or being drilled to obtain geological or geophysical information respecting petroleum or natural gas.

And includes a water source well.

Approved energy resource applications receive a permit under Section 25 of ERAA to carry out construction and operations pertinent to the activity. The permit expires where construction activities have not started within two (2) years of permit issuance. Unless expired, the permit remains active until cancelled, suspended or declared spent, according to the provisions of ERAA.

Well Names

Well names are generated by, and populated into, AMS automatically when spatial data is uploaded. Well names are based on information gathered at the application stage and formatted as follows:

- Company abbreviation – working interest partner(s) abbreviation – well profile – oil and gas field name – legal location or NTS/DLS legal location, including exception codes.

Each well must have a unique legal location. All wells must use the defined NTS or DLS legal location as per the Petroleum and Natural Gas Grid Regulation. After the first well within a quarter unit in the PNG grid system or within a legal subdivision in the DLS system, additional wells must be distinguished from each other with an exception code. Exception codes must be entered into AMS manually to differentiate between multiple wells at a single legal location.

- The 2nd well is identified with exception code “A”, the third well is identified with exception “B” and continues through to exception code “Z”. Sequencing then continues with exception code “AA, then AB and AC through to AZ, followed with BA, BB, BC, etc.

- Once an exception code and legal location has been recorded against a permitted well, that same exception code and legal location cannot be used on another proposed well.

Depending on the number of wells in a quarter unit or legal subdivision; and depending on the order in which wells were applied for, exception codes may not be sequential on a single wellpad. Scenarios may include:

- One wellpad that spans into different NTS or DLS legal locations where wells already exist.
- Multiple wellpads in the same quarter unit or the same legal subdivision where wells already exist.

Exception codes do not have to be in sequence based on the order in which the permit holder plans to drill them.

Oil and Gas Field Name: AMS will spatially derive the oil and gas field name or display "not found" if the well location is not located within a defined field. When "not found" displays, applicants may select the nearest appropriate field from the oil and gas field name drop-down list or enter the nearest geographical location. To enter a field name that is not available in the drop-down list, select "Other Areas" from the list and type the name in the 'specify area' text field.

Well names are issued by the Regulator at the time of permit issuance. Once permitted, the Regulator will not re-name wells or re-organize exception codes to accommodate drilling activities.

Final locations in well head surface coordinates must be reported in the eSubmission portal using the As-Drilled Survey Plan process. If the final UTM coordinates result in the well head being drilled in a different NTS or DLS grid, the permitted legal location and well name will be updated to reflect the drilled NTS or DLS legal location using the next available exception code. Refer to the Oil and Gas Activity Operations Manual for further information on the As-Drilled Survey Plan requirements.

Well names can not be renamed to be in sequential order and exception codes will not be re-assigned according to drilling sequence.

4.1.2 Creating a New Well Activity Application

New Well Applications

A new well permit is required for any new well to be constructed and operated, including re-entering wells which have been previously issued a certificate of reclamation.

An application may include a single or multi-well application and may be submitted with other energy resource activities. The system generates data input requirements for additional wells based on the well-points specified within the spatial data upload. Where multi-well pads are planned, the Regulator encourages applicants to submit the all the wells together in one application.

In situations where a new well application is being applied for on an existing wellpad, but additional land is required, an applicant has two options:

Option 1 - Submit a new well application that includes the “additional” land area. The “additional” area must be adjacent to the existing “permissioned” area. The “additional” area will be assigned its own new land id resulting in two land id’s for one wellpad. The Regulator will not merge the new land id for the “additional” area with the existing permissioned land id.

Option 2 - Submit an amendment to the original permit to modify the wellpad area. A replacement polygon may be submitted for the entire wellpad area to be captured under one land id. After the amendment application has been approved, the applicant can then submit a new application for the well on permissioned land.

Well Permit Amendments

A well permit amendment is required for changes to approved well permits as outlined in the following scenarios. Approval of a permit amendment is required before the associated changes are carried out. Amendment scenarios include:

- Surface footprint (surface disturbance) is changed.
- Change in well type (for example from Production to Disposal)
- Change in BHL with attendant changes in well profile such that the well name adds or deletes "HZ".
- Adding (drilling) a new bottom hole location to a well that has previously been drilled and rig released. This can include lengthening the depth, window cutting, or O/H sidetracking from an existing wellbore.
  Note: an Engineering Data Sheet must be submitted with the amendment application as an "Other Attachment".

