## Table A-1 ERCB Draft Directive 23 Oil Sands Project Applications (ERCB 2013)

| Directive 023 Section | Requirement (abridged) | Locations in the Application unless otherwise noted |
|---|---|---|
| **3 GENERAL APPLICATION REQUIREMENTS** | | |
| **3.3** | **Project Description Requirements** | |
| 3.3.1 | Applicant and the project name. | Sections 1.1 and 1.2 |
| 3.3.2 | Partners involved in the project. State their roles and responsibilities. | Section 1.2 |
| 3.3.3 | Section of the OSCA under which the application is being made. | Section 1.5.2 |
| 3.3.4 | Project overview:<br>a) project location and its proximity to the nearest communities;<br>b) target resource;<br>c) project components;<br>d) recovery technology;<br>e) annual production capacity over the life of project;<br>f) project development phases;<br>g) energy sources used for recovery and processing;<br>h) intended transportation of product and by-products to market; and<br>i) water source(s) and estimated volume of annual use. | Section 1.1.2<br>Section 3.1<br>Sections 1.1.1 and 4<br>Sections 1 and 3.4<br>Section 1.1<br>Sections 1.1 and 1.1.3<br>Section 4.2.13<br>Section 4.3.3.3<br>Section 4.2.13; Section 4.4.1 App. C |
| 3.3.5 | Project map:<br>a) project area;<br>b) lease boundaries;<br>c) water bodies;<br>d) mine sites;<br>e) processing plants;<br>f) pad locations, central processing facilities (CPFs), and drainage patterns;<br>g) storage or disposal structures; and<br>h) roads, pipelines, and other significant infrastructure. | Figure 3.1-1<br>Figure 1.1-1<br>Figure 1.1-2<br>N/A<br>N/A<br>Figure 1.1-2<br>Figure 4.2-1<br>Figure 1.1-2 |
| 3.3.6 | Project regional map:<br>a) urban centres;<br>b) major industrial operations;<br>c) water bodies;<br>d) road, rail, pipeline, power and utility corridors, and other significant infrastructure; and<br>e) public works. | Figure 1.1-1<br>Figure 1.1-1<br>Figure 1.1-1<br>Figure 1.1-1<br>Figure 1.1-1 |
| 3.3.7 | Project schedule:<br>a) regulatory application submissions and anticipated approvals;<br>b) construction; and<br>c) operations. | Section 1.1.3 |
| 3.3.8 | Associated applications and any additional approvals obtained or required from other regulatory agencies. | Section 1.5.3 |
| 3.3.9 | Statement regarding the ownership of mineral rights for the oil sands project. | Section 1.1 |
| 3.3.10 | Summary of surface rights access and ownership within the project area, including existing surface rights holdings and Crown land. | Section 6.1.2 |

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| 3.3.11 | Table showing the LSD coordinates of the oil sands project. For each LSD, identify the owner of the surface rights, as well as the owner of the rights to any other surface or subsurface resources. | Section 6.1.2, Figure 6.1-2, Appendix H |
| 3.3.12 | List of all waivers or variances. | Section 1.5.4 |
| **4 STAKEHOLDER INVOLVEMENT** | | |
| **4.4** | **Application Requirements** | |
| 4.4.1 | Stakeholder involvement area and criteria used to determine it.<br>Map including:<br>a) project area;<br>b) existing land uses; and<br>c) the locations of persons included within the stakeholder involvement area (including landowners, mineral leaseholders, and owners of any unleased lands in the project area and the off-setting sections and oil sands leaseholders in the project area and off-setting quarter sections). | Section 2<br><br>Figure 3.1-1<br>Figure 6.1-1<br>Section 2.4 |
| 4.4.2 | Stakeholder involvement program:<br>a) activities completed to date and any future planned activities; and<br>b) engagement activities results. | Appendix B; Section 2<br>Appendix B |
| 4.4.3 | Information package copy. | Appendix B |
| **5 SOCIOECONOMIC REQUIREMENTS** | | |
| 5.1 | Assessment area. | Section 6.10.1 and Figure 6.10-1 |
| 5.2 | Existing socioeconomic conditions:<br>a) population;<br>b) housing;<br>c) employment and training;<br>d) economic activity;<br>e) transportation; and<br>f) infrastructure and services. | <br>Section 6.10.3.2<br>Section 6.10.3.4<br>Section 6.10.3.3<br>Section 6.10.3.3<br>Section 6.10.3.5<br>Section 6.10.3.6 |
| 5.3 | Overall economic effects:<br>a) taxes, royalties, gross domestic product, and labour income table; and<br>b) capital costs and annual operating expenditures table. | Table 6.10-9<br><br>Table 6.10-4, 6.10-5, 6.10-7 |
| 5.4 | Project effects within the assessment area on:<br>a) population;<br>b) housing;<br>c) employment and training;<br>d) economic activity;<br>e) transportation;<br>f) infrastructure and services; and<br>g) other social effects. | <br>Section 6.10.4.6<br>Section 6.10.4.7<br>Section 6.10.4.8<br>Section 6.10.4.1<br>Section 6.10.4.9<br>Section 6.10.4.10<br>Section 6.10.4 |
| 5.5 | Socio-economic effects mitigation measures. | Section 6.10.4 |

