

September 2003
R&R/03-7

In an effort to reduce cumulative impacts to land, industry has increasingly been using no-strip or reduced disturbance construction on natural landscapes such as prairie and forested areas, and more recently on cultivated land.

If applied correctly, these practices can result in better environmental protection. However, inappropriate use of these practices can result in damage to soils and vegetation.

This Fact Sheet provides guidance for implementation of these practices to assure the best environmental outcomes.

BACKGROUND

The objective of conservation and reclamation is to return disturbed land to an equivalent land capability.

To meet this objective, landscape, soil, biological resources and water need to be conserved and protected and minimal disturbance techniques should be used on sensitive landscapes like prairie.

Environmental protection plans must be prepared to address appropriate mitigation measures.

Careful pre-planning on the part of the operator is required to ensure that changes in ground, weather or operating conditions do not adversely impact the land or negate the benefits of no strip or reduced disturbance techniques.

A pre-construction evaluation of full disturbance with topsoil stripping versus no-strip or reduced disturbance must be completed. Considerations include:

- Seasonal timing
- Soil type
- Potential for mixing and compaction
- Water and/or wind erosion
- Presence of native vegetation or endangered species
- Slope conditions
- Risk of off-lease fluid migration
- Trespassing
- Possibility of extreme weather changes (e.g., Chinooks, sudden heavy rainfall)

An operator must prepare a contingency plan and appropriate equipment (e.g., rigs equipped to drill using a tank system) must be used. There must also be a commitment on the part of the operator to delay, modify or suspend operations (when safe to do so) when conditions dictate that an adverse impact is likely to occur.

Landowners, land managers and regulators must be in full agreement with the practices proposed for use. Any decisions regarding soil-handling techniques should be discussed at the time of survey and should take into account any landowner concerns. Landowners often have a better understanding of local environmental conditions; however, do not always know the potential impacts of a drilling operation. Effective communication is essential.

APPROPRIATE USE

No-strip Construction

No-strip construction is generally used for:

- Drilling gas wells under frozen conditions
- Short duration drilling of exploratory shallow gas wells in unfrozen conditions (e.g., on prairie) where the weather forecast is fair and a contingency plan is in place for inclement weather
- Gas wells that are immediately adjacent to a gravel road

Reduced Disturbance Construction

Reduced disturbance construction is generally used for:

- Drilling under frozen or unfrozen conditions for sites that require minimal leveling in rough topography (soils should be stripped prior to freeze-up)
- Longer duration drilling of exploratory shallow gas wells in frozen or unfrozen conditions where the weather forecast is fair and a contingency plan is in place for inclement weather
- Oil wells in frozen or unfrozen conditions

This Fact Sheet applies to the full life cycle (e.g., construction, completion, tie-in, production, servicing and reclamation) of wellsites, oil production sites and access to these sites throughout the province on private and public land (e.g., cultivated land, prairie and forested areas).

Guidelines for No-Strip and Reduced Disturbance

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BEST PRACTICES - PLANNING

When planning projects, the following must be fully understood and addressed prior to surveying a no-strip or reduced disturbance wellsite.

The single most important item in no-strip or reduced disturbance drilling is the timing of drilling operations.

- ❑ Winter is the best time to drill native prairie, forested areas and cultivated farmland locations (under frozen conditions). This allows for drilling operations to take place with little or no surface damage. Drilling of deeper wells can be undertaken as rig stays of up to 14 days have little effect on land under these conditions.
 - ❑ No-strip or reduced disturbance drilling on irrigated or flood-irrigated land must only be attempted in winter with frozen ground conditions.
 - ❑ Drilling of low impact wells on other cultivated land in the summer must be limited to three day wells unless extra care and attention are paid to the project, as weather conditions cannot be predicted with any certainty beyond that timeframe. Weather forecasts must be for dry weather.
- Contingency plans must be in place in the event that the weather becomes inclement.***
- ❑ Plans should include voluntary shutdown, use of steel tanks or a remote pit to hold drilling fluids until field conditions allow for disposal.
 - ❑ All staff and contractors must understand the contingency plans.
 - ❑ Completions, servicing, pipelining and operations must be prepared to operate under the same weather restrictions (i.e., dry weather, frozen conditions). No-strip disturbance does not apply to pipeline construction on the lease and/or associated tie-in projects.
- ❑ Planning for reduced disturbance should be on an “area” basis, in addition to considering the unique circumstance of individual wells.
 - ❑ The area and intensity of the overall footprint, including other phases of the project, should be minimized. This means coordination and cooperation with other users in the area to reduce cumulative impacts.
 - ❑ In forested areas, existing pipeline right-of-ways, cut-lines and road allowances should be used for winter road access.
 - ❑ The planning of a reduced disturbance wellsite is much easier if the geology of the project allows for movement of well centre. This helps to ensure that a fairly level area can be picked to set up drilling operations on. Communication of environmental concerns to geologists and drilling personnel is very important.
 - ❑ The moisture content of the soils must be considered. Lighter soils such as sand and loamy sand are better suited for no stripping than loams, clay loams, and clays.
 - ❑ Care must be taken during stripping to avoid admixing. The use of geotextiles or platforms to protect vegetation and soils should be considered. Only essential traffic should be allowed onsite.
 - ❑ Appropriate erosion control measures must be taken, including the use of cover crops, erosion control products (e.g., geotextiles, tackifiers) to stabilize soils on access roads or piles of soil where stripping has occurred.
 - ❑ Straw crimping should be reserved for use under drought conditions where cover crops won’t grow. Care must be taken to ensure the straw is clean (i.e., weed free). On public land, permission to use straw crimping must be obtained from the public land manager.