The following minor well changes do not require an amendment, and can be submitted as a notification providing the well permit includes the notification permission and:

a) prior notice of the change is provided, in the form and manner the BC Energy Regulator requires;
b) notice of the change, other than for changes to the maximum volume and H2S content of gas to be flared, is provided to the Regulator not less than 7 days in advance of the change taking effect;
c) there is no substantive impact to any aspect of the activities that was included in the consultation;
d) The well activities continue to meet all regulatory requirements and applicable standards.

Well Hazard Planning

- Sour Formations, and Maximum H2S Concentration (%) therein
- H2S Release Rate (Maximum Cumulative Drilling, Maximum Completion, Maximum Applicable)
- EPZ Distances (Calculated Drilling, Calculated Completion, Effective)
- Critical Features, and # within Effective EPZ

Bottom Hole Details

- Formation at Total Depth
- Expected Total Depth (TVD, MD) (m)
- BOP Class
- Objective Formation
- Objective Depth (TVD, MD) (m)

Well Flaring

- Flaring Objective Formation
- Maximum H2S Concentration (%)
- Requested Volume (10^3m^3)

More information on the minor well change notification process, including how to submit a notification, can be found in the Oil and Gas Activity Operations Manual.

A permit amendment is not required for the following but must be reported using the "As Drilled Survey Plan" process in eSubmission:

- Minor changes if the proposed final total depth (FTD) resulting from geological prognosis change, or minor changes in well centre coordinates.
- When relocating the well head location within the permitted wellpad.
- After drilling, final well head UTM coordinates must be reported in the eSubmission portal using the As-Drill Survey Plan process. Note: if the final UTM coordinates result in the well head being drilled in a different NTS or DLS legal location, the permitted legal location and well name will be updated to reflect the drilled NTS or DLS legal location using the next available exception code. Well names will not automatically be renamed to be in sequential order and exception codes will not be re-assigned according to drilling sequence. Refer to the Oil and Gas Activity Operations Manual for further information on the As-Drilled Survey Plan requirements.

Please Note:

Neither the working interest partner nor the oil and gas field name can be modified through an amendment application. To change the working interest partner a permit holder is required to submit a Well Name Change Notification Form to assetmanagement@bc-er.ca. Oil and gas field names are typically not changed once permitted. To request a change to an oil and gas field name, send a request to servicedesk@bc-er.ca.

Well Identification

The well must be identified by type, sequence and drilling direction.

1. Well type:
   - Gas is a well drilled for the primary purpose of extracting natural gas.
   - Oil is a well drilled for the primary purpose of extracting oil.
   - Water source is a well drilled to obtain water for the purposes of injecting water into an underground formation in connection with the production of petroleum or natural gas.
   - Injection is a well drilled or operated for the primary purpose of injection into a subsurface formation to increase oil recovery or the storage of natural gas. It can be either water or gas injection.

- Disposal is a well drilled or operated for the primary purpose of disposal of fluids that are a by-product of production.
- Observation is a well drilled to observe production parameters.

2. Well sequencing and exception code:
   - Each well must have a unique legal location. All wells must use the defined NTS or DLS legal location as per the Petroleum and Natural Gas Grid Regulation .See the Well Name section above for more information on well sequencing and exception code requirements.
3. Well drilling direction
   - Directionally drilled wells are greater than a five degree inclination for a minimum of 150 metres of measured depth.
   - Horizontally drilled wells have a greater than an 80 degree inclination for a minimum of 100 metres of measured depth.

Both injection and disposal wells require a permit to construct and complete a well. In conjunction, an additional order or permission is required under s. 75 of ERAA before a permit holder can use a particular sub-surface formation for the purpose of disposal or injection. This can be obtained via an amendment to the original permit or independently, depending on the specifics of the case. Contact the Regulator's Reservoir Engineering department for more information regarding orders allowing for injection or disposal.

Well Classification

Wells are classified as development, exploratory wildcat, exploratory outpost, discovery, special data or observation well as defined in Section 2 of the Drilling and Production Regulation. To determine the classification of a well, refer to the high resolution Schedule 2 Unconventional Zones Map available on the Regulator's website.

