Appendix 2C

Environmental Commitments and BMPs for Haul/Access Roads

Haul and Access Roads

Environmental Commitments and Best Management Practices to Ensure that Water Quality and Fish Passage are Maintained

Along with standard engineering practices, additional design, construction, and maintenance commitments would be made to protect stream, soil, and aquatic resources. These commitments take the form of environmental protection measures and/or Best Management Practices (BMPs) that would be implemented where appropriate. They are based upon sound, tested techniques from established sources, including, but not limited to, U.S. Forest Service Road-Water Interaction publications (Furniss, 1997; Copstead, 1998; Flanagan, 1998; Johansen, 1997; Moll, 1999); the recent draft *Selenium Management Practices* publication (Agrium et al, 2004); Idaho Department of Lands (1992); Idaho Forest Practices Commission (2004); and the Caribou National Forest Plan (USFS 2003). While these measures will be taken into account during the final road design process, the permitting agencies will have the authority to approve or disapprove any specific aspect of the design.

DESIGN BMPS

Drainage Crossings

- Proper engineering design would ensure that the existing channel configurations immediately up- and downstream of culverts are maintained to the maximum extent possible. This would include maintaining cross sectional dimensions, width-depth ratio, stream gradient (longitudinal profile), velocity, floodplain accessibility and flow patterns. Removing existing riparian vegetation would be restricted to the minimum necessary for equipment maneuvering and the actual necessary permanent disturbed footprint. Where possible, stream bank and floodplain areas needed for working outside the permanent fill/dredge footprint would have approved mots or woven geotextile covered by a temporary fill pad (1-2' thick) to form a working surface.

- Channel crossing culverts would be designed to pass the peak flow associated with the 100-year flow event plus sediment and debris, without headwater above the top of the culvert. A minimum of 10% of the culvert diameter will be buried below the channel bed and the buried portion not counted for the purpose of estimating culvert capacity. Calculation of the 100 year flows will use the higher prediction of the regression methodologies specified in Quillian an Hadenberg (1982) and by Blakemore et al (1994). Culvert gradient shall mimic stream gradient. In general a distance of at least two full meaner lengths (but not less than 50') both upstream and downstream should be used.

- Culverted crossings of streams in which fish have been found and where perennial streams may occur would be designed to pass appropriate or expected species and life-stages during appropriate times of the years during both high and low flow conditions. The final designs would be submitted to BLM, IDEQ, Idaho Department of Water Resources and USFS fisheries biologists for approval. On Forestland, the guidance at the time of initial construction for aquatic organism passage would be followed. Flow depth, flow velocity, and grade would are some of the items the final design would take into consideration. Water velocity on fish-bearing streams would not exceed 2 feet-per-second, or mean stream velocity, whichever is greater.

- In the interest of passing sediment and debris, and facilitating maintenance, minimum culvert diameter would be 18 inches. Where a road footprint requires a long drainage crossing culvert (>40 ft), the specified culvert diameter would also take into account the need for a safe and efficient means to access and clean accumulated debris and sediments.

- In non-fishbearing crossings, culvert inverts would be placed several inches under the bed surface, along grade, whenever possible. This would allow a natural substrate to bed the culvert to provide aquatic benefits as well as reduce the potential for up- and downstream channel changes. Provide riprap or other grade control methods to prevent head and down-cutting

- Road fills at culvert inlets would be protected through the use of riprap up to the flow depths associated with the 100-year peak flow.

- Energy dissipating rock aprons would be used at culvert outlets to return flows to an acceptable velocity and depth as they exit the culvert. The distance downstream that the aprons would extend would be based upon site conditions.

- Unless specific conditions are prohibitive, culverted crossings would be placed perpendicular to the roadway, in other words with the road approaching the natural channel alignment at a 90 degree angle. However, where the road alignment cannot accommodate this, the channel would not be realigned, and thus the angle would not be perpendicular.

- The width of the road fill at the crossing would be limited to the minimum necessary for the crossing. For example, pull out lanes, wide shoulders, etc. would not occur in these areas unless required for safety.

- All requirements and conditions of the relevant Army Corps of Engineers Permit for Road Crossings will be followed at crossings for which the permit applies. However, more stringent requirements and conditions than Approved by the Army Corps of Engineers, may be required by the BLM USFS, and/or Idaho Department of Water Resources.

- Culverts would be installed and maintained to avoid inlet scouring and to prevent erosion of downstream banks. This includes such items as use of rock aprons, protected fills, installation along grade but slightly below bed elevation and other

items discussed in this section. Culverts will not be designed based on inlet control hydraulics.

