OPERATIONS AND MAINTENANCE MANUAL REV.0 TDF-1 AND TDF-2 METALINE FALLS, WASHINGTON

Prepared For:
TECK WASHINGTON INCORPORATED
URS Job No. 36310085

Prepared By:
920 N. Argonne Road, Suite 300
Spokane Valley, Washington 99212

January 11, 2013

URS

January 11, 2013

Mr. David Riggleman
Teck Washington Incorporated
P.O. Box 7
Metaline Falls, Washington 99153

RE: Operations and Maintenance Manual
TDF-1 and TDF-2
Metaline Falls, WA
URS Job No. 36310098

Dear Mr. Riggleman:

Enclosed are three copies of the O&M Manual for Tailing Disposal Facilities Nos. 1 and 2 at the Pend Oreille Mine, Metaline Falls, Washington. This O&M Manual was prepared by URS Corporation (URS) on behalf of Teck Washington Incorporated (TWI) to describe the long-term operation and maintenance of the low permeability cover and other remedy components for the Cleanup Action conducted by TWI in accordance with the Model Toxics Control Act (MTCA), WAC Chapters 173-340. Construction of the Cleanup Action selected by Washington State Department of Ecology for TDF-1 and TDF-2 was completed on October 11, 2012, as documented in the Construction Completion Report, TDF-1 & 2 Cleanup Action, Pend Oreille Mine, Metaline Falls, WA, dated December 2012.

Thank you for the opportunity to work on this project. If you have any questions, please do not hesitate to contact either of the undersigned.

Sincerely,
URS CORPORATION

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OPERATIONS AND MAINTENANCE MANUAL
REVISION 0

TDF-1 AND TDF-2

METALINE FALLS, WASHINGTON

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1.0 INTRODUCTION

This Operations and Maintenance (O&M) Manual, Revision 0, provides operation and maintenance guidelines for Tailings Disposal Facilities 1 and 2 (TDF-1 and TDF-2) at the Teck Washington Incorporated (TWI) Pend Oreille Mine (POM) in Metaline Falls, Washington (Site). The POM is a lead-zinc mine. TDF-1 and TDF-2 are historic tailings disposal facilities. See Figure 1, Site Vicinity Map, for Site location and Figure 2, Site Plan Map, for site features.

In 2011 and 2012, TWI implemented a Cleanup Action at TDF-1 and TDF-2 in accordance with the Washington State Model Toxics Control Act (MTCA), Washington Administrative Code (WAC) 173-340 and Consent Decree #11-2-00083 between the Washington State Department of Ecology (Ecology) and TWI. Remedial actions included: grading and covering to stabilize the tailings, control of stormwater to reduce infiltration; covering of the tailings with a biological barrier and clean growth media to reduce human and ecological exposure to tailings; and revegetation to minimize future erosion. Institutional controls include placement of a deed restriction, signage, and access control.

The O&M Manual (Plan) is defined by WAC 173-340-400 as a *"plan that presents technical guidance and regulatory requirements to assure effective operations under both normal and emergency conditions."* This O&M Manual fulfills the requirements of WAC-173-340-400.

The O&M Manual describes procedures for the maintenance of the facility after completion of the cleanup action, including maintenance of the cover, stormwater controls, and institutional controls and monitoring devices. The following information is included in this O&M Manual:

- General information, including a description of the Site, its purpose and features, and identification of the parties responsible for its operation and maintenance;
- A description of the Site processes and operating principals;
- General operating procedures and emergency or contingency procedures;
- A discussion of the individual treatment units;
- Procedures and sample forms for collection and management of operating and maintenance records;
- A list of materials used to construct the stormwater conveyance features;
- Description of procedures that ensure that the safety and health requirements are met;
- Schedule for maintenance of aspects of the system that require routine attention, as well as maintenance instructions.;
- Schedule for routine inspection and monitoring, including a site-specific visual inspection checklist and data forms; and
- Description of unusual conditions that could occur and operating procedures to be performed under those conditions, including special inspections and incident reporting.

The responsibility, location and distribution of the manual at the POM are discussed in **Section 3.0**.

2.0 SITE INFORMATION

2.1 LOCATION

The Site is located at the POM in Pend Oreille County in the northeastern corner of Washington State. The POM is an underground zinc and lead mine and mill operated by TWI. The POM is located at a latitude and longitude of 48°53'54.12" N and -117°21'36.00" W respectively, approximately 11 miles south of the Canadian border and 15 miles west of the Idaho State line. The nearest town is Metaline Falls, which is approximately two miles south of the Site. The Pend Oreille River is located approximately 700 feet west of TDF-1 (Drawing 1, Appendix A).

The 13,000 acre POM property is bounded by the Pend Oreille River to the west, State Route 31 and the Grandview Mine to the south, Colville National Forest to the north, and private property to the east. The topography is generally mountainous and elevations in the region range from 6,800 feet above mean sea level (MSL) to 1,990 feet MSL at the Pend Oreille River adjacent to the Site. The Site is located in a coniferous forest within the Okanogan Highlands of the Selkirk Mountain Range.

TDF-1 is located on a terrace approximately 700 feet east and 200 feet above the Pend Oreille River at an elevation of approximately 2,250 feet MSL. A wetland (Wetland A) covers approximately two acres along the eastern edge of TDF-1. TDF-1 covers approximately 18 acres and has a maximum tailing thickness estimated to be 68 feet (Drawing 2, Appendix A).

TDF-2 is located approximately 700 feet east and southeast of TDF-1. TDF-2 is located within a terrace above TDF-1, covers approximately nine acres, and is at an elevation of approximately 2,335 feet MSL.

2.2 HISTORY

The current TDF configuration was a result of mining operation from the late 1960s and 1970s. TDF-1 was used from 1968 to 1974. TDF-1 was constructed using upstream construction methods and stepping the tailings impoundment inward or upstream as the elevation of tailings increased. Decant structures were installed in the facility to allow quiescent settling of particles before the clarified water was discharged.

Use of TDF-2 began in 1974. TDF-2 was constructed above TDF-1 by building an earthen starter dam across a natural drainage channel. Use of TDF-2 was brief and ceased in 1975 when the starter dam failed and the reservoir contents flowed onto the surface of TDF-1. Tailings deposition was moved to TDF-3 in 1975. Tailings deposition at TDF-3 and mine operations stopped in 1977 and did not resume until 2004 when operations were restarted by Teck Cominco American, now known as TWI. When mining resumed, a high density polyethylene lined TDF was constructed over the previously deposited tailings at TDF-3. TDF-3 is permitted to accept tailings from current POM operations and is not included in the cleanup actions discussed in this O&M Manual.

In May 2005 Ecology and TWI entered into an Agreed Order #2585 that required TWI to conduct a Remedial Investigation and Feasibility Study (RI/FS) of the site. As part of the RI/FS the following substances were identified as contaminants of concern (COCs) and found to exceed MTCA screening levels within the tailings:

- Arsenic
- Barium
- Cadmium

- Copper
- Lead
- Mercury
- Zinc

In addition to the COCs found in the tailings, iron and manganese exceeded MTCA screening levels for groundwater at the Site. In order to reduce human and ecological exposure to these COCs, Ecology prepared a cleanup action plan (CAP). Ecology and TWI entered into Consent Decree #11-2-00083 where TWI agreed to conduct a cleanup action consistent with the CAP. In 2011, an Engineering Design Report (URS 2011a) and Construction Plans and Specifications (URS 2011b) were created to describe specific Site activities to be performed to meet the intent of the CAP.

During the summer of 2011 and 2012 the actions described in the Engineering Design Report and Plans and Specifications were implemented by TWI. URS served as the construction manager during construction and Clearcreek Contractors of Everett, Washington, completed construction activities under contract with URS. Construction was completed in October 2012. As-built drawings documenting the construction are provided as an Appendix A.

This O&M Manual provides guidance to the property owner, currently TWI, on how to maintain the design intent of the CAP-implemented actions at the Site. The Compliance Monitoring Plan, presented under separate cover, provides guidance to meet regulatory conditions established as part of the CAP including environmental sampling, monitoring and reporting requirements. This O&M Manual provides a summary of these requirements.

2.3 CLIMATE

Climate at the Site is influenced by mountainous topography with prevailing winds from the north and northwest. The major weather fronts are from the Pacific Ocean and the Arctic. The area is characterized by warm moderately moist summers, and cool snowy winters.

Average monthly temperatures range from 15 to 25 degrees Fahrenheit (°F) in the winter to 60°F to 70°F in the summer. Freezing temperatures have been recorded from September through June (URS 2011b).

Average precipitation at the Site is approximately 28 inches per year and is relatively evenly distributed. Winter snowfall ranges between 40 and 80 inches per year. Mean annual evaporation for the area is estimated to be 20.2 inches per year (URS 2011b).

2.4 HYDROLOGY

The Site is bordered by the Pend Oreille River to the west; the river adjacent to the Site is within the reservoir of Boundary Dam, located about 17 miles downriver (north) of the Site. River flow upstream of the Site is controlled by Box Canyon Dam and other dams located upstream. The Pend Oreille River flows north towards Canada before it joins the Columbia River near the Canadian border. Two creeks (Creek 1 and Creek 2) are located is the vicinity of TDF-1 and TDF-2 and both flow west towards the Pend Oreille River. Creek 1 is located north of TDF-1 and TDF-2 and does not appear to be hydraulically connected to the Site. Creek 2 forms at the toe of TDF-1 and transports water from the Site to the Pend Oreille River. Water within Creek 2 primarily consists of stormwater runoff from the Site and local groundwater, which manifest through local springs, seeps, and water collection structures within TDF-1 (Drawing 2, Appendix A).

Historical operation of TDF-1 led to a depression around a decant structure installed within the tailings basin. This depression eventually formed into Wetland A along the top of TDF-1. A smaller wetland identified as Wetland B is located west of TDF-1 near the northern end. Water collected in Wetland A generally drains through the decant structure and empties into Creek 2.

2.5 HYDROGEOLOGY

Groundwater near TDF-1 and TDF-2 is believed to present in three local interconnected unconfined aquifers. A thin perched aquifer is present under the northern portion of TDF-2 and includes saturated tailings overlying bedrock. The second aquifer is the main aquifer comprised of glaciofluvial deposits overlying the bedrock, which extends below TDF-1 and TDF-2. Seeps at Creek 2 and along the eastern margin of TDF-1 are believed to be discharges of this aquifer. A third aquifer appears to be present with the saturated tailings of TDF-1. Additional information regarding hydrogeologic conditions of the Site is available in the Supplemental RI/FS (URS 2010b).

3.0 RESPONSIBILITY

3.1 RESPONSIBLE PARTY

The Site is currently under ownership by TWI, which has overall responsibility for operating and maintaining TDF-1 and TDF-2. The POM General Manager is the Project Coordinator in this O&M Manual. The POM Environmental Manager is designated as the back-up Project Coordinator for when the Project Coordinator is away from the mine.

The Project Coordinator should have a basic understanding of engineering principles, operation and maintenance practices, environmental sampling, and should be experienced in assessing slope stability and vegetation.

Suitable administrative controls and reporting procedures are in place and should continue to be implemented by mine management to monitor and assist the activities of the Project Coordinator. Any plans of the mine, mill, environmental and other departments that relate to TDF-1 or TDF-2 should be discussed with the Project Coordinator so that possible impacts can be considered.

The location of the O&M Manual shall be in the office of the Project Coordinator. The Project Coordinator is responsible for distributing copies of the O&M Manual to the control room and other mine staff with responsibilities related to TDF-1 and TDF-2.

3.2 REGULATORY REFERENCE DOCUMENTS

The Project Coordinator should have available, and be familiar with, the following documents as they relate to the Site:

Ecology 2004. “Eastern Washington Stormwater Management Manual”, Washington State Department of Ecology, Publication Number 04-10-076, September 2004.

Ecology 2007a. “Model Toxics Control Act Statute and Regulation”, Publication No. 94-06. Revised November 2007.

Ecology 2007b. "Washington State Wetland Rating System for Eastern Washington-Revised". Washington State Department of Ecology, Publication Number 04-06-15, Published 2004, Revised March 2007.

Natural Resources Conservation Service (NRCS). 1992. Soil Survey of Pend Oreille County Area, Washington. By N. C. Donaldson, J. T. Defrancesco, M. E. Haagen, D. W. Barron and R. G. Coleman.

Norman, D. K., P. J. Wampler, A. H. Throop, E. F. Schnitzer, and J. M. Roloff. 1997. Best Management Practices for Reclaiming Surface Mines in Washington and Oregon. Washington Division of Geology and Earth Resources, Open File Report 96-2, Washington Department of Natural Resources.

3.3 PROJECT REFERENCE DOCUMENTS

The Project Coordinator should have available, and be familiar with, the following project documents, or with any superseding updates of these documents:

Ecology, 2006. "Final Environmental Impact Statement, Pend Oreille Mine Project", Washington State Department of Ecology, July 12, 2000.

Ecology, 2010a. "Pend Oreille Mine Tailings Disposal Facilities Nos. 1 & 2 Cleanup Action Plan", Consent Decree Exhibit B, Washington State Department of Ecology, 2011.

Ecology, 2010b Consent Decree #11-2-00083-1, State of Washington, Pend Oreille County Superior Court, 2010.

Golder 2006. "Draft Remedial Investigation/Feasibility Study Report for the Pend Oreille Mine Tailing Disposal Facilities TDF-1 and TDF-2", Golder Associates Inc., October 17, 2006.

URS 2008. "Memorandum: Pend Oreille Mine TDF-1 and TDF-2 Hydrogeology Data Review", prepared for Teck Cominco American Incorporated by URS Corporation, May 8, 2008.

URS 2009. "Report: Supplemental Monitoring Well Installation and Groundwater Monitoring, Pend Oreille Mine TDF-1 and TDF-2", prepared for Teck Cominco American Incorporated by URS Corporation, February 24, 2009.

URS 2010a. "Report: Groundwater Monitoring, Pend Oreille Mine TDF-1 and TDF-2", prepared for Teck Washington Incorporated by URS Corporation 28 January 2010.

URS, 2010b. "Report: Supplemental Remedial Investigation/Feasibility Study Pend Oreille Mine TDF-1 and TDF-2", prepared for Teck Washington Incorporated by URS Corporation, June 03, 2010.

URS, 2010c. "Wetland Delineation Report, Pend Oreille Mine, Tailings Disposal Facilities (TDF) 1 & 2", prepared for Teck Washington Incorporated by URS Corporation, December 17, 2010.

URS, 2011a. "Final Engineering Design Report Tailings Disposal Facilities Nos. 1 and 2 Cleanup Action", prepared for Teck Washington Incorporated by URS Corporation June, 2011.

URS, 2011b. "Sampling and Analysis Plan, Materials Testing and Evaluation for TDF-1 and TDF-2", prepared for Teck Washington Incorporated by URS Corporation January 17, 2011.

URS, 2012a. "Construction Completion Report for TDF-1 and TDF-2", prepared for Teck Washington Incorporated by URS Corporation December 2012.

URS, 2012b. "Compliance Monitoring Plan for TDF-1 and TDF-2", prepared for Teck Washington Incorporated by URS Corporation December 2012.

4.0 SITE CONTROLS

4.1 TDF COVER SYSTEM

As part of the CAP implementation, the embankment of TDF-1 was graded to a 2 Horizontal to 1 Vertical (2H:1V) slope to promote embankment stability. Excess tailings from the embankment were incorporated into the surface of the TDFs and the surfaces of the TDFs were compacted. The embankment face was then armored with waste rock from a source located at POM.

The top surface of compacted tailings for each facility was graded to direct drainage to installed stormwater controls. The compacted tailings surfaces have been concealed by a cover system consisting of a 12-inch thick layer of waste rock, six ounce geotextile, and a 12-inch thick vegetated growth media layer. The geotextile and waste rock serve as a biological barrier, designed to prevent direct contact with the tailings by humans and wildlife. The compacted tailings and permeability of the waste rock were designed to promote lateral drainage and reduce infiltration of water into the tailings. The cover system also serves to reduce the migration of tailings from the Site due to erosional forces such as wind and water.

The surfaces of TDF-1 and TDF-2 are vegetated with shallow rooted native grasses including a 75-foot buffer around Wetland A (Drawing 10, Appendix A). A 20-foot section of the buffer area adjacent to Wetland A was planted with a mixture of native dryland grasses and a specific wetland grass seed mix. Seed mixes are included in Appendix B. The integrity of this cap is important to prevent the migration of the tailings and exposure to human and ecological receptors.

Stormwater controls have been built into the Site to encourage removal of total suspended solids (TSS). Sections 4.2 and 4.3 describe the stormwater controls for each facility.

4.2 TDF-1 STORMWATER CONTROLS

TDF-1 is graded to drain to Wetland A and flow lines extend radially from a decant structure within the wetland boundary (Drawing 7, Appendix A). Slopes of TDF-1 vary from approximately 0.85 to 2 percent. Wetland A is sized to retain a typical water quality design storm and allow removal of TSS within stormwater runoff. The storage capacity of Wetland A is approximately 0.84 ac-ft with the decant structure serving as the primary outlet. As a secondary control, water levels that exceed the design storage volume are routed to an overflow structure inlet connected to the french-drain (see below).

The decant structure is a historical feature constructed during TDF-1 operation. The decant structure extends vertically through the tailings where it is then joined to a horizontal pipe which extends to the toe of TDF-1 and connects to an 18-inch pipe originating from the french-drain (see below).

Ground and surface waters are conveyed from TDF-1 by a perimeter ditch (Ditch 1B) and a french-drain system. Ditch 1B is located along the northeast third of TDF-1 and discharges to the north in an 18-inch corrugated polyethylene (CPE) pipe. The 18-inch CPE pipe is exposed along the northern toe of the

TDF-1 buttress and discharges to Creek 2. The french-drain is located along the southeast two-thirds of TDF-1 at the base of the hillside. The french-drain consists of perforated 18-inch CPE pipe with two inlets and three cleanouts. The 18-inch pipe conveys ground and surface waters to a 30-inch CPE pipe at the southern end of TDF-1. The 30-inch pipe is located beneath the southern portion of the buttress access road and transitions to the toe of the buttress approximately at the mid-point of TDF-1. The 30-inch pipe transitions to a 24-inch pipe north of the buttress landing. The discharge pipe of the decant is connected to the 18-inch pipe with a tee. The 18-inch pipe discharges to Creek 2.

4.3 TDF-2 STORMWATER DRAINAGE

TDF-2 slopes to the north and is concave to direct stormwater toward the flow line along its center (Drawing 6, Appendix A). Six-inch perforated CPE under drain piping has been installed within the drainage layer at the flow line. The under drain collects groundwater within the drainage layer and conveys it north where it is discharged to Ditch 2A.

The northern half of TDF-2 is graded to drain toward north and into the start of Ditch 2A. Three six-inch under drains are provided in the drainage layer beneath the flow lines. The three under drains daylight and discharge at the beginning of Ditch 2A. Ditch 2A extends from the top of the embankment to the toe.

Ditch 2A is approximately 60 feet in length and has a trapezoidal cross section. Ditch 2A has an approximate 10-foot bottom width and a slope of approximately eight percent. Ditch 2A is lined with a one-foot thick layer of quarry spall rip rap and geotextile and discharges to Ditch 2B at the toe of the TDF-2 embankment.

Ditch 2B was constructed in an existing natural drainage between TDF-1 and TDF-2. Ditch 2B is approximately 510 feet in length with an overall slope of 12 percent. Ditch 2B has a trapezoidal cross section with a five-foot bottom width. A one foot layer of quarry spall rip rap is installed over geotextile. Ditch 2B discharges to Ditch 1B.

The surface of TDF-2 functions as a biofiltration channel to remove TSS from stormwater. The surface grade allows particle settlement along the flow lines. Water that infiltrates through the growth media layer and geotextile is collected within the drainage layer and conveyed to the under drain piping.

4.4 DRAINAGE MATERIALS USED IN CLEANUP

Details of specific drainage features have been provided in the attached as-built documentation (Appendix A). Geotextile and pipe manufacturer documentation has been provided in Appendix B.

4.5 TDF-1 INSTRUMENTATION

Five piezometers are present on the surface of TDF-1. The piezometers are used to measure the groundwater or piezometric level within TDF-1. Groundwater elevations within TDF-1 tailings will be used to assist with assessment of TDF-1 embankment slope stability..

5.0 COMPLIANCE MONITORING

A Compliance Monitoring Plan (CMP) is required to document protection monitoring, performance monitoring and conformation monitoring requirements for the remedial actions at the Site pursuant to WAC 173-340-410. The Compliance Monitoring plan has been prepared for this Site and is provided under separate cover.

6.0 ROUTINE OBSERVATION AND MAINTENANCE

This section describes the monthly, quarterly, and annual inspections for TDF-1 and TDF-2, as well as actions or maintenance activities that may be required as a result of inspection observations. Monthly inspections should be completed for one full year after construction completion. Quarterly inspections should be conducted for the first two years after completion of construction. If the Site doesn't require substantial maintenance during the first two years and Site features and Best Management Practices (BMPs) appear to be functioning properly, inspections may be reduced to following significant events and annual intervals with the consent of Ecology.