The Regulator may reclassify a permitted well, post approval, if a well, or a portion of a well (in the opinion of the Regulator) resulted in a discovery of prior unknown factors.

The Regulator may reclassify re-entries if a well is re-entered and a new pool is not identified. Well information obtained during the re-entry is released in accordance with the classification assigned to the re-entry event.

The classification assigned to the well is reflected on the well permit letter. It is the permit holder's responsibility to review the classification assigned and follow-up with the Regulator if there are any questions.

4.1.3 Well Planning and Design

This section provides typical planning and design requirements, guidelines and considerations when planning and designing a well for an energy resource activity application. The standards and guidelines presented here form a substantial basis for assembling an application. The Regulator reviews the well application relative to the engineering and technical information provided in AMS; therefore, applicants should review this section for an indication of any application requirements or attachments required in relation to the components.

Regulatory Requirements

Well activities must meet the design and operational requirements outlined in the Energy Resource Activities Act (ERAA), Drilling and Production Regulation (DPR), the Environmental Protection and Management Regulation (EPMR).

If an exemption is requested from regulatory requirements, an exemption request may be submitted prior to an application, with an application, or after a permit has been issued. It must include:

- Specific regulatory provision requiring an exemption.
- Rationale for exemption (explanation of why an exemption is required).
- Proposed plan showing mitigation strategies to reduce impacts.

If exemptions are approved prior to the application, this approval must be attached to the application.

Specific well exemption considerations include:

- Inline testing is required for all new wells within 1.25 kilometres of a residence and 3.0 kilometres or less of a suitable pipeline. If an exemption is desired for a specific well, a justification for the exemption must be included with the permit application. Exemption considerations are outlined in Regulator Directive 2010-03.

Guidance Requirements

In addition to the requirements articulated in the Energy Resource Activity Application Manual, well activities should meet guidance recommendations in the following Regulator documents:

- Oil and Gas Activity Operations Manual.
- Inline Testing Directive.
- Supplementary Information for Water Source Wells.

If energy resource activities cannot adhere to the guidance recommendation then justification for a variance must be included in the permit application. Include specifics of the guidelines not followed, an explanation of why they cannot be followed, proposed plan and mitigation strategies.

Advisory Guidance

The Regional Health Authority must be contacted prior to construction of the camp sump and disposal of sump fluids before reclamation. Locations of the various Health authorities are:

- 1001-110th Avenue, Dawson Creek, B.C., (250) 719-6500.
- 5217 Airport Drive Bag 1000, Fort Nelson, B.C., (250) 263-6000.
- 10115-110th Avenue, Fort St. John, B.C., (250) 263-6000.

Other than Normal Well Spacing

Normal spacing requirements for oil and gas wells are defined within Sections 5 through 7 of DPR.

Other than normal spacing areas occur along the entire provincial boundary and along the boundary of the Peace River Block, (Township-Range survey system), where it adjoins the Petroleum and Natural Gas Grid system. Other than normal spacing areas can also occur where active tenure was surrendered up to the boundary of a newly established park or protected area. They may also be established to manage resource production more equitably.

Horizontal wells with the productive interval open in two or more normal spacing areas, and not within an approved reservoir project (good engineering practice, pressure maintenance or unitized operation), must have an approved enlarged "other than normal" spacing area prior to production.

To space wells outside of the requirements, review the Other Than Normal Spacing Application Guideline and Information Letter EMD 00-09 Other Than Normal Spacing and Target Areas for Petroleum and Natural Gas Wells.

Wells with Surface Casing Set Depth Less Than 600m

Wells with a surface casing set depth less than 600 metres require a justification indicating how the base of useful ground water was determined and how the ground water will be protected. Justifications for the planned surface casing set depth can be submitted to the Regulator via the Application Management System. For more information, refer to INDB 2016-09 Technical Guidance for Determining "Base of Usable Groundwater" on the Regulator's website.

An intermediate casing program can be used as a justification for a shallow set surface casing if the intermediate hole will be drilled with non-toxic drilling fluid and the intermediate casing is to be set deeper than 600 metres and cemented in full length.

4.1.4 Well Specific Activity Requirements

This section outlines requirements for well applications. Requirements are dependent on the characteristics of each well and are outlined in full details below including a description, details of additional information and requirements. In most cases, the details are input into the well application tab within AMS, but may require the upload of an attachment to support the details

Attachments must meet specific size and file formatting restrictions in order to be uploaded correctly as defined in Section 5.8 of this manual.