- The bottom of the designed vertical curve should never be located above the culvert for the drainage crossing, so that water from the low spot in the road on the bridge does not drain directly above the culvert.

- Where beavers are present, if possible, the low spot of the crossing will be situated so that it is over the floodplain and not over the culvert and fill. Appropriately sized rock will cover the downstream slope of the crossing fill to minimize erosion of the fill should the culvert become plugged or overtopped.

- Drainage ditch lengths along roads that drain to stream crossings will be minimized by adding cross-drains or daylight culverts placed on the crossing approaches. The minimum sized culverts shall be 18 inches in diameter.

- For fish-bearing reached, culvert geometry will be appropriately chosen so as to maintain a suitable depth of flow in the culvert, i.e. “squash” shaped culverts will not be used where they result in very shallow flow depths in the culverts.

Road Drainage Network

- Ditch relief cutouts would be installed as needed at spacings adequate to manage runoff, and armored/lined for stability as needed. The cutouts will be located so that any drainage from them will be directed toward sediments ponds constructed for this purpose. The cutouts will be designed to minimize erosion or scouring of fill slopes. Down-drains may also be used. Settling ponds will be located and designed to manage runoff from all sources routed to the ponds.

- Rerouting or transferring up-gradient runoff water via roadside ditches to adjacent basins, even on a small sub-basin scale, which would result in a cross-basin diversions that could alter natural flow and sediment regimes, would be avoided.

- Runoff from road surfaces would be discharged in a manner so as to avoid directly converging with stream channels wherever possible, minimizing or eliminating hydrologic connectivity between the road drainage network and the stream channels. This would be done by: (1) properly locating ditch lines and ditch relief cutouts; (2) by grading slopes away from channel networks; and/or (3) by allowing sufficient distance for flows leaving ditch relief cutouts to re-infiltrate and deposit sediments away from stream channels and their floodplains. Where it is not possible to prevent a ditch or cross drain from draining more or less directly to a channel, the ditch would be armored until reaching the next upstream ditch relief.

- Where possible, cross drains and ditch turn outs would be located on gently sloping, stable terrain such as where rock or stable vegetation is found. Discharge areas would be located to release water on convex slopes where possible, so that water would be dispersed rather than channeled; concave slopes would be avoided wherever possible.

- As needed, ditch relief cutout outflow areas would be armored with riprap, turf reinforcement mat, gabions, or similar types of materials and configured to reduce velocity by providing dispersal and velocity reduction. This armoring would occur wherever needed due to grade and/or substrate characteristics.

- As needed, sediment traps would be used to treat road runoff where there is not sufficient buffering distance or dispersal between the outflow and a stream channel.

- With consideration given to safety concerns as well as drainage considerations, road surfaces will be designed as crowned, insloped, or outsloped as most appropriate for a given road segment.

- Sediments mucked out of drainage ditches and ponds would be placed pit-backfills used for seleniferous waste.

Channel Realignment or Roadfill/channel interactions

- Any in-channel work, whether related to stream bank realignment, crossing, or other purpose would result in reestablishment of original channel gradient, bank width, bank slope, re-compaction of disturbed banks, and width-depth ratio.

- Where channel realignment cannot be avoided, the natural channel's pattern and geometry would be mimicked where possible, including radius of curvature of meanders, stream gradient and width-depth ratio, bank slope and compaction, substrate diameter, habitat features. Runs and glides will be proportioned to the same ration to bank-full depth and slopes as in an identified reference reach.

- Realigned or reconstructed streams would be designed to carry bank full flows in-channel, with flood flows dispersed on floodplains.

- At the upstream and downstream ends of realigned reaches, appropriate transitions to the undisturbed channel reaches would be designed.

- Where appropriate, rather than using riprap, new channel banks would be treated with appropriate material to encourage and enhance both herbaceous and woody vegetation growth. This would occur where banks have non-rocky substrate that would allow such treatments to be effective and develop natural functioning banks.

- Any in-stream structures to be proposed shall be reviewed by the Forest Hydrologist.

Fill Slopes and Cut Slopes

- Where necessary, cut or fill slopes will be benched when feasible from an engineering standpoint in order to reduce runoff velocities, prevent erosion, maximize infiltration and facilitate revegetation.

- Where a fill slope toes out within 50 feet of a perennial stream, silt fences or similar sediment collection treatments, such as sediment traps, straw bales, coir wattles

would be used during construction and until sufficient vegetation exists to prevent erosion. Such devices would similarly be used where fill slopes come within 300 feet of a perennial stream when the toe of the slope is within 50 feet of a drainage directed toward that stream.