Inspections are to be performed without seasonal interruption. However, the Site may be inaccessible for close examination during the winter because of snow. Special attention should be given during inspections performed following weather delays, during rain-on-snow events, and just before the first major snowfall.

The inspections should focus on BMP functions and unusual behavior, which includes slides, slumps or cracking of the embankments, plugging of the stormwater conveyance system, lack of vegetative and growth media cover and function of the decant tower within Wetland A. Documentation of inspections and maintenance activities should be kept in the office of the Project Coordinator. If inspections indicate that actions need to be taken, the Unusual Occurrences and Emergency Response Procedure Plan (Appendix C) should be followed.

6.1 MONTHLY INSPECTIONS

TDF-1 and TDF-2, including the surrounding areas, should be visually inspected monthly for the elements in the Monthly Inspection Checklist (Appendix D) and for unusual behavior or conditions. Monthly Inspections are to be completed by the Project Coordinator or designee. Elements of the Monthly Inspection Checklist include, but are not limited to, the following:

- Document the temperature and general weather condition.
- Inspect the Site and surrounding areas for unusual behavior or conditions.
- Inspect the embankment faces for slides, sloughs, seeps, or other movement.
- Verify all gates and signs are functional and present.
- Inspect the stormwater conveyance system for blockages, turbidity, and unusual behavior or conditions.
- Measure the depth to water in the TDF-1 piezometers, See Section 7.0.
- Record any unusual behavior.

In the event of an unusual occurrence the Project Coordinator is to:

- Investigate and assess the behavior or condition and take appropriate action (See Appendix C),
- Keep a written log of the date, nature of the unusual behavior or condition, action taken, and other pertinent information

Special attention should be paid to the stormwater conveyance system (including pipes, culverts, the decant tower and ditches) for any obstructions that might block flow, such as ice and other debris prior to the spring melt. Promptly remove any such materials, and increase the frequency of checking as necessary to prevent additional restrictions or blockages.

6.2 QUARTERLY INSPECTIONS

The Project Coordinator or designee should walk over the cover system of each TDF and inspect all accessible parts of the system at quarterly intervals. The Project Coordinator or designee should also inspect stormwater controls and conveyance systems. Document this inspection in the "Quarterly Inspection Checklist" in Appendix D.

At a minimum the quarterly inspections are to include checking the following:

- All embankment surfaces and cover system for evidence of deformation, vertical or horizontal displacement, cracks, sags, escarpments, settlement, subsidence, sinkholes, erosion, sliding, slumping, and frost heaving.
- Embankment toes, downstream area and abutments for new springs, seeps, boils, or unusually wet spots. Record the location, pattern, discharge, turbidity, temperature, and duration.
- Surface of the TDF-1 and TDF-2 cover system for evidence of erosion, exposed biologic-barrier lack of vegetation, rodent holes, noxious weeds, sediment accumulation on grasses, standing water or other evidence of cover failure that may expose the underlying tailings. Vegetation cover should be maintained at approximately 80 percent or more.
- The surface of the french-drain area and inlet grates for debris that may prevent water from infiltrating into the subsurface drain pipe.
- Ditch 1B for channel obstructions, sediment deposition, inlet erosion, damage to safety bars, and overall positive drainage.
- Culvert outlets for obstructions, sediment, turbidity, or animal activity.
- Discharge point at Creek 2 for eroding soils, sediment deposition, undercutting, scouring and other erosional behavior.
- Condition of gates, signs, fences, roadways and other ancillary features and institutional controls.

Deformation or cracking of the embankment slopes should be compared to previous conditions to evaluate its significance to performance of the system. For quarterly inspections, the Project Coordinator or designee is to:

- Keep a complete written record of each inspection and findings with the checklist.
- Attempt to find the cause and evaluate the significance of any deviations noted during the inspections.
- Schedule the necessary repairs and maintenance for items identified during the inspection in a timely manner and ensure their completion.
- Obtain the help of a specialist if unable to confidently assess the significance of any observations made during inspections.
- Keep a written log of repairs and maintenance items, including the date and time of inspection, inspector's name, description of the repair or item, summary of the action taken, date of action, and persons involved.

6.3 EVENT AND ANNUAL INSPECTIONS

Event and annual inspections are to be conducted if major maintenance is not required in the first two years after project completion and if all Site features and BMPs appear to be functioning correctly. Otherwise, more frequent inspections should be performed. Event and annual inspections are to be conducted by the Project Coordinator or designee and follow the same procedures as the quarterly monitoring procedures. An event is defined as a significant storm, rain-on-snow event, fire, earthquake, or

other unanticipated occurance that has potential to damage or destabilize cleanup action elements. If substantial maintenance is required at the Site, quarterly monitoring shall be reinstated until two consecutive years without substantial maintenance is obtained. Event inspections should be conducted as soon after the event as it is safe to do so. Annual inspection shall occur for a period of five consecutive years. After five consecutive years of annual monitoring, the results and frequency of the monitoring shall be evaluated by TWI and Ecology and revised as appropriate. An event and annual inspection checklist has been provided in Appendix D.

7.0 INSTRUMENTATION MONITORING

7.1 PIEZOMETRIC LEVEL MONITORING

Piezometers (P1 to P5) are present on TDF-1 to monitor water levels and groundwater flow direction. Unusually high water elevations beneath the tailing may be a sign of problems with the low permeability cover and may lower the factors of safety for the slope stability on the embankment of TDF-1. Water level measurement results should be considered along with inspection results and other data to evaluate if problems exist and there is a need for repair, maintenance, or further investigations.

7.2 DATA COLLECTION

7.2.1 Frequency of Data Collection

Water levels in the piezometers should be measured with a water level indicator or similar method (such as pressure transducer) capable of measuring water level to the nearest 0.01-foot at the following intervals:

- Quarterly under normal operating conditions for the first 5-years and annually thereafter.
- Monthly if the water level in Wetland A exceeds the spillway elevation and discharges to the french-drain.

During subsequent revisions of this O&M Manual the schedule of readings should be reviewed and the reading intervals should be modified in consultation with Ecology, if necessary.

7.2.2 Data Collection Methods

Data from piezometers P1 through P5 are to be read using a portable water level indicator.

Standard operating procedures for data collection, inspection, calibration, and maintenance procedures for piezometers from the U.S. Department of the Interior Bureau of Reclamation have been provided in Appendix E.

The elevation of water in Wetland A and location of any unusual seeps should be noted the same day as when the piezometer data is recorded.

The Project Coordinator must be alert for erratic or unreasonable readings that may indicate instrument malfunctions or operator error. Water levels should be re-read or repaired as necessary.

8.0 ENVIRONMENTAL COMPLIANCE MONITORING

Groundwater and surface water sampling locations have been assigned to assess the long term performance of the cover system as part of the CAP. The headwaters of Creek 2 and three existing down gradient monitoring wells have been assigned as the conditional points of compliance for surface water and groundwater respectively (Figure 1). Water samples will be collected at these locations in accordance with the Compliance Monitoring Plan and Sampling & Analysis Plan, which are provided under separate cover.

As described in the Compliance Monitoring Plan, surface and groundwater samples will be collected quarterly beginning after construction completion in 2012 for a period of two years and yearly thereafter through 2017. If groundwater and surface water cleanup levels have been achieved, or if groundwater and surface water trends are not significantly increasing, the sampling frequency or parameters may be reduced or eliminated with written concurrence from Ecology. The sampling program will be re-evaluated by Ecology and TWI after five years of monitoring and the monitoring program parameters and sampling frequency may be modified based on the previous five years of monitoring results.

8.1 GROUNDWATER MONITORING

Groundwater was found to exceed MTCA screening levels for iron and manganese during the RI/FS process and these two substances were identified as indicator substances in the CAP. Four existing groundwater wells (MW-7, MW-301, MW-302, and MW-303) will be used to monitor conditions within the groundwater in the vicinity of TDF-1 and TDF-2 (Figure 1). Wells MW-301, MW-302 and MW-303 are located downgradient of TDF-1 and TDF-2. Monitoring well MW-7 is located upgradient of TDF-2. Boring logs for the monitoring wells and piezometers have been provided in Appendix F. Concentrations of total and dissolved arsenic, cadmium, copper, iron, lead, manganese, selenium and zinc will be evaluated from groundwater water samples collected from these wells. Additionally, water samples will be tested for pH, TSS, total hardness, conductivity, and temperature. Analytical results for dissolved metals will be compensated for hardness per Ecology requirements and compared to the established surface water standards for the Site.

8.2 SURFACE WATER MONITORING

Surface water sampling will be conducted to confirm that surface water standards are being met. Surface water discharged from the Site is directed to the headwaters of Creek 2. Therefore, the surface water outfall of TDF-1 and TDF-2 at Creek 2 will be used as the conditional point of compliance for surface water (Figure 1). Water samples will be collected from the 18-inch surface water outlet of Wetland A and the french-drain, as well as the 18-inch outlet of Ditch 1B when flow is present. Surface water samples will be analyzed for dissolved arsenic, cadmium, copper, iron, lead, manganese, selenium and zinc in accordance with the Compliance Monitoring Plan.

8.3 REPORTING

Monitoring results are to be maintained by the Project Coordinator in electronic format. Quarterly groundwater and surface water monitoring results will be submitted to Ecology in a letter report within 30 days after the laboratory results are received and the laboratory results have been qualified by the Project Coordinator or within 60 days of the sampling event, whichever is sooner. Also, laboratory results and other monitoring data will be uploaded to Ecology's Environmental Information Management (EIM) System on a periodic basis. At the end of the two-year monitoring period, the sampling frequency will be decreased from quarterly to annually. Annual groundwater and surface water samples will be collected for a minimum of three years for a total of five years of monitoring. After five years, Ecology and TWI

will review the monitoring program and possibly reduce the number of monitored constituents and/or sampling frequency if appropriate.

9.0 HEALTH AND SAFETY

The TDF-1 and TDF-2 cover system has been design to prevent ecological and human contact with the tailings. Institutional controls have been instituted for the Site to help protect human and ecological receptors (Drawing 11, Appendix A). Signage has been placed strategically around the Site restricting access and informing humans of the possible hazards. A restrictive covenant has also been filed with Ecology and Pend Oreille County (Appendix G). The covenant restricts the activities that can be performed at the Site such as the future use of groundwater as a drinking water source. The covenant, along with this O&M Manual and other MTCA documents serves to protect the controls implemented as part of the remedial actions and to ensure the long term performance of the engineered systems.

Maintenance activities on and within the cover system may be required . These maintenance activities may create the potential for workers to come in contact with the tailings. The tailings are generally not acutely harmful but long-term exposure to the tailings may promote chronic hazards. The following steps should be taken to minimize exposure to the tailings when conducting repair work:

- Develop a Site and activity specific health and safety plan in accordance with WAC 173-340-810.
- Use appropriately trained and certified workers. Certification may include Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) training (as administered by Washington State Labor and Industries), Mine Safety and Health Administration (MSHA) training, Confined Space Entry, and others depending on the risk and activity.
- Wear personnel protective equipment such as safety glasses and gloves and wash hands after contact with the tailings and before eating, drinking, or smoking.
- Remove tailings from any equipment used for maintenance work.
- Place temporary covers over any exposed tailings during non-working hours, if possible, to prevent exposure to local ecological receptors.
- Follow current stormwater pollution prevention practices prior to conducting repairs and maintenance activities, and install BMPs as needed to prevent the erosion of tailings.

10.0 MAINTENANCE RECOMMENDATIONS

Potential maintenance activities and possible corrective actions for potential problems are discussed in Appendix H. All maintenance should be documented in a log such that personnel can readily assess trends or common maintenance items. An example maintenance activity log has also been included in Appendix H to track maintenance activities at the Site.

Non-specified maintenance might be required depending on the specific behavior or condition. For instance, sediment accumulation within drain piping might be manifested by decreasing discharge and could be assessed by conducting a sewer pipe camera inspection and remedied by sewer rodding; similarly, decreasing discharge might indicate plugged infiltration piping or associated geotextile which would require replacement. Poor or decreasing vegetation health might indicate a need to fertilize or be the result of climatic conditions. The Project Coordinator should be be prepared to recognize, assess and correct poor performance of cleanup action components beyond those specified in this O&M Manual.

11.0 O&M MANUAL UPDATING

The Project Coordinator is responsible for updating this O&M Manual as required. Updates should be recorded as subsequent revisions or addendums to this manual. Revisions/addendums should be distributed to Ecology and made available to workers, as appropriate. Examples of changes that would require a revision include, but are not limited to, the following:

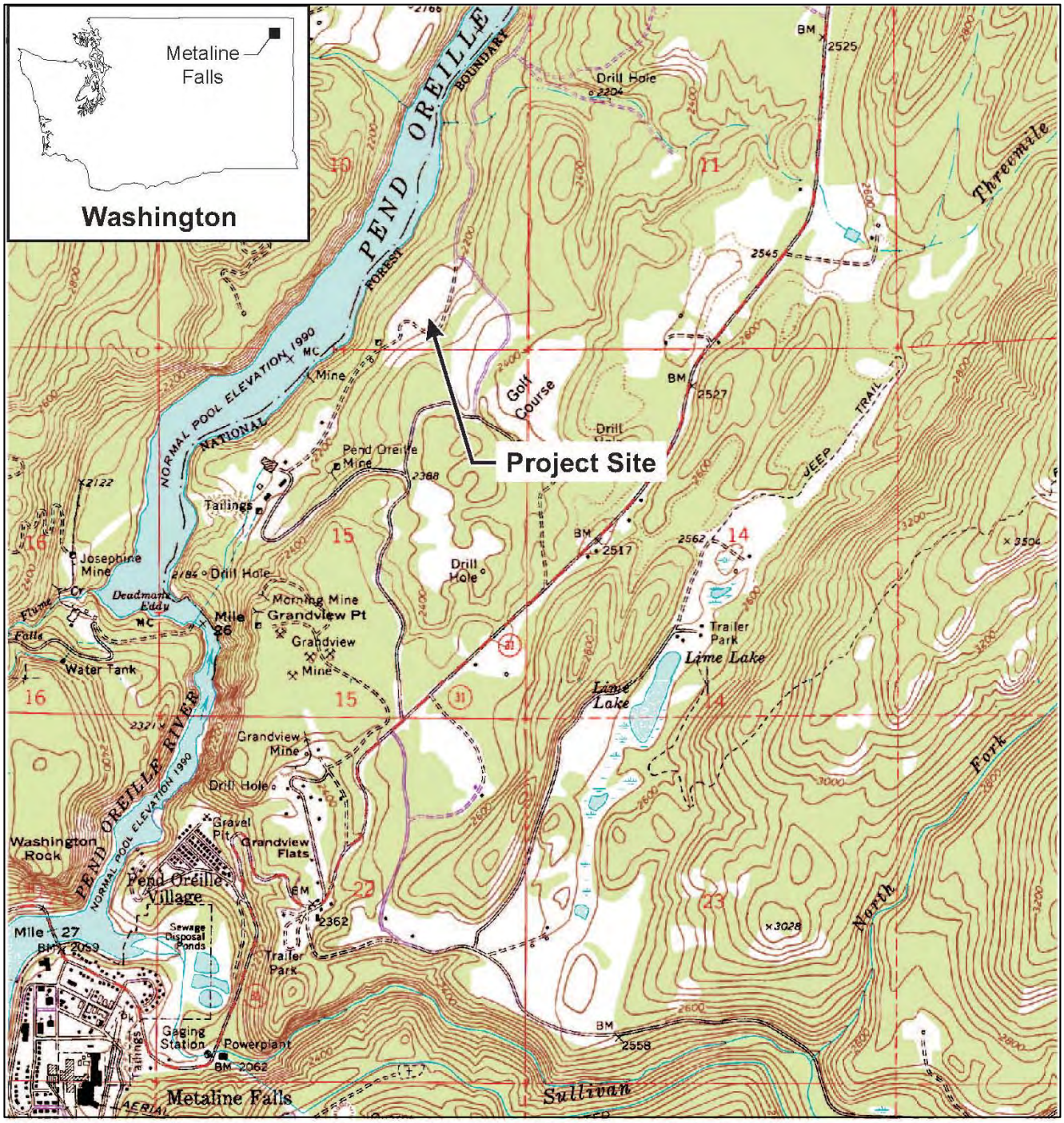
- Change of sample parameters.
- Revision of monitoring requirements.
- Changes, alterations, or additions to Site or adjacent features.
- Recurring maintenance or poor performance of cleanup action elements.
- Change of ownership or site use.
- Changes to regulatory requirements (Dam Safety, MTCA, NPDES, Stormwater, etc.).
- Increased Site surveillance.

12.0 LIMITATIONS AND ASSUMPTIONS

The recommendations, explanations, and procedures in this O&M Manual have been prepared for specific application to this project and have been developed in a manner consistent with the level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area and in general accordance with the terms and conditions set forth in our Agreement and URS proposal. No other warranty, expressed or implied, is made.

This O&M Manual is for the exclusive use of TWI and its representatives. No third party shall have the right to rely on opinions or recommendations rendered in connection with URS' services or in this document without our written consent of and the third party's agreement to be bound to the same conditions and limitations as TWI. URS appreciates the opportunity to provide these services.

FIGURES

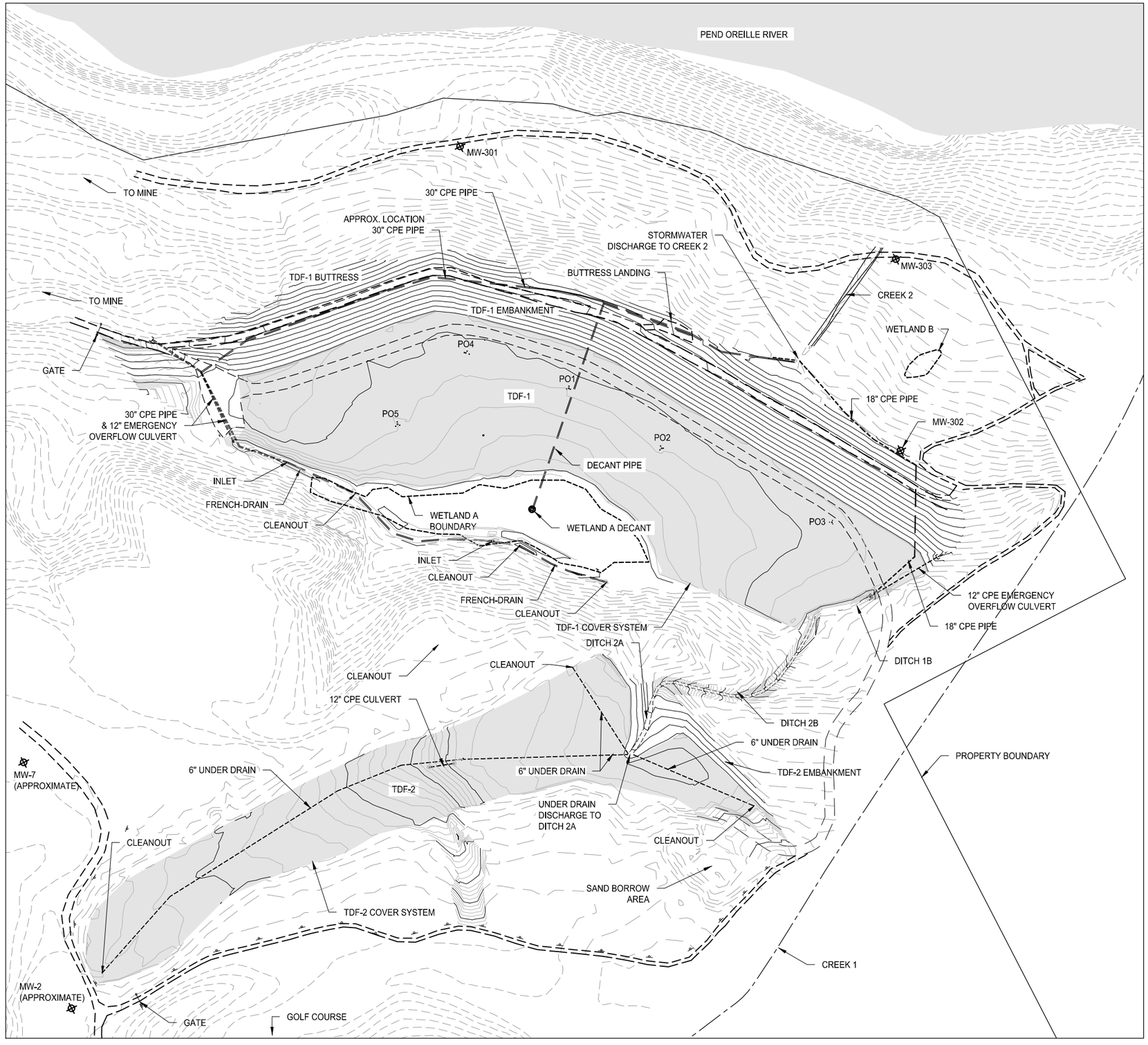


SOURCE: 7.5-minute USGS topographic quadrangles, Metaline Falls and Boundary Dam, Washington, 1986

Figure 1
Site Vicinity Map

Job No. 36310185

URS



LEGEND:

- MW-302 — MONITORING WELL & NUMBER
- P05 — PIEZOMETER & NUMBER
- DECANT STRUCTURE
- 5-FOOT CONTOUR
- PIPE/CULVERT
- APPROXIMATE EXTENTS OF FINAL COVER
- ROADWAY

Job No. 36310185

URS

Figure 2
Site Plan
Pend Oreille Mine TDF-1 and TDF-2
Metaline Falls, Washington

APPENDIX A

AS-BUILT DRAWINGS

APPENDIX B

MATERIAL SUBMITTALS

Product Description MIRAFI

Engineered Solutions for an Innovative World

product

Mirafi® N-Series Nonwoven Polypropylene Geotextiles

for Soil Separation, Filtration, and Protection

Ten Cate Nicolon offers a wide range of nonwoven geotextiles for soil separation, filtration and protection. These geotextiles are cost-effective reinforcement elements which improve and enhance modern construction techniques in a variety of civil engineering applications.