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|---|---|---|
| 5.6 | Project workforce information:<br>a) number of direct jobs;<br>b) timing of peak periods;<br>c) transportation of workers and equipment to and from the site; and<br>d) worker accommodation. | Section 6.10.4 |
| **6 ENVIRONMENTAL REQUIREMENTS** | | |
| **6.2** | **Land Use** | |
| 6.2.1 | Assessment area. | Section 6.1.1 |
| 6.2.2 | Existing land uses. | Section 6.1.2 |
| 6.2.3 | Local and regional land-use plans, policies, and approvals that affect the project area. | Section 6.1.2.1 |
| 6.2.4 | Assessments undertaken pursuant to the Historical Resources Act. | Section 6.7 |
| 6.2.5 | Project effects on the identified land uses. | Section 6.1.3 |
| 6.2.6 | Planned measures to mitigate effects and any anticipated residual effects. | Section 6.1.3 |
| 6.2.7 | Potential use of existing footprints. | Section 6.1.3.1 and Figure 6.1-3 |
| 6.2.8 | Project footprint table in hectares, differentiating between the new and existing disturbance as well as the type of disturbance. | Table 6.1-3 |
| 6.2.9 | Project's footprint management and monitoring over the life of the project. | Sections 7.6 and 7.8 |
| 6.2.10 | Monitoring and follow-up activities necessary to assess the effectiveness of mitigations. | Sections 7.6 and 7.8 |
| 6.2.11 | Additional approved or applied for project-related developments. | Section 1.5.3 |
| **6.3** | **Soils** | |
| 6.3.1 | Assessment area | Section 6.2.1 |
| 6.3.2 | Sensitive soil types within the assessment area. | Section 6.2.3 and Figures 6.2-7a-h |
| 6.3.3 | Soils information summary and collection methods.<br>Sources of information may include baseline surveys and existing reports and assessments. Collection methods may include field or desktop surveys.<br>Identify how collection methods are appropriate for the scale of the project, site conditions, and the timing of development. | Sections 6.2.2 and 6.2.3 |
| 6.3.4 | Identify and discuss the effects of the project on the sensitive soils, including the effect of potential acid input, where applicable. | Sections 6.2.3.5; 6.2.3.6; 6.2.3.7 |
| 6.3.5 | Summary of planned measures to mitigate effects and any anticipated residual effects. | Sections 6.2.4 |
| **6.4** | **Vegetation and Wetlands** | |
| 6.4.1 | Assessment area. | Section 6.3.1 |
| 6.4.2 | Vegetation and wetland types within the assessment area. | Section 6.3.3 |
| 6.4.3 | Species of management concern and culturally important species. | Sections 6.3.3.1 and 6.3.3.2 |
| 6.4.4 | Summary of vegetation information gathered in the assessment area and the collection methods. | Sections 6.3.2 and 6.3.3 |
| 6.4.5 | Project effects on vegetation and wetlands. | Section 6.3.3 |
| 6.4.6 | Mitigation of effects and any anticipated residual effects. | Section 6.3.4 |
| 6.4.7 | Monitoring and follow-up activities necessary to assess the effectiveness of mitigations. | Section 6.3.5 |

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| **6.5** | **Wildlife** | |
| 6.5.1 | Assessment area. | Section 6.4.1 |
| 6.5.2 | Presence or potential overlap of rare, sensitive, or culturally important wildlife species' habitat or ranges within the assessment area. | Section 6.4.3 |
| 6.5.3 | Summary of wildlife information gathered in the assessment area and the collection methods. | Sections 6.4.2 and 6.4.3 |
| 6.5.4 | Identify and discuss effects of the project on the identified wildlife species. Effects may include mortality, sensory loss, habitat loss, and changes to habitat quality. | Section 6.4.3 |
| 6.5.5 | Mitigation measures. | Section 6.4.4 |
| 6.5.6 | Monitoring and follow-up activities. | Section 6.4.5 |
| **6.6** | **Hydrology** | |
| 6.6.1 | Watershed(s) in the region of the project. | Section 6.5.3 |
| 6.6.2 | Assessment area. | Section 6.5.1 |
| 6.6.3 | Water bodies within the assessment area. | Section 6.5.3 |
| 6.6.4 | Summary of hydrological information. | Sections 6.5.3 |
| 6.6.5 | Effects of the project on the identified water bodies. | Section 6.5.4 |
| 6.6.6 | Mitigation measures. | Section 6.5.7 |
| 6.6.7 | Locations where the project's footprints are near a water body. | Section 6.5.4 |
| 6.6.8 | Identify the effects on surface water as a result of groundwater use in areas of groundwater-surface water interaction. Summarize associated planned measures to mitigate effects. | Appendix C |
| 6.6.9 | Monitoring and follow-up activities necessary to assess the effectiveness of mitigations. | Section 6.5.8 |
| **6.7** | **Surface Water Quality** | |
| 6.7.1 | Assessment area | Section 6.5.1 |
| 6.7.2 | Identify water bodies within the assessment area sensitive to changes in water chemistry. | Section 6.5.3.4 |
| 6.7.3 | Atypical features and factors contributing to the atypical result. | Section 6.5.6 |
| 6.7.4 | Baseline physical, inorganic, and organic water chemistry measurements for a representative water body, all water bodies sensitive to changes in chemistry, and those with atypical chemistry. | Section 6.5.3.4 |
| 6.7.5 | Summary of water quality information gathered in the assessment area and the collection methods. | Sections 6.5.2.3 |
| 6.7.6 | Effects of the project on the water quality of the identified water bodies. | Section 6.5.6 |
| 6.7.7 | Mitigation measures. | Section 6.5.7 |
| 6.7.8 | Monitoring and follow-up activities necessary to assess the effectiveness of mitigations. | Section 6.5.8 |
| **6.8** | **Fisheries** | |
| 6.8.1 | Assessment area. | Section 6.5.1 |
| 6.8.2 | Fish-bearing and potentially fish-bearing water bodies in the assessment area. | Sections 6.5.3.3 |
| 6.8.3 | Rare, sensitive, or culturally important fish and their habitats within the assessment area. | Section 6.5.3.3 |
| 6.8.4 | Summary of fisheries information gathered in the assessment area and the collection methods. | Sections 6.5.2.2 |

