Appendix 12 Plant Site: Management and Monitoring Plans Outlines



NORTHMET PROJECT MANAGEMENT AND MONITORING PLANS FLOTATION TAILINGS BASIN MANAGEMENT AND MONITORING PLAN AUGUST 2016 DRAFT

1.0	INTROD	UCTION
2.0	BACKGF 2.1	ROUND Permit Overview
3.0	FLOTAT 3.1 3.2	ION TAILINGS CHARACTERISTICS Geochemical Characteristics Geotechnical Characteristics
4.0	FLOTAT 4.1 4.2	Management Objectives Operations 4.2.1 FTB Dams 4.2.1.1 FTB Staging and Sequence 4.2.1.2 FTB Freeboard Requirements 4.2.1.3 Dam Construction 4.2.1.4 Dam Incremental Reclamation 4.2.2 Flotation Tailings Transport and Deposition 4.2.3 Water Management 4.2.4 General Maintenance
5.0	Monito	
5.0	5.1 5.2	Material Characteristics Verification Stability Monitoring 5.2.1 Piezometers 5.2.2 Inclinometers 5.2.3 Survey Monitoring Hubs 5.2.4 Semi-Continuous Data Collection
	5.3 5.4	Construction Monitoring and Documentation Monitoring of Other Systems 5.4.1 Flotation Tailings Deposition 5.4.2 Pond Level and Beach Length 5.4.3 Water Quality 5.4.4 Return Water System 5.4.5 Topographic and Bathymetric Survey
6.0	DAM SA 6.1 6.2 6.3 6.4	RETY INSPECTIONS AND REVIEWS Routine Dam Safety Inspections Inspections After Unusual Events/Observations Semi-Annual Dam Safety Inspections 5-Year Dam Safety Review
7.0	REPOR 7.1 7.2 7.3	Dam Safety Permit Annual Report Permit to Mine Annual Report Comparison to Slope Stability Models 7.3.1 Comparison of Monitoring Results to Model Estimates 7.3.2 Model Refinements 7.3.3 Annual Report
	7.4 7.5	Adaptive Management Contingency Mitigation

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LIST OF ATTACHMENTS

ATTACHMENT A FTB DAM SAFETY PERMIT

ATTACHMENT B FTB CONTINGENCY ACTION PLAN
ATTACHMENT C QUALITY ASSURANCE PROJECT PLAN

LIST OF STANDARD OPERATING PROCEDURES (SOP)

FTB SOP 1	FTB OPERATIONS SOP
FTB SOP 2	MATERIAL CHARACTERISTICS TESTING SOP
FTB SOP 3	FTB INSTRUMENTATION AND STABILITY MONITORING SOP
FTB SOP 4	FTB CONSTRUCTION MONITORING AND DOCUMENTATION SOP
FTB SOP 4	FTB MONITORING OF OTHER SYSTEMS SOP
FTB SOP 5	FTB DAM SAFETY INSPECTION SOP
FTB SOP 6	ANNUAL COMPARISON TO SLOPE STABILITY MODEL SOP

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NORTHMET PROJECT MANAGEMENT AND MONITORING PLANS HYDROMETALLURGICAL RESIDUE FACILITY MANAGEMENT AND MONITORING PLAN AUGUST 2016 DRAFT

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2.0	BACKGF 2.1	ROUND Permit Overview
3.0	RESIDU 3.1 3.2	E CHARACTERISTICS Geochemical Characteristics Geotechnical Characteristics
4.0	HYDROI 4.1 4.2	METALLURGICAL RESIDUE FACILITY MANAGEMENT Management Objectives Operations 4.2.1 HRF Dams 4.2.1.1 HRF Staging and Sequence 4.2.1.2 HRF Freeboard Requirements 4.2.1.3 Dam Construction 4.2.1.4 Dam Incremental Reclamation 4.2.2 Residue Transport and Deposition 4.2.3 Water Management 4.2.4 General Maintenance
5.0	MONITO 5.1 5.2 5.3 5.4	
6.0	DAM SA 6.1 6.2 6.3 6.4	ROUTIONS AND REVIEWS ROUTIONS AND REVIEWS ROUTIONS AND REVIEWS ROUTIONS AND REVIEWS Inspections After Unusual Events/Observations Semi-Annual Dam Safety Inspections 5-Year Dam Safety Review
7.0	REPORT 7.1 7.2 7.3 7.4 7.5	TING AND ADAPTIVE MANAGEMENT Dam Safety Permit Annual Report Permit to Mine Annual Report Periodic Comparison to Slope Stability Models and Model Refinement Adaptive Management Contingency Mitigation