PRODUCT DESCRIPTION

Mirafi® N-Series products are nonwoven geotextiles comprised of polypropylene staple fibers. Mirafi® N-Series Nonwoven Polypropylene Geotextiles provide excellent physical and hydraulic properties in addition to high tensile strengths.

FEATURES AND BENEFITS

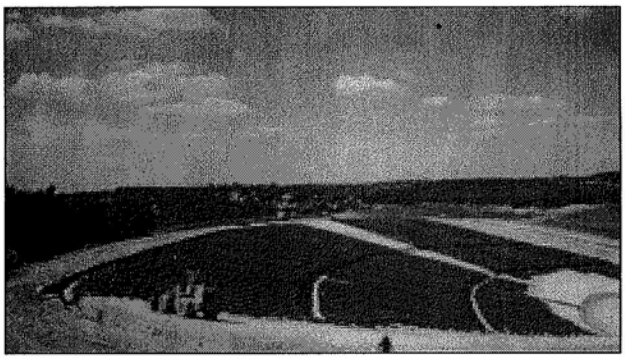
- **Construction.** Mirafi® N-Series geotextiles easily conform to the ground or trench surface for trouble-free installation.
- **Strength.** Mirafi® N-Series geotextiles withstand severe installation stresses with high puncture and burst resistance.
- **Filtration.** High permeability properties provide high water flow rates while providing excellent filtration properties.
- **Environmental.** Mirafi® N-Series geotextiles are chemically stable in a wide range of aggressive environments.
- **Cost effective.** Mirafi® N-Series geotextiles provide economical solutions to many civil engineering applications including a cost-effective alternative to graded-aggregate filters.

APPLICATIONS

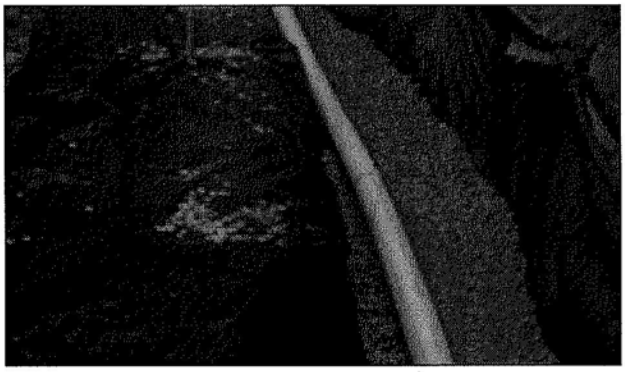
Mirafi® N-Series Nonwovens are used in a wide variety of applications including separation, filtration, and protection applications.

Lightweight nonwovens are predominantly used for subsurface drainage applications along highways, within embankments, under airfields, and athletic fields. For these drainage structures to be effective, they must have a properly designed protective filter. Mirafi® N-Series Nonwoven Geotextiles eliminate the problems of determining the aggregate gradation required to match soil conditions, finding a convenient and economical source of a specific aggregate gradation, transporting and placing graded aggregate, and assuring that the in-place aggregate gradation provides effective filter performance.

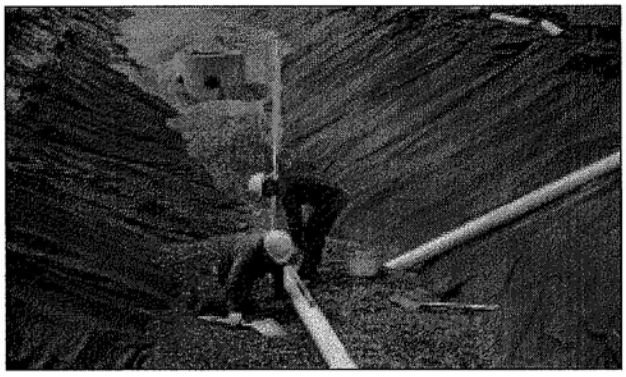
Heavyweight nonwovens are use in critical subsurface drainage systems, soil separation, permanent erosion control, and geomembrane liner protection within landfills. These geotextiles provide the required strength and abrasion resistance to withstand installation and application stresses to create an effective, long-term solution.



Mirafi® N-Series heavyweight nonwoven used as a liner protection in landfill application



Mirafi® N-Series lightweight nonwoven used as protective filter in subsurface drainage application.



Mirafi® N-Series light weight nonwoven used as protective filter in an athletic field

Ten Cate Nicolon

Technical Data MIRAFI

Engineered Solutions for an Innovative World

product

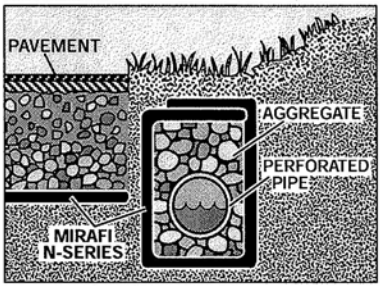
Mirafi® N-Series Nonwoven Polypropylene Geotextiles

for Soil Separation, Filtration, and Protection

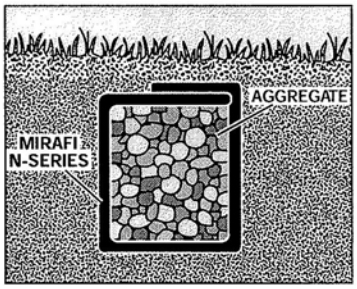
Property / Test Method	Units	140NL	140NC	140N	160N	170N	180N	1100N	1120N	1160N
MECHANICAL PROPERTIES										
Grab Tensile Strength ASTM D 4632										
Strength @ Ultimate	kN (lbs)	0.40 (90)	0.45 (100)	0.53 (120)	0.71 (160)	0.80 (180)	0.9 (205)	1.11(250)	1.34 (300)	1.69 (380)
Elongation @ Ultimate	%	50	50	50	50	50	50	50	50	50
Mullen Burst Strength	kPa	1205	1447	1550	2100	2273	2618	3445	4030	5098
ASTM D 3786	(psi)	(175)	(210)	(225)	(305)	(330)	(380)	(500)	(585)	(740)
Trapezoidal Tear Strength	kN	0.18	0.20	0.22	0.27	0.33	0.36	0.45	0.51	0.62
ASTM D 4355	(lbs)	(40)	(45)	(50)	(60)	(75)	(80)	(100)	(115)	(140)
Puncture Strength	kN	0.24	0.30	0.30	0.42	0.46	0.58	0.69	0.78	1.05
ASTM D 4833	(lbs)	(55)	(65)	(65)	(95)	(105)	(130)	(155)	(175)	(235)
UV Resistance after 500 hrs. ASTM D 4355	% strength	70	70	70	70	70	70	70	70	70
HYDRAULIC PROPERTIES										
Apparent Opening Size (AOS)	US Sieve	60	70	70	70	80	80	100	100	100
ASTM D 4751	mm	0.25	0.212	0.212	0.212	0.180	0.180	0.150	0.150	0.150
Permittivity ASTM D 4491	sec^{-1}	2.0	1.9	1.8	1.4	1.4	1.2	1.0	0.8	0.7
Flow Rate ASTM D 4491	$l/min/m^2$ ($gal/min/ft^2$)	5907 (145)	5698 (140)	5500 (135)	4477 (110)	4278 (105)	3866 (95)	3056 (75)	2648 (65)	2037 (50)
Packaging										
Roll Width	m(ft)	3.8 (12.5) 4.5 (15.0)	3.8 (12.5) 4.5 (15.0)	3.8 (12.5) 4.5 (15.0)	4.5 (15.0)	4.5 (15.0)	4.5 (15.0)	4.5 (15.0)	4.5 (15.0)	4.5 (15.0)
Roll Length	m(ft)	110 (360)	110 (360)	110 (360)	91 (300)	91 (300)	91 (300)	91 (300)	91 (300)	46 (150)
Est. Gross Weight	kg(lbs)	60 (133) 70 (160)	64 (142) 75 (166)	67 (148) 89 (197)	103 (227)	113 (249)	124 (273)	150 (331)	158(348)	114 (251)
Area	$m^2(yd^2)$	418 (500) 502 (600)	418 (500) 502 (600)	418 (500) 502(600)	418 (500)	418 (500)	418 (500)	418 (500)	418 (500)	209 (250)

NOTE: All Mechanical Properties and Hydraulic Properties shown are Minimum Average Roll Values (MARV).

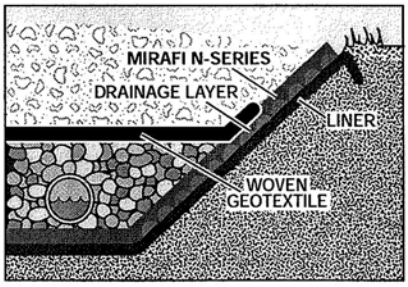
Cut-off/inceptor drain along a roadway or other critical structure



French drain without pipe



Liner protection within a landfill



www.tcnicolon.com

TECHNICAL SERVICES
Complete technical assistance is available from Ten Cate Nicolon and its sales representatives. Service include assistance during design and specification stages as well as initial stages of installation.

WARRANTY
Ten Cate Nicolon warrants that the product that it sells will conform to the specifications published in this literature. For information on limitations to this warranty, contact Ten Cate Nicolon.

CORPORATE OFFICE
365 South Holland Drive • Pendergrass, GA 30567
(888) 795-0808 • (706) 693-2226 • Fax (706) 693-4400

Ten Cate Nicolon

ADS N-12® ST IB PIPE (per AASHTO) SPECIFICATION

Scope

This specification describes 4- through 60-inch (100 to 1500 mm) ADS N-12 ST IB pipe (per AASHTO) for use in gravity-flow drainage applications.

Pipe Requirements

ADS N-12 ST IB pipe (per AASHTO) shall have a smooth interior and annular exterior corrugations.

- 4- through10-inch (100 to 250 mm) shall meet AASHTO M252, Type S or SP.
- 12- through 60-inch (300 to 1500 mm) shall meet AASHTO M294, Type S or SP or ASTM F2306.
- Manning's "n" value for use in design shall be 0.012.

Joint Performance

Pipe shall be joined using a bell & spigot joint meeting AASHTO M252, AASHTO M294 or ASTM F2306. The joint shall be soil-tight and gaskets, when applicable, shall meet the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.

Fittings

Fittings shall conform to AASHTO M252, AASHTO M294, or ASTM F2306. Bell and spigot connections shall utilize a spun-on or welded bell and valley or saddle gasket meeting the soil-tight joint performance requirements of AASHTO M252, AASHTO M294 or ASTM F2306.

Material Properties

Virgin material for pipe and fitting production shall be high density polyethylene conforming with the minimum requirements of cell classification 424420C for 4- through 10-inch (100 to 250 mm) diameters, or 435400C for 12- through 60-inch (300 to 1500 mm) diameters, as defined and described in the latest version of ASTM D3350, except that carbon black content should not exceed 4%. The 12- through 60-inch (300 to 1500 mm) virgin pipe material shall comply with the notched constant ligament-stress (NCLS) test as specified in Sections 9.5 and 5.1 of AASHTO M294 and ASTM F2306, respectively.

Installation

Installation shall be in accordance with ASTM D2321 and ADS recommended installation guidelines, with the exception that minimum cover in trafficked areas for 4- through 48-inch (100 to 1200 mm) diameters shall be one foot. (0.3 m) and for 54- and 60-inch (1350 and 1500 mm) diameters, the minimum cover shall be 2 ft. (0.6 m) in single run applications. Backfill for minimum cover situations shall consist of Class 1, Class 2 (minimum 90% SPD) or Class 3 (minimum 90%) material. Maximum fill heights depend on embedment material and compaction level; please refer to Technical Note 2.01. Contact your local ADS representative or visit our website at www.ads-pipe.com for a copy of the latest installation guidelines.

Pipe Dimensions

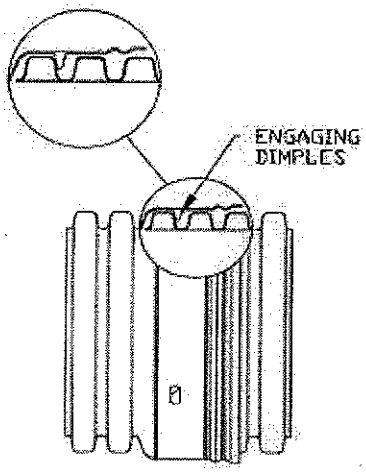
	Nominal Diameter, in (mm)													
Pipe I.D. in (mm)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	15 (375)	18 (450)	24 (600)	30 (750)	36 (900)	42 (1050)	48 (1200)	54* (1350)	60 (1500)
Pipe O.D.** in (mm)	4.8 (122)	6.9 (175)	9.1 (231)	11.4 (290)	14.5 (368)	18 (457)	22 (559)	28 (711)	36 (914)	42 (1067)	48 (1219)	54 (1372)	61 (1549)	67 (1702)
Perforations	All diameters available with or without perforations													

*Check with sales representative for availability by region.

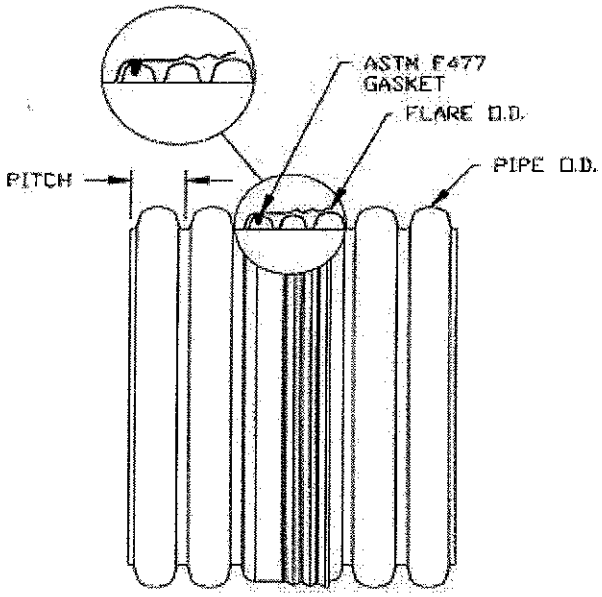
**Pipe O.D. values are provided for reference purposes only, values stated for 12- through 60-inch are ± 1 inch. Contact a sales representative for exact values.

N-12® ST IB (per AASHTO) JOINT SYSTEM

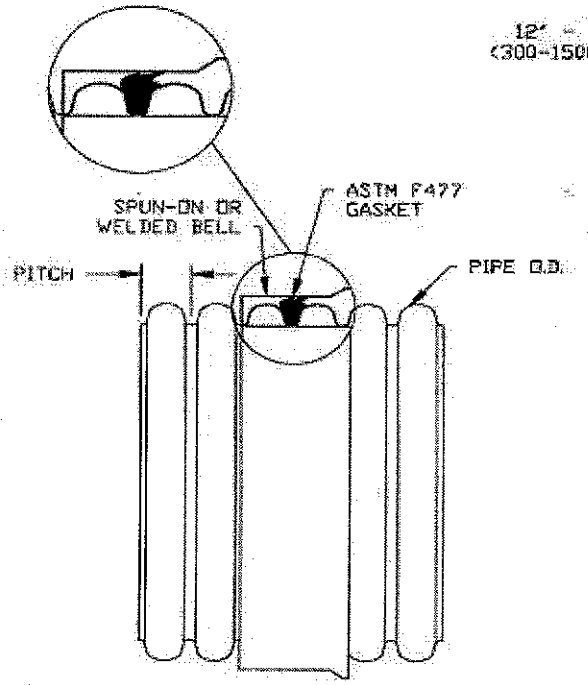
(Joint configuration & availability subject to change without notice. Product detail may differ slightly from actual product appearance.)



4" – 10"
(100–250 MM)



12" – 60"
(300–1500 MM)



4" – 60"
(100–1500 MM)

ADS/HANCOR, INC. D-WALL STIB PIPE SPECIFICATION

Scope

This specification describes 4- through 60-inch (100 to 1500 mm) ADS/Hancor, Inc. D-Wall ST IB pipe for use in gravity-flow storm sewer applications for Washington State DOT.

Pipe Requirements

D-Wall STIB pipe shall have a smooth interior and annular exterior corrugations.

- 4- through 10-inch (100 to 250 mm) shall meet AASHTO M252, Type S.
- 12- through 60-inch (300 to 1500 mm) shall meet AASHTO M294, Type S or ASTM F2306.
- Manning's "n" value for use in design shall be 0.012.

Joint Performance

Pipe shall be joined using a bell & spigot joint meeting AASHTO M252, AASHTO M294 or ASTM F2306. The joint shall be soil-tight and gaskets, when applicable, shall meet the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.

Fittings

Fittings shall conform to AASHTO M252, AASHTO M294, or ASTM F2306. Bell and spigot connections shall utilize a spun-on or welded bell and valley or saddle gasket meeting the soil-tight joint performance requirements of AASHTO M252, AASHTO M294 or ASTM F2306.

Material Properties

Virgin material for pipe and fitting production shall be high density polyethylene conforming with the minimum requirements of cell classification 424420C for 4- through 10-inch (100 to 250 mm) diameters, or 435400C for 12- through 60-inch (300 to 1500 mm) diameters, as defined and described in the latest version of ASTM D3350, except that carbon black content should not exceed 4%. The 12- through 60-inch (300 to 1500 mm) virgin pipe material shall comply with the notched constant ligament-stress (NCLS) test as specified in Sections 9.5 and 5.1 of AASHTO M294 and ASTM F2306, respectively.

Installation

Installation shall be in accordance with ASTM D2321 and ADS/Hancor, Inc. recommended installation guidelines, with the exception that minimum cover in trafficked areas for 4- through 48-inch (100 to 1200 mm) diameters shall be one foot. (0.3 m) and for 54- and 60-inch (1350 and 1500 mm) diameters, the minimum cover shall be 2 ft. (0.6 m) in single run applications. Backfill for minimum cover situations shall consist of Class 1, Class 2 (minimum 90% SPD) or Class 3 (minimum 90%) material. Maximum fill heights depend on embedment material and compaction level; please refer to Technical Note 2.01. Contact your local ADS/Hancor, Inc. representative or visit our website at www.ads-pipe.com for a copy of the latest installation guidelines.

Pipe Dimensions

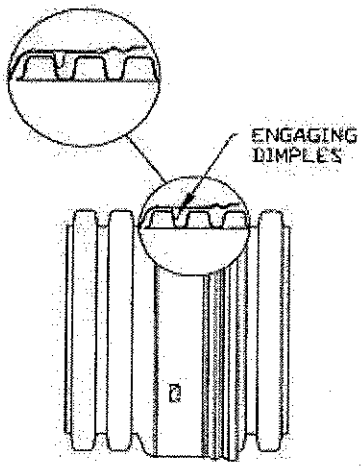
	Nominal Diameter, in (mm)													
Pipe I.D. in (mm)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	15 (375)	18 (450)	24 (600)	30 (750)	36 (900)	42 (1050)	48 (1200)	54* (1350)	60 (1500)
Pipe O.D.** in (mm)	4.8 (122)	6.9 (175)	9.1 (231)	11.4 (290)	14.5 (368)	18 (457)	22 (559)	28 (711)	36 (914)	42 (1067)	48 (1219)	54 (1372)	61 (1549)	67 (1702)
Perforations	All diameters available with or without perforations													

*Check with sales representative for availability by region.

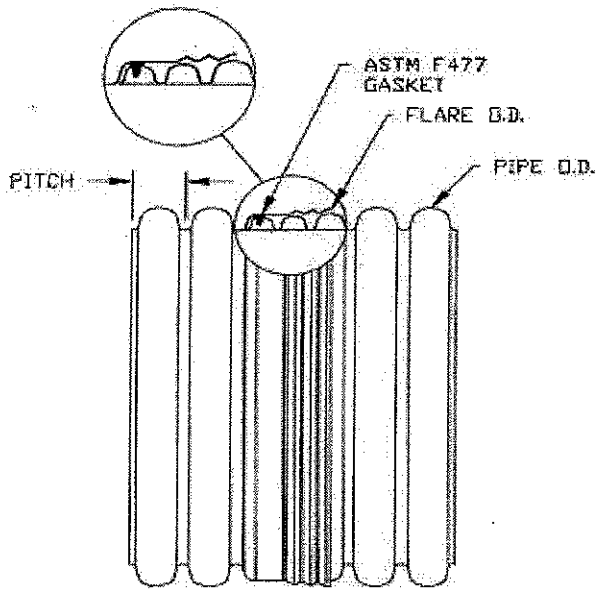
**Pipe O.D. values are provided for reference purposes only, values stated for 12- through 60-inch are ± 1 inch. Contact a sales representative for exact values.