- Where original ground is steeper than a 2h:1v (50%), roads should be constructed by completely cutting into the hillside (100% cut), without using any fill.

- In areas where the original ground slope is greater than 2.5h:1v, (40%) a catch bench or toe bench will be cut to prevent fill material from running or rolling excessively down slope.

CONSTRUCTION BMPS

- Road construction materials and methods that would minimize the probability for selenium leaching would be used where appropriate as recommended in the *Selenium Management Practices* draft publication (Agrium, et al, 2004).

- Under no circumstances would center waste shale, or other highly seleniferous material be used for road construction fill material. Rex chert may be used for road construction if it can be demonstrated to the satisfaction of BLM and Forest Service that it will not release unacceptable amounts of selenium, i.e.: only “clean” chert or other material will be used. Seleniferous material which is cut from slopes to build roads will be placed in mine dumps with other seleniferous waste.

- Minimize the time of exposure of bare soils when feasible, before reseeding or other reclamations techniques are implemented.

- Erosion control measures will be in place prior to initiation of construction.

- When feasible, construction near or in drainages would be restricted to normal low flow seasons (late July through October) and would be temporarily halted during runoff events.

- Length of construction time in/near the stream channel would be minimized by segregating that work task to occur as rapidly as possible in a sequential manner; area of disturbance would also be minimized, by restricting equipment to a narrow construction corridor while maintaining a safe running surface.

- As construction near a stream channel is completed, loose material that remains within the flow path of flood events would be removed and placed away from flow paths and floodplains

- Riparian vegetation would remain undisturbed wherever possible, and its disturbance would be limited to that necessary in the actual footprint as well as the minimum necessary for equipment work in the established construction corridor. This would also apply to large woody debris.

- Topsoil will be salvaged and stockpiled for later use in reclamation.

- If blasting is required, control methods will be utilized to minimize material that is deposited outside the disturbance boundaries.

- All the terms and requirements of Simplot's National Pollutant Discharge Elimination System (NPDES) Permit for Storm Water Discharges from Construction Activities would be followed. These are not reproduced here, but are incorporated by reference.

- Contractors responsible for constructing the road would be responsible for maintaining spill kits on site and would train their personnel on how to respond to an emergency spill.

- Fuel, oils, or other hazardous materials would not be stored or stockpiled within 200 feet of perennial streams.

- Live water shall be piped, pumped or otherwise routed around channel work. No excavation activities shall occur in live water.

RECLAMATION BMPS

Road Corridor and Cut/Fill Slopes

- Once reclamation treatments have occurred, they would be monitored and maintained until they are deemed successful.

- Larger stumps and slash that are by necessity removed during road clearing would be used as temporary sediment filter windrow barriers at the base of road fill slopes or below ditch relief culverts or other locations to provide sediment trapping and runoff velocity control. Stumps and slash would not be used as fill material in fill slopes. Stumps and slash will not be placed in stream channels.

- Cut-slope reclamation would be performed to the safe physical limitations of equipment for spreading topsoil, which is approximately 3h:1v. Figures illustrating where this will be necessary will be provided for analysis and review.

- Fill would be pulled back to the level of the original ground on slopes steeper that 3h:1v down to the point at which the fill width is 20 feet. Once that 20 foot width is reached, an additional pass with a backhoe another 20 feet down to pull fill back to original ground level. Figures illustrating where this will be necessary will be provided for analysis and review.

OPERATIONAL BMPS

Winter Deicing BMPs

- Sand with added salt or salt substitutes would be used when necessary to provide safe winter driving conditions.

- Winter maintenance shall avoid discharge of snow or road material into stream channels.

Miscellaneous

- Mine personnel would be trained to properly respond to and report spills of fuel, waste rock, ore, or other materials that threaten surface water.

- Inspection, maintenance and/or repairs to drainage crossings, slopes, road drainage network, etc. would occur in a timely manner to prevent continuing or extensive erosion/sedimentation problems.

- Inspection reports/logs will be available to regulatory agencies, including IDEQ. Inspections will occur on a daily basis (at a minimum) during runoff events.

Maintenance

- Conduct regular preventative maintenance inspections to ensure proper functioning of all drainage structures, culverts, etc. Inspections should occur AT LEAST every spring following snowmelt, following major summertime precipitation events and prior to winter snowfall. Maintenance and/or repairs to drainage crossings, slopes, road drainage network, etc. would occur in a timely manner to prevent continuing or extensive erosion/sedimentation problems.

- Hauling and other vehicular traffic should be minimized during wet road conditions to reduce impacts to road surfaces/subgrade and drainage structures.

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