MONTANA RESOURCES, LLC
YANKEE DOODLE TAILINGS IMPOUNDMENT

TAILINGS OPERATIONS, MAINTENANCE AND SURVEILLANCE (TOMS) MANUAL
VA101-126/29-3

Rev	Description	Date
0	Issued in Final	April 20, 2016
1	Updated to Reflect 2017 Operational Changes	December 19, 2017
2	Updated to Reflect 2018 Operational Changes	December 21, 2018
3	Issued with Minor Revisions and Editorial Changes	January 7, 2019
4	Updated to Reflect 2020 Operating Conditions	May 13, 2020
5	Updated to Reflect 2021 Operating Conditions	January 12, 2022
6	Updated to Reflect 2023 Operating Conditions	December 4, 2023

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Montana Resources

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ABBREVIATIONS

ACC ..... Anaconda Copper Company
AIR ..... Annual Inspection Report
AMC ..... Anaconda Minerals Company
AR ..... Atlantic Richfield Company
ARD ..... Acid Rock Drainage
BMFOU ..... Butte Mine Flooding Operable Unit
BPPS ..... Berkeley Pit Pumping System
CERCLA ..... Comprehensive Environmental Response, Compensation and Liability Act
CFR ..... Code of Federal Regulations
CMP ..... Construction Management Plan
DAR ..... Data Analysis Report
DBRA ..... Dam Breach Risk Assessment
DNRC ..... Department of Natural Resources and Conservation
EAP ..... Emergency Action Plan
EOR ..... Engineer of Record
EPA ..... Environmental Protection Agency
GNSS ..... Global Navigation Satellite System
GPM ..... gallons per minute
HDPE ..... High Density Polyethylene
HsB ..... Horseshoe Bend
HsBCS ..... Horseshoe Bend Capture System
InSAR ..... Interferometric Synthetic Aperture Radar
IPI ..... In-place Inclinometer
IRP ..... Independent Review Panel
KP ..... Knight Piésold Ltd.
MBMG ..... Montana Bureau of Mines and Geology
MCA ..... Montana Code Annotated
MDEQ ..... Montana Department of Environmental Quality
MSHA ..... Mine Safety and Health Administration
MR ..... Montana Resources, LLC
MTPH ..... Main Tailings Pump House
NID ..... National Inventory of Dams
QA/QC ..... Quality Assurance/Quality Control
QPP ..... Quantitative Performance Parameters
OP ..... Operating Permit
PMF ..... Probable Maximum Flood
QPP ..... Quantitative Performance Parameter
RMS ..... Remote Monitoring System
SLWS ..... Silver Lake Water System
TOMS ..... Tailings Operations, Maintenance and Surveillance
TSF ..... Tailings Storage Facility
USACE ..... United States Army Corps of Engineers
U.S. EPA ..... United States Environmental Protection Agency

VWP ..... Vibrating Wire Piezometer
WED ..... West Embankment Drain
WTP ..... Water Treatment Plant
YDTI ..... Yankee Doodle Tailings Impoundment

SECTION 1.0 INTRODUCTION

1.1 SCOPE AND OBJECTIVE OF MANUAL

Montana Resources, LLC (MR) operates an open pit copper and molybdenum mine in Butte, Montana. The mine includes the mill and processing facilities, and a tailings storage facility called the Yankee Doodle Tailings Impoundment (YDTI). The mine produces copper sulfide concentrate, molybdenum disulfide concentrate, and copper precipitate (cement copper) for sale in U.S. and world markets.

This Tailings Operations, Maintenance and Surveillance (TOMS) Manual has been prepared for the YDTI. It considers and is applicable to the YDTI and associated embankments, tailings distribution systems, reclaim water systems, stormwater management, facility monitoring devices, and other ancillary infrastructure associated with the operation and management of the YDTI facility during construction, operation and closure.

The principal objectives of this TOMS Manual are as follows:

- To describe the roles and responsibilities of MR personnel for the management of the YDTI and associated facilities
- To identify the operation, surveillance, maintenance, and inspection requirements
- To provide details on the emergency processes, plans and procedures

The TOMS Manual has been developed to comply with State law. The requirements of the TOMS Manual are described in Montana Code Annotated (MCA) 82-4-379.

1.2 MANUAL STRUCTURE

This TOMS Manual presents the required information in the following nine sections:

Section 1.0 - Introduction

Section 2.0 - Roles and Responsibilities

Section 3.0 - TOMS Manual Distribution and Updates

Section 4.0 - Description of Facilities

Section 5.0 - Operations, Maintenance and Surveillance

Section 6.0 - Inspections, Reporting and Reviews

Section 7.0 - Emergency Preparedness and Response

Section 8.0 - References

Section 9.0 - Certification

SECTION 2.0 ROLES AND RESPONSIBILITIES

2.1 MONTANA RESOURCES ORGANIZATIONAL STRUCTURE

The key roles, responsibilities and assigned personnel for tailings management, operations, surveillance, and inspection of the YDTI are identified in the following sections.

MR employs approximately 388 people for operation and management of the mine. The MR corporate organization chart is structured with five divisions as presented on Figure 2.1.

1. Finance
2. Operations
3. Environmental Affairs
4. Maintenance
5. Human Resources

Separate organization charts for the MR Operations and Maintenance Divisions are presented on Figures 2.2 and 2.3, respectively.

The MR President has the ultimate responsibility for the mine and the YDTI. A description of each of the key supporting roles and responsibilities for YDTI Operations, YDTI Maintenance and Engineering Support (provided by Knight Piésold Ltd) is presented in Table 2.1. The following definitions apply to the roles indicated in Table 2.1:

- Responsible (**R**) is the position that performs the functional activity. The responsibility may be shared or delegated, but does not change the overall responsibility of the position.
- Accountable (**A**) is ultimately accountable for completion of the functional activity, review of the results, and has veto power over it. This position ensures that the functional activity is completed.
- Support (**S**) is a position that provides assistance during implementation of the activity. This position may allocate resources and assists the Responsible position to complete the activity.
- Consulted (**C**) is a position that is consulted prior to or during a task. The position brings expertise to the task or could be affected by the execution and/or completion of the task and may include subject matter experts.
- Informed (**I**) is a position that is informed of key aspects of the process, including progress, status, and results. This typically occurs after a decision or action is taken.

The names of the MR personnel responsible for each of the roles and their contact details are included in Table 2.2.

MONTANA RESOURCES
2023 ORGANIZATION

Montana Resources

PRESIDENT
Jack Standa

V.P. FINANCE
Kyle Carter

- **SENIOR ACCOUNTANT** — T. Markovich
- **FINANCIAL ACCOUNTANT** — B. Sullivan
- **PAYROLL COORDINATOR** — T. Seccomb
- **ACCOUNTS PAYABLE** — L. Williams — Non-Exempt
- **MATERIALS SUPERVISOR** — C. Galle
  - **BUYER (2)** — S. Mellott, E. Gessele
  - **CLERK** — J. Wright — Non-Exempt
  - **WAREHOUSEMEN** — B. Dobb, J. Haran, J. Stevenson — Non-Exempt

V.P. OPERATIONS
Daniel Janney

- **MANAGER OF ENGINEERING & GEOLOGY** — M. Harvie
  - **MINE ENGINEER (3)** — T. Birkenbuel, J. Hoover, C. Warner
  - **MINE GEOLOGIST** — A. Griffith, R. McConnaha
  - **SURVEYOR** — B. Drescher
- **GENERAL SHIFT FOREMAN (4)** — P. Boulter, K. Corbitt, M. Merrick, M. Seitz
  - **FRONT-LINE FOREMEN (18)**
- **MINE SUPERINTENDENT** — T. Boyle
  - **MINE STAR CHAMPION** — K. Hugulet
- **GENERAL OPERATIONS SUPERINTENDENT** — T. Kloker
  - **SHIPPING COORDINATOR** — D. Hamry — Non-Exempt
  - **MILL SUPERINTENDENT/ METALLURGIST** — M. Antonioli
    - **BUSINESS IMPROVMENT** — J. Bentley
    - **LAB SUPERVISOR** — M. Hogan
      - **CHEMIST (5)** — R. Ball, C. Crawshaw, J. Gress, A. Olson, D. Scheitlin

V.P. ENVIRONMENTAL AFFAIRS
Mark Thompson

- **ENVIRONMENTAL ENGINEER** — J. Fleege

V.P. MAINTENANCE
Robert Sanderson

- **MAINTENANCE ASSISTANT** — S. McClernan — Non-Exempt
- **MINE MAINTENANCE SUPERINTENDENT** — D. Lyons
  - **PLANNER** — B. McGee
  - **FRONT-LINE MAINT. SUPERVISORS (5)** — J. D'Arcy, T. Galle, R. Johnson, W. Malyevac, B. Sandoval
- **ELECTRICAL SUPERINTENDENT** — J. Wiley
  - **ELECTRICAL ENGINEER** — A. Havlovick
  - **ELECTRICAL SUPERVISOR** — J. Schofield
    - **INSTRUMENTATION (2)** — L. McHugh, R. Moodry
    - **TROUBLESHOOTERS (4)** — B. Fitzhugh, B. McHugh, W. Richards, B. Fitzpatrick
- **CONCENTRATOR MAINTENANCE SUPERINTENDENT** — L. McCarthy
  - **PLANNER** — J. Dinius
  - **FRONT-LINE MAINT. SUPERVISORS (4)** — B. Bacon, T. Johnston, R. Moody, M. Watson

V.P. HUMAN RESOURCES
Michael McGivern

- **HUMAN RESOURCES MANAGER** — J. Dove
  - **ADMIN CLERK** — L. Anderson — Non-Exempt
- **SAFETY MANAGER** — P. Steilman
  - **SECURITY** — Z. Bates — Non-Exempt

Budgeted
Grand Total Exempt – 76
Non-Exempt – 316
Total Employed - 392

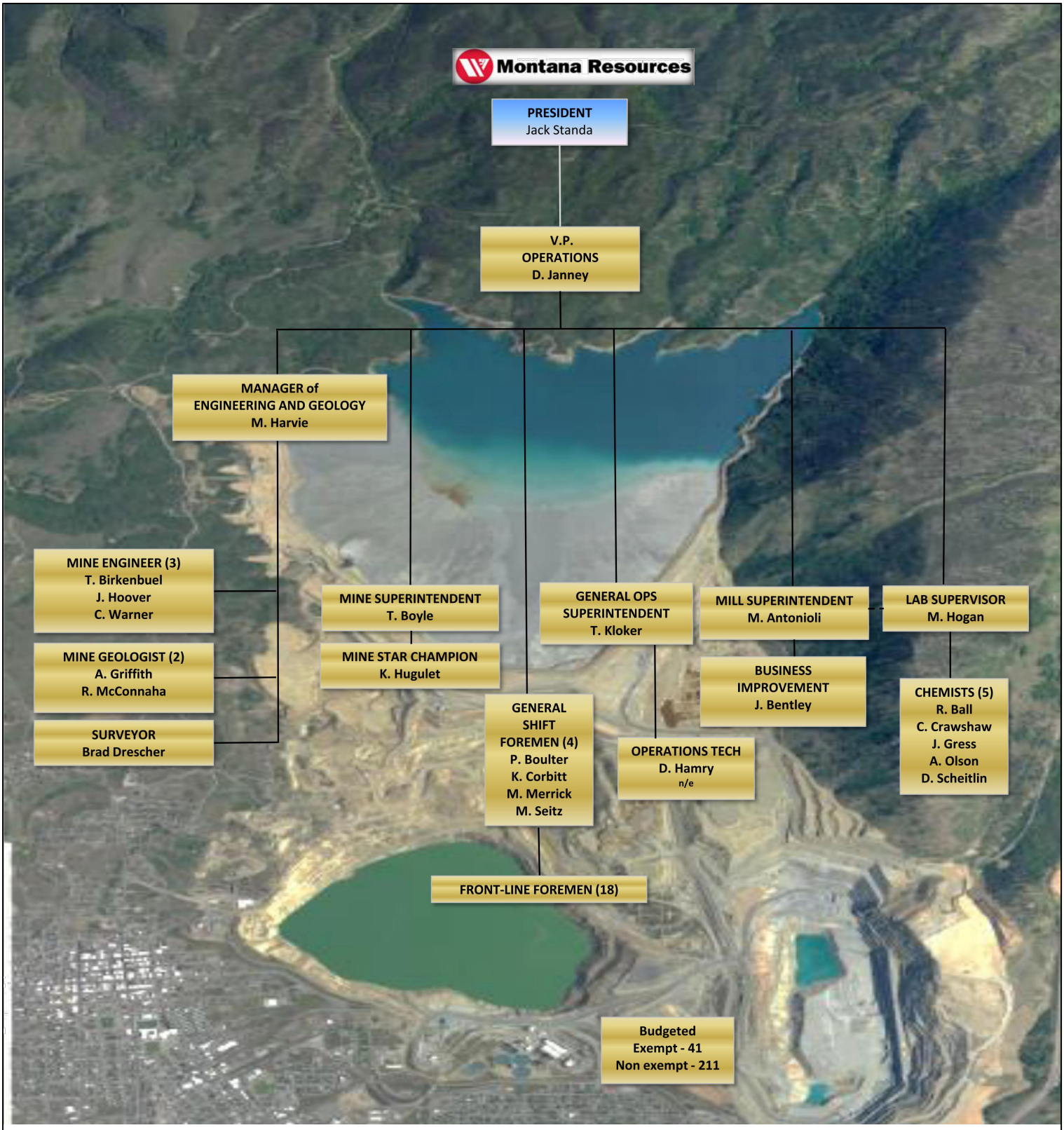
REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
6	04DEC'23	ISSUED FOR TOMS MANUAL	RDS	RMM	DDF

Montana Resources

YANKEE DOODLE TAILINGS IMPOUNDMENT

MR CORPORATE ORGANIZATION CHART

FIGURE 2.1



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YANKEE DOODLE TAILINGS IMPOUNDMENT

MR OPERATIONS ORGANIZATION CHART

FIGURE 2.2

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
6	04DEC'23	ISSUED WITH TOMS MANUAL	RDS	RMM	DDF

SAVED: M:\1\101\00126\29\A\Acad\FIGS\A05, 12/4/2023 8:03:22 AM, RMCLELLAN PRINTED: 12/4/2023 11:16:00 AM, FIG 2.2, RMCLELLAN
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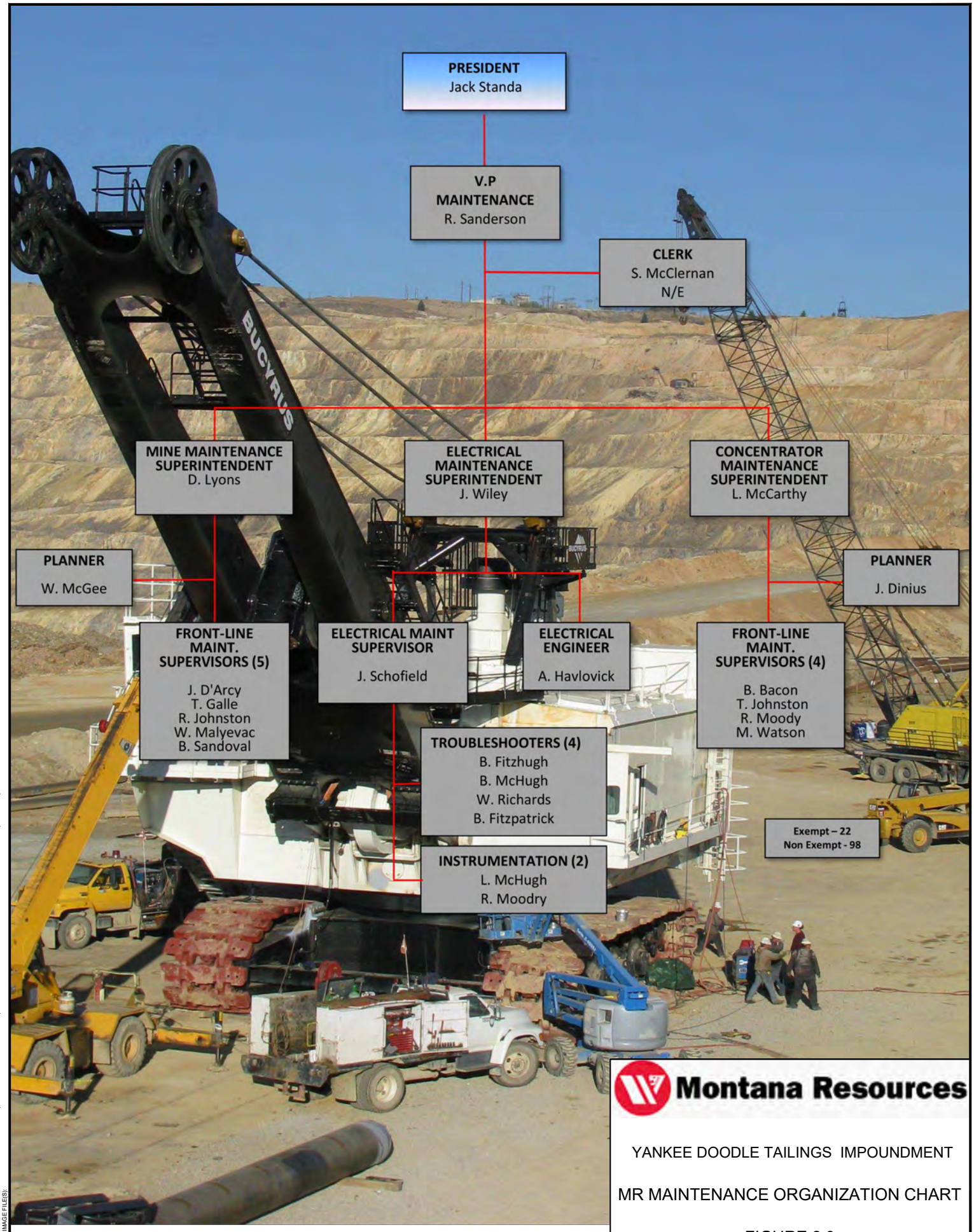