D WALL STIB (per AASHTO) JOINT SYSTEM

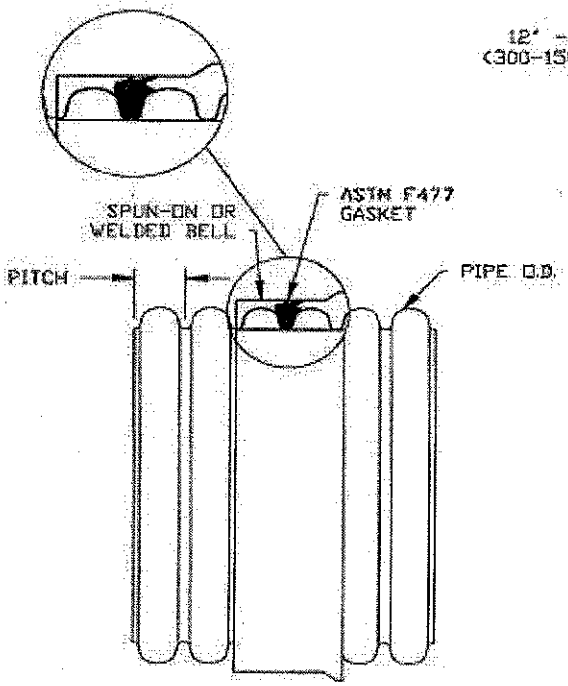
(Joint configuration & availability subject to change without notice. Product detail may differ slightly from actual product appearance.)



4" - 10"
(100-250 MM)



12" - 60"
(300-1500 MM)



4" - 60"
(100-1500 MM)

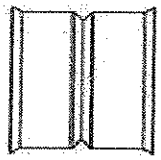
HANCOR INJECTION MOLDED FITTING SPECIFICATION

Scope
This specification describes 4- through 12-inch (100 to 300 mm) Hancor Injection Molded Fittings for use in joining gravity-flow drainage pipe. Available fittings include tees, wyes, bends, couplers, and reducing fittings.

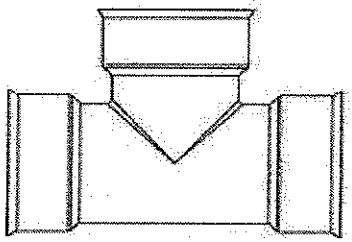
Fitting Requirements
Hancor Injection Molded Fittings shall have a smooth interior and exterior.
- 4- through 10-inch (100 to 250mm) shall meet the fitting requirements of AASHTO M252.
- 12-inch (300mm) shall meet AASHTO M294 or ASTM F2306.

Joint Performance
The fittings shall provide a joint meeting AASHTO M252, AASHTO M294 or ASTM F2306. For non-gasketed fittings, dimples in the bell shall engage the corrugation to provide a soil-tight connection. For gasketed fittings, the joint shall be watertight according to the requirements of ASTM D3212. Gaskets shall be made of EPDM meeting the requirements of ASTM F477. Gaskets shall be supplied by the pipe manufacturer. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.

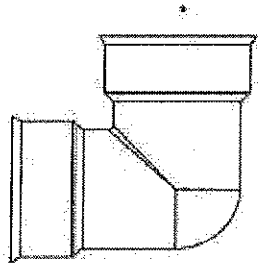
Material Properties
Virgin material for fitting production shall be high density polyethylene conforming with the minimum requirements of cell classification 314420C or 314420E for 4- through 12-inch (100 to 300mm) diameters, as defined and described in the latest version of ASTM D3350, except that carbon black content should not exceed 4%.



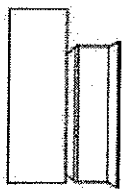
SIZE-ON-SIZE OR REDUCING BELL-BELL COUPLER



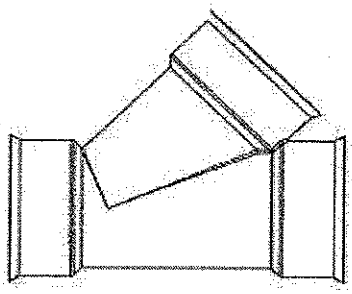
SIZE-ON-SIZE OR REDUCING TEE



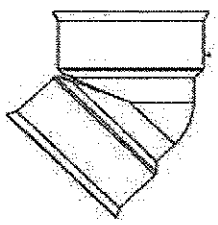
90-DEG BEND



SPIGOT-BELL REDUCER



SIZE-ON-SIZE OR REDUCING 45-DEG WYE

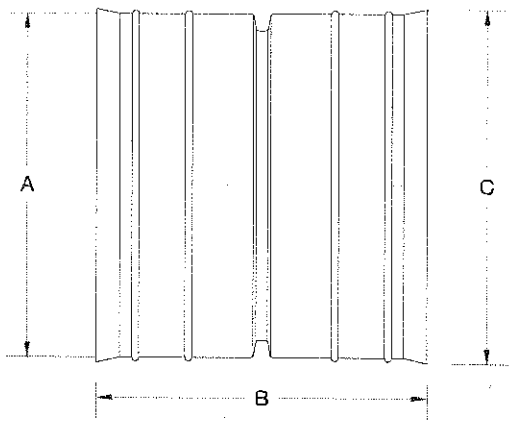


45-DEG BEND

Refer to the Product Catalog for a complete listing of available fittings. Availability may vary for each fitting type based on diameter or joint performance.

BELL-BELL COUPLERS
12" - 60" DIAMETER

PART #	PIPE SIZE	A	B	C	JOINT
1215AA	12 in (300 mm)	14.6 in (371 mm)	14.0 in (356 mm)	15.4 in (391 mm)	ST/WT
1515AA	15 in (375 mm)	17.8 in (451 mm)	16.0 in (406 mm)	18.6 in (472 mm)	ST/WT
1815AA	18 in (450 mm)	21.4 in (544 mm)	18.0 in (457 mm)	22.4 in (569 mm)	ST/WT
2415AA	24 in (600 mm)	28.2 in (716 mm)	14.8 in (376 mm)	29.3 in (743 mm)	ST/WT
3013AN65	30 in (750 mm)	36.0 in (914 mm)	22.6 in (574 mm)	38.5 in (978 mm)	ST/WT
3613AN65	36 in (900 mm)	42.5 in (1080 mm)	22.6 in (574 mm)	45.1 in (1145 mm)	ST/WT
4213AN85	42 in (1050 mm)	48.9 in (1241 mm)	18.0 in (457 mm)	50.4 in (1280 mm)	ST
4213AN65	42 in (1050 mm)	48.9 in (1242 mm)	18.0 in (457 mm)	50.4 in (1280 mm)	WT
4813AN85	48 in (1200 mm)	54.9 in (1393 mm)	18.0 in (457 mm)	57.5 in (1461 mm)	ST
4813AN65	48 in (1200 mm)	54.9 in (1394 mm)	18.0 in (457 mm)	57.5 in (1461 mm)	WT
6013AN85	60 in (1500 mm)	67.3 in (1708 mm)	19.1 in (486 mm)	70.1 in (1780 mm)	ST
6013AN65	60 in (1500 mm)	67.3 in (1708 mm)	19.1 in (486 mm)	70.1 in (1780 mm)	WT



* REQUIRES GASKET TO PROVIDE SPECIFIED JOINT PEROFRMANCE

NOTE: ALL FITTINGS DIMENSIONS ARE FOR REFERENCE ONLY

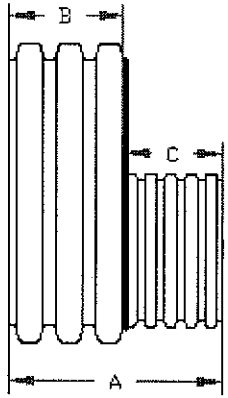
Hancor®

DRAWING #:	2030	
DRAWN BY:	JCB	10.30.06
APPROVED BY:		
REVISIONS:	TJR	4/15/2009

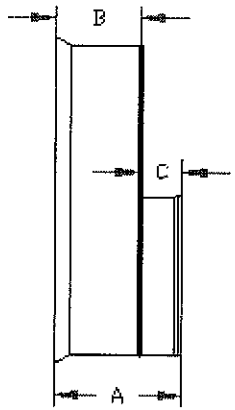
DUAL WALL FABRICATED REDUCERS
30"×15" - 30"×24" DIAMETER

PART #	PIPE SIZE	A	B	C	JOINT
3075AN	30 x 15 in (750 x 375 mm)	25.0 in (635 mm)	12.4 in (314 mm)	12.7 in (321 mm)	*
3075AN85B	30 x 15 in (750 x 375mm)	19.5 in (495 mm)	11.8 in (298 mm)	7.8 in (197 mm)	ST
3075AN65B	30 x 15 in (750 x 375 mm)	19.5 in (495 mm)	11.8 in (298 mm)	7.8 in (197 mm)	WT
3076AN	30 x 18 in (750 x 450 mm)	25.0 in (635 mm)	12.4 in (314 mm)	12.7 in (321 mm)	*
3076AN85B	30 x 18 in (750 x 450 mm)	20.6 in (524 mm)	11.8 in (298 mm)	8.9 in (226 mm)	ST
3076AN65B	30 x 18 in (750 x 450 mm)	20.6 in (524 mm)	11.8 in (298 mm)	8.9 in (226 mm)	WT
3077AN	30 x 24 in (750 x 600 mm)	27.9 in (709 mm)	12.4 in (314 mm)	15.6 in (395 mm)	*
3077AN85B	30 x 24 in (750 x 600 mm)	18.8 in (476 mm)	11.8 in (298 mm)	7.0 in (178 mm)	ST
3077AN65B	30 x 24 in (750 x 600 mm)	18.8 in (476 mm)	11.8 in (298 mm)	7.0 in (178 mm)	WT

* = PLAIN END
ST = SOIL TIGHT
WT = WATER TIGHT



PLAIN END



ST & WT (INCLUDES 2 GASKETS)

NOTE: ALL FITTINGS DIMENSIONS ARE FOR REFERENCE ONLY

Hancor®

DRAWING #:	2520A	
DRAWN BY:	NJP	09.28.06
APPROVED BY:	JCB	06.26.07
REVISIONS:	NJP	06.15.07

ADS N-12® WT IB PIPE (per AASHTO) SPECIFICATION

Scope

This specification describes 4- through 60-inch (100 to 1500 mm) ADS N-12 WT IB pipe (per AASHTO) for use in gravity-flow applications.

Pipe Requirements

N-12 WT IB pipe (per AASHTO) shall have a smooth interior and annular exterior corrugations.

- 4- through 10-inch (100 to 250 mm) shall meet AASHTO M252, Type S.
- 12- through 60-inch (300 to 1500 mm) shall meet AASHTO M294, Type S or ASTM F2306.
- Manning's "n" value for use in design shall be 0.012.

Joint Performance

Pipe shall be joined with the N-12 WT IB joint meeting the requirements of AASHTO M252, AASHTO M294, or ASTM F2306.

4- through 60-inch (100 to 1500 mm) shall be watertight according to the requirements of ASTM D3212. Gaskets shall meet the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable, protective wrap to ensure the gasket is free from debris. A joint lubricant available from the manufacturer shall be used on the gasket and bell during assembly.

12- through 60-inch (300 to 1500 mm) diameters shall have a reinforced bell with a polymer composite band. The bell tolerance device shall be installed by the manufacturer.

Fittings

Fittings shall conform to AASHTO M252, AASHTO M294, or ASTM F2306. Bell and spigot connections shall utilize a spun-on or welded bell and valley or saddle gasket meeting the watertight joint performance requirements of AASHTO M252, AASHTO M294 or ASTM F2306.

Field Pipe and Joint Performance

To assure watertightness, field performance verification may be accomplished by testing in accordance with ASTM F2487. Appropriate safety precautions must be used when field-testing any pipe material. Contact the manufacturer for recommended leakage rates.

Material Properties

Virgin material for pipe and fitting production shall be high-density polyethylene conforming with the minimum requirements of cell classification 424420C for 4- through 10-inch (100 to 250 mm) diameters, and 435400C for 12- through 60-inch (300 to 1500 mm) diameters, as defined and described in the latest version of ASTM D3350, except that carbon black content should not exceed 4%. The 12- through 60-inch (300 to 1500 mm) virgin pipe material shall comply with the notched constant ligament-stress (NCLS) test as specified in Sections 9.5 and 5.1 of AASHTO M294 and ASTM F2306 respectively.

Installation

Installation shall be in accordance with ASTM D2321 and ADS recommended installation guidelines, with the exception that minimum cover in trafficked areas for 4- through 48-inch (100 to 1200 mm) diameters shall be one foot. (0.3 m) and for 54- and 60-inch (1350 and 1500 mm) diameters, the minimum cover shall be 2 ft. (0.6 m) in single run applications. Backfill for minimum cover situations shall consist of Class 1, Class 2 (minimum 90% SPD) or Class 3 (minimum 90%) material. Maximum fill heights depend on embedment material and compaction level; please refer to Technical Note 2.01. Contact your local ADS representative or visit our website at www.ads-pipe.com for a copy of the latest installation guidelines.

Pipe Dimensions

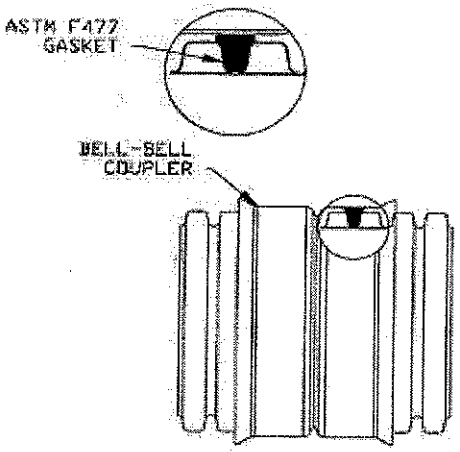
	Nominal Diameter, in (mm)													
Pipe I.D. in (mm)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	15 (375)	18 (450)	24 (600)	30 (750)	36 (900)	42 (1050)	48 (1200)	54* (1350)	60 (1500)
Pipe O.D.** in (mm)	4.8 (122)	6.9 (175)	9.1 (231)	11.4 (290)	14.5 (368)	18 (457)	22 (559)	28 (711)	36 (914)	42 (1067)	48 (1219)	54 (1372)	61 (1549)	67 (1702)
Perforations	All diameters available with or without perforations													

*Check with sales representative for availability by region.

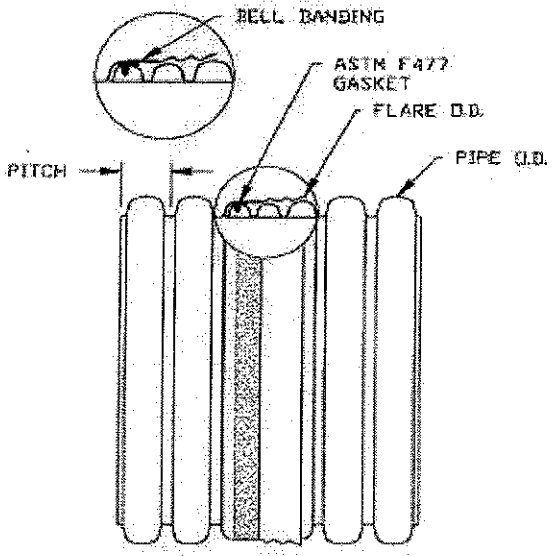
**Pipe O.D. values are provided for reference purposes only, values stated for 12- through 60-inch are ± 1 inch. Contact a sales representative for exact values.

N-12® WT IB (per AASHTO) JOINT SYSTEM

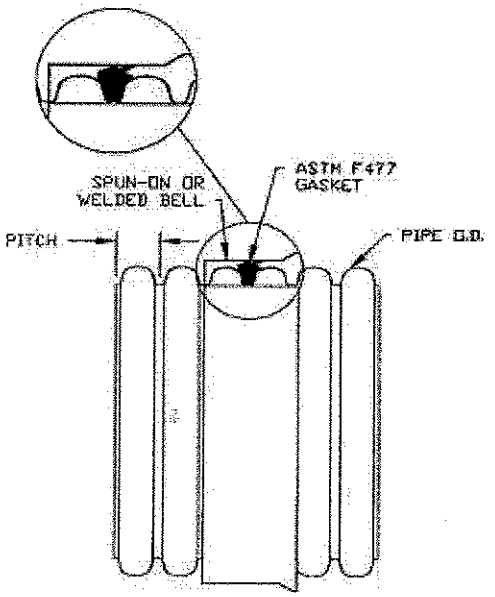
(Joint configuration & availability subject to change without notice. Product detail may differ slightly from actual product appearance.)



4" - 10"
(100-250 MM)



12" - 60"
(300-1500 MM)



12" - 60"
(300-1500 MM)

ADS/HANCOR, INC. D-WALL WTIB PIPE SPECIFICATION

Scope
This specification describes 4- through 60-inch (100 to 1500 mm) ADS/Hancor, Inc. D-Wall WTIB pipe for use in gravity-flow storm sewer applications for Washington State DOT.

Pipe Requirements
D Wall WTIB pipe shall have a smooth interior and annular exterior corrugations.
- 4- through 10-inch (100 to 250 mm) shall meet AASHTO M252, Type S.
- 12- through 60-inch (300 to 1500 mm) shall meet AASHTO M294, Type S or ASTM F2306.
- Manning's "n" value for use in design shall be 0.012.

Joint Performance
Pipe shall be joined with the ADS/Hancor D-Wall WTIB joint meeting the requirements of AASHTO M252, AASHTO M294, or ASTM F2306.

4- through 60-inch (100 to 1500 mm) shall be watertight according to the requirements of ASTM D3212. Gaskets shall meet the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable, protective wrap to ensure the gasket is free from debris. A joint lubricant available from the manufacturer shall be used on the gasket and bell during assembly.

12- through 60-inch (300 to 1500 mm) diameters shall have a reinforced bell with a polymer composite band. The bell tolerance device shall be installed by the manufacturer.

Fittings
Fittings shall conform to AASHTO M252, AASHTO M294, or ASTM F2306. Bell and spigot connections shall utilize a spun-on or welded bell and valley or saddle gasket meeting the watertight joint performance requirements of AASHTO M252, AASHTO M294 or ASTM F2306.

Field Pipe and Joint Performance
To assure watertightness, field performance verification may be accomplished by testing in accordance with ASTM F2487. Appropriate safety precautions must be used when field-testing any pipe material. Contact the manufacturer for recommended leakage rates.

Material Properties
Virgin material for pipe and fitting production shall be high-density polyethylene conforming with the minimum requirements of cell classification 424420C for 4- through 10-inch (100 to 250 mm) diameters, and 435400C for 12- through 60-inch (300 to 1500 mm) diameters, as defined and described in the latest version of ASTM D3350, except that carbon black content should not exceed 4%. The 12- through 60-inch (300 to 1500 mm) virgin pipe material shall comply with the notched constant ligament-stress (NCLS) test as specified in Sections 9.5 and 5.1 of AASHTO M294 and ASTM F2306 respectively.

Installation
Installation shall be in accordance with ASTM D2321 and ADS/Hancor, Inc. recommended installation guidelines, with the exception that minimum cover in trafficked areas for 4- through 48-inch (100 to 1200 mm) diameters shall be one foot. (0.3 m) and for 54- and 60-inch (1350 and 1500 mm) diameters, the minimum cover shall be 2 ft. (0.6 m) in single run applications. Backfill for minimum cover situations shall consist of Class 1, Class 2 (minimum 90% SPD) or Class 3 (minimum 90%) material. Maximum fill heights depend on embedment material and compaction level; please refer to Technical Note 2.01. Contact your local ADS representative or visit our website at www.ads-pipe.com for a copy of the latest installation guidelines.