Guidelines for No-Strip and Reduced Disturbance

- ❑ Assess safety risks such as fire control, rough topography or onsite hazards such as badger holes. Risks to the public, livestock, wildlife and rare plants must be assessed and mitigation plans put in place.
- ❑ Monitoring needs to be included in the planning process. Monitoring conducted by trained personnel can ensure early mitigation of problems.

BEST PRACTICES - DRILLING OPERATIONS MANAGEMENT

It is imperative that no-strip or reduced drilling disturbance locations be supervised by experienced environmental or construction supervisors during the surveying, construction and reclamation stages. The supervisor should have the authority to shut down the project or resort to a contingency plan if the need arises.

When adverse weather is anticipated, operations must not commence or proceed beyond a safe shut down point.

There are several possible contingency plans if the rig is on the main hole and drilling operations cannot be safely suspended.

- ❑ The rig can continue with safe operations (i.e., circulate) rather than continue drilling.
- ❑ Drilling activity can continue to completion of drilling providing soil resources are not impacted.
- ❑ All fluids should be left in tanks until the wellsite dries up.

When leveling of the rig is required for drilling, the disturbed area must be stripped or padded

- ❑ Using a cloth or straw blanket can work well as a separation barrier between soils and padding.
- ❑ Partial cut and fill can help to minimize disturbance in some situations.

- ❑ During summer operations, rig moves are not to be attempted until construction personnel have checked the access and wellsite. An upper subsoil evaluation may be required to determine if the wellsite and access are stable enough to take a rig move. Note: This includes activities in times of warm weather thaws during frozen ground conditions.
- ❑ When a rig is being moved on a no-strip wellsite, skidding or sliding of rig buildings is not recommended as this may cut or scalp the prairie grass mat or can lead to soil mixing on cultivated lands. During summer operations this becomes even more important. Care needs to be taken with snow removal in the winter to avoid peeling sod in native prairie areas on rough surfaces.
- ❑ The management of the drilling operation is very important as the use of water for rig washing must be controlled or completely avoided. No rig ditches are allowed on no-strip wellsites. The use of flare tanks is required on all no-strip wellsites.

On no-strip wellsites, all drilling waste must be contained in tanks and disposed of off-site through Landspray While Drilling (LWD) or at a remote sump site.

- ❑ There must be no cement pits.
- ❑ In frozen muskeg areas, fluids must be disposed of off-site but cuttings may be retained onsite either in tanks or above ground provided measures are taken to contain the solids and prevent contamination to the frozen muskeg.
- ❑ Any solids must be removed immediately following rig release and disposed of according to the Alberta Energy and Utilities Board's *Guide 50: Drilling Waste Management*.
- ❑ There must be no residual solids left on the wellsite.