Montana Resources

YANKEE DOODLE TAILINGS IMPOUNDMENT

MR MAINTENANCE ORGANIZATION CHART

FIGURE 2.3

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
6	04DEC'23	ISSUED FOR TOMS MANUAL	RDS	RMM	DDF

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XREF FILE(S): IMAGE FILE(S):

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TABLE 2.1

MONTANA RESOURCES, LLP.
YANKEE DOODLE TAILINGS IMPOUNDMENT

TAILINGS OPERATIONS, MAINTENANCE, AND SURVEILLANCE (TOMS) MANUAL
ROLES AND RESPONSIBILITIES

Print Dec/04/23 16:11:56

		YDTI Operations										YDTI Maintenance		Engineering Support (KP)			
		Daniel Janney	Mark Thompson	Mike Harvie	Tim Boyle	Mary Anne Antonioli	Jonathan Hoover	Corey Warner	Travis Birkenbuel	Amanda Griffith	Jeremy Fleege	Rob Sanderson	Leo McCarthy	Daniel Fontaine	Roanna Dalton	Kevin Davenport	Jason Gillespie
		Vice President Operations	Vice President of Environmental Affairs	Manager of Engineering and Geology	Mine Superintendent	Mill Superintendent/Metallurgist	Mine Engineer	Mine Engineer	Mine Engineer	Mine Geologist	Environmental Engineer	Vice President Maintenance	Concentrator Maintenance Superintendent	YDTI Engineer of Record	Project Manager	Senior Engineer	Senior Engineer
Design	Embankment Construction Drawings and Specifications		C	S				C		I				A, R			S
	Mine Plan and Dumping Design	I	I	A	C		S	R	I	C				I			I
Construction	Embankment Construction	I	I	A	R		S	S	S	S		I		I			I
	Construction Quality Control		I	A	R		S	S	I	S				I	I		I
	Construction Quality Assurance		I	C	I				I	S				A			R
	As-Built Surveys			A			R	S						I			I
Operations and Monitoring	Pond Surveys and Bathymetry	I	I	A	I	I	R	I		I	I	I	I		I	I	I
	Tailings Beach Surveys and Deposition Plan	I	I	A	I	C	R	I		I	I	I	I		I	I	I
	Tailings Delivery System	I	I	I	S	S						A	R		I		
	Reclaim Water System	I	I			C					I	A	R		I		
	HsB Water Management Systems	A	C			R					I	S	R		I		
	WED Extraction Pond	I	I	C		I					I	A	R		I		
	Silver Lake Water System	C	C			S					I	A	R		I		
	Piezometric Monitoring	I		A					S					C		R	C
	Movement Monitoring	I		A					S					C		R	C
	Site Climate Station		I								I	A, R			I		
	Environmental Compliance	I	A	S	C	C					R						
Reporting	Monthly Inspections	A	C	R			S	S	S		I			I			I
	Quarterly Construction Field Review		I	S			S	I	I					A			R
	Quarterly Piezometric Data Summary		I	I										A		R	I
	Quarterly Water Data Summary		I	I							I			A	R		I
	Annual Permit Reporting	C	A	S						S	R						
	EOR Annual Inspection Report (AIR)	C	C	S								C		A, R		S	S
	Annual Data Analysis Report (DAR)		C	C										A	R	R	S
	Water Balance Modelling	C	C	C		C								A	S	S	S
	Emergency Preparedness & Response	A	S	R	S				S					C	I	I	I
	Emergency Action Plan	A	S	C	C						R	I		I	I	I	I
	Closure Planning		A	C				S			R			C	C	I	I

M:\1\01\00126\29\A\Report\3 - 2023 TOMS Report\[Table 2.1 - Roles and Responsibilities (RASCI Matrix).xlsm]Table 2.1

NOTES:

1. A = ACCOUNTABLE; R = RESPONSIBLE; S = SUPPORT; C = CONSULTED; I = INFORMED.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
6	15SEP'23	ISSUED WITH REPORT VA101-126/29-3	RSD	DDF

Table 2.2 Key Role Assignments and Contact Information

	NAME	POSITION	CONTACT INFORMATION
YDTI Operations	Jack Standa	President	Phone: +1 406 496 3202 Email: jstanda@montanaresources.com
	Daniel Janney	Vice President Operations	Phone: +1 406 496 3203 Email: djanney@montanaresources.com
	Mark Thompson	Vice President of Environmental Affairs	Phone: +1 406 496 3211 Email: mthompson@montanaresources.com
	Mike Harvie	Manager of Engineering and Geology	Phone: +1 406 496 3215 Email: mharvie@montanaresources.com
	Tim Boyle	Mine Superintendent	Phone: +1 406 496 3241 Email: tboyle@montanaresources.com
	Mary Anne Antonioli	Mill Superintendent/Metallurgist	Phone: +1 406 496 3265 Email: mantonioli@montanaresources.com
	Jonathan Hoover	Mine Engineer	Phone: +1 406 496 3216 Email: jhoover@montanaresources.com
	Corey Warner	Mine Engineer	Phone: +1 406 496 3206 Email: cwarner@montanaresources.com
	Travis Birkenbuel	Mine Engineer	Phone: +1 406 496 3277 Email: tbirkenbuel@montanaresources.com
	Amanda Griffith	Mine Geologist	Phone: +1 406 496 3262 Email: agriffith@montanaresources.com
	Jeremy Fleege	Environmental Engineer	Phone: +1 406 496 3205 Email: jfleege@montanaresources.com
YDTI Maintenance	Rob Sanderson	Vice President Maintenance	Phone: +1 406 496 3242 Email: rsanderson@montanaresources.com
	Leo McCarthy	Concentrator Maintenance Superintendent	Phone: +1 406 496 3236 Email: lmccarthy@montanaresources.com
Engineering Support Knight Piésold Ltd.	Daniel Fontaine	YDTI Engineer of Record	Phone: +1 604 685 0543 Email: dfontaine@knightpiesold.com
	Roanna Dalton	Project Manager	Phone: +1 604 685 0543 Email: rdalton@knightpiesold.com
	Kevin Davenport	Senior Engineer	Phone: +1 604 685 0543 Email: kdavenport@knightpiesold.com
	Jason Gillespie	Senior Engineer	Phone: +1 604 685 0543 Email: jgillespie@knightpiesold.com

2.2 REGULATORY AGENCIES

The jurisdiction for regulation of tailings impoundments resides with the Montana Department of Environmental Quality (MDEQ). Embankments for tailings impoundments and water reservoirs subject to permits issued by MDEQ are specifically exempt from certain provisions of the Montana Dam Safety Act (MCA 85-15-107), and therefore are not subject to embankment hazard potential classification within the State (MCA 85-15-209). The MDEQ is the regulatory agency responsible for ensuring compliance with the applicable regulations relating to this TOMS Manual as outlined in MCA 82-4-379.

Federal regulatory involvement was initiated through the National Dam Inspection Act (Public Law 92-367) dated August 8, 1972, which directed the United States Army Corps of Engineers (USACE) to conduct inspections of non-federal dams and alert owners and the State to conditions that may constitute a danger to human life or property. The USACE inspections led to the development of a National Inventory of Dams (NID). A delegation from USACE inspected the YDTI on May 11, 1978 and issued their Phase 1 Inspection Report in February of 1980 (USACE, 1980). The NID includes the YDTI (NID ID# MT01425) and indicates that it is a State regulated dam that falls under the jurisdiction of the MDEQ (USACE, 2015). The USACE has not inspected the YDTI since the initial Phase 1 Inspection and has not stated a regulatory interest since the initial inspection.

The Mine Safety and Health Administration (MSHA) is responsible for administering the provisions of the Federal Mine Safety and Health Act of 1977 (Mine Act) and enforcing compliance with mandatory safety and health standards. Title 30 Code of Federal Regulations (CFR) part 56.20010 requires that '*if failure of a water or silt retaining dam at a mine will create a hazard, it shall be of substantial construction and inspected at regular intervals'*. The Mine Act requires the MSHA inspect surface mines at least twice per year.

The Environmental Protection Agency (EPA) is not directly involved in the current MR mine operations on site; however, the EPA does monitor and oversee the water remediation and environmental management associated with the various on-site Butte Mine Flooding Operable Unit (BMFOU) projects.

2.3 ENGINEER OF RECORD

The Engineer of Record (EOR) cannot be an employee of the operator or the permit holder and has the following MCA responsibilities:

- Review design and other documents pertaining to the tailings storage facility.
- Certify and seal designs or other documents pertaining to the tailings storage facility submitted to the MDEQ.
- Complete an annual inspection of the tailings storage facility.
- Notify the operator when credible evidence indicates the tailings storage facility is not performing as intended.
- Immediately notify the operator and the MDEQ when credible evidence indicates the tailings storage facility presents an imminent threat or has a high potential for imminent threat to human health or the environment.

The EOR for the YDTI is currently Mr. Daniel Fontaine, P.E. of Knight Piésold Ltd (KP) who accepted the role in September 2021. The EOR is also responsible for providing construction oversight as specified in the Construction Management Plan (KP, 2018a).

2.4 INDEPENDENT REVIEW PANEL

An Independent Review Panel (IRP) consisting of three independent TSF review experts is required when a new facility or existing facility raise is proposed. The IRP is responsible for review of the amendment application design document, the underlying analysis, and assumptions for consistency with MCA 82-4-376. The IRP assesses the practicable application of current technology in the proposed design, submits review comments, indicates any recommended modifications and specifies the required IRP on-going progress review schedule relevant to the amendment application. The first IRP was assembled in July 2015, and the following three international experts constitute the current IRP for the YDTI:

- Dr. Dirk Van Zyl, P.E. – Tailings and Geotechnical Specialist
- Dr. Leslie Smith, P.Geo. – Hydrogeology Specialist
- Mr. Jim Swaisgood, P.E. – Dam and Seismic Specialist

A fourth international expert is also engaged to provide additional YDTI oversight and review. Tailings and geotechnical specialist, Dr. Peter K. Robertson, participates with the IRP and EOR in update meetings and reviews documents concerning the YDTI.

The IRP is required to be reassembled at least every five years to complete a Periodic Review of the facility, including the following activities:

- Inspect the YDTI.
- Review of TOMS Manual and associated records.
- Interview people with responsibilities identified in the TOMS Manual.
- Review EOR inspection reports, corrective action plans, records associated with construction, and any other information relating to the tailings storage facility that the IRP needs to ensure that the YDTI is constructed, operated, and maintained as designed and is functioning, and can be closed as intended, and meets acceptable engineering standards.

Additional details regarding the scope and submission requirements of the Periodic Review, including details regarding the first Periodic Review, are included in Section 6.4.

2.5 COMPETENCY AND TRAINING

New personnel (full time or contract) that work within the mine property must comply with the training requirements of the Federal Mine Safety and Health Act of 1977. Personnel whose activities at the site exceed five days in a calendar year must receive twenty-four hours of Part 48 New Miner Training. Personnel working at the site must attend a Site-specific Health and Safety Induction Training Session before commencing work at the mine.

Additional training for personnel involved in the operation, maintenance, inspection, and surveillance of the YDTI is provided on an individual basis depending on the specific work the individual is required to perform. New personnel are accompanied by a suitably qualified MR representative while working on site until they have proven a satisfactory level of work competence. Competence is assessed by the supervisor through visual observation of personnel behavior.

SECTION 3.0 TOMS MANUAL DISTRIBUTION AND UPDATES

3.1 GENERAL

Section 3.0 presents the protocols for distribution and updates of the TOMS Manual, including consideration of the following components:

- Distribution of the TOMS Manual
- TOMS Manual review requirements
- TOMS Manual update procedures

The distribution, review, and update of the TOMS Manual is the responsibility of the Vice President of Environmental Affairs.

3.2 TOMS MANUAL DISTRIBUTION LIST

One hard copy of the TOMS Manual will be maintained in the offices of the following individuals:

- Vice President of Operations
- Vice President of Environmental Affairs

An electronic copy of the TOMS Manual will be provided to all staff listed in Table 2.2.

3.3 TOMS MANUAL REVIEW REQUIREMENTS

The TOMS Manual will be reviewed annually to confirm that it reflects the current site conditions. The review will include identification and update of out-of-date information and incorporation of new details and components. Required updates and modifications will be made according to the TOMS Manual update procedures detailed below.

3.4 TOMS MANUAL UPDATE PROCEDURES

Operating procedures and personnel will likely change during operation of the mine. Changes (procedural and personnel) that affect the content of the TOMS Manual need to be updated periodically. An update may comprise the entire TOMS Manual or may be limited to specific pages or sections. The following procedures will be followed when updating the TOMS Manual:

- Each updated page must be clearly marked with the version number and date.
- A letter of transmittal that clearly identifies the distribution list must accompany each update of the TOMS Manual. A copy of the most recent transmittal letter must be kept in the Vice President of Environmental Affairs office.
- All updates must be reviewed and accepted by the EOR. The revised TOMS Manual will be certified by EOR seal.
- The Vice President of Environmental Affairs is responsible for ensuring the two hard copies of the TOMS Manual are updated, and MR staff identified on Table 2.2 receive updated electronic copies.
- KP is responsible for distributing electronic copies of the updated TOMS Manual to non-MR staff identified in Table 2.2.

3.5 REFERENCES AND SUPPORTING DOCUMENTS

References and other supporting documents specifically relevant to the operation of the YDTI and this TOMS Manual include the following:

- Montana Resources Continental Mine Operations Plan
- Montana Resources Dust Control Plan for Yankee Doodle Tailings Impoundment
- Montana Resources Tailings Discharge Plan for Yankee Doodle Tailings Impoundment
- Montana Resources Continental Mine Reclamation Plan
- Montana Resources Emergency Action Plan Yankee Doodle Tailings Impoundment

3.5.1 Montana Resources Continental Mine Operations Plan

The *Continental Mine Operations Plan* (Operations Plan) was prepared by MR in 2023 (MR, 2023a). The Operations Plan presents an overview of the entire mine operations including the Mill Process, Yankee Doodle Tailings Impoundment, Continental Pit and Precipitation Plant. The Operations Plan includes an Operational Surface Water Management Plan and a Temporary Cessation of Operations Plan in the event of a temporary mine closure ranging from several days to a few months. The TOMS Manual complements the Operations Plan and provides additional details applicable to the YDTI and associated embankments, tailings distribution works, reclaim water works, monitoring devices, storm water diversions, and other ancillary structures associated with the operation and management of the tailings storage facility during construction, operation and closure.

3.5.2 Montana Resources Dust Control Plan for Yankee Doodle Tailings Impoundment

The *Dust Control Plan for Yankee Doodle Tailings Impoundment* (Dust Control Plan) was prepared by MR in 2022 (MR, 2022). The Dust Control Plan formalized the existing management and monitoring systems used to monitor and mitigate the risk of wind-blown tailings dust from the tailings facility. MR has a proactive monitoring program implemented that includes visual inspections and weather forecasting. Strategies to address any elevated dust risk from the facility are managed through wetting and stabilization of the tailings beach with tailings slurry, freshwater or manual application of dust suppressants.