| Directive 023 Section | Requirement (abridged) | Locations in the Application unless otherwise noted |
|---|---|---|
| 6.8.5 | Effects of the project on the identified fisheries' resources. | Section 6.5.5 |
| 6.8.6 | Mitigation measures. | Section 6.5.7 |
| 6.8.7 | Monitoring and follow-up activities necessary to assess the effectiveness of mitigations. | Section 6.5.8 |
| **6.9** | **Hydrogeology and Water Source** | |
| 6.9.1 | Assessment area. | Appendix C |
| 6.9.2 | Base of groundwater protection (BGWP) across the hydrogeological assessment area. Discussion of which water bearing units within the assessment area are considered to be domestic use aquifers (DUA) as defined by ESRD, identify these units on a geologic column. | Appendix C |
| 6.9.3 | Hydrogeological settings for the assessment area. | Appendix C |
| 6.9.4 | Hydrogeological information gathered in the assessment area and the collection methods. | Appendix C |
| 6.9.5 | Aquifer users in the assessment area and a map indicating locations of use, including source and disposal activities. | Appendix C |
| 6.9.6 | Nonsaline groundwater source. | Appendix C |
| 6.9.7 | Saline groundwater source. | Appendix C |
| 6.9.8 | Challenges to water sourcing. | Appendix C |
| 6.9.9 | Effects on groundwater receptors resulting from the Project. | Appendix C |
| 6.9.10 | Summary of planned measures to mitigate effects and any anticipated residual effects. | Appendix C |
| 6.9.11 | Summary the monitoring and follow-up activities necessary to assess the effectiveness of mitigations. | Appendix C |
| **6.10** | **Air Quality and Emissions** | |
| 6.10.1 | Assessment area. | Appendix G |
| 6.10.2 | Description of the air dispersion modelling that was conducted in accordance with the Alberta Air Quality Model Guideline published by ESRD and how it is appropriate for the Project. | Appendix G |
| 6.10.3 | Regional acid deposition modelling. | Appendix G |
| 6.10.4 | Discussion of any modelling results not in compliance with the Alberta Ambient Air Quality Objectives. | Appendix G |
| 6.10.5 | Summary of planned measures to mitigate effects and any anticipated residual effects. | Appendix G |
| 6.10.6 | Discussion of potential for odours. | Appendix G |
| 6.10.7 | Summary of air emission control technologies to be used. | Appendix G |
| 6.10.8 | Summary of monitoring and follow-up activities needed to assess the effectiveness of mitigations. | Appendix G |
| 6.10.9 | Summary of Project's greenhouse gas management plan. | Appendix G |
| 6.10.10 | Description of flare stacks and associated units. | Appendix G |
| 6.10.11 | Discussion of mitigation strategies to prevent or minimize flaring events. | Appendix G |
| 6.10.12 | Anticipated gas venting rates and expected emission sources. | Appendix G |
| **6.11** | **Noise Impact Assessment** | Appendix J |
| **6.12** | **Reclamation** | |
| 6.12.1 | Project reclamation plan. | Section 7 |