Technical and engineering well details are required for each well and include surface hole details, bottom hole details, well classification, well type and well characteristics.

For well re-entry of an active or abandoned well the Engineering Data Sheet for Re-entry must be completed and submitted with application as an "Other Attachment".

Water Source Wells Requirements

A water source well is defined in Petroleum and Natural Gas Act as:

- A hole in the ground drilled to obtain water for the purposes of injecting water into an underground formation in connection with the production of petroleum or natural gas.

A water source well permit is required before drilling or operating a water source well. Petroleum and natural gas titles are required for water source wells if petroleum or natural gas is produced. A water well drilled for the purpose of supplying water for drilling, camps, hydrostatic testing of pipelines, etc., does not classify as a "water source well" therefore does not require a well permit, but is regulated under the Water Sustainability Act.

All water source wells require well permits, however, companies wishing to explore for groundwater sources through test well drilling to depths of up to 300m on Crown land, may do so under an Investigative Use through an Associated Activity application. Following test well drilling under an Investigative Use , a water source well permit under ERAA and authorization under the Water Sustainability Act are required before any test well can be used as a water source.

Groundwater test wells drilled to depths greater than 300m on Crown land, or to any depth on private land cannot be authorized under an Investigative Use Permit, and require direct application for a well permit. Investigative Use applications are discussed in more detail in Section 4.6 of this manual.

Applicants are encouraged to consult the Supplementary Information for Water Source Wells document available on the Regulator's website for additional information regarding drilling of test groundwater wells under an Investigative Use and description of operational requirements for water source wells.

Groundwater Usage

The use of groundwater is regulated under the Water Sustainability Act and requires a water authorization (licence or approval) from the Ministry of Forests (MOF). Water licences are required to operate water source wells, unless they access "deep groundwater" as defined in the Water Sustainability Regulation. Consult the Regulator's Water Licence Application Manual.

Operators must comply with the Ministry of Environment's Ground Water Protection Regulation and the Ministry of Health's Protection Drinking Water Protection Act when using groundwater for camp water supply.

Requirements for Fracturing Operations Less than 600m Below Ground

The Drilling and Production Regulation states fracturing operations must not be conducted at a depth less than 600 metres below ground level unless the operations are permitted by the well permit. Fracture model simulation is required as part of the application if fracturing at depths shallower than 600 metres and must include a risk assessment for all potential impacts to usable groundwater resulting from the fracturing operations (where the "base of usable groundwater" is defined as per IB 2016-09). As a minimum, the fracture model simulation report must include:

- Fracture program design including proposed pumping rates, volumes, pressures, and fluids.
- Estimation of the maximum height and length of fracture propagation.
- Determination of the "base of usable groundwater" as per Information Bulletin 2016-09.
- Identification of water supply wells within 200 m of the proposed surface hole location and within 200 lateral metres of the surface trajectory of a horizontal or directional well. Include notification documentation of the water well owners of the proposed activity.
- Development of a groundwater monitoring program for the identified water supply wells that includes pre-drilling and post-fracture sampling of water wells where agreed to by the water well owners.
- Verification of cement integrity through available public data of all wells under the Regulator's jurisdiction within a 200 metre radius of the well to be fractured.

- Determination of bedrock depth.
- Assessment of the suitability and geological integrity of the candidate well for the proposed fracturing operations including casing and cement integrity.

Sour Well Formation Details

Applicants submitting a permit application for a well with an expected H_2S release rate greater than 0.01 m^3/s, must provide additional information, including H_2S release rate rationale spreadsheet and emergency planning zone (EPZ) map. Sour well formation details include:

- All expected sour zones and the corresponding maximum H_2S content.
- Estimated H_2S release rates for drilling and completions in accordance with the CAPP H_2S Release Rate Assessment Guidelines.
- Distance to nearest occupied dwelling. In remote areas, it is acceptable to indicate the distance to the nearest occupied dwelling with a greater than symbol. For example, distance to nearest occupied dwelling: greater than 4.2 kilometres. The Regulator does not require applicants to search a large radius to identify the nearest occupied residence. It is sufficient to ground truth the area out to the edge of the Emergency Awareness Zone (EAZ).