3.5.3 Montana Resources Tailings Discharge Plan for Yankee Doodle Tailings Impoundment

The *Tailings Discharge Plan for Yankee Doodle Tailings Impoundment* (Tailings Discharge Plan) was prepared by MR in 2018 (MR, 2018b). The key objectives of the tailings deposition plan are to maintain extensive tailings beaches between the embankments and the supernatant pond and to manage wetting of the beach surface to minimize the risk for wind-blown tailings dust. The discharge plan presents the YDTI multiple-point tailings discharge system that was initiated in 2017 and outlines the tailings discharge system infrastructure, the deposition objectives, discharge philosophy, and existing beach monitoring program.

The multiple tailings discharge locations allow for continued development of extensive, drained tailings beach adjacent to the YDTI embankments. Continued use of the multiple-point configuration since 2017 has transformed the tailings beach as planned into a ‘U’ shape compared to the historical ‘fan’ shape.

3.5.4 Montana Resources Continental Mine Reclamation Plan

The *Continental Mine Reclamation Plan* (MR, 2023b) presents the closure and reclamation strategies to reclaim the mine site following operations to conditions consistent with the approved post-mine land use. The plan includes provision for restoring previously un-reclaimed areas affected by mining activity to conditions compatible with future desired land uses (as required by State law). Key objectives of the reclamation plan include long-term stabilization of post-mining slopes and soils and protection of air, surface water, and groundwater resources in the long-term. Reclamation activities associated with the YDTI will generally include;

- Construction of a vegetated soil cover over the trafficable region of the exposed tailings beach. A pond will be maintained along the headwaters of the facility after closure where surface runoff from the capped layer and from upstream catchments would tend to pool. Non-trafficable intermediate areas between the final pond and the vegetated soil cover will be reclaimed as wetlands.
- The downstream face of the embankments will be regraded where necessary and covered with a suitable growth medium.

3.5.5 Montana Resources Emergency Action Plan Yankee Doodle Tailings Impoundment

The Emergency Action Plan (EAP) for the facility was updated in January 2021 (MR, 2021c). The EAP outlines the Responsibilities and Authorities, Notification Procedures, and the Mitigation Actions. The plan is described in further detail in Section 7.5.

3.5.6 Design and Site Investigation Reports

Numerous design and site investigation reports have been produced since the mine started operating and the YDTI was commissioned. Historical reports of the YDTI assisted in the development of the Design Document supporting the Amendment 10 Permit Application. The Design Document consisted of 11 detailed reports that made up the technical component of the Amendment Application. These reports are available from the Vice President of Environmental Affairs.

3.6 MINE OPERATING PERMIT

The MR mine is operated under a single Operating Permit (OP) 00030. Operation of the mine under a single OP commenced in June 2021 after the DEQ approved consolidation of the previous four permits into a single permit. The active permit incorporates raising the YDTI embankments to a crest elevation of 6,450 feet and mining in the Continental Pit through 2040 per the D-East Extension.

SECTION 4.0 DESCRIPTION OF FACILITIES

4.1 OVERVIEW

The components of the MR facilities, general mine history and specific information on the YDTI are presented in this section. This information provides background and context for the operating, maintenance, and surveillance protocols that are required during future operation, development, and closure of the YDTI.

4.1.1 Location

The mine is located in Butte, Silver Bow County, in Sections 5 and 6 Township 3 North (T3N), Range 7 West (R7W) and Sections 31 and 32 Township 4 North (T4N), Range 7 West (R7W) of the Montana Principal Meridian. The site is bounded by Interstate 15 and the Continental Divide on the east, Moulton Reservoir Road on the west, and Farrell Street, Continental Drive and Shields Avenue to the south. The main access route to the guard house for the mine is from Farrell Street. The entrance to the administrative department is from Shields Avenue.

The service address for the mine is:

Montana Resources, LLC
600 Shields Avenue
Butte, Montana 59701

4.1.2 Coordinate System

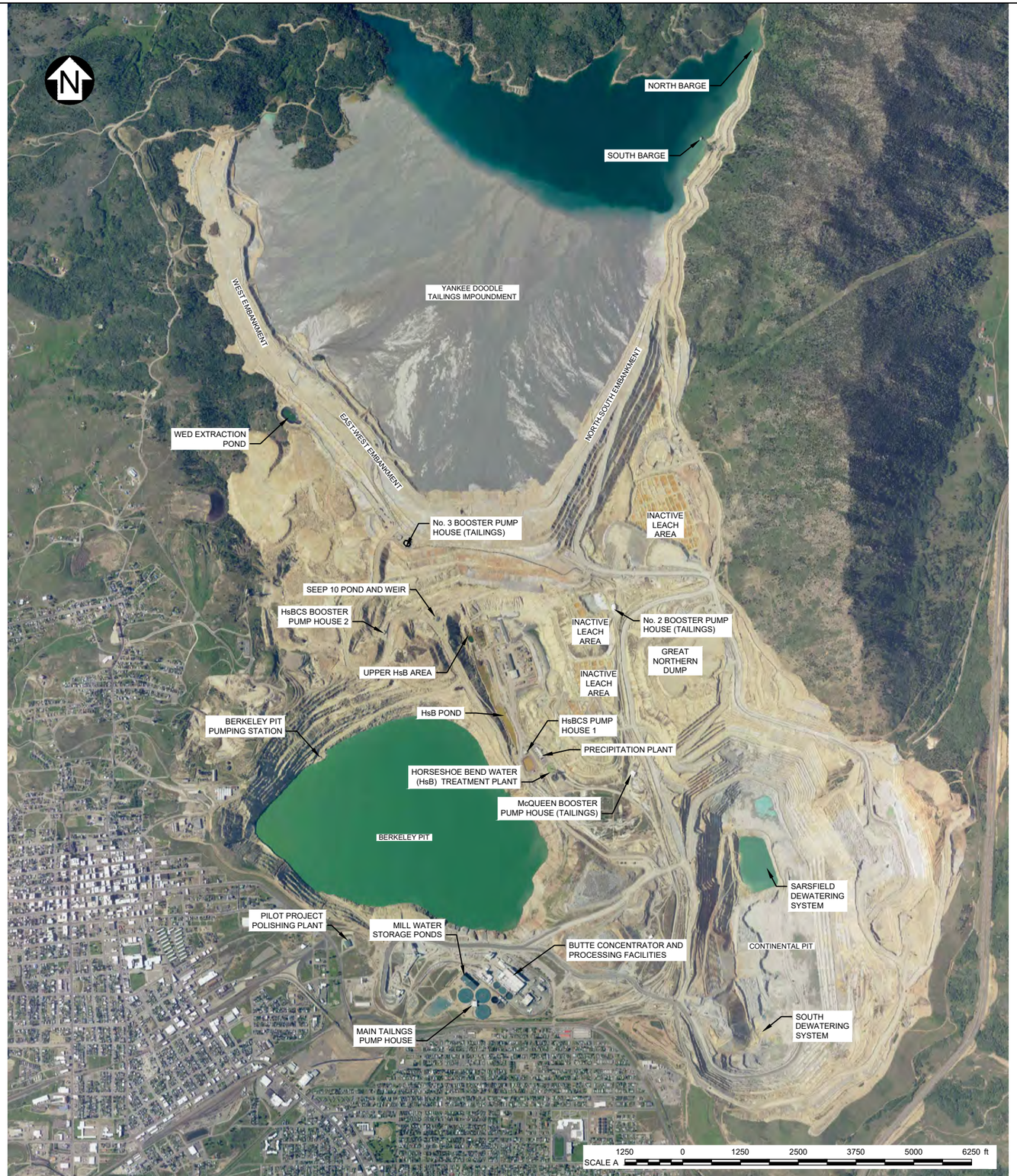
All elevations are stated in the site coordinate system known as the 'Anaconda Mine Grid' established by The Anaconda Company in 1957. The Anaconda Mine Grid is based on the Anaconda Copper Company Datum established in 1915. The MR GPS Site Coordinate System is based on the 'Anaconda Mine Grid' and utilizes International Ft.

4.1.3 Facilities

The key components of the MR facilities include:

- The Butte Concentrator and Processing Facilities (Mill),
- The Yankee Doodle Tailings Impoundment, including tailings delivery system, water reclaim systems, and West Embankment Drain system,
- Horseshoe Bend (HsB) area, including the various water management systems, the HsB Capture System (HsBCS) and the HsB Water Treatment Plant (WTP),
- Precipitation Plant and inactive Leach Pad Facilities,
- The Continental Pit,
- The Berkeley Pit and Berkeley Pit Pumping System (BPPS), and
- Various additional surface water management facilities.

The YDTI and select supporting facilities are shown on Figure 4.1.



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SAVED: M:\110\110126\29\A\cad\FIGS\B38, 12/1/2023 4:16:53 PM , RMCLELLAN PRINTED: 12/4/2023 11:22:16 AM, FIG 4.1, RMCLELLAN
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Montana Resources

YANKEE DOODLE TAILINGS IMPOUNDMENT

GENERAL ARRANGEMENT

FIGURE 4.1

4.1.4 Site Mining History

Anaconda Copper Company (ACC) began open pit mining at the Berkeley Pit in 1955 and began construction and operation of the YDTI facility in 1962. Mining of a new pit operation (Continental Pit) commenced in July 1981. Operations within the Berkeley Pit ceased in April 1982 and mining in the Continental Pit was suspended on June 30, 1983. The underground mines and Berkeley Pit were allowed to gradually fill with water from the bedrock and alluvial aquifers and site runoff once mining operations ceased. Mining recommenced in the Continental Pit in 1986 and YDTI construction continued using Continental Pit rockfill.

Continental Pit mining operations were suspended again in 2000 due to high electricity prices. A thin capping layer of rockfill material was placed over the YDTI beach to reduce the blowing tailings risk at this time. Operations and tailings discharge into the YDTI resumed again in 2003.

Leaching operation of the leach pads was suspended between 1999 and 2004. Leaching recirculation flowrates steadily increased from 2004 through 2012 when full operation was achieved with MR recirculating approximately 5,000 gpm, seven days per week. MR suspended leach recirculation again in July 2021 and drained down the leach pads adjacent to the YDTI in preparation for construction of the HsB Rock Disposal Site (RDS).

4.1.5 Mining and Processing

The MR mine operations process consists of three stages: ore extraction, ore processing and tailings disposal. Ore processing is undertaken in the Butte Concentrator and after concentrate exaction, the remaining tailings are pumped to three thickeners for thickening prior to being pumped to the YDTI.

4.1.6 Butte Mine Flooding Operable Unit Activities

The majority of the MR mine site is contained within the BMFOU of the Silver Bow Creek/Butte Area Superfund Site. The BMFOU activities onsite are largely associated with water management.

The ‘Berkeley Pit and Discharge Pilot Project’ (the Pilot Project), was implemented in 2019 as part of the BMFOU activities. The Pilot Project incorporates using the YDTI supernatant pond for treatment of Berkeley Pit and HsB Area waters. The Pilot Project primarily consists of three parts:

1. Conveyance of waters from the Berkeley Pit and/or HsB Area to the Precipitation Plant for processing
2. Conveyance of Berkeley Pit and HsB Area waters from the Precipitation Plant to the YDTI (with lime treatment at the HsB WTP or HsBCS)
3. Conveyance of water from the YDTI supernatant pond to the Polishing Plant for polishing treatment and off-site discharge.

The Pilot Project involves the withdrawal of water from the Berkeley Pit to maintain a relatively constant water surface elevation in the pit (an annual average flowrate of 2,100 to 2,500 gpm). Water is conveyed from the Berkeley Pit to the Precipitation Plant by the Berkeley Pit Pumping System (BPPS). The BPPS consists of a floating pump barge and land-based pump house that pumps the water to the Precipitation Plant for processing. The flow is then conveyed to either the Influent Pump House for treatment in the HsB WTP or to HsBCS-1 Pump House. If routed to HsBCS-1, the water is pumped to HsBCS-2 pump house, which conveys the flows to an injection station located immediately downstream of the No. 3 Booster Tailings Pump House. The flows are injected into the tailings slurry,

which have been dosed with additional lime at the Butte Concentrator to facilitate treatment of the Berkeley Pit water. The combined flow is discharged into the YDTI, and the supernatant pond provides residence time for water treatment objectives to be achieved. Seepage and water collected in the HsB area and delivered to the HsB WTP equalization basin may also be conveyed to the Precipitation Plant for processing, then pumped to HsBCS-1 for conveyance to the YDTI.

The Pilot Project operation is not entirely within MR's control due to a variety of factors. Further discussion of the interaction between the Pilot Project and the mine operations are described in subsequent sections.

4.2 YANKEE DOODLE TAILINGS IMPOUNDMENT

4.2.1 General

The YDTI is located approximately two miles northeast of the City of Butte, within the Silver Bow Creek, Dixie Creek, and Yankee Doodle Creek drainages. The YDTI consists of rockfill embankments which facilitate the storage of tailings solids and a surface water reservoir (supernatant pond) to support ore processing resulting from continued mining at the Continental Pit. The impoundment covers a total surface area of approximately 1,550 acres (MR, 2023c).

The principal objectives for the ongoing design and construction of the YDTI are to maintain adequate storage capacity for mill tailings, protect the regional groundwater and surface water flows (both during operations and after closure) and to achieve effective reclamation at mine closure. The YDTI is also an integral component of the Pilot Project and the modifications to BMFOU water management strategy associated with the Pilot Project are consistent with the principal objectives for the YDTI.

The YDTI design considers the following requirements:

- Permanent, secure, and total confinement of solid materials within an engineered storage impoundment.
- Secure and reliable transportation of tailings from the Mill to the YDTI.
- Temporary storage of supernatant water in the YDTI and recycling to the Mill as process water to the maximum practicable extent.
- Control, collection, and removal of free draining liquids from the tailings during operations and management of seepage from the impoundment.
- The inclusion of monitoring features for aspects of the impoundment to confirm performance goals are monitored and achieved.
- Staged development of the impoundment over the life of the mine.
- Development of extensive drained tailings beaches adjacent to the embankments to limit seepage rates and to facilitate controlled drainage into the embankments.
- The crest elevations of the YDTI embankments maintained at least 22 ft above the normal operating supernatant pond elevation. This design provision provides sufficient storage capacity to accommodate runoff from the Probable Maximum Flood (PMF) within the impoundment while maintaining at least 5 feet of minimum freeboard above and beyond the storm storage freeboard.

The key operating parameters for the YDTI and related facilities are described below. Other information, including descriptions of site conditions, is provided within the various site investigation,

design, and construction reports previously identified and the reference documents listed in Section 8. Selected photographs of the YDTI and related facilities are included in Appendix A.

4.2.2 Embankments

The YDTI comprises a valley-fill style impoundment created by a continuous rockfill embankment with a maximum embankment height of up to approximately 800 ft measured from the downstream toe to the embankment crest at Section 8+00W. Construction of the EL. 6,450 ft lift of the embankment was substantially completed in mid-2023 and minor work (e.g. upstream facing, final grading in select areas, and progressive reclamation activities) is ongoing. The continuous embankment is divided into three rockfill embankments for descriptive purposes according to the general geometry of each limb of the continuous embankment. These embankments are:

- North-South Embankment – The North-South Embankment forms the eastern to southeastern limb of the YDTI and runs approximately north to south in orientation. The North-South Embankment abuts onto the base of Rampart Mountain, a topographic ridge that forms the eastern boundary limit of the site.
- East-West Embankment – The East-West Embankment forms the southwestern limb of the YDTI and runs approximately east to west in orientation. The East-West Embankment is situated upstream of the HsB area and Berkeley Pit.
- West Embankment – The West Embankment extends north of the existing East-West Embankment and runs approximately south to north in orientation to form the western perimeter of the YDTI.

The embankments have been constructed almost continuously since the early 1960s from rockfill that is highly variable in grain size distribution, geologic alteration and weathering, and clast strength, and has undergone physical and chemical degradation since its initial placement. The records documenting the characteristics of the historical embankment fill material are sparse due in part to the state of practice at the time of construction and also to ownership changes in the 1980s. Available historical construction sequencing records have been compiled (KP, 2017a) and provide a general indication of historical rockfill placement practices and material distribution within the embankments.