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- ❑ Landspray While Drilling (LWD) operations (where allowed) should only take place when field conditions are dry and the ground is stable.
 - ❑ LWD is not currently allowed on public land or on prairie in the Special Areas.
 - ❑ The use of wide tires on vacuum trucks is required for landspraying on unfrozen ground.
 - ❑ A central cement containment pit is required for intensive drilling operations. The site should be planned in a less sensitive area that can service a number of wellsites and should be large enough to let normal mix, bury and cover operations take place. This site is to be used for cement returns and some heavy end cuttings and is not intended for drilling fluid disposal.
 - ❑ Reduced disturbance drilling during summer on cultivated lands and prairie grasslands may require dust control and pre-watering of access and wellsites. Prairie wellsites should be kept damp (but not wet) during drilling operations to protect the grass mat root structure. This reduces the effect trucks have on the grass mat when turning. Vehicular traffic must be kept to a minimum under non-frozen conditions.
 - ❑ On no-strip locations, catch pans, liners or other measures must be utilized. This helps to minimize contamination risk due to oil leaks, diesel and hydraulic leaks, and pipe connection leaks. A spill kit containing absorbent material (adequate for all spill types), etc. must be on location at all times. Boilers should be underlain with matting.
 - ❑ Care needs to be taken in forested areas to spread residual woody debris evenly and at a depth that allows vegetation regrowth.
 - ❑ Well servicing, facility and operational groups must allow enough time after rig release so that the rat and mouse holes can be restored.
 - ❑ Time must be allowed to properly strip the site and build a production pad with proper drainage. If required, containment berms must be constructed.
- Well servicing and maintenance must be completed under dry or frozen conditions.***
- ❑ Operators should voluntarily shutdown their operations when the activity has the potential to create a significant adverse effect (e.g., soil rutting (C&R/IL/98-4, as amended)). Wells must be accessed by quads under adverse weather conditions.

CONSIDERATION FOR OIL WELLS

The potential contamination of topsoil around wellhead, pipeline risers and tanks during the production operations of oil wells make it advisable to use reduced disturbance versus no-strip techniques. Measures must be taken to control weeds and to prevent loss of topsoil due to wind and water erosion. Care must be taken during stripping to avoid admixing.

For development wells that require stripping, it is preferred that the stripping operation be done prior to freeze-up or after breakup. It is more difficult to separate the soils after the frost has been driven in by the drilling operation.

Most oil wells on cultivated land require all weather access. In these cases, the access road and lease should be stripped when drilling a development well even if a pipeline is installed.

Alternatively, the well may be drilled using no-strip techniques as long as a proper production pad is constructed prior to the well going to production. Multi-well oil pads must be stripped or padded for production purposes.

Guidelines for No-Strip and Reduced Disturbance

A contingency plan must be in place if weather conditions lead to a change of operations

CONSIDERATIONS FOR GAS WELLS

Frozen Conditions

- ❑ Weather conditions need to be considered (e.g., possibility of chinook). A contingency plan must be in place if weather conditions lead to a change of operations.
- ❑ As all weather access is not usually required, all shallow gas wells on any land type must be drilled with no stripping wherever possible under frozen conditions.
- ❑ Deeper gas wells (more than three days operations but less than fourteen days) can also be planned with no-strip under frozen conditions.

Non-Frozen Ground Conditions

- ❑ Any wellsite on prairie where drilling is expected to exceed 3 days should be partially stripped unless there is a commitment from the operator to prepare a contingency plan, the climate has been dry, and the weather forecast does not anticipate rain.
- ❑ Multiwell gas pads on native prairie must have a risk assessment and a contingency plan completed. The type of production facility should be considered at this time. Approval from the appropriate regulatory bodies must be obtained prior to project commencement.
- ❑ Cultivated land should be stripped with the exception of shallow, short duration exploratory wells with less than a 50% chance of success, shallow gas wells and wells that are immediately adjacent to a gravel road. Contingency plans must be in place.

DEFINITIONS

- ❑ **Reduced or minimal disturbance** means that partial topsoil stripping takes place, for example under a rig footprint or sump area. If leveled areas required for the rig and soil storage do not exceed 50% of the surveyed wellsite area, the development can be regarded as reduced disturbance.

- ❑ **No-strip** means no topsoil stripping takes place. The drilling rig is placed on the topsoil and the only disturbance is at well center as a result of the well bore. In frozen conditions there should be no further impact beyond woody vegetation clearing (i.e., brush and tree removal). In non-frozen conditions some compaction can occur. Care must always be taken to prevent leaks and spills.
- ❑ **Adverse conditions** means those soil, weather or timing conditions that may lead to unfavourable impacts to soil or vegetation when activities are conducted on the land. Examples include wet weather (compaction, rutting concerns), frozen conditions (reduced soil stripping control), drought conditions (pulverization concerns), spring breakup (compaction, rutting concerns) or Chinook conditions.
- ❑ **Adverse effects** include (but are not limited to) spills, rutting, compaction, admixing, loss of topsoil and damage to vegetation or other biological resources.

CONTACTS

The following can be reached toll free by calling 310-0000 and then dialing the number shown below.

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