If the well is classified as a special sour well, the applicant must also submit a drilling plan. Drilling plan details include (but not limited to):

- Drilling fluid type.
- Underbalanced drilling (pressure in the well bore is lower than the fluid pressure in the formation).
- Managed pressure drilling information (an additive drilling process used to precisely control the annular pressure profile throughout the well bore).
- Sump information. A remote sump must be shown on construction plans.
- Geological information, including the extent and quality of offset data, a summary of offset hole problems and adverse drilling occurrences, an assessment of the possibility of encountering similar problems and occurrences at the proposed well, and how the problems and occurrences is dealt with.

- Description of the equipment used to drill the well including:
    1. Blowout preventer system, including a discussion as to whether blind shear rams is used and if not, an assessment or evaluation of the possible use.
    2. Drill pipe.
    3. Mud-gas separators.
    4. Drilling fluid system and equipment (type, density, quantity, hole volume, surface volume, stockpile supplies and availability, H_2S scavenger, mixing and pumping equipment).
    5. Wellhead (casing bowl, intermediate spool, valves) and casing (surface, intermediate, production).
- Description of the procedures to be followed in drilling the well including:
    1. Inspection and testing procedures ensuring all equipment is fully operational prior to the well reaching the critical depth and procedures to ensure a state of readiness is maintained.
    2. Procedures to ensure wellsite personnel are familiar with the drilling and emergency response plan, trained in the use of the drilling and safety equipment, and are proficient in blowout preventer and well control procedures.
    3. Procedures to ensure wellbore and casing integrity (directional survey, formation leak-off tests, casing pressure test, caliper logs).
- Description of the monitoring of drilling and drilling fluid parameters to be installed ensuring drilling occurrences (kicks, lost circulation) or warning signs (drilling rate, torque, pump pressure, gas-cut mud) are promptly detected.
- Information to confirm, prior to licensing sufficient well-site personnel are available and adequately trained and experienced for the drilling operation.

Special sour wells are classified by a combination of potential H_2S release rate and distance from an urban centre as outlined below. In addition, the Regulator may classify a well as a special sour well based on the maximum potential H_2S release rate, population density, environment, sensitivity of the area and any expected complexities during the drilling phase.

Potential H_2S Release Rate (m^3/s)	Distance to Boundary of Urban Centre
$0.01 \leq H_2S < 0.10$	≤ 500 metres
$0.10 \leq H_2S < 0.30$	≤ 1,500 metres
$0.30 \leq H_2S < 2.00$	≤ 5,000 metres
$H_2S \geq 2.00$	N/A

Flaring

Where flare volumes are requested as part of a new permit application or well permit amendment application, a technical justification in support of those volumes may be required, and will always be required if the total of all requested volumes across all zones exceed the following thresholds:

- 400 10^3 m^3 for a well classified as a development well.
- 600 110^3 m^3 for a well classified as either an exploratory outpost or exploratory wildcat well.

Requirements where applicant is not PNG rights tenure holder

According to Section 24.4 of ERAA, if the applicant is not the registered petroleum and natural gas rights holder for the target formation, an agreement between the applicant and the registered holder of the subsurface rights must be in place.

Applicants must adhere to the conditions of the PNG tenure and ensure any proposed applications are compliant with the tenure conditions set out under Section 72 of the PNG Act, if there are any.

If the PNG tenure includes any special conditions, known as caveats, the applicant must provide an explanation of the caveats in AMS. These caveats disclose information related to potential access restrictions that an applicant may adhere to and that the Regulator may need to consider as part of the decision making process. Caveats may have been identified as part of the pre-tenure engagement referral process with another Ministry, local government and or First Nation.

For more information, refer to the Ministry of Natural Gas Development website.

Emergency Response Planning

An Emergency Response Plan (ERP), or an update to an existing plan, must be submitted to the Regulator prior to commissioning a well, in accordance with Section 7 of the Emergency Management Regulation. Emergency planning zones are determined using H_2S content of product in a well or pipeline. Review Schedule A of the Emergency Management Regulation for more information.

4.1.5 Geothermal Wells

On March 31, 2017, the Geothermal Operations Regulation of the Geothermal Resources Act (GRA) was amended. With the amendment to this legislation, the BC Energy Regulator was granted jurisdiction over geothermal wells.