The West Embankment incorporates the West Embankment Drain (WED) that was designed to maintain hydrodynamic containment of YDTI seepage as the supernatant pond elevation rises above the lowest groundwater elevations in the West Ridge. The WED system consists of a subsurface aggregate drain, Extraction Pond, Extraction Basin, contingency drain pods, and secondary seepage collection drains. The Extraction Pond forms the gravity outlet of the WED and water collected in the WED is pumped from the Extraction Pond to the YDTI. The Extraction Basin, which is located approximately halfway along the WED alignment, is a contingency WED dewatering system that consists of two wells. Each well can be fitted with a submersible pump to dewater the WED and reduce water levels in the West Embankment, if required.

4.2.3 Tailings Beach

The tailings beach is formed by the discharge and deposition of conventional tailings slurry from discharge locations along the YDTI embankments. The tailings beach is progressively developed as the tailings are discharged and the solids settle and accumulate within the impoundment. Efficient storage of tailings is achieved by maximizing the settled tailings dry density through sub-aerial drying

and drainage to enhance natural consolidation within the tailings mass. The tailings beach naturally settles and consolidates further over time due to increased loading from the accreting tailings mass.

The tailings beaches work in conjunction with the free draining embankments to limit pore pressures at the interface between the tailings and embankment materials. Tailings slurry water flows in a braided stream across the tailings beach to the supernatant pond at the north-east end of the facility. Water percolates into the tailings beach at the discharge points and along the braided stream. The sandy tailings near the discharge points drain quickly and the pore water recharges the phreatic surface deep within the beach. The drained tailings beach is considered part of the impoundment containment system, which collectively with the rockfill embankments, contains the supernatant pond on the north side of the facility. The tailings beach area has increased from approximately 50% to 70% of the total YDTI surface area over the past five years (MR, 2023c).

4.2.4 Supernatant Pond

The supernatant pond is located on the northeast side of the YDTI and is constrained by natural topography to the north and east and the tailings beach to the south and west. The supernatant pond provides a source of water to support continuous mill operations as described in Section 4.4. Fluctuations in the supernatant pond volume typically occur seasonally due to precipitation/runoff, higher summer evaporation rates, variation in the Silver Lake Wake System (SLWS) flowrates, and development/melt of winter ice.

The YDTI supernatant pond volume, pond area and pond elevation are affected by MR's commitment to reduce and maintain the operational pond volume at approximately 15,000 ac-ft. The elevation of the pond surface has historically increased at a rate of five to seven feet per year as the volume of tailings stored in the facility increases, this rate however has been temporarily reduced over the past several years while the pond volume was being actively drawn down.

4.3 TAILINGS DELIVERY SYSTEM

4.3.1 System Overview

The Tailings Delivery System consists of three tailings delivery pipelines (two operational and one standby) and four tailings pump houses (the Main Tailings Pump House (MTPH), McQueen Booster Pump House, No. 2 Booster Pump House, and No. 3 Booster Pump House) to transport tailings from the Mill to the YDTI at approximately 18,000 gpm. Tailings are pumped to a total elevation increase of approximately 900 ft using up to 13 pump stages. The 21,000 ft tailings delivery pipelines are constructed from a combination of 22" Steel, 24" HDPE or 26" HDPE pipe. The single walled tailings pipelines are installed on the ground surface and locally anchored with mounds of overburden or pipe supports. A schematic of the tailings delivery system and the general arrangement of the system components are shown on Figures 4.2 and 4.3, respectively.

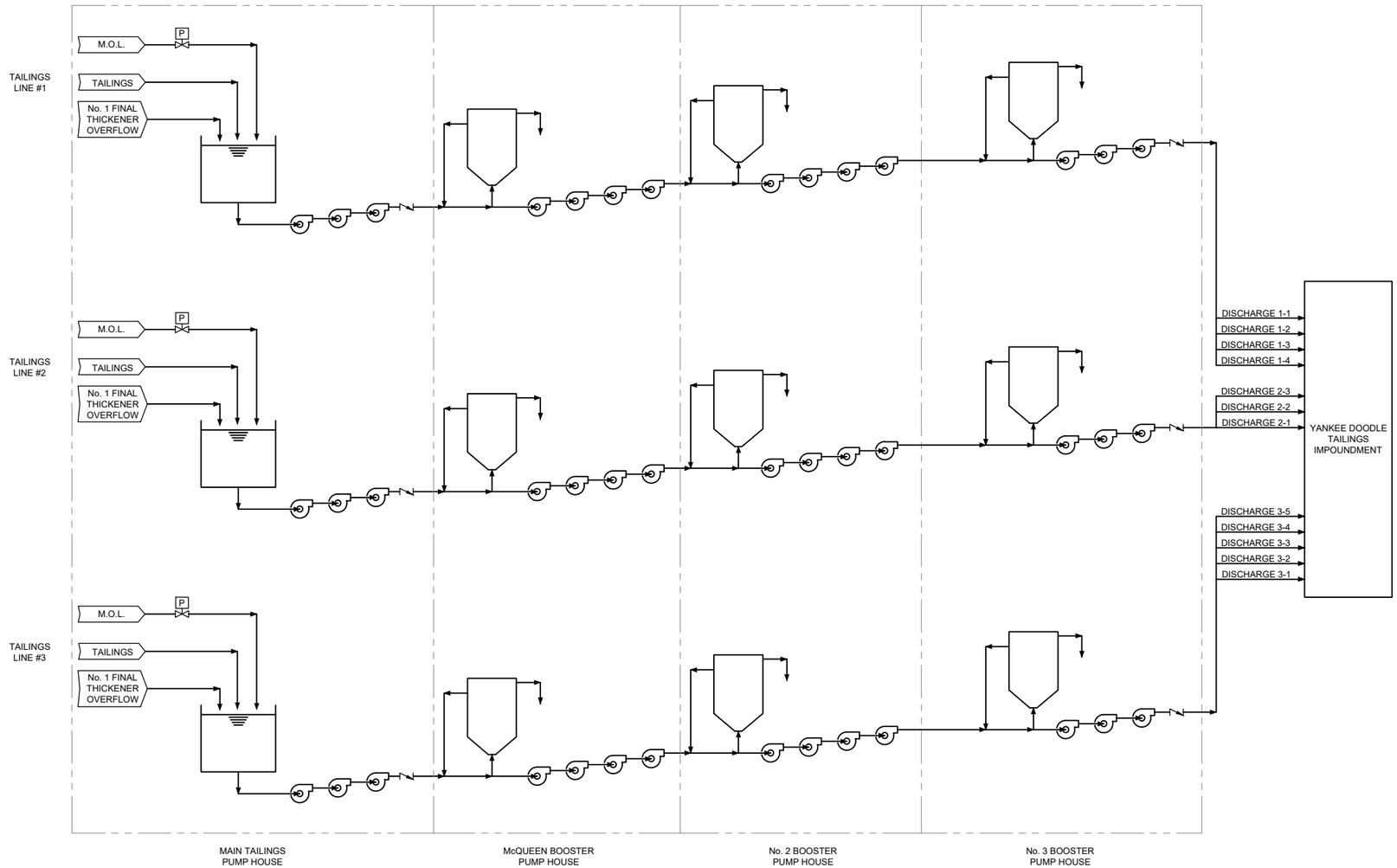
The tailings delivery pipelines are routed up to the YDTI such that there is positive drainage back to a pump house. The pump houses are equipped with tailings drain back discharge systems that are used if the tailings pipelines need to be drained or flushed. The drain back systems are routed to flow into the site wide stormwater drainage network. In the unlikely event of a pipe leak, tailings slurry will flow adjacent to the pipeline and drain into the nearest surface runoff drainage ditch or other on-site containment.

The standby tailings pipeline is used intermittently to facilitate delivery of additional make-up water from Silver Lake to the YDTI for blowing tailings mitigation. The Silver Lake supply line is connected to the tailings pipeline at the Concentrator and the tailings pump houses are used to deliver the water to the YDTI.

4.3.2 Tailings Discharge Locations

The Tailings Delivery System is currently configured to facilitate tailings discharge from a combination of 'single-point' (24-inch and 26-inch nominal diameter) and 'multiple-point' (12-inch nominal diameter) discharge spigots along the three embankment limbs. Generally, Line 1 conveys tailings to the West Embankment, Line 2 conveys tailings to the west limb of the East-West Embankment, and Line 3 conveys tailings to the east limb of the East-West Embankment and the North-South Embankment. There is some overlap between the discharge lines and the discharge locations, which provides flexibility for depositing tailings into the facility.

The locations of the discharge points are shown on Figure 4.1, with discharge controlled by hydraulically actuated knife gate valves located at each discharge location along the pipeline alignment. The tailings discharge schedule is managed by MR and is based on the objective to develop extensive tailings beaches adjacent to each of the three embankments.



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YANKEE DOODLE TAILINGS IMPOUNDMENT

TAILINGS DELIVERY SYSTEM
FLOW SCHEMATIC

FIGURE 4.2

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EAST-WEST EMBANKMENT (JULY 2023)

NORTH-SOUTH EMBANKMENT (JULY 2023)

WEST EMBANKMENT (JULY 2023)

PHOTO REFERENCE:

JULY 2023 AERIAL IMAGE PROVIDED BY MONTANA RESOURCES.

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YANKEE DOODLE TAILINGS IMPOUNDMENT

TAILINGS DELIVERY SYSTEM
GENERAL ARRANGEMENT

FIGURE 4.3

SAVED: M:\1\01\00126\29\A\Acad\FIGS\B30, 12/1/2023 3:25:50 PM , RMCLELLAN PRINTED: 12/4/2023 11:18:29 AM, FIG 4.3, RMCLELLAN
XREF FILE(S): Tailings and Reclaim Pipelines; 5ft_01_2023-07-26 IMAGE FILE(S): East-West Embankment (July 2023) North-South Embankment (July 2023) West Embankment (July 2023) 5ft_01 2023-07-26

4.4 WATER RECLAIM SYSTEM

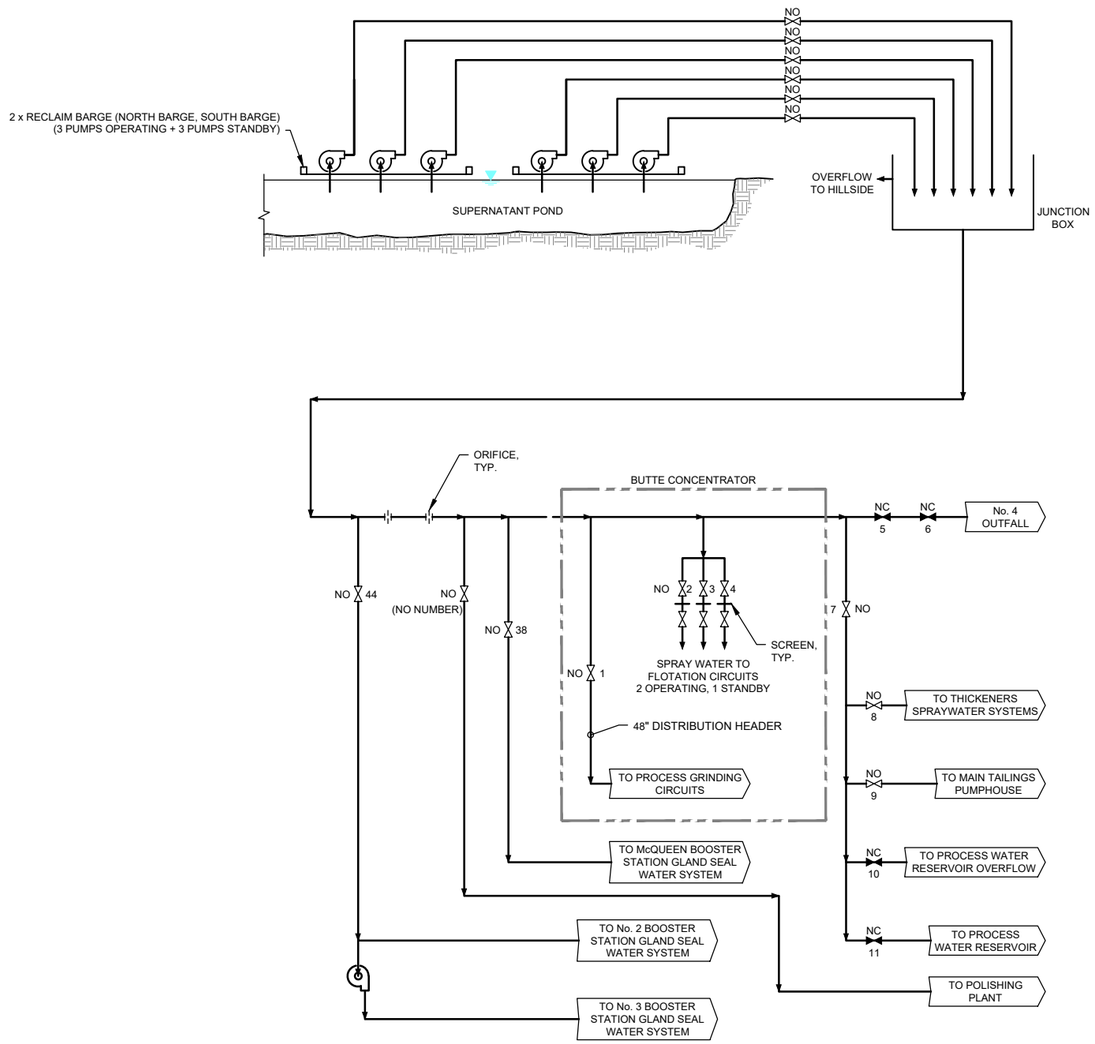
The YDTI water reclaim system supplies water for use in the mill process and treatment/discharge in the Pilot Project Polishing Plant. A schematic of the water reclaim system network is presented on Figure 4.4. Supernatant water is reclaimed from the northeast end of the YDTI using two floating pump barges (North Barge and South Barge). Each barge is equipped with three vertical turbine pump units. Generally, three to four (of the six) pump units are operational at any time. The barge pumps convey approximately 11,000 gpm to the Butte Concentrator, and when warranted, additional flows (typically between 2,100 to 6,000 gpm) to the Polishing Plant.

The barge pumps deliver water into a junction box, as indicated on Figure 4.4, which is located on the east side of the pond along the 6,500 ft elevation reclaim road. The North Barge is connected to the box with two pipelines and the South Barge is connected with three pipelines. The outlet of the box feeds into two pipelines that converge downstream into a single 42” diameter HDPE pipeline. The last mile of reclaim pipeline prior to delivery at the mill is 30” HDPE pipe. The total pipeline length from the reclaim barge to the Concentrator is approximately 5.1 miles with an elevation decrease of approximately 810 ft. The offtake to supply reclaim water to the Pilot Project Polishing Plant (Section 4.1.5) is located near the McQueen Tailings Booster Pump House. The pipeline is approximately 13,300 ft long and constructed using 24” HDPE pipe.

The HsB WTP effluent is pumped to the Return Water Line near the McQueen Tailings Booster Pump House where it joins reclaimed water from the YDTI and flows by gravity to the Butte Concentrator. The reclaim water is delivered to two locations at the Mill: the concentrator building for direct use in processing and to the process water reservoir located west of the Concentrator and Lime Silos. Reclaim water system flows are not currently measured.

4.5 SILVER LAKE WATER SYSTEM

Make-up and freshwater for the mine operations are supplied by the SLWS pursuant to the terms of a Water Services agreement with the City and County of Butte-Silver Bow and is located approximately 40 miles east of Butte. Up to an annual average of 1 MGPD of water may be supplied to the mine from Silver Lake during normal operating conditions. During upset conditions, up to 18 MGPD may be supplied for mine operations. The majority of Silver Lake water is added into the process at the Concentrator and as service water at the HsB WTP; however, water may also be pumped directly to the YDTI via a tailings pipeline if operations staff determines there is a need for dust control from the tailings beach.