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LIST OF ATTACHMENTS

ATTACHMENT A HRF DAM SAFETY PERMIT

ATTACHMENT B HRF CONTINGENCY ACTION PLAN

ATTACHMENT C QUALITY ASSURANCE PROJECT PLAN

LIST OF STANDARD OPERATING PROCEDURES (SOP)

HRF SOP 1	HRF OPERATIONS SOP
HRF SOP 2	MATERIAL CHARACTERISTICS TESTING SOP
HRF SOP 3	HRF INSTRUMENTATION AND STABILITY MONITORING SOP
HRF SOP 4	HRF CONSTRUCTION MONITORING AND DOCUMENTATION SOP
HRF SOP 5	HRF MONITORING OF OTHER SYSTEMS SOP
HRF SOP 6	HRF DAM SAFETY INSPECTION SOP



NORTHMET PROJECT MANAGEMENT AND MONITORING PLANS PLANT SITE AIR QUALITY MANAGEMENT AND MONITORING PLAN AUGUST 2016 DRAFT

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2.0	BACKGF 2.1	ROUND Permit Overview
3.0	DESCRI 3.1 3.2 3.3	PTION OF SOURCES AND MITIGATION MEASURES Point Sources Fugitive Sources Mitigation Measures
4.0	AIR QUA 4.1 4.2	Management Objectives Point Source Controls 4.2.1 Beneficiation Plant Sources 4.2.2 Hydrometallurgical Plant Sources and Lime Slaker 4.2.3 Concentrate Dewatering/Storage Building 4.2.4 Process Consumable Sources with Fabric Filters 4.2.5 Oxygen Plant Cooling Tower Fugitive Source Controls
	4.0	4.3.1 Fugitive Emissions Control Plan
5.0	MONITO	
	5.1 5.2 5.3 5.4	Point Source Tons Processed or Operating Hours Boiler/Heater/Stationary Engine Fuel Usage Stack Tests Periodic Monitoring System 5.4.1 Crusher/Concentrator 5.4.2 Autoclave 5.4.3 Hydrometallurgical Process Tanks 5.4.4 Integration with Plant Control System 5.4.5 Process Consumable Sources
	5.5 5.6 5.7	Material Handling Tons and Rates for Fugitive Emissions Mobile Equipment Monitoring 5.6.1 Vehicle Miles Traveled 5.6.2 Tailpipe Emissions Ambient Air Monitoring
6.0	5.8 REPORT	Other Monitoring FING AND ADAPTIVE MANAGEMENT
0.0	6.1 6.2 6.3 6.4	Air Operating Permit Reporting Additional Reporting Needs Adaptive Management Contingency Mitigation

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ATTACHMENT B PLANT SITE FUGITIVE EMISSIONS CONTROL (FEC) PLAN

ATTACHMENT C AMBIENT AIR BOUNDARY CONTROL PLAN

ATTACHMENT D EMISSION CONTROL EQUIPMENT OPERATION AND MAINTENANCE PLAN

ATTACHMENT E QUALITY ASSURANCE PROJECT PLAN

LIST OF STANDARD OPERATING PROCEDURES (SOP)