The Geothermal Resources Act regulates wells encountering water equal to and greater than 80 degrees Celsius.

Please Note:

If the proposed application is being designed to extract ground water at a rate that is equal to or greater than 75 litres per second, periodically or continuously for one year or more, an Environmental Assessment review may be required. Please contact the Regulator prior to submission of the application.

4.1.6 Geothermal Wells Defined

The Geothermal Resources Act (GRA) defines a geothermal well and resource as follows:

"**well**" means a hole in the ground:

a) made or being made by drilling, boring or any other method for the purpose of producing a geothermal resource or through which a geothermal resource is or can be produced,

b) used, drilled or being drilled for the purpose of injecting any substance into subsurface strata to assist the production of a geothermal resource, or to dispose of water produced in connection with the production of a geothermal resource, or

c) used, drilled or being drilled for the purpose of obtaining information about a geothermal resource.

"**geothermal well**" means a well in which casing is run and that the minister considers is producing or capable of producing a geothermal resource from a geothermal resource bearing zone.

"**geothermal resource**" means the natural heat of the earth and all substances that derive an added value from it, including steam, water and water vapour heated by the natural heat of the earth and all substances dissolved in the steam, water or water vapour obtained from a well, but does not include:

a) water that has a temperative less than 80 degrees Celsius at the point where it reaches the surface, or
b) hydrocarbons;

"**facility**" means any surface equipment required to produce geothermal resources or to inject water or other fluids produced in connection with a geothermal resource into subsurface strata, but does not include:

a) a pipeline as defined in the Energy Resource Activities Act, or
b) equipment used in connection with the conversion of the geothermal resource into a commercial commodity.

"**development plan**" means a plan for the drilling of the number of wells that are, in the opinion of the minister, sufficient to enable production of a geothermal resource underlying a lease to begin, including providing piping, equipment, reinjection wells and controls required to produce the geothermal resource, but does not include plans for the commercial utilization of the geothermal resource or for converting it into any other form of energy.

The Geothermal Operations Regulation defines a thermal gradient well as follows:

"thermal gradient well" means a well drilled to obtain geotechnical information about a geothermal source.

Approved geothermal applications receive a permit under Section 12 of the GRA to carry out construction and operations pertinent to the activity. The permit expires where construction activities have not started within two (2) years of permit issuance. Unless expired, the permit remains active until cancelled, suspended or declared spent, according to the provisions of GRA.

Geothermal Well Names

Well names are generated by, and populated into, AMS automatically when spatial data is uploaded. Well names are based on information gathered at the application stage and formatted following the same standards as identified for an ERAA well name in Chapter 4.1.1 of this manual.

4.1.7 Creating a New Geothermal Well Activity Application

New Geothermal Well Applications

A new geothermal well permit is required for any new geothermal wells to be constructed and operated, including re-entering wells which have been previously issued a certificate of reclamation.

Currently, the Regulator utilizes an ERAA well application in AMS for the submission of a geothermal well. To create a geothermal well application:

1. Select New ERAA application
2. Select the activity as an ERAA well

Application Information Tabs

Applicants are required to follow the guidance for Application Information tabs which include: Spatial Data, Administrative, Land, Stewardship, Agriculture, Archaeology, First Nations engagement, Rights Holder Engagement, Maps and Plans and Attachment requirements as outlined for an ERAA application found throughout this manual. Exceptions to this guidance, specific to a geothermal well, are identified below.

Additional information on how to create an application can be found in the AMS User Manual.

Agriculture

The ALC-OGC Delegation Agreement does not apply to geothermal activity; however, based on spatial data uploaded, AMS will identify if the application falls within the Agriculture Land Reserve (ALR) and trigger additional questions.

If the application impacts ground disturbance within the ALR an application to the Provincial Agricultural Land Commission will be required to be submitted to them or to the local authority with an ALC delegation agreement.

More information can be found in Chapter 5.3 – Agriculture Land Reserve Information Tab.

Rights Holder Engagement

A geothermal well application will require Rights Holder Engagement (RHE); however, for this application type, AMS will populate the Consultation and Notification tab.

Rights holder engagement information can be found in Chapter 6.2 of this manual.