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SAVED: M:\1\01\00126\29\A\Acad\FIGS\B40\ 12/1/2023 1:55:27 PM , RMCLELLAN PRINTED: 12/4/2023 11:23:56 AM, FIG 4.4, RMCLELLAN
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YANKEE DOODLE TAILINGS IMPOUNDMENT

RECLAIM PIPELINE NETWORK

FIGURE 4.4

4.6 HORSESHOE BEND AREA

4.6.1 HsB Overview

HsB is an area located downstream (south) of the YDTI and has a mix-use purpose. The area is shaped like an inverted 'U', bounded on both the east and west by historically leached mine rock. The following activities and associated infrastructure are currently located in the area:

- HsB Pond and associated seepage and runoff collection systems
- Stage 1 HsB rock disposal site (RDS) drainage system
- Precipitation Plant
- Mine maintenance and workshop area

The HsB area receives seepage from the YDTI and runoff from the surrounding disturbed and undisturbed catchment areas. Seepage migrates through the free-draining YDTI rockfill embankments and the historical leach pads and discharges at several locations along the toe of the slopes around north and east perimeter of the HsB area. Seepage sources include tailings slurry water that percolates into the tailings beach, meteoric recharge to the tailings surface, and seepage from the supernatant pond. The seepage flows and precipitation runoff collected within the HsB area are conveyed to the HsB Pond.

Construction of the Stage 1 HsB rock disposal site (RDS) drainage system in the HsB area commenced in 2022 and is scheduled to continue into 2024. The drainage system includes a foundation layer and a series of rock drains and perimeter ditches intended to convey seepage and precipitation runoff from under the future Stage 1 HsB RDS to the HsB Pond. Placement of rockfill material in the Stage 1 RDS is planned to commence in late 2023.

Active leach operations in the HsB area have ceased. Recirculation of leach solution to the leach pads stopped in July 2021 and drain down of the pads is considered complete. The Precipitation Plant is currently used to process Berkeley Pit water (from the Berkeley Pit Pumping System). A new Precipitation Plant is currently being constructed adjacent to the HsB Water Treatment Plant and is anticipated to be commissioned in late 2023. The existing Precipitation Plant will subsequently be decommissioned.

The HsB area contains the mine's maintenance and workshop area, which includes several mine buildings and associated infrastructure, including the truck maintenance workshop, wash bay, and laydown yard. Utility services located within the HsB area include electricity, water, sanity sewer and gas.

A general arrangement and flow schematic of the HsB area and various water management systems operating and interacting are presented on Figures 4.5 and 4.6, respectively.

4.6.2 Number 10 Seep

Several smaller seeps daylight above the main HsB Seep area, approximately 250 ft above the downstream toe of the embankment. These localized perched seepage flows, known as Number 10 Seep (Seep 10), have been attributed to a buried historical haul ramp, which conveys some tailings seepage that migrates as perched flows through the embankment to the collection facilities. An underdrain was installed in mid-2012 to capture the flows and convey them to a small surface pond before discharging through a v-notch weir into a pipe that conveys the flows to the Upper HsB Area.

The flowrates at Seep 10 are measured continuously by recording the stilling pond level adjacent to the v-notch weir using an ultrasonic lookdown level sensor. The sensor is connected to the mine's web-based remote monitoring system (RMS). The measurement recording frequency for the sensor is approximately hourly.

The Number 10 Seep system is being upgraded as part of the Stage 1 HsB RDS drainage system works. The surface flows will be conveyed via a new ditch to a new lined surface pond located on the west side of the 5,900 ft bench above the HsB Area. The new Number 10 Seep system will be constructed and commissioned in late 2023.

4.6.3 HsB Pond

The HsB Pond is a long, narrow basin approximately 100 ft wide and 2,000 ft long. Flow through the HsB Pond has been measured regularly since 1996 using a weir (the HsB Weir) established by the Montana Bureau of Mines and Geology (MBMG) near the south end of the pond. The water depth passing over the weir is measured continuously by an ultrasonic look-down level sensor located upstream of the weir. Data from this sensor is downloaded monthly by MBMG.

A second water level sensor was installed by MR in late 2022. The sensor continuously records the water level immediately upstream of the weir. The sensor is connected to the mine's web-based remote monitoring system (RMS). The measurement recording frequency for the sensor is every 30 minutes.

The HsB Weir records are representative of total flows within the HsB area. Historical flow data indicates a 98th percentile flow rate of 4,500 gpm. The HsB Pond discharges into a diversion structure at the south end of the pond. The structure directs the water by gravity to the WTP Equalization Basin during normal operations. The structure also has a high-water level gravity overflow into Berkeley Pit that can be used during upset conditions.

LEGEND:

- FLOW MEASUREMENT
- SEEPS
- HsB FLOWS
- EXISTING INFRASTRUCTURE
- BMFOU PUMPING INFRASTRUCTURE
- GRAVITY PIPED FLOW
- STAGE 1 HsB RDS DRAINAGE SYSTEM (UNDER CONSTRUCTION)
- STAGE 1 HsB RDS DRAINAGE SYSTEM (FUTURE EXPANSION)

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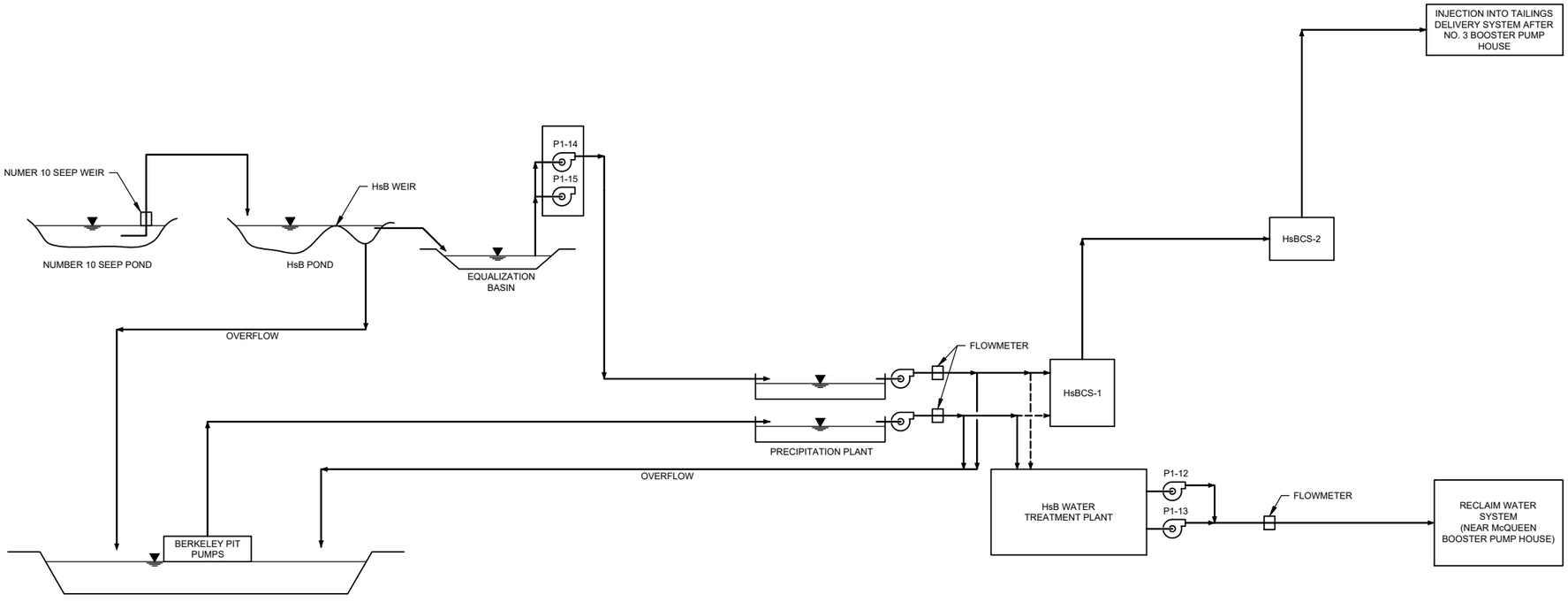
YANKEE DOODLE TAILINGS IMPOUNDMENT

GENERAL ARRANGEMENT:
HsB, BPPS AND HsBCS
WATER MANAGEMENT SYSTEMS

FIGURE 4.5



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SAVED: M:\1\10\100126\29\AAcad\FIGS\B32, 12/4/2023 10:49:17 AM , RMCLELLAN PRINTED: 12/4/2023 11:19:00 AM, FIG 4.6, RMCLELLAN
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YANKEE DOODLE TAILINGS IMPOUNDMENT

SCHEMATIC:
HsB, BPPS AND HsBCS
WATER MANAGEMENT SYSTEMS

FIGURE 4.6

4.7 SURFACE WATER MANAGEMENT

There are six locations where surface water drainage is collected:

- Yankee Doodle Tailings Impoundment
- Continental Pit
- Clear water ditch
- Berkeley Pit
- Horseshoe Bend
- Mill water storage ponds

Water stored in these locations is generally routed to the Concentrator and pumped to the YDTI in the tailings slurry.

The majority of precipitation (rainfall and snowfall) that occurs on the catchments upstream of the YDTI drains into the YDTI via three creeks: Yankee Doodle, Dixie and Silver Bow. Precipitation occurring in the Moulton Reservoir watershed (part of the Yankee Doodle watershed) is collected in the Moulton Reservoirs. The two Moulton Reservoirs are part of the Butte public water supply system.

4.8 WATER BALANCE

MR operates a conventional copper/molybdenum flotation process circuit with slurry tailings disposal. The process relies on efficient water management practices. Sources of water into the mine process include:

- Moisture in the ore
- Dewatering of the Continental Pit
- Drainage and surface run-off from watersheds upstream of the YDTI and Continental Pit
- Surface run-off from within the mine site
- Berkeley Pit dewatering
- Berkeley and Continental Pit dewatering wells for high-wall slope stability
- Butte water (potable water)
- Fresh water from the SLWS

Consumption of water leaving the mine process includes:

- Evaporation from the tailings beach, ponded water, and reservoirs
- Water contained in the stored tailings
- Water shipped with concentrates as moisture
- Process water used for dust control on the haul roads
- Discharge of treated water into Silver Bow Creek

The main sources of water introduced to the MR mine operations are from precipitation and runoff into the facility and SLWS water.

A site water balance was developed to identify and characterize the key variables that influence water demands and water supply requirements for the YDTI. The water balance model simulates the supply and demand for water on a month-by-month basis, from the initiation of mine operations through to current operating conditions. The water balance model was developed considering average model

input assumptions for the historical and current operating conditions. The water balance includes evaluation of the historical conditions to facilitate calibration of the model.

The water balance is updated approximately annually to reflect the current operating conditions at MR. The water balance model incorporates the following major project components:

- YDTI and contributing catchments
- Continental Pit
- MR Concentrator
- HsB Area
- Great Northern Dump (Inactive leach area)
- Northwest Dumps
- Berkeley Pit
- HsB WTP
- SLWS
- BPPS and Horseshoe Bend Capture System (HsBCS)

The following data are collected on site and are used in the balance:

- Mill Production Data
- Supernatant pond water volume
- HsB WTP flows
- BPPS and HsB CS flows
- HsB Weir flows
- SLWS flows
- Polishing Plant flows
- Mine site dust control (road network) water volume

The following water balance flows are currently estimated as there is no recording mechanism:

- Continental Pit dewatering
- Evaporation

The water balance model results indicate the mine operates with an overall water deficit. The water sources collected and stored on site (i.e. surface runoff from contributing catchments areas, YDTI embankment seepage, YDTI pond, and pit dewatering) is insufficient to support the mill processing and water consumption, therefore makeup water is required from an outside source (e.g. Silver Lake).

SECTION 5.0 OPERATIONS, MAINTENANCE AND SURVEILLANCE

5.1 INTRODUCTION

The design, construction, operation, maintenance, and surveillance of the YDTI involves a multidisciplinary team of professionals. This tailings management team includes oversight by the President of MR and involves the Engineering, Operations, Maintenance, and Environmental Affairs departments of MR, the EOR, multidisciplinary technical specialists from KP, plus additional external professionals as appropriate (IRP, MDEQ, etc.). The team works closely together to achieve the fundamental objective of on-going continuous improvement of the safety of the impoundment.

Risk is managed through a continuous process of risk identification, assessment of practicable solutions, implementation of change, and observation. The best practices employed at the site continue to progressively evolve, taking advantage of the best practicable new technologies and techniques. The guiding risk management objective for the YDTI is to continuously expand understanding of the facility and continuously improve management of the facility to enhance safety to the MR workforce, community, and environment.

5.2 PERFORMANCE OBJECTIVES

The on-going development and operation of the YDTI considers continuously achieving four key performance objectives as fundamental requirements for maintaining consistency with the design of the facility. These objectives incorporate the following:

- The YDTI supernatant pond remains separated from the embankments by large tailings beaches.
- The embankments and adjacent tailings beaches remain well drained, and piezometric elevations within the embankments remain below prescribed levels.
- Sufficient freeboard is maintained at all times to manage risks associated with extreme floods and seismic events.
- The embankment geometry, including downstream slope angle and crest width, remains consistent with the design criteria.

5.3 QUANTITATIVE PERFORMANCE PARAMETERS

Quantitative Performance Parameters (QPPs) are indicators of performance that can be easily measured and evaluated on-site without complex calculation or data interpretation. QPPs are a good reference to quickly assess the performance of the YDTI. The QPPs identified in Table 5.1 were selected to enable a high-level comparative assessment with the performance objectives listed above. QPP status is monitored daily as part of the surveillance activities discussed below and reviewed on a weekly basis during discussions between MR and KP.

Table 5.1 Quantitative Performance Parameters

Location	QPP	Value
YDTI Supernatant Pond	Total Freeboard	> 22 ft
YDTI Tailings Beach	Minimum beach length	> 200 ft
YDTI Embankments	Downstream Overall Slope	No steeper than 2H:1V
	Minimum Crest Width	> 200 ft
East-West Embankment Piezometers	Water level: MW94-08	< 5,680 ft
	Water level: MW94-11	< 5,693 ft
	Water level: DH15-S3 VW1	< 5,690 ft
	Water level: DH15-S4 VW1	< 5,740 ft
	Water level: DH15-S4 VW2	< 5,800 ft
	Water level: DH17-S1 VW2	< 5,741 ft
	Water level: DH18-S3 VW3	< 6,044 ft
	Water level: DH19-S7-VW1	< 5,770 ft
North-South Embankment Piezometers	Water level: MW12-01	< 5,940 ft
West Embankment Piezometers	Water level: VWP-DP1	< 6,374 ft
	Water level: VWP-DP2	< 6,366 ft
	Water level: DH15-12 VW1	< 6,372 ft
	Water level: DH15-12 VW2	< 6,372 ft
	Water level: DH15-12 VW3	< 6,372 ft

5.4 MAINTENANCE AND SURVEILLANCE REQUIREMENTS

5.4.1 Overview

The YDTI components and associated facilities must be inspected and maintained regularly to detect any changes to the condition and performance of the facilities, and to identify any potentially hazardous conditions that need to be promptly addressed. Surveillance activities are performed to verify that the performance objectives for the facility and operational objectives of the mine are continuously being achieved. These surveillance activities include site observations and inspections, collection of site monitoring data, and remote sensing techniques.

The maintenance and inspection responsibilities for the various MR facility components are discussed in Section 2 of this Manual. The MR Engineering department performs an inspection of the facility at least monthly and documents the inspection using the inspection log template in Appendix B. The monthly inspection covers major items related to the YDTI and associated facilities.

Table 5.2 presents a summary of the routine operational surveillance activities completed by MR. Additional details, including the specific maintenance and surveillance requirements for each component of the facility, are provided in the following sections.

Table 5.2 Operational Surveillance Requirements

Location	Inspection	Frequency[1]
Supernatant Pond	Measure pond water level	weekly
	Evaluate pond storage volume	annually
	Complete bathymetric survey of the tailings pond	annually
Tailings Beach	Inspect beach surface for dusting risk/potential	daily
	Complete survey of tailings beach elevation at 24 -inch 'single-point' discharge points.	quarterly
	Collect aerial image and topographic survey of the facility	annually
Tailings Delivery System	Observe discharge flow looking for whirlpools or indication the discharge flow is entering the embankment when a discharge stream is adjacent to the embankment	daily
	Observe the active tailings discharge pipes to confirm discharge is not blocked by beach/tailings sand.	daily
	Visually inspect the tailings pipelines for leaks.	daily
	Monitor tailings pump electrical current draw for changes in pump system demand. Visually inspect the tailings pipelines for leaks.	twice daily
	Record tailings line and discharge point use	twice daily
	Sample tailings slurry and analyze index properties	quarterly
Embankments	Inspect for cracking, slumping/deformation, erosion, slope failure, and any other changes in the embankment shape and surface. Inspect the upstream slope, downstream slope, and embankment crest.	monthly
	Inspect for daylighting seeps on the downstream embankment slope/benches, water pooling/ponding, soft/wet areas	monthly
	Inspect the embankment upstream slope and the integrity of the facing materials, particularly when the tailings discharge stream is flowing adjacent to the embankment	monthly
	Record water levels in standpipe piezometers	daily
	Record water levels from vibrating wire piezometers	daily
HsB Seepage Collection System	Record the Number 10 seep flowrate	daily
	Record the WED pump back rate	daily
	Record the HsB Capture System (HsBCS) flowrate	daily
	Record the Berkeley Pit Pumping System (BPPS) flowrate	daily
	Record the HsB WTP flowrate	daily
	Record the Polishing Plant effluent flowrate	daily
	Record the HsB Weir flowrate	daily
Site Wide Water Management	Observe surface drainage ditches and culverts for erosion, blockage, or damage	periodically

NOTES:

1. MR will make every effort to comply with the general monitoring frequency specified in the table. However, the schedule can be modified should circumstances temporarily preclude monitoring at the desired frequency.