| Directive 023 Section | Requirement (abridged) | Locations in the Application unless otherwise noted |
|---|---|---|
| 6.12.2 | Discussion of management of the project footprints during the life of the project, including the use of progressive reclamation. | Sections 7.4, 7.6 |
| 6.12.3 | Areas affected by the project that may be difficult to reclaim. Specify the criteria used to identify these areas and discuss the reclamation measures that will be applied. Provide a map of these areas, which may include geotechnically unstable areas, saline-sodic disposal areas, watercourses, end pit lakes containing tailings, disposal areas with potential for mineral oxidation, peat lands, and areas with coarse-textured soils. | Sections 7.4 and 7.7.3 |
| 6.12.4 | End land-use objectives. | Section 7.7.1 |
| 6.12.5 | Monitoring and follow-up activities necessary to assess the effectiveness of reclamation throughout the life of the project. | Section 7.8 |
| **7 IN SITU APPLICATIONS** | | |
| **7.1** | **Regional Geology** | |
| 7.1.1 | Geological description of the stratigraphic units, including:<br>a) a stratigraphic column with all units displayed;<br>b) well log cross-sections that illustrate all units;<br>c) a seismic cross-section tied to well logs;<br>d) isopach maps for all units; and<br>e) structure maps for all units. | Section 3.2 |
| **7.2** | **Project Geology** | |
| 7.2.1 | Description of the bitumen resource delineation in the project area, supported by:<br>a) a discussion of the resource delineation for the project and development areas;<br>b) a map of the project and development areas showing the locations of the evaluation wells and cored wells;<br>c) a map of the project and development areas showing the 3-D seismic area and 2-D seismic lines;<br>d) a discussion of the seismic acquisition parameters and the processing methods; and<br>e) an annotated depth-converted seismic section tied to well logs. | Section 3.3 |
| 7.2.2 | Geological modelling conducted to support the project:<br>a) the modelling software used;<br>b) the data used to generate the model and any data conditioning that occurred;<br>c) the cell size and how the cells were populated; and<br>d) the anisotropy assumptions of reservoir parameters used in generating the model. | Section 3.3.1.1 |
| 7.2.3 | Discussion on structural events, supported by mapping, that are in the project area. | Section 3.2 |
| **7.3** | **Regional Hydrogeology** | |
| 7.3.1 | Discussion on hydrostratigraphy to the deepest nonsaline aquifer in the area. | Appendix C |

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|---|---|---|
| 7.3.2 | Discussion of all Quaternary channels and river valleys that are connected to bedrock aquifers within the project area:<br>a) map showing the Quaternary channels and river valleys in relation to the trajectories of injection and production wells, water source wells, and disposal wells;<br>b) cross-sections of channels and river valleys;<br>c) incision elevation(s);<br>d) lithology of Quaternary channels; and<br>e) all subcropping formations along the thalweg. | Appendix C |
| **7.4** | **Reservoir Characterization** | |
| 7.4.1 | Discussion on each target reservoir, including:<br>a) the depositional environment;<br>b) mineralogy, grain size, and clay content;<br>c) porosity;<br>d) vertical and horizontal permeability;<br>e) facies association;<br>f) water, gas, and lean zones associated with the bitumen;<br>g) permeability barriers and baffles (e.g., tight streaks and shales); and<br>h) for a carbonate reservoir, the fracture analysis that includes the distribution, size, orientation, and density of the fractures. | Sections 3.2.3; 3.3,3.4 |
| 7.4.2 | For each target reservoir, provide the following maps and discuss the criteria used to generate each map:<br>a) gross bitumen pay isopach;<br>b) net bitumen pay isopach;<br>c) net/gross bitumen pay ratio;<br>d) structure map of top and base of net bitumen pay;<br>e) pool isopach for all associated and nonassociated gas within the target reservoir, including an identification of the gas associated with the target reservoir (summarize the data and analysis used to determine pooling [e.g., pressure and fluid contacts]);<br>f) top-water isopach (include identification of top water in contact with the target reservoir);<br>g) bottom-water isopach (include identification of bottom water in contact with the target reservoir); and<br>h) lean zone isopachs associated with the target reservoir. | Figures 3.2-23<br>Figure 3.1-4<br>Table 3.2-1<br>Figures 3.2-16; 3.2-18<br>Figure 3.2-19<br><br>N/A<br><br>Figure 3.2-17<br><br>Figure 3.2-20 |
| 7.4.3 | For each target reservoir, provide:<br>a) average bitumen viscosity;<br>b) initial gas-oil ratio;<br>c) initial pressure; and<br>d) initial temperature. | Table 3.3-1 |
| **7.5** | **Resource Recovery Process** | |
| 7.5.1 | Bitumen recovery process. | Section 3.4.1 |
| 7.5.2 | Expected drainage pattern recovery performance and how it was determined. Steam-oil ratio if applicable. | Section 3.3.2 |