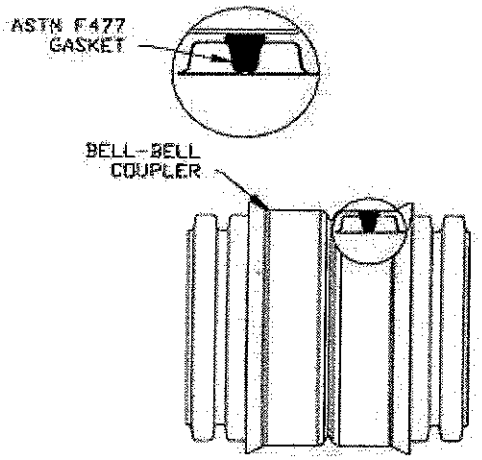
Pipe Dimensions

	Nominal Diameter, in (mm)													
Pipe I.D. in (mm)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	15 (375)	18 (450)	24 (600)	30 (750)	36 (900)	42 (1050)	48 (1200)	54* (1350)	60 (1500)
Pipe O.D.** in (mm)	4.8 (122)	6.9 (175)	9.1 (231)	11.4 (290)	14.5 (368)	18 (457)	22 (559)	28 (711)	36 (914)	42 (1067)	48 (1219)	54 (1372)	61 (1549)	67 (1702)
Perforations	All diameters available with or without perforations													

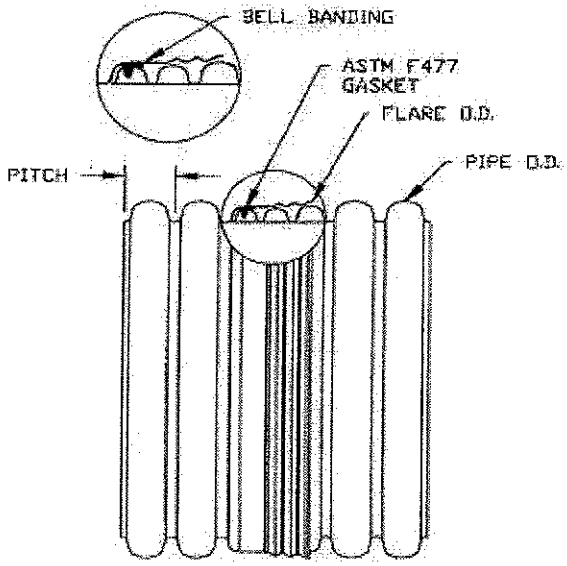
*Check with sales representative for availability by region.
**Pipe O.D. values are provided for reference purposes only, values stated for 12- through 60-inch are ± 1 inch. Contact a sales representative for exact values.

D WALL WTIB JOINT SYSTEM

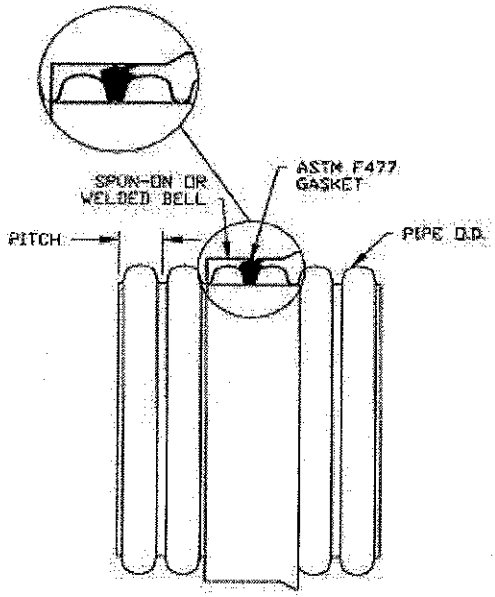
(Joint configuration & availability subject to change without notice. Product detail may differ slightly from actual product appearance.)



4" - 10"
(100-250 MM)



12" - 60"
(300-1500 MM)



12" - 60"
(300-1500 MM)

HANCOR SURE-LOK® ST PIPE SPECIFICATIONS

Scope

This specification describes 4- through 60-inch (100 to 1500 mm) Hancor Sure-Lok ST pipe for use in gravity flow drainage applications.

Pipe Requirements

Sure-Lok pipe shall have a smooth interior and annular exterior corrugations.

- 4- through10-inch (100 to 250mm) shall meet AASHTO M252, Type S.
- 12- through 60-inch (300 to 1500 mm) shall meet AASHTO M294, Type S or ASTM F2306.
- Manning's "n" value for use in design shall be 0.012.

Joint Performance

Pipe shall be joined using a bell & spigot joint meeting AASHTO M252, AASHTO M294 or ASTM F2306. The joint shall be soil-tight and gaskets, when applicable, shall meet the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.

Fittings

Fittings shall conform to AASHTO M252, AASHTO M294, or ASTM F2306. Bell and spigot connections shall utilize a spun-on or welded bell and valley or saddle gasket meeting the soil-tight joint performance requirements of AASHTO M252, AASHTO M294 or ASTM F2306.

Material Properties

Virgin material for pipe and fitting production shall be high density polyethylene conforming with the minimum requirements of cell classification 424420C for 4- through 10-inch (100 to 250mm) diameters, or 435400C for 12- through 60-inch (300 to 1500mm) diameters, as defined and described in the latest version of ASTM D3350, except that carbon black content should not exceed 4%. The 12- through 60-inch (300 to 1500mm) virgin pipe material shall comply with the notched constant ligament-stress (NCLS) test as specified in Section 9.5 and 5.1 of AASHTO M294 and ASTM F2306, respectively.

Installation

Installation shall be in accordance with ASTM D2321 and Hancor's published installation guidelines with the exception that minimum cover in trafficked areas for 4- through 48-inch (100 to 1200 mm) diameters shall be one foot (0.3 m) and for 54- and 60-inch (1350 and 1500 mm) diameters shall be 2 ft (0.6 m) in single run applications. Contact your local Hancor representative or visit our website at www.hancor.com for a copy of the latest installation guidelines.

Pipe Dimensions

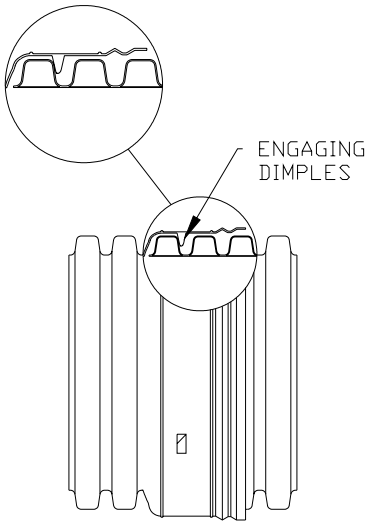
	Nominal Diameter, in (mm)													
in Pipe I.D. (mm)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	15 (375)	18 (450)	24 (600)	30 (750)	36 (900)	42 (1050)	48 (1200)	54* (1350)	60 (1500)
in Pipe O.D.** (mm)	4.8 (122)	6.9 (175)	9.1 (231)	11.4 (290)	14.5 (368)	18 (457)	21 (533)	28 (711)	36 (914)	42 (1067)	48 (1219)	54 (1372)	61 (1549)	67 (1702)
Perforations	All diameters available with or without perforations													

*Check with sales representative for availability by region.

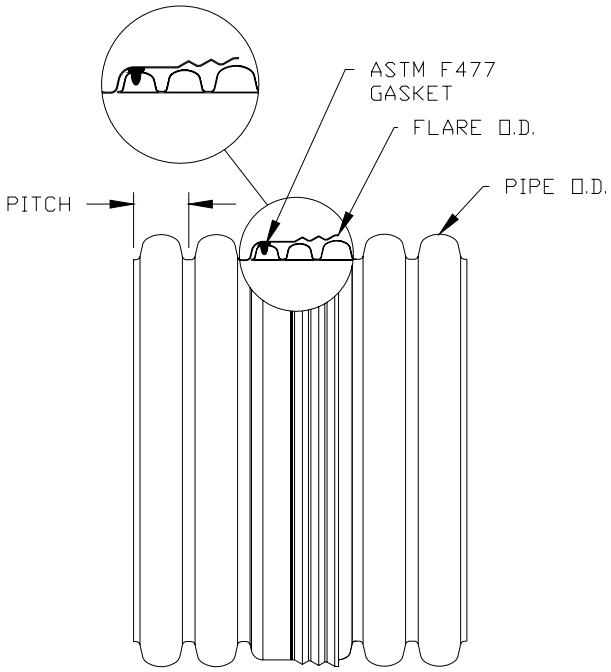
**Pipe O.D. values are provided for reference purposes only, values stated for 12- through 60-inch are ± 1 inch. Contact a sales representative for exact values.

SURE-LOK® ST PIPE JOINING SYSTEM

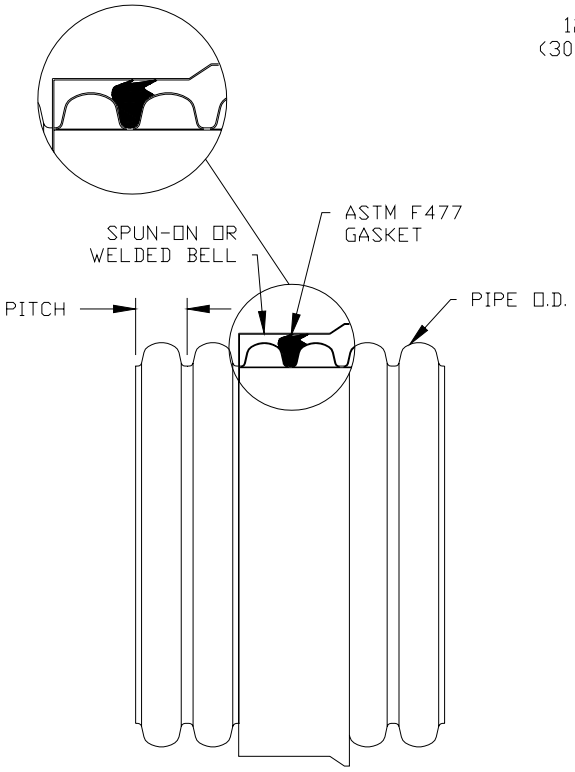
(Joint configuration & availability subject to change without notice. Product detail may differ slightly from actual product appearance.)



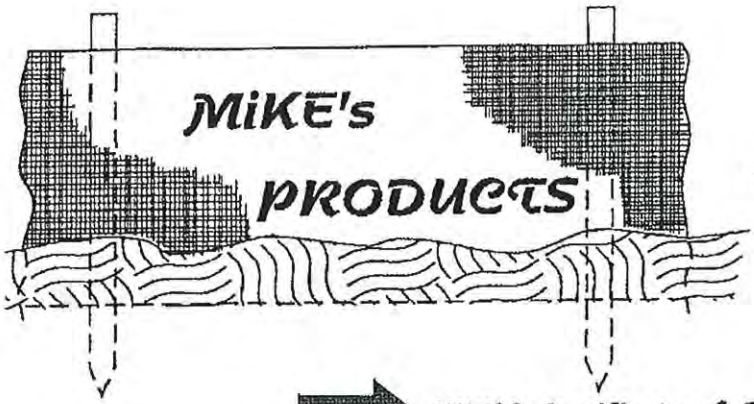
4″ - 10″
(100-250 MM)



12″ - 60″
(300-1500 MM)

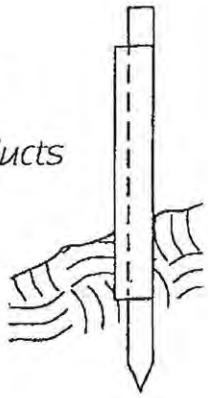


4″ - 60″
(100-1500 MM)



Mfg. Silt Fence
& Sewn Const. Products

503/256-5607
Fax 256-5589



MK703 Certificate of Compliance

This is to certify that MK703, a woven polypropylene fabric yarn consists of long chain synthetic polymers and contains stabilizers and inhibitors to make the material resistant to ultraviolet and heat deterioration. MK703 meets the State of Washington Department of Transportation specification for Supported Silt Control Fabric. As listed in section 9.33, Table 6 of WADOT. Below are the values MK703 will meet or exceed when tested in accordance with the proper ASTM test methods.

PHYSICAL PROPERTY MATERIAL	TEST METHOD	MINIMUM ROLL AVERAGE POLYPROPYLENE
TENSILE (WARP X FILL)	ASTM-D4632/ASTM-D1682	180 x 100 LBS
PUNCTURE STRENGTH	ASTM-D4833	90 LBS.
TRAPEZOID/TEAR (WARP X FILL)	ASTM-D4533	70 x 60 LBS
MULLEN BURST	ASTM-D3786	300 PSI
ELONGATION (WARP XFILL)	ASTM-D4632	20%
PERMITTIVITY	ASTM-D4491	0.05 -1/SEC
PERMEABILITY	ASTM-D4491	.002 CM/S
FLOW RATE	ASTM-D4491	6.0 GAL/MIN FT^2
APPARENT OPENING SIZE US SIEVE NUMBER	ASTM-D4751	.425 MM US SIEVE # 40
UV RESISTANCE STRENGTH RETENTION AFTER 500 HOURS	ASTM-D4355	70%

DATE: July 1, 2004

 This material does not meet the requirements of Table 2, 2.03, Sect 02072 for Type II geotextile. However may be used as silt fence

13315 N.E. Whitaker Way • Portland, OR 97230

RICHLAWN ORGANIC 100

100% Natural Organic Lawn Fertilizer

7-2-1

GUARANTEED ANALYSIS:

Total Nitrogen (N)……7.0%
6.0% Water Insoluble Nitrogen
1.0% Water Soluble Organic Nitrogen

Available Phosphate (P205)……..2.0%

Soluble Potash (K20)…….1.0%

Richlawn Organic 100 7-2-1 is derived from the following natural organic ingredients: Dried Poultry Manure, Blood Meal, Bone Meal, Feather Meal and Sulfate of Potash.
The source of the blood meal used in Richlawn 7-2-1 is from cattle. Blood is flashed dried at 720 degrees Fahrenheit resulting in a pathogen and weed free material.
The source of the feather meal used in Richlawn 7-2-1 is from chickens and turkeys. The feathers are hydrolyzed by steam pressure at 300 degrees Fahrenheit for 45 minutes at 105 psi steam pressure, resulting in a pathogen free material.

Directions :

Established Lawns:
12.5lbs/1000 sq. ft. 3-4 applications, Spring, Summer, and Fall

Thin, Weak Lawns:
18-20 lbs/1000 sq. ft 4-5 application beginning in Spring at monthly intervals.

New Lawns:
Prior to seeding or sodding – 10 lbs/1000 sq. ft. Rake or till into the top 2-3” of soil. Water thoroughly after application to ensure soil contact and to activate.

Information regarding the contents and levels of metals in this product is available on the internet at http://www.aapfco.org/metals.htm

Certificate of Compliance: Hydro Mulch 1000®

Conwed Hydro Mulch 1000® is a 100% wood fiber mulch manufactured from specially prepared wood chips. The wood fiber is produced by a Thermally Refined™ process and manufactured to contain a specified range of fibers averaging 0.25 inches or longer, with 50% or more retained on a 28-mesh screen (a Tyler Ro-Tap method). The manufacturing process of pressurized disc refining separates the solid wood into its individual fibers and fiber bundles, and the high temperature steam (300^0F) completely sterilizes the fiber. ***Conwed Hydro Mulch 1000®*** is dyed green and packaged in 50 lb. plastic bags with 40 bags per pallet.

Profile Products certifies that Hydro Mulch 1000® meets the following specifications:

Physical Properties:

Moisture Content (total air dry weight basis)	12% $\pm$3%
Organic Matter (oven dry weight basis)	99.2% $\pm$0.8%
Ash Content (oven dry weight basis)	0.8% $\pm$0.8%
pH at 3% consistency in water	4.8 $\pm$0.2
Moisture holding capacity, percent	min 1,350
Boron Content	<250 ppm
Non-toxic to plant or animal life	
The fiber is sterilized and is weed free	

Conwed Hydro Mulch 1000® specifications are monitored by the Profile Products Technical Services group. Tests are conducted using scientifically sound and reliable methods. Other test methods may produce slightly different results.

Becky Gauthier — February 6, 2008

Profile Products Technical Representative — Date

RANTEC CORPORATION

P.O. BOX 729,
HWY 14 WEST, RANCHESTER, WY 82839
PH 307-655-9565 FAX 307-655-9528

EMAIL rantec@ranteccorp.com

February 26, 2007

Certificate of Compliance
J3000

Rantec Corporation certifies J3000 has been tested and meets the requirements of a tacking agent. This Statement is based on field tests and on the job.

Rantec J3000 is a granular powder for use as a mulch stabilizer, a slurry lubricant, for straw and hay or hay mulch tacking, and for temporally stabilization of soil and sand.

Rantec J3000 is biodegradable and non-toxic when used as directed.

Rantec J3000 contains no germination or growth inhibiting materials and is non-toxic to fish or other wildlife when used as directed.

Minimum Specifications:

Ash	**1.5% max**
Protein	**5.8% max**
Moisture	**8-12%**
pH	**5.2-6.5su**

J3000 is minimum 92.7% carbohydrate (including moisture).

Lloyd Marsden
General Manager
Rantec Corporation

Friday, October 21, 2011

ACF West
Woodinville Corporate Center II
Bldg. A #400
15540 Woodinville-Redmond Rd.
Woodinville, WA 98072

Re: Table 2. Wetland Transition Seed Mix

This certifies that all the grass seed to be furnished for the above referenced project, as stated below will meet the quality standards and associated requirements as stated on the specifications sheet and or packaging tags as supplied to ACF West.

% by Weight	Kind and Variety	Min % Pure	Min % Germ
30	Redtop Bentgrass	95	85
20	Northern Mannagrass	95	85
20	Beaked Sedge	95	80
10	Lakeshore Sedge	95	80
20	Creeping Spikerush	95	80

Weed Seed 0.25% (Max)
Inert and Other Crop 3.50% (Max)

We further certify that this seed will meet all requirements for the Federal Seed Act (7U.S.C. 1551-1610) and comply with all the seed laws and noxious weed laws for the State of Washington.

All seed will be tested for current germination and be free of prohibited noxious weeds.

Sincerely,

Karen Krych

Karen Krych
Clearwater Seed

Friday, October 21, 2011

ACF West
Woodinville Corporate Center II
Bldg. A #400
15540 Woodinville-Redmond Rd.
Woodinville, WA 98072

Re: Table 1. Final Cover Seed Mix

This certifies that all the grass seed to be furnished for the above referenced project, as stated below will meet the quality standards and associated requirements as stated on the specifications sheet and or packaging tags as supplied to ACF West.

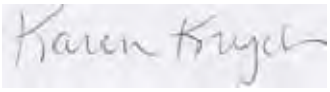
% by Weight	Kind and Variety	Min % Pure	Min % Germ
10	Indian Ricegrass	95	85
20	Sheep Fescue	95	85
10	Silky Lupine	95	85
20	Sherman Big Bluegrass	95	80
30	Bluebunch Wheatgrass	95	85
10	Sand Dropseed	95	85

Weed Seed 0.25% (Max)
Inert and Other Crop 3.50% (Max)

We further certify that this seed will meet all requirements for the Federal Seed Act (7U.S.C. 1551-1610) and comply with all the seed laws and noxious weed laws for the State of Washington.

All seed will be tested for current germination and be free of prohibited noxious weeds.

Sincerely,



Karen Krych
Clearwater Seed

APPENDIX C

UNUSUAL OCCURRENCES AND EMERGENCY RESPONSE PROCEDURE PLAN

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FIGURES

UNUSUAL OCCURRENCES AND EMERGENCY RESPONSE PROCEDURE PLAN

This Response Plan outlines the response procedures for unusual occurrences or emergency situations at the Site pertaining to performance monitoring and operations and maintenance associated with the remedial actions at Tailing Disposal Facility Nos. 1 and 2 (TDF-1 & TDF-2) at the Pend Oreille Mine, near Metaline Falls, Washington. It is an attachment to the Operations & Maintenance Plan for TDF-1 and TDF-2. Any of the events described in this Response Plan should be reported directly to the Project Coordinator. Teck Washington Incorporated (TWI) and its representatives should use the procedures outlined in the following sections to determine the proper responses and contact information for unusual occurrences at TDF-1 and TDF-2.

1.0 UNUSUAL OCCURRENCES

1.1 DEFINITION OF UNUSUAL OCCURRENCES

Unusual occurrences are events or conditions that are not normally encountered and may endanger the TDF-1 and TDF-2 facilities. Examples include:

- Major storms and floods;
- Earthquakes;
- Landslides near or on the TDFs that do not cause embankment failure;
- Fire or explosions;
- Human interference by terrorism, vandalism, or accidents;
- Incidents of potential property or environmental damage;
- General Site deficiencies such as fencing, signage or excessive erosion that mat require attention.

1.2 POSSIBLE UNUSUAL OCCURRENCES

1.2.1 Earthquake

The occurrence of an earthquake of at least Richter Magnitude 5.0 (M 5.0) in the vicinity of the property will require that actions be taken. Some indications of an M 5.0 event include:

> *"Felt by all. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., knocked off shelves. Furniture moved or overturned. Weak plaster and masonry cracked. Trees, bushes shaken visibly, or heard to rustle."*

If an M 5.0 event is experienced near the Site, the following action items should occur:

- When safe, conduct a general overall visual inspection of the embankment and drainage features.
- If the embankment is failing, implement the **Section 2.3.2 - Failure in Progress** procedures

- If there is damage to the extent that tailings are moving down the hillside toward the Pend Oreille River, immediately implement the **Section 2.3.1 - Failure is Imminent** procedures.
- Check the embankment surface for settlement, and if any subsidence is visible, contact a TWI approved engineer for recommendations to address the situation.
- If damage has occurred but is judged not serious enough to cause failure of the embankment, observe the nature, location and extent of the damage, evaluate the potential for failure and contact a TWI approved engineer
- Photograph and describe any new or increased slides, sloughs, seeps, springs or subsidence and document the location, extent, rates, effects on adjoining structures, prevailing weather conditions and other pertinent observations
- If there appears to be no imminent danger of embankment failure, the TWI representative should thoroughly inspect the following:
    - Both embankment faces for cracks, settlement, or seepage;
    - Culverts, drains and seeps for any turbidity, muddy water, or increased flow;
    - Local hillsides for landslides; and
    - Upstream drainages for evidence of landslide caused impoundments
- Consult with a licensed Geotechnical Engineer to evaluate static stability of embankments.