5.4.2 Supernatant Pond

The supernatant pond provides a source of water to support continuous mill operations as described in Section 4.2.4. The primary maintenance requirements for the supernatant pond include:

- Managing the position and keeping it separated from the embankments by large tailings beaches.
- Maintaining adequate water storage to provide for continuous mill water supply during winter months and extended dry periods.
- Maintaining adequate freeboard by keeping the pond elevation at least 22 ft below the lowest containment elevation (e.g. embankment crest or natural ground).
- Providing adequate residence time for water clarity and water treatment objectives to be achieved prior to uptake by the reclaim water pumps.
- Maintaining the pH of reclaim water between 10 and 11.

The following surveillance activities are typically performed for the supernatant pond at the frequency indicated below:

- The position of the supernatant pond is observed daily by MR staff involved in the construction and maintenance of the facility.
- The elevation of the supernatant pond is surveyed approximately once per week.
- Satellite-based imagery is reviewed approximately monthly to remotely observe the position of the pond relative to the embankments.
- The MR Engineering department performs an inspection of the facility at least monthly.
- An aerial image and topographic survey of the facility is collected approximately annually.
- A bathymetric survey of the supernatant pond is conducted approximately once per year. The survey typically occurs in early summer, roughly at the same time as the aerial survey, when weather conditions are appropriate. The bathymetric survey is used to evaluate the subaqueous extents of the tailings surface and to support estimation of the supernatant pond volume.

5.4.3 Tailings Beach

The drained tailings beach is considered part of the impoundment containment system, which collectively with the rockfill embankments, contains the supernatant pond on the north side of the facility. The development of the tailings beach is described in Section 4.2.3. The primary maintenance requirements for the tailings beach include:

- Managing tailings beach shape and evenly raising beach elevations adjacent to the YDTI embankments by rotating the active discharge locations.
- Wetting of the tailings beach surface through rotation of the discharge locations and inundation at the margin of the supernatant pond to minimize the potential for dust generation, while maintaining drained beach conditions and low pore pressures within the free draining embankments.
- Selective wetting of tailings beaches by the discharge of tailings and freshwater from the SLWS if site conditions, weather monitoring data, and daily forecasts indicate the potential for blowing tailings dust generation.

The following surveillance activities are typically performed for the tailings beach at the frequency indicated below:

- The development of the tailings beach is observed daily by MR staff involved in the construction and maintenance of the facility. Daily surveillance of the beach includes observation of tailings discharge stream position, evaluation of any flow paths adjacent to the embankments, and identification of beach areas at risk of blowing tailings that require mitigation.
- The elevation of the tailings beach adjacent to the 24" discharge locations is surveyed quarterly and the elevation of the tailings beach at the discharge locations is compared with the elevation of the supernatant pond.
- Satellite-based imagery is reviewed approximately monthly to remotely observe the shape of the tailings beach. The tailings beach length adjacent to the embankment is visually estimated.
- The MR Engineering department performs an inspection of the facility at least monthly.
- An aerial image and topographic survey of the facility is collected approximately annually.

MR has maintained a climate station at the YDTI since 2014. The climate station currently records temperature, precipitation, barometric pressure, wind speed, wind direction and humidity. The key objective of the YDTI climate station is to collect real-time data that can be used to generate weather forecasts for the YDTI, specifically to identify conditions that may cause wind-blown tailings. The MR climate station is located adjacent to the No. 3 Tailings Booster Pump House. The station generates real-time information that is accessed remotely and is used by MR's control room operator and meteorologist. Weather forecasting for the MR site is updated daily by a contracted meteorologist. The 5-day forecasts are used to guide operations, plan dust control/mitigation activities and schedule tailings management. The climate data review and forecasting procedures are detailed further in the Dust Control Plan (MR, 2022).

5.4.4 Tailings Delivery System

A Tailings Discharge Plan, as described in Section 3.5.3, was prepared by MR in 2018. The Tailings Discharge Plan outlines the operational management and monitoring of the tailings discharge system.

The primary maintenance requirements for the tailings delivery system include:

- Cutting off or pulling back the discharge pipe as the beach surface increases and inundates the discharge point.
- Periodic rotation of the tailings pipelines to reduce concentrated abrasion along the bottom of the pipeline.
- Flushing of the pipelines with water when switching an operational line to standby, to prevent tailings sediments from accumulating and solidifying in the bottom of the pipeline.
- Periodic adjustments to the route and elevation (gradient) of the discharge lines.

The following surveillance activities are typically performed for the tailings delivery systems at the frequency indicated below:

- The active discharge locations in the YDTI are regularly inspected to ensure that the developing tailings beach does not block the discharge outlet.
- Regular inspection of the pipelines for leakages, signs of internal pipe abrasion and external damage to the pipeline is also conducted.

- Review of the tailings pump amperage trends at each booster pump house to monitor for changing pumping conditions. Increasing pump amperage indicates potential tailings deposition and sanding of the tailings delivery pipelines.
- The tailings line and discharge point usage are recorded twice daily (once per shift).

5.4.5 Embankments

Technical specifications associated with the continued construction of the embankment are detailed in the Construction Management Plan (CMP) (KP, 2018a). The CMP outlines the Quality Assurance and Quality Control (QA/QC) requirements for embankment construction, including construction inspection and compaction requirements. Additional details related specifically to the technical specifications for continued embankment construction and QA/QC requirements are available in the CMP.

The YDTI embankments do not require regularly scheduled maintenance activities; however, specific corrective maintenance items may be identified as a result of the inspections and surveillance of the embankments. The primary maintenance needs for the embankments include:

- Maintaining grading along the embankment crests to improve trafficability and to enhance drainage by preventing depressions, rutting or other potential areas for standing water to accumulate.
- Replacing batteries and maintaining and replacing monitoring equipment, including data loggers and radio-gateway devices, associated with the remote monitoring system.

MR is continually improving their embankment monitoring and surveillance system. Surveillance activities are completed to verify that the performance objectives for the facility are continuously being achieved and the embankment is functioning as intended. The surveillance activities for the embankment include site observations and inspections, collection of site monitoring data, and use of remote sensing techniques. The surveillance practices continue to progressively evolve and take advantage of the best practicable new technologies and techniques to enhance dam safety.

The following surveillance activities are typically performed for the embankments at the frequency indicated below:

- The condition of the embankments is observed daily by MR staff involved in the construction and maintenance of the facility.
- The MR Engineering department performs an inspection of the facility at least monthly.
- Periodic inspection of the embankment upstream slope and the facing materials is required, particularly when a tailings discharge stream is flowing adjacent to the embankment.
- KP completes a quarterly engineering field review to observe construction progress, discuss construction practices, and provide recommendations for priority actions as outlined in the Earthworks Inspection and Test Plan in Table 3.4 of the CMP. A summary report is prepared to document the observations during the field review and recommendations. The summary report is provided to MR, DEQ, and the IRP.

- Real-time piezometric records are available to MR and KP via a web-based remote monitoring system (RMS). The default reading frequency for the piezometric monitoring instrumentation is approximately hourly. The system uses a series of automated alerts to continuously evaluate for QPP trigger exceedances. Select MR and KP personnel will automatically receive an email notification from the RMS if measured pore pressures at a given QPP site exceed the trigger elevation. The system also provides additional status updates that inform system maintenance needs (battery replacements, hardware failure, radio-connectivity interruptions, etc.).
- In-place inclinometer (IPI) instrumentation was installed within slope inclinometer casings at four sites within the East-West Embankment in early-2020. The IPI instruments are integrated with the RMS allowing real-time, continuous sub-surface displacement monitoring within the central East-West Embankment, including along the maximum section.
- Subsurface angular deformations are monitored using Elexon Geo4Sight instrumentation (multi-node wireless deformation instrumentation) installed on Sections 0+00 and 8+00W upstream of the East-West Embankment crest.
- Surface displacement sensors are installed at the four IPI instrumentation sites and are integrated with the RMS. These sensors allow continuous monitoring of embankment surface displacement at these four locations using the Global Navigation Satellite System (GNSS).
- Surface displacements are monitored manually at eighteen Differential Global Positioning System (DGPS) survey-monuments located within the East-West (Central Pedestal Area) and North-South Embankments. Readings are collected by MR approximately three times per week, conditions permitting.
- Surface displacements are also monitored remotely using interferometric synthetic aperture radar (inSAR), which provides satellite-based displacement measurements approximately every 11 days. The operational inSAR displacement monitoring program use satellite data from Terra-SAR-X satellites to monitor vertical and line-of-sight displacement. Two-dimensional long-term displacement results are provided twice annually in approximately July and November. Shorter-term Bulletin assessments are provided every 22-days and monitor line-of-sight displacements using the Terra-SAR-X Ascending Orbit satellite. InSAR is active only during the snow-free season (approximately April through October).

The YDTI embankment has 75 active monitoring instrumentation locations. Many of these monitoring sites are outfitted with nested piezometer installations and over 200 monitoring instruments are providing real-time data through the RMS. Instrumentation locations that are currently being monitored are presented on Figure 5.1 and in Table 5.3. The instrumentation is distributed as follows:

- 41 locations in the embankments, including 107 VWPs (both grouted drillhole installations and sensor installations in standpipe piezometers), 1 manually-monitored standpipe piezometer, and 4 IPIs
- 13 locations with 37 VWPs within the Horseshoe Bend Area
- 20 locations with 38 VWPs within the tailings mass

There is currently one standpipe piezometers (MW12-03) that has not been retrofitted with a VWP and connected to the RMS.

Two Elexon Geo4sight installations (DH20-S2 and DH21-S4) were installed during the 2020 and 2021 site investigation programs. These instruments monitor pore water pressure at numerous sensor

locations within the drillholes (6 ft and 18 ft vertical spacing within rockfill and tailings materials, respectively).

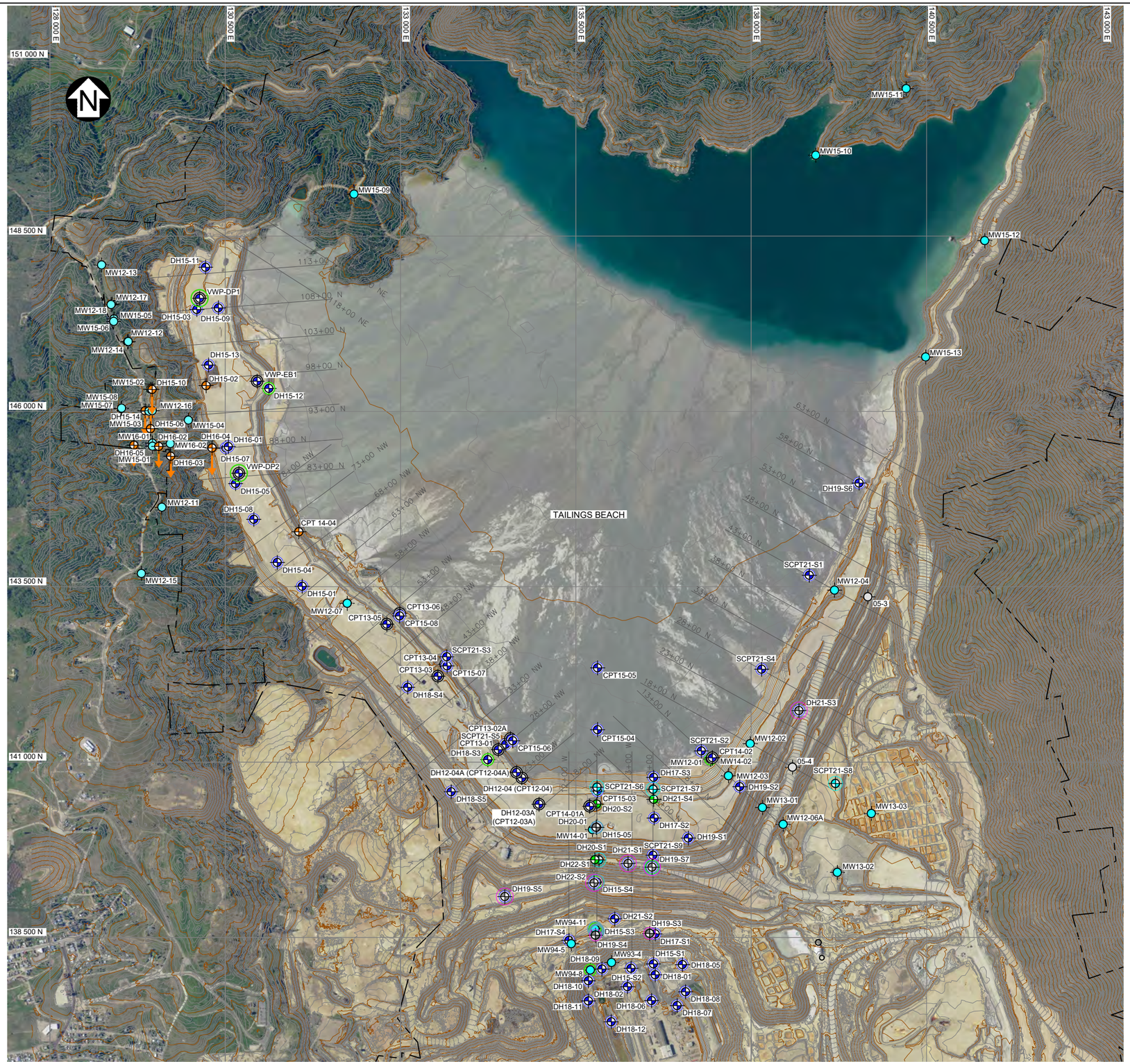
Table 5.3 Embankment Monitoring and Instrumentation Locations

Monitoring Location	Well ID	Instrumentation
North-South Embankment	MW 12-01	VWP
	MW 12-02	VWP
	MW 12-03	Standpipe
	MW 12-04	VWP
	MW 13-01	VWP
	MW 13-02	VWP
	MW 13-03	VWP
East-West Embankment	DH15-S3	VWP
	DH15-S4	2 x VWP, Thermistor
	DH17-S1	3 x VWP
	DH17-S2	4 x VWP
	DH17-S4	3 x VWP
	DH18-S3	5 x VWP
	DH18-S4	4 x VWP
	DH18-S5	5 x VWP
	DH19-S3	IPI
	DH19-S4	IPI
	DH19-S5	IPI, 6 x VWP
	DH19-S7	IPI, 7 x VWP
	MW 93-4	VWP
	MW 94-5	VWP
	MW 94-8	VWP
	MW 94-11	VWP
	MW12-07	VWP
West Embankment	DH15-01	3 x VWP
	DH15-02	3 x VWP
	DH15-03	3 x VWP
	DH15-04	3 x VWP
	DH15-05	3 x VWP
	DH15-07	3 x VWP
	DH15-08	3 x VWP
	DH15-09	3 x VWP
	DH15-11	3 x VWP
	DH15-12	3 x VWP
	DH15-13	3 x VWP

Monitoring Location	Well ID	Instrumentation
West Embankment (continued)	VWP-EB1	VWP
	VWP-DP1	VWP
	VWP-DP2	VWP
Tailings Beach	DH12-03A	VWP
	DH12-04	VWP
	DH12-04A	VWP
	CPT13-01	3 x VWP
	CPT13-02A	VWP
	CPT13-03	VWP
	CPT13-04	VWP
	CPT13-05	VWP
	CPT13-06	VWP
	CPT14-01A	VWP
	CPT14-02	VWP
	CPT14-04	VWP
	CPT15-03	3 x VWP
	CPT15-04	3 x VWP
	CPT15-05	3 x VWP
	CPT15-06	2 x VWP
	CPT15-07	2 x VWP
	CPT15-08	2 x VWP
	DH17-S3	3 x VWP
	DH19-S6	6 x VWP
Horseshoe Bend Area	DH-11	VWP
	DH15-S1	3 x VWP
	DH15-S2	3 x VWP
	DH18-01	3 x VWP
	DH18-02	3 x VWP
	DH18-05	3 x VWP
	DH18-06	3 x VWP
	DH18-07	3 x VWP
	DH18-08	3 x VWP
	DH18-09	3 x VWP
	DH18-10	3 x VWP
	DH18-11	3 x VWP
	DH18-12	3 x VWP

NOTES:

1. VWP = Vibrating Wire Piezometer.
2. IPI = In-Place Inclinometer.



NOTES:

1. COORDINATE SYSTEM AND ELEVATIONS BASED ON ANACONDA MINE GRID.
2. QPP MONITORING SITES = QUANTITATIVE PERFORMANCE PARAMETER
   CPP MONITORING SITES = CONSTRUCTION PERFORMANCE PARAMETER.
3. THE AERIAL PHOTO SHOWN IS FROM JULY, 2023.
4. JANUARY 2023 TOPOGRAPHY PROVIDED BY MONTANA RESOURCES, LLC.