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|---|---|---|
| 7.5.3 | Subsurface and surface constraints that have influenced the layout for the drainage patterns. Justification of the reasoning for any unexploited bitumen resources. Bitumen net pay map overlaid with the drainage pattern boundaries and well trajectories. | Section 3.3 |
| 7.5.4 | Criteria used to determine the drainage pattern design. | Section 3.3 |
| 7.5.5 | Expected variation for each parameter and the basis for this variation.<br>a) vertical placement of horizontal wells or the perforation interval of vertical wells;<br>b) interwell spacing;<br>c) horizontal well length;<br>d) buffers between drainage patterns; and<br>e) setbacks from project boundaries. | Sections 3.3; 3.4<br>Table 3.4-1 |
| 7.5.6 | Annotated well log cross-section for each drainage pattern including logs, within and off-setting the pattern, that illustrates:<br>a) the pay top and pay base;<br>b) facies distribution;<br>c) fluid contacts; and<br>d) the vertical placement of horizontal wells or the perforation interval of vertical wells. | Figures 3.3-4 to 3.3-16 |
| 7.5.7 | Operating strategy for the project. Include injection rates, volumes, injection and production durations, bottomhole pressures, and temperatures on a typical well or well pair and drainage pattern.<br>a) For steam-assisted gravity drainage (SAGD) projects, provide the above for start-up operations, normal operations, and wind-down operations.<br>b) For cyclic steam stimulation (CSS) projects, provide the above on a cycle-by-cycle basis specifying injection, soaking, and production operations. | Figures 3.4-1 to 3.4-4<br><br>N/A |
| 7.5.8 | Geological factors that could affect the operating strategy. | Sections 3.3; 3.4.3 |
| 7.5.9 | Operating strategy potential effect on associated gas reserves, where applicable.<br>a) identification of any associated gas pools that will or may have to be repressured in order to recover the bitumen;<br>b) the fluid(s) that are planned for the repressurization; and<br>c) any resource conservation or operational impacts associated with the fluid to be injected and how these could be mitigated. | Section 3.4 |

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| 7.5.10 | Project effects on other energy resource recovery operations in the project area.<br>a) a summary of other operations in the area that could impact the project or could be impacted by the project;<br>b) identification of any surface or subsurface conflicts that may have implications on the development of the project or on the development of other operations;<br>c) a summary of protocols and agreements in place to ensure the safe drilling and operation of wells;<br>d) how the integrity of the caprock within the project area with the development of other reservoirs will be addressed;<br>e) how the coordination of surface development to minimize overall disturbance will be addressed; and<br>f) how any future conflicts will be addressed. | Section 3.1.1<br>Section 3.4.3 |
| 7.5.11 | Artificial lift plans. | Section 4.1.2 |
| 7.5.12 | Reservoir monitoring program:<br>a) the strategy in the placement of observation wells and the planned number of observation wells per drainage pattern;<br>b) the type of monitoring data to be collected;<br>c) the approximate interval depths at which monitoring data will be collected;<br>d) the frequency of monitoring data collection;<br>e) plans for 4-D seismic data collection; and<br>f) plans for surface-heave data collection. | Section 4.1.4; 4.1.6; 4.1.7 |
| **7.6** | **Reserves** | |
| 7.6.1 | Project and development area inputs used in the calculations:<br>a) the initial volume in place of bitumen (IVIP);<br>b) the initial volume in place of developable bitumen (IVIPDB);<br>c) the initial established reserves of bitumen; and<br>d) the recovery factor. | Section 3.3.2 |
| 7.6.2 | Demonstration that the IVIPDB in the project area can support the applied-for production capacity for the duration of the project. | Section 3.3 |
| 7.6.3 | Discussion of methods used to determine the recovery factor. | Section 3.3 |
| 7.6.4 | Discussion on how thief zones may impact bitumen recovery in the development area. | N/A |
| 7.6.5 | Annual production forecast for the life of the project. | Table 4.2-3 |
| 7.6.6 | Drainage pattern table:<br>a) drainage area (hectares);<br>b) average net bitumen pay;<br>c) average porosity;<br>d) average water saturation;<br>e) volume of IVIPDB;<br>f) recovery factor;<br>g) initial established reserves of bitumen; and<br>h) number of production wells. | Table 3.3-3; 3.3-4 |
| **7.7** | **Reservoir Simulation** | |

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|---|---|---|
| 7.7.1 | If reservoir simulation modelling is used to support the application:<br>a) describe the modelling software used;<br>b) discuss the modelling conducted;<br>c) summarize the relevant results of the modelling and how they support the reservoir development strategy;<br>d) discuss the assumptions (e.g., homogenous reservoir, dead oil) used in the reservoir simulation model; and<br>e) provide the reservoir simulation model input files. | Section 3.3; 3.4 |
| 7.7.2 | If a geostatistical geological model is used, discuss how it was upscaled to the reservoir simulation model. | Section 3.4.2 |
| **7.8** | **Existing Wells in the Project Area** | |
| 7.8.1 | Criteria used to assess the thermal compatibility of existing wells in the project area. | Section 4.1.8 |
| 7.8.2 | Thermal compatibility of existing wells. | Table 4.1-2 |
| 7.8.3 | Map of the project and development areas showing the drainage pattern boundaries and the locations of wells that are not thermally compatible. | Figure 4.1-5 |
| 7.8.4 | Mitigation measures for the wells that are not thermally compatible. | Section 4.1.8 |
| **7.9** | **Well Operation, Design, and Drilling Practices** | |
| 7.9.1 | Wellbore schematic. | Figures 4.1-2 and 4.1-4 |
| 7.9.2 | Identify any site-specific issues that may lead to challenges in obtaining adequate cement bonds during the drilling and completion of the project wells. Provide the mitigations that will be incorporated into the drilling practices to ensure that cement bonds are compatible with thermal operations. | Section 4.1.2.1 |
| 7.9.3 | Discussion on the operational monitoring systems proposed (e.g., passive seismic, thermal fibre, pressure | Section 3.4.3.3; 4.1.2; 4.1.6; 4.1.7 |
| **7.10** | **Reservoir Containment and Maximum Operating Pressure** | |
| 7.10.1 | Caprock of the target reservoir in the project area. | Section 3.4.3; Appendix E |
| 7.10.2 | Geological interpretation of the caprock, including:<br>a) the lithology and mineralogy of the caprock;<br>b) structure maps of the top and base of the caprock in the project area;<br>c) a map showing the depth of the base of the caprock in true vertical depth for the project area; and<br>d) an isopach map of the caprock in the project area. | Section 3.4.3; Appendix E |
| 7.10.3 | Presence of water and gas bearing intervals between the caprock and the bitumen pay zone within the target reservoir. | Appendix E |
| 7.10.4 | Discussion of any fractures, faults, karsts, incising channels, and structural collapse in the caprock or target reservoir in the area used to assess the regional geology. Including:<br>a) core photos and results from any wellbore image logs run, and<br>b) a map illustrating where these features are located. | Section 3.4.3<br>Appendix E |