1.2.2 Human Interference (Terrorism, Vandalism or Accident)

Human interference could occur as terrorist activity, vandalism or accident. The nature and form of human interference is hard to predict. If such interference is suspected to have occurred, take the following steps:

- Immediately conduct a general overall visual inspection of the embankment
- If the embankment is failing, implement the **Section 2.3.2 - Failure in Progress** procedures
- If there is damage to the extent that tailings are moving down the hillside toward the Pend Oreille River, immediately implement the **Section 2.3.1 - Failure is Imminent** procedures.
- Check the embankment crest for settlement, and if it has dropped by more than two feet, contact a TWI approved engineer for recommendations to address a potential release of tailings.
- If damage has occurred but is judged not serious enough to cause failure of the embankment, observe the nature, location and extent of the damage, evaluate the potential for failure and contact a TWI approved engineer
- Photograph and describe any new or increased slides, sloughs, seeps, springs or subsidence and document the location, extent, rates, effects on adjoining structures prevailing weather conditions, and other pertinent observations
- If there appears to be no imminent danger of embankment failure, the TWI representative should thoroughly inspect the following:
    - TDF-1 and TDF-2 embankment faces for cracks, settlement, or seepage;
    - Culverts, drains and seeps for any turbidity, muddy water, or increased flow;
    - Local hillsides for landslides; and
    - Upstream drainages for evidence of landslide caused impoundments.

1.2.3 Failure of the Stormwater Conveyance System

Excessive precipitation, human/wildlife activity or land movements could possibly result in a failure of the stormwater conveyance system and allow water to pool up on the surface of TDF-1 beyond the limits of Wetland A. If such conditions are observed, take the following steps:

- If Ditch 1A or 1B fails and water begins to collect in Wetland A ensure that the auxiliary over flow structures at the north and south ends are clear (Drawing No. 5) and implement **Section 1.3 – Unusual Occurrence Response** procedures.
- Immediately conduct a general overall visual inspection of the site.
- Evaluate the potential for release of tailings from the TDFs
- Take actions to avoid significant impoundment of water within Wetland A.
- If Wetland A continues to fill and water is within 2 feet of the embankment shoulder immediately implement **Section 2.3.1 - Failure is Imminent** procedures.

1.2.4 General Site Deficiencies

It is possible to observe general site deficiencies which may or may not require immediate attention. These site deficiencies may include but are not limited to:

- Fences in need of repair;
- Increased erosion at one of the features;
- Blockage of an inlet or culvert;
- Lack of vegetation;
- Exposed bio-barrier or tailings;
- Missing signage;
- Trespassing; and
- Noxious weed invasions.

If one of these conditions are observed or a unusual occurrence is observed, implement the **Section 1.3 – Unusual Occurrence Response**

1.3 UNUSUAL OCCURRENCE RESPONSE PROCEDURES

The following steps should be taken in the event of an unusual occurrence:

- Immediately report unusual occurrences to TWI.
- Promptly make a special inspection, document the conditions and evaluate the significance of the occurrence.
- Take protective or corrective actions as appropriate for the nature of the occurrence.
- Activate emergency procedures discussed below, if necessary.
- If emergency procedures are activated, inform Ecology and State Dam Safety Engineer within 24 hours.

2.0 EMERGENCY SITUATIONS

2.1 EMERGENCY SITUATION DEFINITIONS

Three categories of emergency situations are:

- Failure is Imminent;
- Failure is in Progress; and
- Possible or Slowly Developing.

Failure is imminent if the following situation is occurring:

- Wetland A fills and water is within two vertical feet (100 horizontal feet) of the embankment shoulder for TDF-1 shoulder

Failure is in progress if any of the following situations are occurring:

- Wetland A exceeds the embankment shoulder elevation and water begins to flow down the slope of TDF-1; or
- Either TDF-1 or TDF-2 embankment is failing.

Failure is possible or slowly developing if any of the following situations are occurring:

- Erosion, slumping, sloughing, or cracking of the embankment or abutment
- New springs, seeps, sandboils, sinkholes
- Landslides in the vicinity of the site

These possible emergency situations are presented in detail in **Section 2.2**.

2.2 POSSIBLE EMERGENCY SITUATIONS

2.2.1 Failure is Imminent

2.2.1.1 Pond Water 2 feet below the Embankment Shoulder

Due to high precipitation, runoff and failure of the stormwater conveyance system the water in Wetland A is two vertical feet (100 horizontal feet) from the embankment shoulder and is rising.

Implement the procedures in **Section 2.3.1 - Failure is Imminent**.

2.2.1.2 Noticeable Deformation to Either Embankment and Deformation is Continuing

If observations of either embankment (especially TDF-1) indicate that the structural integrity is affected and the conditions are not stable or observations indicate that additional movement is occurring.

Implement the procedures in **Section 2.3.1 - Failure is Imminent**.

2.2.2 Failure in Progress

2.2.2.1 Water Flowing down the slope of TDF-1

Due to high precipitation, runoff or plugging of the conveyance system, Wetland A crests the embankment shoulder and water overflows down the face of the dam.

Implement the instructions in the **Section 2.3.2 - Failure in Progress.**

2.2.2.2 TDF-1 Embankment Failure

Uncontrolled release of water and tailings from the TDFs will result during a failure. Failure of the embankments could possibly result in a release of sediment laden water or tailings into the Pend Oreille River.

Implement the instructions in the **Section 2.3.2 - Failure in Progress.**

2.2.3 Possible or Slowly Developing Failure Conditions

Some possible or slowly developing failure conditions may include, but are not limited to: erosion, slumping, sloughing, or cracking of the embankment or abutments; new springs, seeps, sandboils, sinkholes and landslides. Appropriate responses to these situations follow.

2.2.3.1 Erosion, Slumping, Sloughing, or Cracking of the Embankment or Abutment

If unusual erosion, slumping, sloughing or cracking is observed in either the embankment or abutment areas, then a determination must be made of the location, size of the affected area(s) (height, width, and depth), severity and possible consequences.

If failure appears likely, immediately implement the **Section 2.3.1 - Failure is Imminent** procedures; otherwise, contact a TWI approved engineer.

2.2.3.2 New Springs, Seeps, Sandboils, Sinkholes

If new springs, seeps, sandboils, or sinkholes are observed, a determination must be made of the location and size of the affected area, estimated discharge if any, nature of discharge (clear or cloudy), and Wetland A and piezometric elevations. A map of the area should be developed to illustrate where the problem is located.

If failure appears likely, implement the **Section 2.3.1 - Failure is Imminent** procedures; otherwise, report all findings to TWI for review by an approved engineer.

2.2.3.3 Landslides

Any landslide having the capability to rapidly displace large volumes could modify the geometry of the embankment or routing of water in the vicinity of the TDFs and could potentially create

upstream water impoundments that could fail catastrophically. A licensed engineering geologist or professional geotechnical engineer must make determinations of the size, possible cause, degree of effect on the operation, probability of additional movement of the disturbed area and other slides area, development of new slide areas, and anything else that seems important.

2.3 EMERGENCY SITUATION RESPONSE PROCEDURES

2.3.1 Failure is Imminent Responses

If failure of the dam is imminent, but has not started, the following steps should be initiated immediately:

- Notify adjacent landowners of the situation as needed;
- Notify the appropriate government agencies including the Washington State Department of Ecology and State Dam Safety Representatives;
- Take preventive actions as necessary; and
- Implement the event notification flowchart (Figure 1).

2.3.2 Failure in Progress Responses

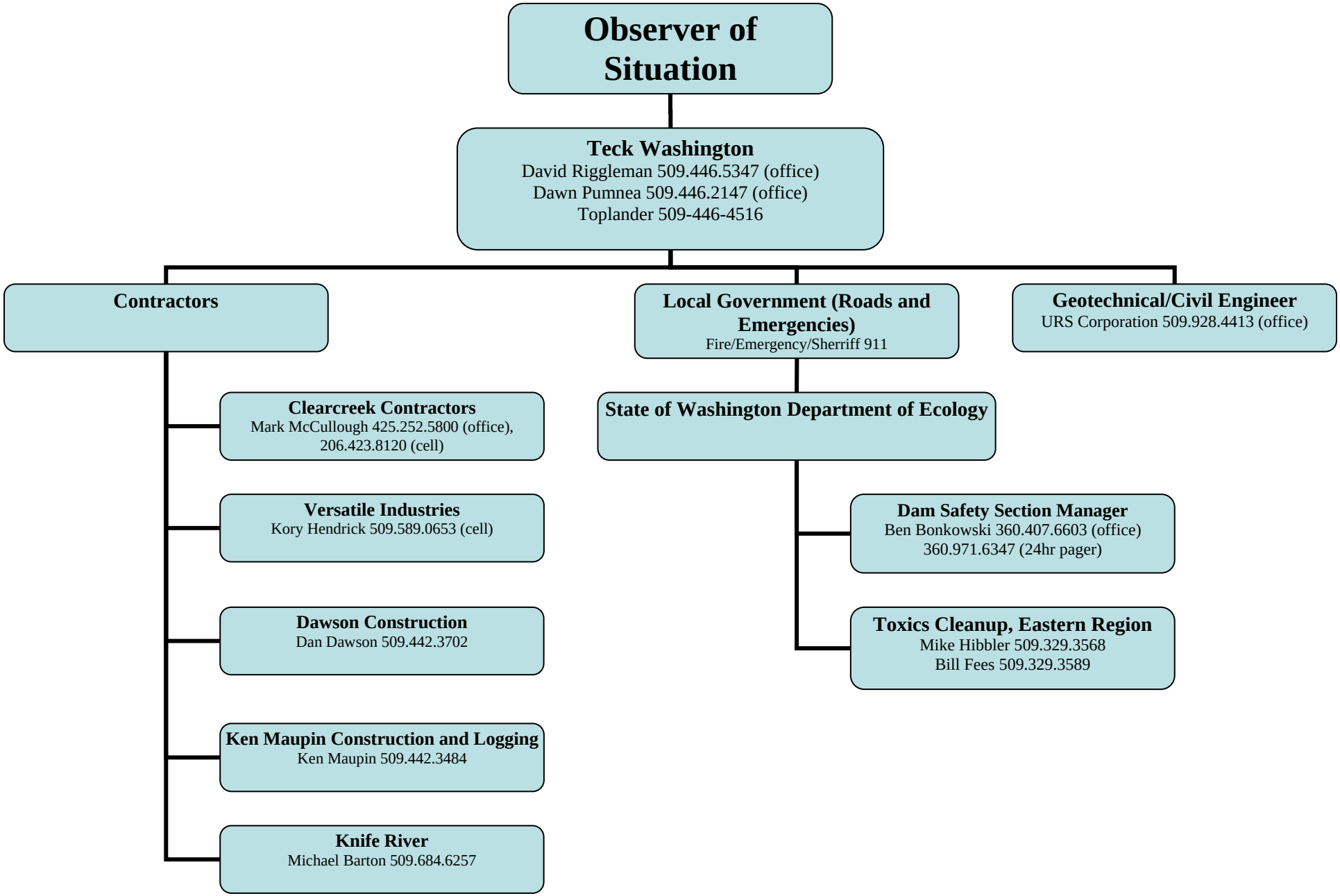
If failure is in progress, actions must be taken to prevent the release of tailings into the Pend Oreille River. Strategic actions must be taken while considering the health and safety of humans and wildlife.

- Remove any people who might be immediately downstream of the area;
- Keep people out of the impacted area except as needed to complete repairs;
- Protect downstream infrastructure as appropriate;
- Take appropriate actions as necessary to reduce the effects of embankment failure; and
- Implement the event notification flowchart (Figure 1).

3.0 SUPPLIES AND RESOURCES

If a response to an unusual occurrence or emergency situation is required, personnel, equipment and supplies might be needed on short notice. Figure 1 list available contractors to assist with site repairs.

Figure 1: Event Notification Flow Chart



APPENDIX D

INSPECTION CHECKLISTS

TDF-1 AND TDF-2
MONTHLY INSPECTION CHECKLIST
TECK WASHINGTON INCORPORATED

DATE OF INSPECTION:
INSPECTED BY:
CURRENT WEATHER:
TEMPERATURE:

ITEM		YES	NO	REMARKS
TDF-1 COVER SYSTEM				
Evidence of cover erosion?				
Exposed geotextile or drainage layer (Bio-barrier)?				
Areas lacking vegetation or cover?				
Noxious weeds or trees present?				
Signs in place and visable?				
Gates functional?				
TDF-2 COVER SYSTEM				
Evidence of cover erosion?				
Exposed geotextile or drainage layer (Bio-barrier)?				
Areas lacking vegetation or cover?				
Noxious weeds or trees present?				
Signs in place and visable?				
Gates functional?				
DRAINAGE SYSTEM				
TDF-1				
Culvert and drain inlets/outlets clear?				
Turbid discharges?				
Wetland A overflow structure clear?				
Piezometer Readings				
Piezometer ID	**Depth to Water (feet)**			
P1				
P2				
P3				
P4				
P5				
TDF-2				
Culvert and drain inlets/outlets clear?				
Turbid discharges?				
EMBANKMENTS				
TDF-1				
Slides, sloughs, cracking, excessive erosion?				
TDF-2				
Slides, sloughs, cracking, excessive erosion?				

TDF-1 AND TDF-2
MONTHLY INSPECTION CHECKLIST
TECK WASHINGTON INCORPORATED

General Notes:

TDF-1 AND TDF-2
QUARTER/EVENT/ANNUAL INSPECTION CHECKLIST
TECK WASHINGTON INCORPORATED

DATE OF INSPECTION:	INSPECTED BY:
CURRENT WEATHER:	TEMPERATURE:

ITEM	YES	NO	REMARKS
TDF-1 COVER SYSTEM			
Erosion of topsoil more than two inches deep?			
Excessive trash and debris?			
Definable area lacking vegetation?			
Noxious weeds present?			
Trees beginning to root?			
Geotextile or waste rock exposed?			
Animal burrows into cover system?			
Sediment deposits more than 2 inches deep?			
Ponded water outside of Wetland A?			
Signs in place?			
Gates damaged?			
Rutting in access roads?			
Other?			
Other?			
Other?			
Other?			
Other?			
Other?			

TDF-1 AND TDF-2
QUARTER/EVENT/ANNUAL INSPECTION CHECKLIST
TECK WASHINGTON INCORPORATED

TDF-1 DRAINAGE SYSTEM			
ITEM	**YES**	**NO**	**REMARKS**
General			
Top of Ditch 1A french-drain free of debris and detritus?			
Ditch 1A inlet grates clear of trash or vegetation?			
Wetland A overflow structure clear and unobstructed?			
Sediment in Ditch 1B more than four inches deep?			
Inlet at termination of Ditch 1B clear and unobstructed?			
Safety bars at termination of Ditch 1B in place and secure?			
Animal activity or obstructions at culvert outlets?			
Scouring at start of Creek 2?			
Other?			
Culverts and Piping			
Able to locate cleanouts?			
Safety bars in place?			
Damaged or cracked?			
Missing cover?			
Deterioration?			
Joints displaced?			
Joints leaking?			
Turbid discharges?			
Other?			
Other?			

TDF-1 AND TDF-2
QUARTER/EVENT/ANNUAL INSPECTION CHECKLIST
TECK WASHINGTON INCORPORATED

ITEM	YES	NO	REMARKS
TDF-1 EMBANKMENT			
Any settlement?			
Any misalignment?			
Any cracking?			
Adequate slope protection?			
Any erosion?			
Animal burrows?			
Trees beginning to root?			
Sinkholes?			
Visual settlement?			
New or increased seepage?			
Other?			
Other?			

Comments

TDF-1 AND TDF-2
QUARTER/EVENT/ANNUAL INSPECTION CHECKLIST
TECK WASHINGTON INCORPORATED

ITEM	YES	NO	REMARKS
TDF-2 COVER SYSTEM			
Erosion of topsoil more than two inches deep?			
Excessive trash and debris?			
Definable area lacking vegetation?			
Noxious weeds present?			
Trees beginning to root?			
Geotextile or waste rock exposed?			
Animal burrows into cover system?			
Sediment deposits more than 2 inches deep?			
Ponded water?			
Signs in place?			
Gates damaged?			
Rutting in access roads?			
Other?			
TDF-2 DRAINAGE SYSTEM			
Manhole inlet/outlets clear?			
Ditch 2A clear of obstructions?			
Ditch 2B clear of obstructions?			
Underdrains covered?			
Erosion or damage at termination of Ditch 2B?			
Other?			
Other?			

TDF-1 AND TDF-2
QUARTER/EVENT/ANNUAL INSPECTION CHECKLIST
TECK WASHINGTON INCORPORATED

TDF-1 EMBANKMENT			
Any settlement?			
Any misalignment?			
Any cracking?			
Adequate slope protection?			
Any erosion?			
Trees beginning to root?			
Animal burrows?			
Sinkholes?			
Visual settlement?			
Surface seepage?			
Other?			

Comments:

TDF-1 AND TDF-2
QUARTER/EVENT/ANNUAL INSPECTION CHECKLIST
TECK WASHINGTON INCORPORATED

Inspection Photo Log

Photo No.	Location	Description

APPENDIX E

OPERATION AND MAINTENANCE PROCEDURES FOR PIEZOMETER DATA COLLECTION

General Guidelines For Standpipe
Piezometer and Observation Well Readings

Porous-tube, and slotted-pipe piezometers, and observation wells can be grouped together since they are all read using the same basic concept and have similar equipment problems, along with similar maintenance for each. These instruments measure the level of the ground water that has passed through a slotted pipe or porous stone and has risen in an attached standpipe. This level is known as the piezometric level. These standpipe instruments can be installed in constructed embankments during or after construction; in downstream area of a dam; on either abutment of the dam. Most standpipe instruments are installed in drill holes. The porous stones used in the past were typically a porous alundum stone

Procedures for taking readings.-

General.- All standpipe type instruments require the use of the following equipment to take the readings: (1) water level depth meter, (2) pocket tape measure, (3) keys to unlock protective caps, (4) screw driver or wrenches if the protective cover is a manhole, (5) field book or data sheet to record readings.

Types of Water Level Depth Meters.- There are generally two types of depth or water level meters available. The typical water level indicator will give the operator many years of service if it is properly maintained (see maintenance section below). The indicator works on a simple principle using the water in the standpipe to complete an electrical circuit when the probe is immersed into water. A small voltage is generated and this voltage is amplified in the transistorized circuit contained in the cable reel of the meter. This voltage can be read directly on a voltage meter, or an indicating light will light, or sounder will beep. This type of indicator is manufactured by a number of manufactures.

Another indicator has a sensitivity knob which is designed to measure saline and/or contaminated water. By testing the water contained in your well, you are able to determine which setting should be used when taking readings with this meter. If the knob is set lower than necessary, the accuracy of the meter will be reduced. This type of indicator is manufactured by at least three different companies. These meters have a cable attached to a probe and the cable is marked every .01-foot for the entire length of the cable. This marking of the cable has eliminated the need for a pocket tape in taking the data.

Taking Readings. - When taking water level readings complete the follows steps:

(1) Turn the indicator switch to the BATTERY CHECK position (if available) to determine the level of charge of the battery.

(2) Check for proper operation of the unit by immersing the probe in water and noting whether the device registers a closed circuit by the voltmeter, light, or if the buzzer sounds off. For units that have a sensitivity knob, lower the probe into a seepage water location or the reservoir to adjust for the proper sensitivity setting before taking readings.

(3) Unlock and remove the piezometers' or well's protective pipe cap (usually a steel

pipe or manhole cover) on the installation. Clean away any debris from or near the stand pipe. Remove the plastic PVC pipe covers from the piezometer pipe if installed. Lower the probe into the standpipe. At the level where the circuit is closed, a buzzer sounds, or a light lights, note the length of cable required to reach this water level from the top of the standpipe (usually the plastic pipe). This is usually accomplished by grabbing the cable as it is leaving the standpipe. Sometime the steel protective pipe is used as this measuring point. These data are usually recorded to an accuracy of 0.01 feet on the correct data sheet or in a field book.

(4) Most older water level indicators are incremented every 1 foot over the entire length of cable. To take measurements to 0.01 foot, the observer must use a separate pocket tape measure. A good tape to use is a Lufkin Engineers Ultralok 12-foot W312D, which is graduated in tenths and one hundredths of a foot. When taking a reading of a water level measurement, place your hand on the electrical cable at the top of the protective pipe or piezometer pipe (always be consistent as to which pipe is used) when the probe indicates the water level. Using a pocket tape, measure the distance from the foot mark below your hand back up the cable in your hand. Add this measurement to the foot mark and you have your water depth.