LEGEND:

- MONITORING WELL/ STAND PIPE - VIBRATING WIRE PIEZOMETER
- EXISTING DRILLHOLE WITH NESTED VIBRATING WIRE PIEZOMETERS AND GEO4SIGHT INSTRUMENTATION
- EXISTING GEOPHYSICAL CASING
- EXISTING INCLINOMETER
- EXISTING INCLINOMETER WITH NESTED VIBRATING WIRE PIEZOMETERS
- EXISTING NESTED VIBRATING WIRE PIEZOMETERS
- EXISTING GEOTECHNICAL DRILLHOLE
- EXISTING SINGLE VIBRATING WIRE PIEZOMETER
- ANGLED DRILLHOLE
- DRY MONITORING WELL
- QPP MONITORING SITES²
- CPP MONITORING SITES²
- TAILINGS PIPELINE
- PROPERTY LINE

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
6	04DEC'23	ISSUED WITH TOMS MANUAL	SY3	RMM	DDF

SCALE A 500 0 500 1000 1500 2000 2500 ft

Montana Resources

YANKEE DOODLE TAILINGS IMPOUNDMENT

SITE INSTRUMENTATION AND MONITORING

FIGURE 5.1

5.4.6 Water Reclaim System

The Water Reclaim System, as described in Section 4.4, is to transfer water from the supernatant pond to the mill process water reservoir and to supply water to the Polishing Plant.

Maintenance and surveillance of the mechanical components of the reclaim water system are completed regularly to improve the longevity of the operating equipment and limit the potential for down time at the mill due to unforeseen equipment breakdown in the reclaim water system. Routine inspections of the pipeline and barge unit and replacement of worn or damaged components help to minimize down time. The barge deicing system is operated continuously during extreme cold conditions to prevent freezing around the barge pontoons. Maintenance shutdowns during cold periods are avoided, and, if necessary, pipes are drained to avoid freezing of standing water in the lines. Other scheduled maintenance needs for the reclaim water system, that pertain to operation of the YDTI, include periodically (yearly or less frequently) adjusting the position of the reclaim barges and elevation of access roads and infrequently (approximately every 5 to 10 years) raising the reclaim water system pipelines due to schedule crest raises of the North-South Embankment. The maintenance and surveillance requirements and associated records for the mechanical components of the reclaim water system are not specifically covered in the TOMS Manual.

5.4.7 Horseshoe Bend Water Management Systems

The HsB Water Management Systems, described in Section 4.6, collectively consist of surface ditches, ponds, drainage structures, pump systems, pipelines, and various flow monitoring devices, which facilitate the collection and transfer of water within the HsB area. The collected water includes contributions from the following sources:

- Seepage from the YDTI.
- Runoff and groundwater discharge from nearby rockfill dumps, decommissioned leach pads, and undisturbed upgradient areas (e.g. Rampart Mountain).
- Berkeley Pit water pumped to the Precipitation Plant (via the Pilot Project).

The low pH of the seepage, pregnant leach solutions, and pumped Berkeley Pit water results in additional management requirements due to precipitate accumulation and corrosion. The primary maintenance requirements for the HsB Water Management Systems include:

- Regular maintenance of pipelines and pump systems, and replacement of damaged/worn components as required.
- Regular maintenance of flow monitoring devices (e.g. Seep 10 Weir) to clear accumulated precipitates, debris, and algae/weed growth.
- Periodic maintenance of earth structures and ditches to facilitate flow collection and limit overflow between the systems.

The following surveillance activities are typically performed for the HsB Water Management Systems at the frequency indicated below:

- Regular inspection of the pipelines, pumps, weirs, and the surrounding area is completed by MR operations personnel to delineate any corrective maintenance required to maintain collection of accurate data.
- The MR Engineering department performs an inspection of the HsB area approximately monthly.
- Pump delivery pressures are monitored by MR operations staff to evaluate precipitate build up in the pipelines and determine any descaling requirements.
- An ultrasonic lookdown sensor connected to a Sensemetrics ThreadX device provides real-time measurement of the stilling pond level and flow rate at the Seep 10 Weir via the RMS.
- Flow rates are recorded daily by MR at the BPPS, HsBCS, and HsB WTP.
- Data loggers continuously record the water levels at the HsB Weir. The data is downloaded approximately monthly by MBMG.
- HsB water is sampled and chemical analysis completed by MBMG approximately monthly to monitor changes in the chemical composition of the flows.

5.4.8 West Embankment Drain

The WED does not require regularly scheduled maintenance activities. Specific corrective maintenance items may be identified during inspections and surveillance of the WED, or if comparison with piezometric monitoring data from the West Embankment and West Ridge indicates that the WED is not functioning as intended. The following surveillance activities are typically performed for the WED at the frequency indicated below:

- The condition of the WED outlet, Extraction Pond, pumping system, and discharge pipeline is observed periodically by MR staff involved in the construction and maintenance of the facility.
- The MR Engineering department performs an inspection of the facility at least monthly.
- The Extraction Pond pumping system flow rate is recorded daily by MR.

5.4.9 Site Wide Water Management

Site wide water management consists of surface ditches and drainage structures to facilitate the collection and conveyance of surface runoff. The key objective of the water management systems are the effective and reliable collection and conveyance of the surface water flows generated during precipitation events and from snowmelt. All surface water conveyance ditches and structures must be maintained in good working order. Water conveyance ditches and structures are to be inspected periodically and following periods of significant rainfall or snowmelt to assess any corrective maintenance requirements.

5.4.10 Upgradient Monitoring Locations

MR has thirty (30) instrumentation locations upgradient of the YDTI. Twenty-three (23) locations consist of standpipe monitoring wells that are fitted with VWPs. Manual water sampling may also be conducted from these locations. The remaining seven (7) sites consist of nested VWPs located on the West Ridge. Figure 5.1 and Table 5.4 present the upgradient locations that are monitored and a summary of the instrumentation at each location. All instruments are connected to the RMS.

Table 5.4 YDTI Upgradient Instrumentation Locations

Monitoring Location	Well ID	Instrumentation
West Ridge Area	DH15-06	5 x VWP
	DH15-10	5 x VWP
	DH15-14	5 x VWP
	DH16-01	4 x VWP
	DH16-03	5 x VWP
	DH16-04	6 x VWP
	DH16-05	7 x VWP
	MW 12-11	VWP
	MW 12-12	VWP
	MW 12-13	VWP
	MW 12-14	VWP
	MW 12-15	VWP
	MW 12-16	VWP
	MW 12-17	VWP
	MW 12-18	VWP
	MW 15-01	VWP
	MW 15-02	VWP
	MW 15-03	VWP
	MW 15-04	VWP
	MW 15-05	VWP
	MW 15-06	VWP
	MW 15-07	VWP
	MW 15-08	VWP
	MW 16-01	VWP
	MW 16-02 (D and S)	2 x VWP
North and Northeast of YDTI Pond	MW 15-09	VWP
	MW 15-10	VWP
	MW 15-11	VWP
	MW 15-12	VWP
	MW 15-13	VWP

NOTES:
1. VWP = Vibrating Wire Piezometer.

5.5 DATA ANALYSIS AND REPORTING

MR routinely monitors piezometric conditions, the supernatant pond elevation, tailings delivery system usage, beach elevation at tailings discharge locations, and flowrates at several water management locations as described in the preceding sections. Real-time piezometric records and flow rates at the Seep 10 and HsB Weirs are available to MR and KP via the web-based RMS. Supernatant Pond elevation data and other flow records are submitted to KP at least quarterly and typically more frequently. Select standpipe piezometers and VWPs have designated QPPs (Section 5.3) with piezometric trigger elevations assigned and are used to routinely assess the performance of the YDTI.

The RMS uses a series of alerts to continuously evaluate QPP trigger exceedances and to provide status updates that inform system maintenance needs. Advanced plotting and reporting tools were implemented in 2019 to visualize the real-time data (piezometric level, change in level, sensor status, etc.) Surveillance data is comprehensively reviewed on a quarterly and annual basis, and summary reports are provided to MR, DEQ, and the IRP. The following summarizes the content and frequency of the surveillance reporting:

- KP completes a quarterly engineering field review to observe construction progress, discuss construction practices, and provide recommendations for priority actions. A summary report is prepared to document the observations during the field review and recommendations.
- KP prepares a quarterly piezometric monitoring update summarizing the piezometric data for QPP monitoring sites.
- KP prepares a quarterly summary of water monitoring data, including the supernatant pond elevation, tailings beach development records, and flow records.
- KP prepares a Data Analysis Report (DAR) on an annual basis to summarize monitoring and instrumentation data for the impoundment.

5.6 YDTI OPERATIONS AND PERFORMANCE REVIEW

MR staff responsible for management of the various components of the YDTI review the annual performance of the facility. The following topics are considered:

- Review of weekly and monthly monitoring results
- Review of QPP compliance
- Review of maintenance status and requirements

Any questions or concerns noted during the review are to be forwarded to the EOR for review and feedback if and when appropriate.

SECTION 6.0 INSPECTIONS, REPORTING AND REVIEWS

6.1 REGULATORY DOCUMENTS

A copy of regulatory documents prepared by MR or consultants related to the YDTI construction, operation and maintenance are provided to the EOR at the same time as these are submitted to the EPA or MDEQ.

6.2 MONTHLY INSPECTION

The MR Engineering department performs an inspection of the facility at least monthly and documents the inspection using the inspection log template in Appendix B. The monthly inspection covers major items related to the YDTI and associated facilities. MR provides a copy of the monthly inspection logs to the EOR.

The EOR has real-time remote access to embankment piezometric and deformation monitoring information.

6.3 ANNUAL EOR INSPECTION

As per MCA 82-4-381, the EOR inspects the tailings impoundment annually during operations or as required during closure pursuant to a reclamation plan under MCA 82-4-336. The requirements for the annual inspection are as follows:

- The EOR prepares a report describing the scope of the inspection and actions recommended to ensure the impoundment is being properly operated and maintained.
- The EOR submits the report to MR and the MDEQ and would immediately notify the MDEQ and MR if the facility presents an imminent threat or the potential for an imminent threat to human health or the environment.

The following actions are taken when the Annual Inspection Report (AIR) contains recommendations:

- MR prepares a corrective action plan and schedule to guide the implementation of the EOR recommendations.
- MR submits the corrective action plan and schedule to the EOR.
- The EOR reviews the corrective action plan and schedule and verifies that the proposed corrective actions are reasonably expected to effectively address the recommendations made in the AIR.
- MR submits the verified corrective action plan and schedule to the MDEQ within 120 days following the date of the inspection.
- MR implements the corrective action plan in accordance with the implementation schedule.

6.4 PERIODIC IRP REVIEWS

As per MCA 82-4-380, at least every 5 years MR will assemble an IRP review in accordance with the IRP requirements (MCA 82-4-377). MR will provide documents and records necessary for the IRP to complete the periodic review. The IRP must conduct the following:

- Inspect the tailings impoundment.
- Review the TOMS Manual and records collected in association with the Manual.

- Interview people with responsibilities identified in the TOMS Manual.
- Review EOR Annual Inspection Reports, corrective action plans, records associated with construction, and any other aspect, plan, record, document, design, model, or report related to the facility, which IRP needs to ensure the facility is constructed, operated, and maintained as designed and is functioning, can be closed as intended, and meets acceptable engineering standards.
- The IRP will prepare a report detailing the scope of review and include any recommendations resulting from the review.
- The IRP would immediately notify the MDEQ and MR if there is an imminent threat to human health or the environment.
- The final review report must be signed by each IRP member and provided to the MDEQ and MR.
- MR will prepare a corrective action plan and schedule effectively implementing the recommendations included in the IRP report. MR will submit the corrective action plan and schedule to the IRP within 60 days after receipt of the IRP report.
- The IRP will review the corrective action plan and schedule to determine whether the corrective action plan and schedule proposed by the operator will effectively implement the recommendations included in the IRP's report.
- Within 30 days after receipt of approval from the IRP, the operator will submit the corrective action plan with an implementation schedule to the MDEQ.

The first periodic review was completed by the IRP on September 12, 2020 (IRP, 2020) and noted that 'the YDTI appears to be performing according to design. Construction is well managed, as is tailings deposition and facility maintenance'.

6.5 INTERIM REVIEW AND REPORTING

Additional inspections or monitoring may be required following any unusual event (e.g., earthquake or extreme rainfall event) or observation made during a routine inspection or monitoring. The response action plan following an unusual event is outlined in Table 6.1. The response procedures following identification of unusual conditions during inspection or monitoring will be undertaken according to the monitoring and mitigation actions presented in Section 7.0.

Reporting of any unusual conditions and documentation of any additional monitoring or remedial measures undertaken will be recorded on the Impoundment Incident Report Form (Appendix C) which must be completed as soon as possible and a copy submitted to the EOR.

If an inspection is performed by the EOR following an unusual event or observation and corrective actions are identified by the EOR, the same procedural framework outlined in Section 6.3 for an annual inspection will be followed for preparing, submitting and implementing the corrective action plan and schedule.

Table 6.1 Response Action Plan (Condition/Notification/Response)

Event / Observation	Recommended Action
Extreme Rainfall or Runoff Event	Monitor the YDTI pond levels against the critical levels daily (or more frequently) until pond inflow reduces to normal.
	Monitor the HsB weir flowrates and water level in the HsB WTP storage pond. Increase inflow to HsB WTP to meet the maximum treatment capacity of HsB WTP pond and open discharge overflow into Berkeley Pit as required.
	Inspect the embankments and HsB Seepage Collection System for signs of concentrated runoff and erosion.
	Inspect surface drainage ditches and culverts for blockages, bank scouring or localized erosion.
	Inspect the YDTI embankments for indications of localized slumping or instability, and note areas of saturated or soft ground
	Read piezometers daily to monitor pore pressure response to increased precipitation. Report findings to the MR Engineering Team.
Extreme winds	Monitor beach for dusting risk. Recirculate reclaim water or pump Silver Lake water to YDTI to discharge over the tailings beach. Apply Magnesium chloride to surface of dry beach areas if safe. Alter tailings discharge location to address areas of dry or blowing tailings.
YDTI pond level close to or approaching maximum operating level	Monitor Pond levels every 3 hours
	Increase reclaim water pump back flow rate. Commence additional reclaim water pump back with standby reclaim barge unit. Mobilize additional pump equipment to increase pumping capacity if accelerated water level reduction is required. Discharge additional water into the Concentrator dredge pond, Berkeley Pit or Continental Pit.
	Stop discharge of tailings into the YDTI.
Extreme earthquake event	Undertake a detailed inspection of the YDTI embankments, pipelines, and associated structures. Observe downstream and upstream (visible) slopes to look for signs of cracks, bulging, settlement, and/or other deformations. Look for and note any changes in seepage, particularly with respect to the rate of seepage flow at the embankment toe and seepage clarity.
	Record water levels in piezometers.
	Inspect downstream embankment toes for sand boils and along the slopes for sinkholes. Inspect the tailings beach upstream to look for whirlpools.
	Discuss findings with the MR Engineering Team and EOR.
	Inspect HsB seepage flow for change in flowrates and seepage clarity.
Rupture of pipeline at the embankment	Switch to alternate tailings pipeline.
	Check the upstream slope and crest for erosion.
	Take photographs and make notes of exact location and cause (if known) of leak. Contact the MR Engineering Team.
Significant, rapid embankment erosion, seepage break out or sand boils	Estimate seepage flow rate. Estimate size of area affected.
	Take photographs and make notes of exact location (if known) of erosion. Contact the MR Engineering Team and EOR.
Extreme freezing temperatures	Drain reclaim pipeline if not in use.
	Ensure de-icing system on reclaim barge is functioning properly. System should be checked prior to expected onset of freezing temperatures.
	Check surface runoff management pumps i.e. Muddler Pump for frozen pipes and intake pipes blocked with ice or snow.
	Check Tailings Pump System to ensure pipelines are not frozen.
	Take photographs and make notes of any damages or unusual observations.
Significant change in the HsB water quality results	Significant change for two consecutive monitoring events - notify the MR Engineering Team.
Power Failure	Drain tailings pipelines if power failure occurs. Drain reclaim pipeline if power failure occurs during freezing temperatures.
	Monitor water levels in the YDTI and check against critical levels. Check more regularly if the water levels are rising and the pond level is close to the maximum level. If the pond level is close to the maximum level portable generators may be required to power the reclaim pump until power is restored.
Significant change in the piezometer levels	Re-check the reading, and contact the MR Engineering Team
Irreparable damage to a monitoring location	Notify MR Engineering Team and EOR. The requirement to replace the well will depend on the effected location.
Other events/observations	Use judgement, consult with MR engineers.