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| 7.10.5 | Summary of results from all mini-frac tests conducted in the project area. Including:<br>a) the criteria used to determine the location of mini-frac test(s);<br>b) the intervals and zones tested;<br>c) a discussion of any geological features that could impact the test results;<br>d) the estimated fracture pressures of the reservoir and caprock determined by each test location; and<br>e) justification for excluding any test results. | Appendix E |
| 7.10.6 | Geomechanical laboratory tests conducted to determine caprock properties within the project area. | Appendix E |
| 7.10.7 | Requested MOP for the project and how it was determined and why it is appropriate. | Section 3.4.3.1 |
| 7.10.8 | If geomechanical modelling is used to support the application:<br>a) identify the modelling software used;<br>b) discuss the modelling conducted;<br>c) summarize the modelling results and show how they support the requested MOP;<br>d) discuss the assumptions of the model (e.g., boundary conditions, material failure criteria, soil constitutive models, material properties); and<br>e) provide the model's input files. | Appendix E |
| 7.10.9 | Discussion on how operations will be monitored to ensure that the MOP is not exceeded. Including the field operating protocols to deal with an exceedance of the MOP should it occur. | Section 3.4.3.3 |
| 7.10.10 | Discuss how operations will be monitored to ensure that the integrity of the caprock has not been compromised. Include the criteria used to characterize events that may compromise caprock integrity and the field operating protocols for responding to such an event. | Section 3.4.3 |
| **7.11** | **Disposal Schemes** | N/A |
| **7.12** | **Cavern Storage or Cavern Disposal Schemes** | N/A |
| **7.13** | **Facilities** | |
| 7.13.1 | Describe the CPF and pad facilities. | Section 4.2 |
| 7.13.2 | Discuss the criteria for selecting the process technology. | Section 1.4 |
| 7.13.3 | Discuss the selected CPF location and its potential for resource sterilization. | Section 4.2.1 |
| 7.13.4 | Provide a plot plan of the CPF and each pad that includes:<br>a) process equipment;<br>b) storage areas;<br>c) emergency relief stacks;<br>d) buildings; and<br>e) pipelines. | Figures 4.1-1 and 4.2-1 |
| 7.13.5 | Major process unit description and associated simplified process flow diagram (PFD). | Section 4.2; Appendix F |
| 7.13.6 | Material balance for water, sulphur, and hydrocarbons. | Table 4.2-2; 4.2-3; 4.2-4 |

| Directive 023 Section | Requirement (abridged) | Locations in the Application unless otherwise noted |
|---|---|---|
| 7.13.7 | Provide a table listing each storage tank, including its:<br>a) capacity;<br>b) contents;<br>c) roof type (e.g., floating, fixed); and<br>d) fugitive emissions control. | Table 4.2-1 |
| 7.13.8 | Energy balance. | Figure 4.2-4 |
| 7.13.9 | Discussion on maximizing produced water recycling and minimize disposal. | Section 1.4; 4.2.5; 4.4.3 |
| 7.13.10 | Provide:<br>a) a discussion of the disposal for the project and how it complies with the associated maximum disposal limit for the project;<br>b) the approximate duration, from start-up, to achieve the maximum disposal limit; and<br>c) a detailed water balance for the project as a whole and for each phase of the project. | Section 4.2.5<br>Table 4.2-1<br>Section 5.2.3 |
| 7.13.11 | Storage, handling, and disposal of waste.<br>a) a list of the oilfield wastes that will be generated by the project;<br>b) the volumes to be generated;<br>c) the volumes to be stored on site;<br>d) the final disposition of the waste; and<br>e) any environmental controls. | Section 5.3 |
| 7.13.12 | Process Flow Diagrams.<br>Measurement, accounting, and reporting plans (MARPs). | Appendix F<br>Figure 4.2-5 |
| 7.13.13 | Technology and methods that will be used to estimate well production.<br>Simplified PFD of a typical well pad. | Section 4.1.1; Figure 4.2-3 |
| 7.13.14 | Describe the gathering and distribution pipelines between the CPF and well pad facilities. | Section 4.2.12 |
| **8 MINING** | | N/A |
| **9 PROCESSING PLANT** | | N/A |
| **APPENDICES** | | |
| Appendix A | Definitions. | |
| Appendix B | Schedule 1—Applicant General Information. | Section 1 |
| Appendix C | Spatial Information Submission Requirements. | Files provided on CD |
| Appendix D | Modelling Submission Specifications. | N/A |
| Appendix E | Geological Units. | Section 3.2 |
| Appendix F | In Situ Resource Delineation Guidelines. | Section 3.3 |
| Appendix G | Table of Thermal Compatibility of Existing Wells. | Table 4.1-2 |
| Appendix H | Generic Energy Balance. | Section 4.2.13<br>Figure 4.2-4 |
| Appendix I | Drillhole Inventory Table. | Section 3.1.1 |