(5) When there are two stand pipes in a hole, each must be identifiable so that the correct data can be determined for each piezometer. The standpipe of the lower piezometer should be cut off flush with the top of the protective pipe, and the standpipe of the upper piezometer should be cut off approximately one-half-inch above the top of the protective pipe. Another method is to color code the stand pipes. An example could be red for the lower piezometer and green for the upper piezometer. If necessary this color coding can be added to existing installations if you have questions about which instrument is at what depth. Color coding can assist a novice operator in collecting data.

(6) Replace all caps and lock the protective cap.

(7) Record the reservoir and tail water levels at the time of the observation.

(8) Once all readings have been taken, the probe of the water-level meter should be cleaned and the cable should be dried off with a cloth.

Problems with readout equipment and stand pipes.-- The typical water level indicator will give the operator many years of service if it is properly maintained (see maintenance section below). The indicator works on a simple principle as described above.

Some problems that have occurred with the **water level instrument** are as follows:

1) If the water level meter probe has been damaged, then they will give false reading of water level depths. This damage may occur if the probe gets hung up within the piezometer well and a wire is broken within the cable. With extended use, the probe on the meter could also become worn and give false readings. The probe should be checked periodically for correct reading. An easy way to check a meter is to take a sample of seepage water or river discharge in a container

or bucket, place the probe into the container. If the meter uses sensitivity knob set that knob to the same setting as used to collect the usual water level readings. The meter should sound as the probe is lower into the container when the circuit closes. Measure the distance from the top of the container to the water level with a rule, this distance should be the same as measured with water-level meter.

2) If a water level meter probe has to be replaced on a cable, care should be taken not to shorten the length of the cable in this process. If the cable has been damaged, the amount of cable that has to be removed should be recorded on the meters' wheel and in a field book or data sheet. This record needs to be kept with the meter so that future readings can be compared without the error in cable length becoming a problem.

3) Most water level indicators are incremented every 1 foot over their length. To take measurements to 0.01 foot, the observer must use a separate pocket tape measure as described above. This measurement becomes difficult if the water level meter is marked every 5-feet as some indicators are marked. The five foot distance at times is difficult to measure with a separate tape.

Problems with **stand pipes** are as follows:

1) When measuring water levels in piezometers that are not vertical (greater than +/- 15° from vertical), condensation will build up within the stand pipe. This condensation will give the observer a false water depth reading. The sensitivity switch on the water level indicator can be set at a low setting which will allow the probe to pass this condensation and read the water level, but the depth reading could still be inaccurate.

2) Another problem related to measuring accurate water depths is caused by chemicals that have entered the stand pipe. Chemicals like diesel fuel or oil will enter the water if they have been used in an attempt to retard the setting of Bentonite pellets used to seal a piezometer in the drill hole. These chemicals will float on the water level within the stand pipe and give false readings. These chemicals have been bailed out, blown out, and even wiped out with little success. The 3M company produces an absorbent material which can be used to soak up the diesel fuel and remove it from the well. This material comes in sheets, 18 inches by 18 inches, and needs to be cut to fit into the standpipe. The model is No. T-156, 3M Company absorbent materials. The absorbent should be lowered into the stand pipe by means of 1/4-inch steel rods with the absorbent attached. Many attempts may be required to remove these chemicals.

Another method to solve the problem of chemicals floating in the water column is to install at bubblier system. A bubblier installation is described at the end of this section.

3) The elevation at the top of the standpipe can settle during the life of the project which requires periodic resurvey. The original elevation should always be determined after installation of the piezometer. When a structural deformation survey is conducted at the dam, always the top of pipe elevations should be checked. The new piezometer stand pipe elevations should be entered onto the piezometer data sheets.

4) Plugging of the stand pipes has caused problems and if the pipes are small diameter it become difficult to remove a blockage. Depending on the location of the blockage within the piezometer, near the piezometers tip elevation or some depth within the standpipe its self, water or air pressure can be used to jet out the blockage. Review the zone material where the piezometer is installed and if it is within a zone 1 material, the pressures used to remove the blockage should be kept as low as possible. Typically a blockage occurs at the tip elevation caused by pore water pressure being fines into the piezometers filter and causing the blockage. If this is occurring than jetting out the tip elevation with water is only a temporary repair and it will plug again in the future. If the plug is occurring within the standpipe typically at a pipe joint that wasn't completely sealed during installation this two can be removed temporary.

Clearing the blockage. - The following methods should be attempted to clear blockages. Special attention needs to be paid to the zone or type of material the piezometer is installed in. If the piezometer is installed in zone 1 material that has a low permeability than the blockage should be removed by using air pressure. If the piezometer is installed in high permeability materials (zone 2 or foundation gravel) than water should be used to remove the blockage. When water is used in a low permeability zoned piezometer, it could take years for the water to dissipate. A small diameter pipe or tube should be lowered to just above the blockage and either pressure medium should be applied to the blockage. Once the blockage has been removed test the total depth of piezometer well with a water level indicator. For ½-inch diameter stand pipes use 3/8-inch nylon tubing, and for 3/4-inch diameter stand pipes use 1/4-inch schedule 80 PVC pipe with external screw on couplings. Attach the tubing or pipe that is being used to a hand pump or air tank and apply pressure to the blockage. Slowly lower the pipe till it has passed the blockage and then removes the pipe or tubing. Test the standpipe with a water level indicator. Several pasts may be required till the blockage has been removed. If water is being used the blockage will be washed from the standpipe. When using air the blockage will fall to the current water level within the piezometer and hopefully not cause a future blockage. **Always remember to keep a good grip on the pipe as it is within the piezometer standpipe so that it is not lost down the standpipe.**

c. **Maintenance**.-- The only maintenance that should be required with most water level indicators are changing the batteries and keeping the electrical cable clean and in good condition. Always turn off units to save battery life. When cleaning the probes on the end of the indicators never use solvent or other harsh cleaners. Always use a clean dry rag and wipe along the length of the cable and indicator probe. Never turn the rag around the cable or probe when the probe is being held in a rigid position. If this is done often, the wires attaching the probe to the cable will tend to break or slip out of the end of the probe.

d. **Bubblier System**.-- A bubblier system can be installed within a piezometer stand pipe to measure the water levels. The advantage of this system is that it allows for measurements in a piezometer well that will not allow a conventional water meter to work because of the well contains chemicals within the water as described above. It can also be used in a stand pipe that is partially blocked and the water meter probe is to large and cannot be lowered to the water level, yet the bubblier tube can be pushed past the blockage. By installation of a bubblier system, data can still be collected from piezometers with these problems.

The bubblier system consists of 1/8-inch diameter plastic tubing, 1/8-inch electrical fish tape, a small instrumentation hand air pump with a section of hose attached, and a pressure gauge marked in feet of water. The fish tape is used to lower the plastic tubing into the piezometer pipe and hold it in place. The end of the plastic tubing is left open so the water column can enter the tubing. The tubing is taped to the fish tape at 20 foot intervals so that the tubing will stay in place during and after installation. At the collar of the piezometer installation, the fish tape should be bent over so that it holds the bubblier tubing in place within the piezometer pipe. A tubing union should be added to the top of the tubing so that the hand pump can easily be attached for taking readings. The length of tubing placed in the well should be measured. The length is than subtracted from the elevation of the top of the piezometer pipe and the elevation of the bubblier tube within the well is known.

To take readings, attached the hand pump and pressure gauge to the 1/8-inch tubing at the tubing union. Pump up the pressure in the tubing using the hand pump. Observe the pressure on the pressure gauge. The pressure should raise to a point equal to the pressure or water head within the well and then exceed it by the length of the tubing added during installation within the well, usually 2.5 feet of water. Once the pressure raises to its highest reading, bubbles start leaving the end of the tubing at the bottom end, the pressure should drop. The pressure should than stay steady. Record this reading. Typically, two readings should be taken at this time to verify the reading. To accomplish this, vent the pump of a small amount of pressure and pump it up again. Average the two readings made. The pressure head measured is than added to the elevation of the bottom of the bubblier tube and that provides the elevation of the water within the well.

APPENDIX F

MONITORING WELL BORING LOGS

Project: Pend Oreille Mine
Project Location: Metaline Falls, WA
Project Number: 36298248

Log of Boring 301

Sheet 1 of 1

Date(s) Drilled	**8/4/08**	Logged By	**GDP**	Checked By	**GDP**
Drilling Method	**ODEX**	Drilling Contractor	**EWE**	Total Depth of Borehole	**15 feet bgs**
Drill Rig Type	**T-300**	Drill Bit Size/Type	**4" O.D.**	Ground Surface Elevation	
Groundwater Level	**5 feet bgs**	Sampling Method	**SPT**	Hammer Data	**140 lb, 30" drop**
Borehole Backfill		Location	**Pend Oreille Mine, TD F-1**		

Elevation, feet / Downhole Depth, feet	SAMPLES: Type / Number	Blows/ 6in.	Recovery (%)	OVM (ppm)	Graphic Log	USCS	MATERIAL DESCRIPTION	Well Completion Schematic	REMARKS AND WELL DETAILS
0						GM	Cobble-boulder		
5		11 16 25	67				5 ft ▼ Gray-brown silty fine to medium GRAVEL (angular) with trace clay (dense) (wet)		–10-slot screen
						SM			
10		16 24 50/3"	27				Gray-brown silty fine to medium SAND with gravel (dense) (wet)		
15							Boring was completed to 15' bgs. No soil samples were collected.		
20									
25									
30									

URS

Project: Pend Oreille Mine
Project Location: Metaline Falls, WA
Project Number: 36298248

Log of Boring 302

Sheet 1 of 1

Date(s) Drilled	**8/4/08**	Logged By	**GDP**	Checked By	**GDP**
Drilling Method	**ODEX**	Drilling Contractor	**EWE**	Total Depth of Borehole	**15 feet bgs**
Drill Rig Type	**T-300**	Drill Bit Size/Type	**4" O.D.**	Ground Surface Elevation	
Groundwater Level	**9 feet bgs**	Sampling Method	**SPT**	Hammer Data	**140 lb, 30" drop**
Borehole Backfill		Location	**Pend Oreille Mine, TD F-1**		

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	Blows/ 6in.	Recovery (%)	OVM (ppm)	Graphic Log	USCS	MATERIAL DESCRIPTION	Well Completion Schematic	REMARKS AND WELL DETAILS
	0							ML	Brown sandy SILT (soft) (wet)		
	5			4 2 3	79						
								GM	Gray-brown silty fine to medium GRAVEL with sand (medium dense) (wet) 9 ft ▼		10-slot screen
	10			5 7 16	50						
	15								Boring was completed to 15' bgs. No soil samples were collected.		
	20										
	25										
	30										

URS

Project: Pend Oreille Mine
Project Location: Metaline Falls, WA
Project Number: 36298248

Log of Boring 303

Sheet 1 of 1

Date(s) Drilled	**8/4/08**	Logged By	**GDP**	Checked By	**GDP**
Drilling Method	**ODEX**	Drilling Contractor	**EWE**	Total Depth of Borehole	**13 feet bgs**
Drill Rig Type	**T-300**	Drill Bit Size/Type	**4" O.D.**	Ground Surface Elevation	
Groundwater Level	**4 feet bgs**	Sampling Method	**SPT**	Hammer Data	**140 lb, 30" drop**
Borehole Backfill		Location	**Pend Oreille Mine, TD F-1**		

Elevation, feet / Downhole Depth, feet	SAMPLES: Type / Number	Blows/ 6in.	Recovery (%)	OVM (ppm)	Graphic Log	USCS	MATERIAL DESCRIPTION	Well Completion Schematic	REMARKS AND WELL DETAILS
0						GM	Gray-black fine to coarse GRAVEL (very angular) (very dense) (wet)		
							4 ft ▼		–10-slot screen
							Weathered rock		
5		16 50/2"	20				Competent rock		
10							No sample Dry rock, slate		
							Boring was completed to 13' bgs. No soil samples were collected.		
15									
20									
25									
30									

ENV2 WITH WELL T:\ONEWORLD\36298248 TECK COMINCO PEND OREILLE MINE\36298248.GPJ URSSEA3B.GLB URSSEA3.GDT 9/5/08

URS

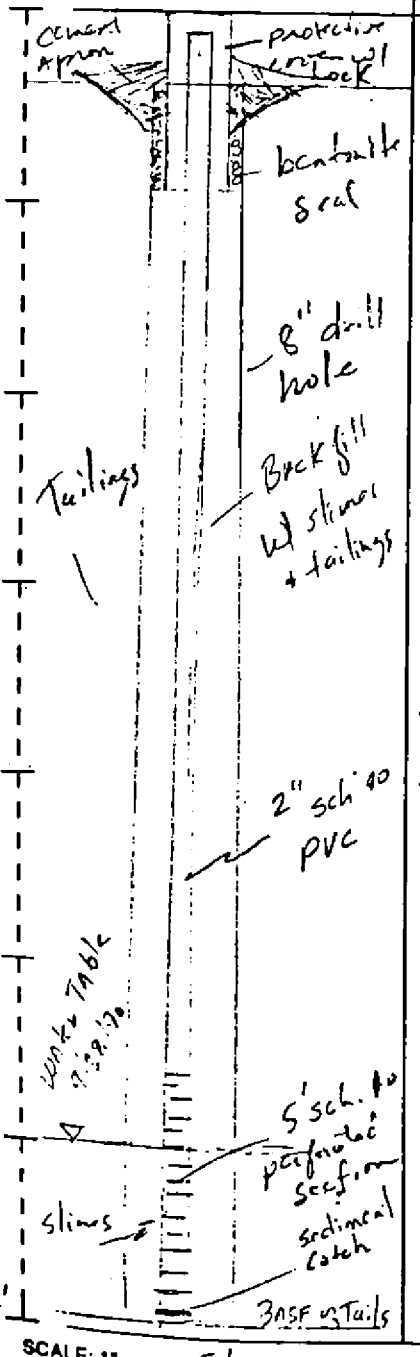
RESOURCE PROTECTION WELL REPORT

START CARD NO. 052969

PROJECT NAME: Pend Oreille
WELL IDENTIFICATION NO. PO 1
DRILLING METHOD: Hollow STEM Auger
DRILLER: L.A. ATKins
FIRM: U.S. Bureau of Mines
SIGNATURE:
CONSULTING FIRM:
REPRESENTATIVE:

COUNTY: Pend Oreille
LOCATION: SE ¼ NE ¼ Sec 15 Twn 39 R 43E
STREET ADDRESS OF WELL: P.O. Box 7, Metalin Falls, WASH.
WATER LEVEL ELEVATION:
GROUND SURFACE ELEVATION:
INSTALLED: 9/24/90
DEVELOPED: 9/27/90

AS-BUILT



SCALE: 1" = 5'

WELL DATA

Well Casing is 2" PVC sch. 40 with a 5' slotted section. Slot size = .020. Entire section of slotted section was covered with a 2" filter sock. Well was pumped until water became clarified + then a 2" down hole bladder pump was installed. Base of Piez. set at 31.24' from Ground level.

JUN 19 1995

FORMATION DESCRIPTION

0 - 3' Sandy tailings Grey
5 - 7' Sandy Grey tailings
7 - 8' wet slimes (perched water?)
10' - 10½' Sandy tailings
10½' - 24' Sandy to fine Grey slimes
25' - 32' saturated sandy to fine grey slimes
32' Top of bedrock Shale

PAGE 1 OF 1

ECY 050-12 (Rev. 11/89)

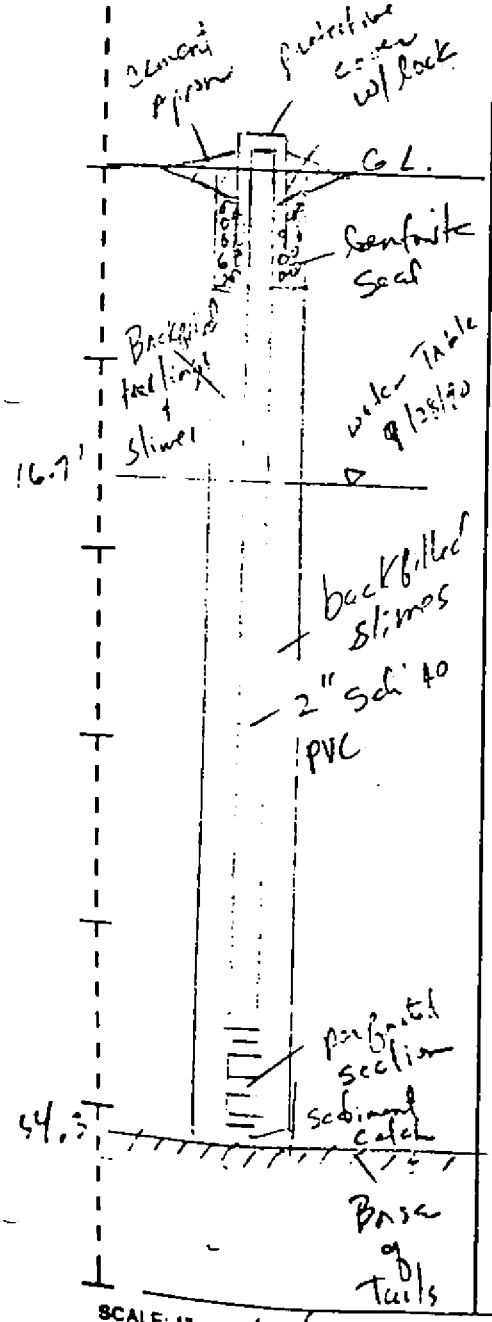
RESOURCE PROTECTION WELL REPORT

START CARD NO. 052969

PROJECT NAME: Pend Oreille
WELL IDENTIFICATION NO. P02
DRILLING METHOD: Hollow stem Auger
DRILLER: L. A. Atkins
FIRM: U.S. Bureau of Mines
SIGNATURE: [signature]
CONSULTING FIRM:
REPRESENTATIVE:

COUNTY: Pend Oreille
LOCATION: SE ¼ NE ¼ Sec 15 Twn 39N R 43E
STREET ADDRESS OF WELL: P.O. Box 7
Metaline Falls, WA.
WATER LEVEL ELEVATION:
GROUND SURFACE ELEVATION:
INSTALLED: 9/25/90
DEVELOPED: 9/27/90

AS-BUILT



SCALE: 1" = 10'

WELL DATA

well casing is 2" PVC Sch. 40 with a 5' slotted section. Slott Size = .020" with a 2" filter sock over slotted section. Well was pumped until water clarified & then a 2" down hole bladder pump was installed. Base of slotted section is at 54.30 ft from ground level (G.L)

FORMATION DESCRIPTION

0-5' dry sandy tailings
6.5-7' wet slime zone (perched water?)
10-15' wet tails
15'-16' sliming sand
16'-53½ saturated grey fine to very fine tailings (sliming)

JUN 19 1995

53½' top of Ledbetter Shale.

PAGE 1 OF 1

ECY 050-12 (Rev. 11/89)

RESOURCE PROTECTION WELL REPORT

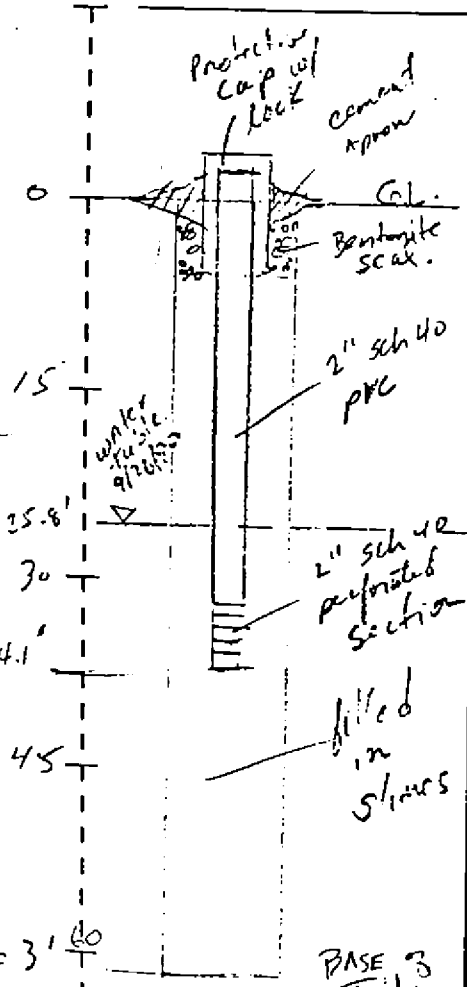
START CARD NO. 052969

PROJECT NAME: Pend Oreille
WELL IDENTIFICATION NO. P03
DRILLING METHOD: Hollow Stem Auger
DRILLER: L.A. ATKins.
FIRM: U.S. Bureau of Mines
SIGNATURE: [signature]
CONSULTING FIRM:
REPRESENTATIVE:

COUNTY: Pend Oreille
LOCATION SE ¼ NE ¼ Sec 15 Twn 37N R 43E
STREET ADDRESS OF WELL: P.O. Box 7

WATER LEVEL ELEVATION:
GROUND SURFACE ELEVATION:
INSTALLED: 9/26/90
DEVELOPED: 9/27 - 9/28/90

AS-BUILT



WELL DATA

well casing is 2" sch. 40 PVC with a 5' slotted section. Slot size = .020 Ending section of slotted section is covered with a filtersock well was pumped until water became clarified + then a 2" down hole bladder pump was installed. Base of pier is set at 34.10' from G.L.