PAQ SOP 1 STACK TESTING SOP

PAQ SOP 2 AIR QUALITY MONITORING SOP

PAQ SOP 3 MOBILE EQUIPMENT MONITORING SOP

PAQ SOP 4 AIR OPERATING PERMIT REPORTING SOP



NORTHMET PROJECT MANAGEMENT AND MONITORING PLANS PLANT SITE WATER MANAGEMENT AND MONITORING PLAN

AUGUST 2016 DRAFT

1.0	INTROD	DUCTION
2.0	BACKG 2.1	ROUND Permit Overview
3.0	TYPES	OF WATER TO MANAGE
4.0	WATER	BALANCE
5.0		Management Objectives Beneficiation Plant Process Water Tailings Basin Water Tailings Basin Seepage 5.4.1 FTB Seepage Containment System 5.4.2 FTB South Seepage Management System Hydrometallurgical Plant Process Water Hydrometallurgical Residue Facility Water Waste Water Treatment Plant Sewage Treatment System Plant Site Reservoir and Colby Lake Pipeline Potable Water Treatment Plant Stormwater 5.11.1 Construction Stormwater Management 5.11.2 Industrial Stormwater Management 5.11.3 Stormwater Infrastructure Stream Augmentation 5.12.1 Unnamed Creek
6.0	Monito 6.1	5.12.2 Trimble Creek 5.12.3 Unnamed (Mud Lake) Creek 5.12.4 Second Creek DRING Tailings Basin Water
	6.2	 6.1.1 Pond Water 6.1.2 Seepage Hydrometallurgical Residue Facility Water 6.2.1 Pond Water 6.2.2 Leachate
	6.3 6.4 6.5 6.6 6.7 6.8	Stormwater Surface Water Discharges Groundwater Wetlands Surface Water Spills
7.0	REPOR 7.1	TING AND ADAPTIVE MANAGEMENT NPDES/SDS Permit Reporting 7.1.1 Discharge Monitoring Reporting
	7.2	7.1.2 Annual ReportWater Appropriations Permit Reporting7.2.1 Monthly/Quarterly Reporting

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7.2.2 Annual Report

- 7.3 Comparison to Water Model
 - 7.3.1 Comparison of Monitoring Results to Model Estimates
 - 7.3.2 Model Refinements
 - 7.3.3 Reporting
- 7.4 Adaptive Management
- 7.5 Contingency Mitigation

LIST OF ATTACHMENTS

ATTACHMENT A NPDES/SDS PERMIT

ATTACHMENT B WATER APPROPRIATIONS PERMITS

ATTACHMENT C PLANT SITE WATER BALANCE

ATTACHMENT D QUALITY ASSURANCE PROJECT PLAN

LIST OF STANDARD OPERATING PROCEDURES (SOP)

PWM SOP 1	CONSTRUCTION STORMWATER HANDLING SOP
PWM SOP 2	INDUSTRIAL STORMWATER HANDLING SOP
PWM SOP 3	WATER MONITORING AND SAMPLING SOP
PWM SOP 4	SPILL HANDLING AND REPORTING SOP
PWM SOP 5	WATER PERMIT-REQUIRED REPORTING SOP
PWM SOP 6	COMPARISON TO WATER MODEL SOP



NORTHMET PROJECT MANAGEMENT AND MONITORING PLANS WASTE WATER TREATMENT SYSTEM AUGUST 2016 DRAFT

1.0	INTROD	UCTION
2.0	BACKGF 2.1	ROUND Permit Overview
3.0	3.1 3.2 3.3 3.4	WATER TREATMENT PLANT MANAGEMENT Overview, Objectives, and System Controls Pre-treatment Basin Greensand Filtration Primary Membrane Separation 3.4.1 Primary RO Membrane Separation System 3.4.2 Primary NF Membrane Separation System
	3.5 3.6 3.7	Secondary Membrane Separation Permeate Stabilization Effluent Discharge 3.7.1 Zero Discharge Requirements 3.7.2 Stream Augmentation Requirements
	3.8 3.9 3.10	Concentrate Management Byproduct Management Chemical Handling
4.0	WASTE 4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9	WATER TREATMENT FACILITY MANAGEMENT AND MONITORING Overview, Objectives, and System Controls Equalization Basins Chemical Precipitation Treatment Train Primary Membrane Separation Treatment Train Secondary Membrane Separation Discharge Works Byproduct Management Chemical Handling Construction Water Basin
5.0	MONITO 5.1	Waste Water Treatment Plant 5.1.1 Influent 5.1.2 Byproducts 5.1.3 Effluent Waste Water Treatment Facility
	0.2	5.2.1 Influent 5.2.2 Byproducts 5.2.3 Effluent
6.0	REPORT 6.1	FING AND ADAPTIVE MANAGEMENT NPDES/SDS Permit Reporting 6.1.1 Discharge Monitoring Report 6.1.2 Annual Report 6.1.2.1 Zero Discharge Tracking
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	6.3	Adaptive Management

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ATTACHMENT A NPDES/SDS PERMIT

ATTACHMENT B WATER APPROPRIATION PERMITS

ATTACHMENT C QUALITY ASSURANCE PROJECT PLAN

LIST OF STANDARD OPERATING PROCEDURES (SOP)

WWT SOP 1 MONITORING AND SAMPLING SOP

WWT SOP 2 SPILL HANDLING AND REPORTING SOP

WWT SOP 3 WATER PERMIT REPORTING SOP