## Table A-2 Concordance Table for Guide to Content for Industrial Approval Applications (GoA 2013)

| EPEA Draft Guide to Content | Information Required | Locations in the Application unless otherwise noted |
|---|---|---|
| **1** | **Applicant Identification** | |
| 1.1 | Applicant's Name | Section 1.1; 1.2 |
| 1.2 | Mailing address | Section 1.2 |
| 1.3 | Mailing address of the plant or facility / regional office | Section 1.2 |
| 1.4 | Contact information | Section 1.2 |
| **2** | **Plant or Facility Identification** | |
| 2.1 | Description of main activities | Section 1.1; 4.2 |
| 2.2 | Plant or facility location | Section 1.1 |
| 2.3 | Plant or facility location map | Figures 1.1-1 and 1.1-2 |
| 2.4 | Size and capacity of the plant or facility, and area potentially affected by the activity | Section 1.1 and Figure 1.1-2 |
| **3** | **Project Background** | |
| 3.1 | Government approved regional initiatives in the affected area | Section 6.1.2.1 |
| 3.2 | Hearing results or decisions | N/A |
| 3.3 | Environmental Impact Assessment report for Hearing | N/A |
| 3.4 | Authorizations related to the Project | Section 1.5.1 |
| 3.5 | Related EPEA applications for other plants | Section 1.5.1 |
| 3.6 | Financial security | N/A |
| 3.7 | Proposed timelines and major milestones | Section 1.1.3 |
| 3.8 | Public consultation or stakeholder engagement process | Section 2 |
| **4** | **Current Setting for the Proposed Project and its Environmental Condition** | |
| 4.1 | Current setting and condition of the environment | Section 6 |
| 4.2 | Ambient air quality | Appendix G |
| 4.3 | Current soil or land survey, and data for the site and surrounding lands | Sections 6.2, 6.3 and 7 |
| 4.4 | Pre-Disturbance Setting and Environmental Condition | Sections 6.2.3, 6.3.3 and 6.5.3 |
| 4.5 | Wildlife and wildlife habitat | Section 6.4 |
| 4.6 | Describe and evaluate the current environmental conditions, and characteristics and features within the area of both the site and proposed receiving watercourses for the area with reasonable potential to be affected by the activity. | Section 6.5 |
| 4.7 | Current properties and suitability of the receiving soil for irrigation/land application | N/A |
| 4.8 | Restrictions to irrigation or land application of waste in the area | N/A |
| 4.9 | For 4.1 to 4.8, provide the information both aspatially (in tabular form) and spatially in scaled maps, diagrams or annotated aerial photographs. | Section 6 |
| 4.10 | Government regional initiatives obligations | Sections 6.1.2.1 and 6.10.3.1 |
| **5** | **Plant or Facility Design** | |
| 5.1 | Process overview, major equipment and mass balances | Section 4.2 |