Please Note:

AMS will populate the C&N tab, rather than RHE tab, therefore the following items will need to be completed:

- The activity radius data fields are required input. The system is designed to only accept the radius for ERAA oil and gas wells as per the Requirements for Consultation and Notification Regulation (RCNR). Enter the minimum radius as outlined in the Section 17 of the RCNR for an ERAA well.
- For a new geothermal well, AMS will require an RCNR Line List to be uploaded, rather than the Rights Holder Engagement Line List. The template can be found here: RCNR Line List.
- Populate the line list with Rights Holder Engagement information. For "Recipient Type", select the "Rights Holder", notify, as per Section 10 of the RCNR.
- AMS will also validate the application submission timelines using the consultation and notification timelines shown in Figure 6-I, rather than rights holder engagement timelines shown in Figure 6-F; within Chapter 6 of this manual.
    - Select "YES" to the question. Exemption from Requirements from Consultation and Notification Regulation requested.
    - When prompted for the Exemption Approval attachment, upload a rationale explaining that the application is for a geothermal well, therefore rights holder engagement timelines apply.

After submission, the application will proceed to a decision once all obligations for rights holder engagement timelines have been met.

First Nations

First Nations consultation for geothermal projects will be assessed on a case by case basis. The Project Description Form is a required attachment and can be found here.

Maps and Plans

Maps and plans for the application should be designed and submitted as per Chapter 5.7 of this manual.

When preparing a construction plan for a geothermal well, ensure position of the well, within the wellpad, references location of the proposed well head in relation to criteria covered under Section 5 of the Geothermal Operations Regulation.

Attachments

Attachments that are mandatory to upload on a specific page will display under the applicable category under the Attachments Tab.

Applicants may wish to upload additional documents directly under the Attachments Tab, such as Emergency Response Plans, Engineering information and any other documentation that may assist in the review of the application.

For more information on Emergency response Plans, refer to the Emergency Response and Safety page on the Regulator's website.

Applicants are required to provide a project summary document including the anticipated temperature and anticipated fluid production.

Well Activity tabs

Further to the application information tabs, the well activity tabs are required to be populated as guidance for an ERAA application found in Chapter 4.1.1 of this manual. Exceptions to this guidance, specific to a geothermal well, are identified below.

Under the Well Overview tab

Oil and Gas Field Name: AMS will spatially derive the oil and gas field name or display "not found" if the well location is not located within a defined field. When "not found" displays, applicants may select the nearest appropriate field from the oil and gas field name drop-down list or enter the nearest geographical location. To enter a field name that is not available in the drop-down list, select "Other Areas" from the list and type the name in the 'specify area' text field.

PNG Tenure Rights ID: Enter the Geothermal subsurface tenure permit number.

Under the Well Details tab

Well Type: Select the appropriate drop down option for the intended use of the geothermal well: "Geothermal Disposal", "Geothermal Injection", or "Geothermal Production". For a thermal gradient well select "Geothermal Exploration". Provide an attachment explaining the intended use of the well.

Well Classification: If the Well Type selected is "Geothermal Disposal", "Geothermal Injection", or "Geothermal Production", then select the Well Classification as: "Geothermal Operation". Otherwise, select the classification option: "Thermal Gradient".

- Applicants must agree to the well classification confidentiality clause by selecting the check box

Bottom Hole Details:

- **Well Profile:** select the profile based on the drill path
- **Formation at depth:** select "Pre-Tertiary"
- **BOP:** select "Other" and provide a description
- **Objective Field:**
  - **Formation:** Pre-Teriary
  - **Fluid:** Water
  - **Depth:** Same as above

Well Hazard Planning: Select "No" as this section does not apply to geothermal wells.

Flaring details: Depending on the geology of the area for the well that is being drilled, flaring may be required. Please refer to Section 4.1.4 of Chapter 4.1 – Completing Activity Details: Well Activity.

Exemption details: Select "Yes", "Yes" then "No" as this section does not apply to geothermal wells.

Application Validation and Submission

The application can be submitted once all mandatory application requirements have been met. For more information on validating and submitting an application, please refer to the AMS User Manual.

AMS Payment

Upon submission of the application, AMS will calculate the application fees for an ERAA well. Applicants are requested to select the e-Pay option to "pay later". Once the application has been submitted, please contact the Authorization Director for the applicable zone to request an adjustment on the application fees from an ERAA well to a geothermal well.