FORMATION DESCRIPTION

GL

0-5' Grey-brown Sandy tailings.
5-6.5' dry slimey Sand.
6.5-20' dry Grey tailings
20'-40' wet grey tailings very fine. (sat.)
40-63' Saturated slimey tailings very fine (90-200 mesh)
63' top of Ledbetter Shale.

JUN 19 1995

SCALE: 1" = 15'

PAGE 1 OF 1

ECY 050-12 (Rev. 11/89)

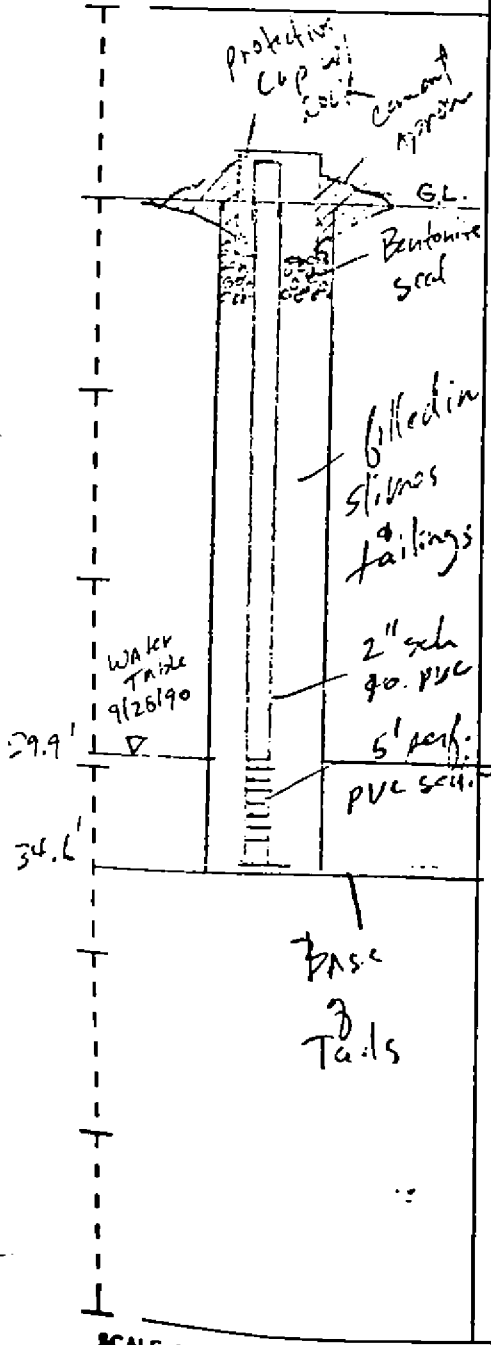
RESOURCE PROTECTION WELL REPORT

START CARD NO. 052569

PROJECT NAME: Pend Oreille
WELL IDENTIFICATION NO. PO 4
DRILLING METHOD: Hollow Stem Auger
DRILLER: L. A. Atkins
FIRM: U.S. Bureau of Mines
SIGNATURE:
CONSULTING FIRM:
REPRESENTATIVE:

COUNTY: Pend Oreille
LOCATION: SE ¼ NE ¼ Sec 15 Twn 41N R 43E
STREET ADDRESS OF WELL: P.O. Box 7 Metaline Falls, WA.
WATER LEVEL ELEVATION:
GROUND SURFACE ELEVATION:
INSTALLED: 9/27/90
DEVELOPED: 9/28/90

AS-BUILT



WELL DATA

well casing is 2" sch. 40 pvc. with a 5' slotted section, slot size = .02" Entire slot section is covered with a filter sock to keep fine particles out. Well was pumped until water became clarified & then a 2" down hole bladder pump was installed. Base of pieg. is set at 34.6' from G.L.

FORMATION DESCRIPTION

0-8' Grey, fine Sandy tailings w/ Trace of FeOxide.

8-20' fine to very fine Sandy tailings dry to moist.

20'-34' Saturated silty tailings

34' top of bedrock Shale

JUN 19 1995

SCALE: 1" = 10'

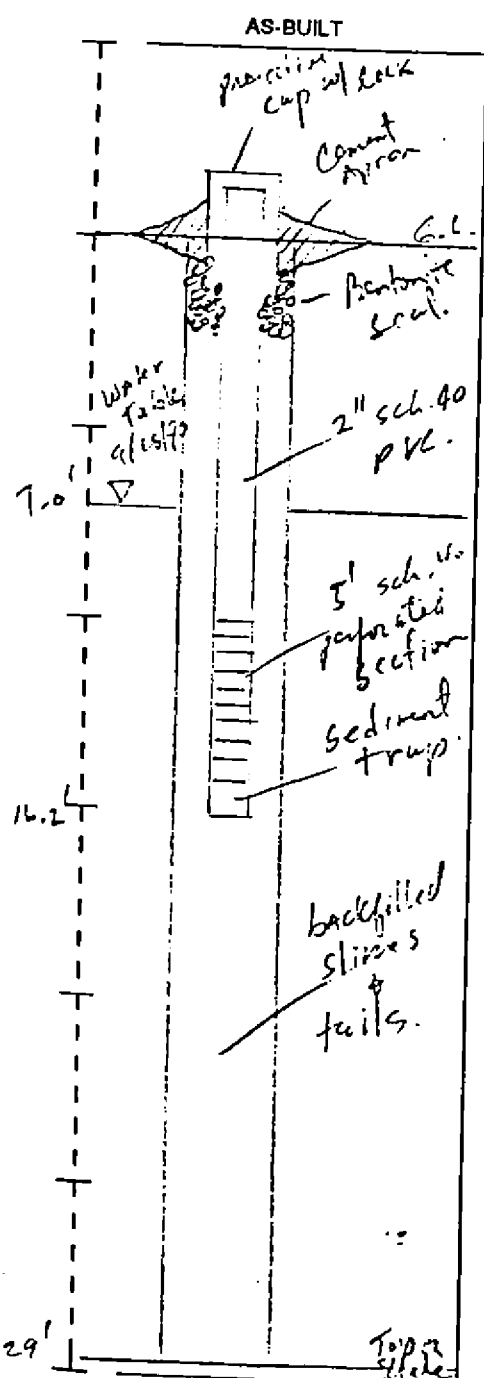
PAGE 1 OF 1

ECY 050-12 (Rev. 11/89)

RESOURCE PROTECTION WELL REPORT

PROJECT NAME: Pend Oreille
WELL IDENTIFICATION NO. P05
DRILLING METHOD: Hollow Stem Auger
DRILLER: L. A. Atkins
FIRM: U.S. Bureau of Mines
SIGNATURE: [signature]
CONSULTING FIRM:
REPRESENTATIVE:

START CARD NO. 052969
COUNTY: Pend Oreille
LOCATION: SE ¼ NE ¼ Sec 15 Twn 39N R 43E
STREET ADDRESS OF WELL: P.O. Box 7 Metaline Falls, WA.
WATER LEVEL ELEVATION:
GROUND SURFACE ELEVATION:
INSTALLED: 9/27/90
DEVELOPED: 9/28/90



WELL DATA

Well casing is 2" sch. 40 pvc with a 5' slotted section. Slot size = .02" Entire section of slotted section is covered with a filter sock. Well was pumped until water clarified & then a 2" down-hole bladder pump was installed. Base of piez is set at 16.2' from G.L.

FORMATION DESCRIPTION

0-5' Brown-green-grey oxidized sandy tails dry.

5-7' Grey tails wet at 6.5'

7-10' Saturated tailings grey.

10'-29' Saturated slimy grey tailings (tails seemed finer & slimyer than others)

29' top of bedrock shale & base of tailings.

JUN 19 1995

SCALE: 1" = 5'

PAGE 1 OF 1

ECY 050-12 (Rev. 11/89)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Start Card No. 43115
UNIQUE WELL I.D. # AEK278
Water Right Permit No. _____

OWNER: Name CONOCO ANGLICAN Address 1382 BEND ORIOLE NINE RD.

(2) LOCATION OF WELL: County BEND ORIOLE ? 1/4 NW 1/4 Sec 15 T 39N N, R 36 W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) SAME AS ABOVE

(3) PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☐ ☐ Irrigation ☐ Test Well ☒ Other ☐ ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) MW-7
Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches. Drilled 140 feet. Depth of completed well 138 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 4 " Diam. from +2.5 ft. to 98 ft.
Welded ☐ Liner installed ☐ Threaded ☒ _____ " Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type Sch 40 PVC Model No. _____
Diam. 4 Slot size .010 from 98 ft. to 138 ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☒ No ☐ Size of gravel 20/40
Gravel placed from 95 ft. to 140 ft.

Surface seal: Yes ☒ No ☐ To what depth? 95 ft.
Material used in seal Bentonite Chips
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name N/A
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 113 ft below top of well Date 12/13
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Sandy Silt (Moist)	0	5
Sand (Moist)	5	25
Sandy Silt	25	30
Moist Sand	30	50
Gravely Sand	50	60
Moist Sand	60	80
Sand & Gravels	90	95
Moist Sand w/some silt	95	110
Gravels saturated at 113	110	125
Saturated Sand w/some silt	125	140

RECEIVED JAN 12 1999 DEPARTMENT OF ECOLOGY EASTERN REGIONAL OFFICE

Work Started 11/12 19 Completed 11/13 19 98

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Environmental West Exp (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address P.O. Box 11095 Spokane WA 99211
(Signed) _____ (WELL DRILLER) License No. 2271
Contractor's Registration No. ENVIRWE101PP Date 1/11 19 99

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer. For special accommodation needs, contact the Water Resources Program at (206) 407-6600. The TDD number is (206) 407-6006.

ECY 050-1-20 (9/93)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

APPENDIX G

RESTRICTIVE COVENANT

Return to:

[Fill in]

DECLARATION OF ENVIRONMENTAL COVENANT

Reference numbers of related documents: n/a

Grantor(s): Teck Washington Incorporated, a Washington corporation

Grantee(s): State of Washington, Department of Ecology

Legal Description:

1. Abbreviated form: [fill in]

2. Additional legal descriptions are on pages 7 through __ of document

Assessor's Property Tax Parcel Account Number(s): [fill in]

****

DECLARATION OF ENVIRONMENTAL COVENANT

The undersigned, Teck Washington Incorporated, a Washington corporation (hereafter “Teck”), is the fee owner of real property (hereafter the "Property") in the County of Pend Oreille, State of Washington, that is subject to this Declaration of Environmental Covenant (hereafter the “Covenant”). The Property consists of _____ separate parcels, each of which is legally described in Attachment A of this Covenant and incorporated herein by reference.

Recitals

This Covenant is made by Teck pursuant to RCW 70.105D.030(1)(f) and (g) and WAC 173-340-440. A remedial action (hereafter "Remedial Action") is being conducted at the Property that is the subject of this Covenant. The Remedial Action conducted at the Property is described in the following documents:

1. Cleanup Action Plan for the Pend Oreille Mine Tailings Disposal Facilities Nos. 1 and 2 in Metaline Falls, Washington dated _____.

2. Design documents dated _____.

These documents are currently on file at the Washington State Department of Ecology’s (hereafter “Ecology”) Eastern Regional Office, located at N. 4601 Monroe, Spokane,

Washington. The Remedial Action includes installation of a cover system over the tailings on the Property. The components of the cover system are depicted on the engineering design drawings which is this covenant is a part of and is incorporated herein by reference.

This Covenant is required because a conditional point of compliance has been established for groundwater. Iron and manganese are present in groundwater upgradient of the conditional point of compliance in concentrations that exceed the Model Toxics Control Act Method B cleanup levels established under WAC 173-340-720.

Teck makes the following declaration as to limitations, restrictions, and uses to which each of the parcels on the Property may be put and specifies that such declarations shall constitute covenants to run with the land, as provided by law and shall be binding on the legal representatives, successors and assigns of all persons having or in the future acquiring any right, title, or interest in any of the parcels on the Property (hereafter "Owner"). Teck hereby binds Owner to the land use restrictions identified herein and grants such other rights under this Covenant in favor of the State of Washington, Department of Ecology (hereafter "Ecology"). Ecology shall have full right of enforcement of the rights conveyed under this Covenant pursuant to RCW 70.105D.030(1)(g) and the Uniform Environmental Covenants Act, chapter 64.70 RCW.

Covenant

Limitations, Restrictions, and Uses for Parcel _____: [*If multiple parcels are involved, the following lists all of the restrictions that could apply to various parcels. If appropriate, we can determine which restrictions apply to which parcels and specify that below.***]**

Section 1. No groundwater may be taken from the parcel, except for purposes related to the Remedial Action, such as groundwater monitoring.

Section 2. The Owner shall maintain components of the Remedial Action installed on this parcel in accordance with the maintenance requirements of the Operations and Maintenance Plan, prepared in accordance with requirements of Exhibit C to the Consent Decree filed on _____, 201__ in *State of Washington, Department of Ecology v. Teck Washington Incorporated*, Pend Oreille County Superior Court No. _____, as now written and hereafter amended.

Section 3. The Owner shall maintain a suitable barrier that restricts unauthorized access to the cover system as described in the Operations and Maintenance Plan, prepared in accordance with requirements of Exhibit C to the Consent Decree filed on _____, 201__ in *State of Washington, Department of Ecology v. Teck Washington Incorporated*, Pend Oreille County Superior Court No. _____, as now written and hereafter amended.

Section 4. Any activity on the parcel that may result in the release or exposure to the environment of a hazardous substance that remains on the parcel as part of the Remedial Action, or create a new exposure pathway, is prohibited without prior written approval from Ecology. Such activities include, but are not limited to, the following: drilling or digging; placing any objects or using any equipment that deforms or stresses the ground surface beyond its load-

bearing capability; or bulldozing or earthwork.

Section 7. Any activity on the parcel that may interfere with the integrity of the Remedial Action and the resultant continued protection of human health and the environment is prohibited.

Section 8. The Owner must give thirty (30) days advance written notice to Ecology of the Owner's intent to convey any interest in the parcel. No conveyance of title, easement, lease, or other interest in the parcel shall be consummated by the Owner without adequate and complete provision for continued monitoring, operation, and maintenance of the Remedial Action. The Owner must include in any instrument conveying any interest in the parcel notice of this Restrictive Covenant.

Section 9. The Owner must restrict leases to uses and activities consistent with the Restrictive Covenant and notify all lessees of the restrictions on the use of the parcel.

Section 10. The Owner must notify and obtain approval from Ecology prior to any use of the parcel that is inconsistent with the terms of this Restrictive Covenant. Ecology may approve any inconsistent use only after public notice and comment.

Section 11. The Owner shall allow authorized representatives of Ecology the right to enter the parcel at reasonable times for the purpose of evaluating the Remedial Action, to take samples, to inspect the Remedial Action conducted at the parcel, and to inspect records that are related to the Remedial Action. Except in an emergency, Ecology shall notify the Owner of its intention to enter the parcel at least 48 hours before entry.

Section 12. The Owner of the parcel reserves the right under WAC 173-340-440 to record an instrument that provides that this Restrictive Covenant shall no longer limit use of the parcel or be of any further force or effect. However, such an instrument may be recorded only if Ecology, after public notice and opportunity for comment, concurs.

Miscellaneous Provisions

Governing Law. The validity, performance, and enforceability of this Covenant shall be governed by the laws of the State of Washington.

Notices. All notices or other communications that are required or permitted to be given under this Covenant shall be in writing, and either personally delivered or mailed to the following addresses:

Notices or other communications to Ecology:

Washington State Department of Ecology
Eastern Regional Office
Toxics Cleanup Program
N. 4601 Monroe
Spokane, WA 99205

Notices or other communications to Teck Washington Incorporated:

Teck Washington Incorporated
1382 Pend Oreille Mine Road
Metaline Falls, WA 99153

(Signature blocks appear on next two pages)

TECK WASHINGTON INCORPORATED, a Washington corporation

_____
By:_____
Its:_____

STATE OF WASHINGTON
COUNTY OF PEND OREILLE

On this _____ day of _____, 201__, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____, to me known to be the person who signed as _____ of TECK WASHINGTON INCORPORATED, the corporation that executed the within and foregoing instrument, and acknowledged said instrument to be the free and voluntary act and deed of said corporation for the uses and purposes therein mentioned, and on oath stated that he was duly elected, qualified and action as said officer of the corporation, that he was authorized to execute said instrument and that the seal affixed, if any, is the corporate seal of said corporation.

IN WITNESS WHEREOF I have hereunto set my hand and official seal the day _____ day of _____, 201__.

_____
Print Name:_____
Notary Public in and for the State of Washington
Residing at _____
My commission expires:_____

STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY

_____
By:_____
Its:_____

APPROVED AS TO FORM:

By:_____
Assistant Attorney General

STATE OF WASHINGTON)
)
COUNTY OF _____)

On this _____ day of _____, 201__, before me personally appeared _____, to me known to be the duly appointed _____ of the STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY, and that ___ executed the within and foregoing instrument and acknowledged the said instrument to be the free and voluntary act and deed of said State of Washington, for the uses and purposes therein set forth, and on oath stated that he/she is authorized to execute said instrument.

IN WITNESS WHEREOF I have hereunto set my hand and official seal the day _____ day of _____, 201__.

_____
Print Name:_____
Notary Public in and for the State of Washington
Residing at _____
My commission expires:_____

Attachment A

Legal Description

APPENDIX H

MAINTENANCE ACTIVITY LOG AND RECOMMENDATIONS

Recommended Maintenance Activities for TDF-1 and TDF-2

Cover System

Defect	Condition when Maintenance is needed	Recommended Maintenance Activity
Lack of vegetation on cover	Less than 80% coverage	Determine why vegetation cover is poor. Re-plant with grass plugs or re-seed into loosened, fertile soil
Trash and debris	Trash and debris exceed 5 cubic feet per 1,000 square feet	Remove trash
Noxious weeds or poisonous vegetation	Any evidence of their presence	Comply with state and local eradication procedures
Rodent holes	Any evidence of their presence	Destroy or remove rodents and repair damage
Rooting trees	Any evidence of their presence	Remove with care to not bring tailings to surface or damage cover system
Cover or embankment erosion	Erosion observed on the embankment slopes or eroded damage is more than 2 inches deep into the cover	For erosion along the cover surface, stabilize with rock reinforcement or plant additional vegetation. Determine root cause of embankment erosion and repair
Ponded water over cover system	Water depth exceeds 2 inches outside of Wetland A	Remove water by pumping or other means. Determine cause of flow restriction. Evaluate settling.
Exposed geotextile and/or drainage layer	Exposed geotextile or waste rock is observed on the surface of the TDFs	Determine cause of missing cover and replace material
Missing signage	Institutional controls as indicated on the design drawings are missing	Locate missing signage or install replacements
Missing or damaged gate	Structural integrity of gate is affected	Replace gate
Trespassing or damaged caused by unauthorized site access	Evidence of unauthorized site access or use is discovered	Determine location where access to the site was achieved and take appropriate measures to restrict access to the area

Water Conveyance

Defect	Condition when Maintenance is needed	Recommended Maintenance Activity
Sediment in Ditch 1B	Sediment Depth exceeds 4 inches	Remove sediment, taking care not to damage the underlying ditch liner. If sediment accumulation returns, remove sediment and determine root cause of erosion
Trash or debris collected in inlet structure	Plugging more than 20% of the opening	Clean trash and debris from barrier
Rusted, bent or missing safety bars	Bars are bent more than 3 inches out of shape, rust is causing deterioration to more than 50% of the barrier or bars are missing	Repair or replace bars
Sediment accumulation in grasses	Sediment depth exceeds more than 2 inches within design grade lines	Remove sediment and determine root cause
Erosion or scouring	Eroded or scoured grade lines	For ruts or bare areas less than 12 inches wide, repair damage by filling with crushed gravel. For larger areas re-grade and re-seed
Turbid discharges	Turbid discharges observed from culvert outlets or from springs or seeps	Determine cause of turbidity and effect on embankment stability. Consult a licensed civil or geotechnical engineer if needed
Blocked or restricted culvert outlet/inlets	Opening is blocked by more than 20%	Remove blockage

Embankment

Defect	Condition when Maintenance is needed	Recommended Maintenance Activity
Slides, slumps or other embankments movements	When slope movement exceeds two inches or is continually moving	Determine root cause of slope movement. Consult a licensed civil or geotechnical engineer if needed
Increased seepage from TDF-1 toe	Development of new springs, seeps or increase in flow of existing seeps	Determine root cause and effect on embankment stability. Consult a licensed civil or geotechnical engineer if needed

TDF-1 and TDF-2 Maintenance Activity Log

Date of Observation	Observer	Identified Deficiency	Corrective Action	Date Completed	Verified By