| EPEA Draft Guide to Content | Information Required | Locations in the Application unless otherwise noted |
|---|---|---|
| | | Figure 4.2-3<br>Appendix F |
| 5.2 | Substances generated | Section 4.2 and 5.3 |
| 5.3 | Describe any alternative options examined | Section 1.4 |
| 5.4 | Footprint minimization | Section 6.1.3 |
| 5.5 | Scale diagrams of the proposed plant or facility site | Figure 4.2-1 |
| 5.6 | Materials storage, waste management, tanks, and runoff/wastewater management system | Sections 4.2.11, 5.2 and 5.3 |
| 5.7 | Monitoring and performance evaluation of collection and storage | Sections 4.2.11 and 5.3 |
| 5.8 | Proposed treatment and release control systems for the substances identified in each wastewater stream | Sections 4.2.5 and 5.3 |
| 5.9 | Suitability and capacity of treatment and release control systems | Sections 4.2.5 and 5.3 |
| 5.10 | Location of proposed treatment facility and disposal locations | Figure 4.2-1<br>Section 4.2.5 |
| 5.11 | Monitoring and performance evaluation of wastewater treatment and disposal | Section 4.2.5 |
| 5.12 | Monitoring and evaluation of the quality, quantity and whole effluent toxicity | N/A |
| 5.13 | Ambient monitoring of released treated wastewater | N/A |
| 5.14 | Data, calculations, models and reliable literature sources of released wastewater and disposal methods | N/A |
| 5.15 | Air emissions | Appendix G |
| 5.16 | Air emissions streams | Appendix G |
| 5.17 | Environmental control systems and management practices | Section 5 |
| 5.18 | Emission source | Appendix G |
| 5.19 | Flare pits | N/A |
| 5.20 | Fugitive emissions | Appendix G |
| 5.21 | Significant area or non-point emissions | Appendix G |
| 5.22 | Dispersion modelling | Appendix G |
| 5.23 | Dispersion modelling diagrams | Appendix G |
| 5.24 | Proposed monitoring and performance evaluation of treatment and control equipment | Section 5<br>Appendix G |
| 5.25 | Proposed monitoring and evaluation of ambient air quality | Section 5.1 |
| 5.26 | Air emissions data, calculations, models and reliable literature sources | Appendix G |
| **6** | **Construction** | |
| 6.1 | Construction schedule, including major milestones | Section 1.1.3 |
| 6.2 | Construction site map and sensitive areas | N/A |
| 6.3 | Location of construction activities | Figure 4.2-1 |
| 6.4 | Reclamation materials salvage | Section 7.4 |
| 6.5 | Storage location of reclamation materials during and after construction | Section 7.4 |
| 6.6 | Timber salvage and woody debris management | Section 7.3.1 |
| 6.7 | Construction on contaminated land | N/A |
| 6.8 | Contamination avoidance during construction | N/A |
| 6.9 | Process flow for releases during construction | N/A |

| EPEA Draft Guide to Content | Information Required | Locations in the Application unless otherwise noted |
|---|---|---|
| 6.10 | Environmental releases monitoring during construction | N/A |
| 6.11 | Ambient monitoring equipment location during construction | N/A |
| **7** | **Operation** | |
| 7.1 | Record keeping procedures | TBD based on consultation with ESRD |
| 7.2 | Operating procedures for release monitoring and performance evaluation | Section 5 |
| 7.3 | Joint monitoring network | Section 6<br>TBD based on consultation with ESRD |
| 7.4 | Suitability of proposed ambient air-monitoring network | TBD based on consultation with ESRD |
| 7.5 | Suitability of proposed ambient monitoring of the receiving environment | TBD based on consultation with ESRD |
| 7.6 | Proposal for a periodic wastewater characterization testing | TBD based on consultation with ESRD |
| 7.7 | Record keeping procedures to meet applicable requirements (Items 7.2-7.6) | TBD based on consultation with ESRD |
| 7.8 | Reporting procedures to meet applicable requirements (Items 7.2-7.6) | TBD based on consultation with ESRD |
| 7.9 | Spill response and reporting plan development | Section 5.4 |
| 7.10 | Storage, treatment and monitoring plan development for wastewater, runoff and sludge | Section 4.2.5, 5.2<br>Appendix H |
| 7.11 | Air emission control equipment maintenance surveillance and repair plans | Section 5.1 |
| 7.12 | Monitoring programs for potential substance release to groundwater | TBD based on consultation with ESRD |
| 7.13 | Other programs for monitoring and managing potential substance release to groundwater | TBD based on consultation with ESRD |
| 7.14 | Management of releases to soils from other media | Section 5.4 |
| 7.15 | Procedures if the plant or facility will accept third-party waste | N/A |
| 7.16 | Classifying and characterizing waste methods | Section 5.3 |
| 7.17 | Soil storage protection measures from contamination and erosion | Section 7.4 |
| 7.18 | Operator certification | TBD |
| **8** | **Reclamation** | |
| 8.1 | End land-use and land capability ratings | Section 7.7 |
| 8.2 | Reclamation of landform, drainage and watercourses | Section 7.7 |
| 8.3 | Soil reclamation plan | Section 7.7 |
| 8.4 | Vegetation reclamation plan | Section 7.7 |
| 8.5 | Wastewater and runoff releases during and after reclamation | N/A |
| 8.6 | Waste management during reclamation | N/A |
| 8.7 | Dust, odours, contaminants and noise control | Appendices G and K |
| 8.8 | Remedial treatment systems vapour control | TBD if required |
| 8.9 | Existing and planned infrastructure for environmental monitoring during reclamation | TBD based on consultation with ESRD |

| EPEA Draft Guide to Content | Information Required | Locations in the Application unless otherwise noted |
|---|---|---|
| 8.10 | Stakeholder involvement | Section 2 |
| 8.11 | Contact information for reclamation activities | Section 1.2 |
| 8.12 | Effectiveness of alternatives for any proposed “engineered” watercourses | N/A |
| 8.13 | Short and long-term effects of reclamation and recontouring to watercourses | N/A |
| 8.14 | Progressive reclamation plan | Section 7.6 |
| 8.15 | Reclamation timeline | Section 7.7.3 |
| 8.16 | Maximization of progressive reclamation | Section 7.6 |
| 8.17 | Reclamation materials salvage and handling procedures | Section 7.4 |
| 8.18 | Storage of reclamation materials | Section 7.4 |
| 8.19 | Progressive reclamation for 8.1-8.3 | Section 7.6 |