SECTION 7.0 EMERGENCY PREPAREDNESS AND RESPONSE

7.1 GENERAL

Emergency preparedness and response planning is critical to prevent failure from occurring, and to reduce and mitigate loss of life and property damage in the event failure transpires. Evaluation of potential emergency and hazardous conditions threatening the facility, and appropriate response actions to prevent development and further advancement of emergency conditions have been identified in the following sections.

7.2 FAILURE MODES

Potential failure modes at the YDTI have been identified as follows (KP, 2018b):

- Overtopping
- Surface Erosion
- Slope Failure
- Internal Erosion
- Foundation Failure

Each of the above-listed failure modes, and their contributing factors, have been taken into consideration in determining the potential emergency conditions.

7.3 DEFINITIONS

A potential emergency condition is an event or condition that is not normally encountered during routine operations (or construction) and that may endanger one or more of the facilities, or may pose a threat to human life, the environment, or infrastructure downstream.

Events or situations that may lead to potential emergency conditions for the YDTI include, but are not limited to:

- Earthquakes
- Large runoff events resulting from storms and/or snowmelt
- Loss of tailings beach adjacent to tailings embankments
- Springs, seeps, sand boils, sinkholes, or increased seepage/leakage rates
- Exceedance of an established trigger level (water level or piezometric pressure)
- Erosion, rockfall, slumping, sloughing, or cracking of an embankment or abutment
- Landslides, debris flows or avalanches
- Embankment breach by overtopping or geotechnical/structural failure
- Human interference by vandalism, terrorism, or accidents

These events or situations are described below.

7.3.1 Earthquake

An earthquake could potentially displace, damage, or cause an embankment to crack or settle, resulting in a loss of structural integrity or freeboard. The occurrence of an earthquake greater than Magnitude 5.0 on the Richter Scale within 100 miles of the facility will automatically trigger a Level 1

or higher condition. Assessing and repairing potential damage caused by an earthquake will be the required remedial action.

7.3.2 Large Runoff Event

A large runoff event resulting from a storm and/or snowmelt could lead to rapid filling and the potential loss of freeboard, extensive erosion, or uncontrolled discharge from one or more of the facilities. Access to the embankments may be affected or may not be possible due to flooding, as roads and culverts could be washed out, and pump and pipeline systems could be affected. Large flooding events that encroach on embankment freeboard requirements as detailed in the TOMS Manual will trigger the emergency response as a Level 1 or higher condition. Regaining freeboard for the normal and safe operation of a facility, by controlled discharge or pumping to an alternative location (with the appropriate regulatory approvals) will be the remedial action.

7.3.3 Loss of Tailings Beach

The tailings beach provides a barrier that hydraulically separates the supernatant pond from the embankment, thereby reducing pore pressures and seepage. The loss of this beach can lead to a decrease in embankment stability, increased seepage, and increased potential for embankment failure. The loss of a tailings beach can cause a greater volume of tailings and water to be mobilized during an embankment failure, leading to a more catastrophic event. The loss of tailings beach will trigger the emergency action as a Level 1 or Level 2 condition. The re-establishment of tailings beach when it is noticed to be decreasing, by strategic tailings deposition, will be the required remedial action.

7.3.4 Springs, Seeps, Sand Boils, Sinkholes, or Increased Leakage

The presence of new springs, seeps, sand boils, sinkholes or increased leakage could be a sign of internal erosion of an embankment. Internal erosion, also referred to as piping, could result in the weakening of the structure that may lead to localized or large-scale embankment failure. If new springs, seeps, sand boils, sinkholes or increased leakages are observed, the following details must be determined: location and size of the affected area, estimated discharge rate, and nature of seepage (clear or cloudy). Such an event will trigger the emergency response as a Level 1 or higher condition, depending on the severity of the problem that is observed. Continual monitoring and mapping of the affected area and prompt remedial action will be required.

7.3.5 Exceedance of an Established Trigger Level

This TOMS Manual provides details on the regular monitoring of geotechnical instrumentation (standpipe piezometers and vibrating wire piezometers) installed in the YDTI and outlines associated trigger levels at which the emergency response should be implemented (for instance if pore pressures change rapidly or dramatically). The emergency response will be triggered as a Level 1 or higher condition, depending on the severity of the occurrence. Remedial action may be required to return within the trigger levels.

7.3.6 Erosion, Rockfall, Slumping, Sloughing or Cracking of the Embankment or Abutment

Erosion, rockfalls, slumping, sloughing, or cracking of the embankment or abutment could potentially result in the loss of freeboard, uncontrolled discharge from the facility or weakening of the structure, with the potential implication of embankment failure. If unusual erosion, rockfalls, slumping, sloughing

or cracking is observed at an embankment or abutment area, then the location and size of the affected area(s) (depth, height, width), severity, estimated discharge rates, nature of discharge (clear or cloudy), and water level elevation must be determined. These events trigger the emergency response as a Level 1 condition or higher.

7.3.7 Landslides, Debris Flows, or Avalanches

Landslides, debris flows, or avalanches have the capability to rapidly displace large volumes of water that could generate large waves with the potential to move across a pond and overtop an embankment, resulting in discharge of water and potentially inducing larger embankment failure. Additionally, if such an event occurs near an embankment, the structure could be destabilized (foundation or overall structure). These events trigger the emergency response as a Level 3 condition. Remedial action may be required to repair damage and restore overall facility safety.

7.3.8 Embankment Breach by Overtopping or Geotechnical/Structural Failure

An embankment breach may occur as a result of embankment overtopping and erosion, or internal geotechnical/structural failure. The magnitude of such a failure will be a function of the volume of free water and tailings that may be mobilized. Embankment breach will trigger the emergency response as a Level 3 condition. The immediate requirement will be to notify those who may be at risk and evacuate workers from the downstream area.

7.3.9 Human Interference (Vandalism, Terrorism, or Accident)

The nature and form of human interference is difficult to predict and may range from quite minor to very serious potential impacts. The emergency response will be triggered by human interference as a Level 1 or higher condition.

7.4 CLASSIFICATIONS

Potential emergency conditions are classified into three emergency levels depending on the severity and development of the condition. A condition or incident may escalate to a higher emergency level if the appropriate actions are not taken to prevent it or are inadequate to mitigate the condition deteriorating. The potential emergency conditions are defined as follows:

- **Level 1: Unusual Occurrence**. Events or observations that do not yet represent a potential emergency but do require prompt investigation and resolution. The hazard or incident does not pose immediate danger but could develop into one.
- **Level 2: Potentially Hazardous Situation.** Conditions that represent a potential emergency, if sustained or allowed to progress, but no emergency situation is imminent. Steps to mitigate damage or prepare for evacuation may need to be taken.
- **Level 3: Actual or Imminent Failure.** An emergency defined by either imminent or actual failure of a significant component of the impoundment. Widespread evacuation of the downstream area is appropriate.

7.5 YDTI EMERGENCY CONDITIONS MONITORING AND MITIGATION

Description of the emergency conditions classified under the three levels and the monitoring and mitigation to be implemented are outlined in Table 7.1.

Note, the emergency condition level shall be increased to Level 3 (imminent or actual emergency) if the embankment is failing or will imminently be failing.

Table 7.1 Emergency Condition Monitoring and Mitigation

LEVEL	UNUSUAL OCCURRENCE	MONITORING AND MITIGATION
1	Water levels in the YDTI rising and approaching minimum tailings beach length.	Monitor water levels daily.
		Develop plan to decrease pond levels or increase embankment freeboard.
		Reduce inflow of make-up water from Silver Lake.
	Tailings discharge resulting in non-uniform tailings beach surface at discharge points.	Alter tailings discharge configuration to in-fill low lying areas
		Survey and monitor to assess effectiveness of targeted in-filling.
	Flowrates from the HsB area are increasing and approaching 75% of historical maximum flowrates (4,500 gpm) (i.e. flow rates are approaching 3,375 gpm)	Monitor seepage flowrates every four hours.
		Assess cause of increased flow rates. Continue monitoring until readings return to normal or increased flow rates are considered acceptable. Otherwise see Level 2.
	Minor surface erosion or localized cracking on YDTI embankment crest/slopes.	Repair as necessary. Conduct embankment walkovers daily until the problem is understood and addressed.
		Survey and monitor erosion area, crack extent and displacement as appropriate. Resurvey any new or reoccurring cracks.
		Determine the cause of the erosion or cracking
	Unusually high piezometer reading(s)	Re-check the reading again.
		Continue monitoring daily until readings return to normal. Otherwise see Level 2 Response.
	Seep or water discharge on embankment downstream slope at approximate tailings beach elevation.	Place rockfill as required along the upstream face opposite the location of the seeps on the downstream face until seepage stops. Place thin layer of alluvium material over rockfill.
		Contact the Engineer of Record.
		Monitor seepage rates through embankment, if flows are unable to be stopped cease tailings discharge into YDTI.
	Failure of Reclaim Pumps	Monitor water levels daily. Use standby barge pumps.
		Ensure portable pumps are available. Repair or replace failed pumps ASAP.
	Tailings Pipeline blocked	Stop tailings discharge, switch to standby tailings pipeline.
		Flush pipeline with water to clear obstruction. Inspect the pipeline for damages or leaks.
		Determine the cause or reason for blockage.
	Rupture of the tailings pipeline	Stop tailings discharge through ruptured pipeline, switch to standby tailings pipeline.
		Check for erosion on the YDTI embankment.
		Build confinement berms as necessary to contain the tailings. Clean up tailings.
		Determine cause of rupture.
2	Water levels in the YDTI have risen to a level that minimum tailings beach length is not maintained.	Cease pumping of make-up water from Silver Lake.
		Increase water reclaim pumping from the YDTI.
		Implement plan to decreased pond levels or increase embankment freeboard (i.e. increase tailings level adjacent to YDTI) embankment.
		Monitor water levels every four hours.
2		Monitor seepage flowrates every four hours.

LEVEL	UNUSUAL OCCURRENCE	MONITORING AND MITIGATION
	Flowrates from the HsB area are increasing and approaching historical maximum flowrates (4,500 gpm)	Inspect tailings discharge flow across tailings beach for short circuiting through embankment.
		Inspect upstream embankment slope for water ponding adjacent to embankment.
	Unusually high piezometer reading(s) maintained over a few days	Re-check readings. Continue daily readings. Contact the Engineer of Record.
	Major erosion of a downstream slope or crest/sediment build-up at the toe of the embankment from erosion.	Contact the Engineer of Record.
		Prepare to carry out corrective repairs.
	Soft embankment toe condition	Determine if water source is natural or from the tailings pond. Contact the Engineer of Record.
		Commission a field investigation program. Prepare to carry out corrective repairs.
	Boils observed downstream of embankment	Contact the Engineer of Record.
		Prepare to carry out corrective repairs. Place granular filter material over the boils, as directed/approved by the Engineer.
	Water vortex within ponded water adjacent to embankment	Check area on downstream side of the embankment for increased and/or turbid seepage discharge.
		Place granular filter material against any such areas, as directed/approved by the Engineer of Record.
	Large earthquake and loss of freeboard	Carry out detailed post-earthquake inspection of the embankment with the assistance of the Engineer of Record. Restore embankment as directed by the Engineer.
	Slope movement / significant failure of embankment slope impacting the crest width	Repair as necessary. Conduct embankment walkovers daily until the problem is understood and addressed. Contact the Engineer of Record.
		Survey and monitor crack development (e.g. crack size, extent, etc.). If movement or failure is progressive, upgrade to Level 3.
	Significant failure of embankment slope impacting the crest width	Repair embankment. Conduct embankment walkovers daily until the cause of the failure is understood and addressed. Contact the Engineer of Record.
		Survey and monitor (e.g. extent, etc.) to assess whether further failure is imminent. If movement or failure is progressive, upgrade to Level 3.
	High turbidity in seepage collection flow	Conduct HsB pond and YDTI embankment walkovers daily until the problem is understood and addressed. Take water samples for suspended solids analysis twice a week.
		Contact the Engineer of Record.
		Prepare to carry out corrective repairs.
	Slumping, sliding, or bulging of an embankment slope or adjacent ground	Follow procedures identified for 'Failure or suspected imminent failure of embankment' (refer Level 3).
		Do not attempt placement of additional material or construction of a stabilizing berm until plan has been discussed with the Engineer of Record.
3	Failure or suspected imminent failure of an embankment (any reason)	Contact the Engineer of Record.
		Initiate chain of communications and ensure safety of people. Stop tailings discharge into the YDTI and make-up water flow from Silver Lake.
		Lower pond by any practical and safe means. Mobilize pumps and earthmoving equipment to safe location if safe to do so.

7.6 EMERGENCY CONDITION NOTIFICATION PROCEDURES

The Emergency Condition Notification Procedures should be initiated following identification of any level of potential emergency condition. Depending on the emergency condition level, different notification processes and sequences will be implemented.

7.6.1 Emergency Action Plan Yankee Doodle Tailings Impoundment

The main objective of the Emergency Action Plan (MR, 2021c) is to ensure the safety of the public at large by the prevention of emergency conditions and by providing response strategies in the event of emergency conditions occurring, specifically Level 2 and Level 3 emergency conditions.

The EAP includes the following keys features:

1. Responsibilities and Authority
2. Notification Procedures (Level 2 and Level 3 Emergency Conditions)
   a. Notification Flowchart
   b. Imminent or Actual Failure mechanisms
   c. Potentially Hazardous situations
3. Mitigation Actions
   a. Emergency Response Actions
   b. Supplies and Resources
   c. Local Contractors and Engineers

The EAP is required to be reviewed on an annual basis to ensure the emergency response procedures and mitigation actions are still relevant and all emergency response contact details correct. An update may incorporate a general revision of the entire EAP or be limited to specific pages or sections.

7.6.2 Level 1 Notification Procedures

The Level 1 notification procedures are as follows:

- The person first noticing a Level 1 Emergency Condition shall notify the General Shift Foreman. The Mine Foreman will immediately notify the Vice President of Operations, Manager of Engineering and Geology, and the Vice President of Environmental Affairs.
- Corrective actions will be determined and initiated, and monitoring will be intensified.
- The Vice President of Environmental Affairs will ensure that the EOR is notified of any unusual occurrences and updated with respect to any relevant changes thereafter until emergency response de-escalation occurs.

7.6.3 Level 2 and 3 Notification

The same initial Level 1 notifications are required for Level 2 and 3 Emergency Conditions. Level 2 and 3 Emergency Conditions also require notification to external individuals and groups. The notification processes and flowcharts for Level 2 and 3 are presented in the Emergency Action Plan.

7.7 EMERGENCY CONDITION DOCUMENTATION AND REPORTING

Documentation and reporting of all levels of potential emergency condition events and occurrences is important to ensure that appropriate monitoring, management, and tracking of site conditions and events is maintained.

7.7.1 Level 1 Reporting

In the case of any emergency condition, the Impoundment Incident Report Form (Appendix C) must be completed as soon as possible as a first report of the Incident. Follow up reporting and presentation of the emergency condition may be required depending on the severity of the condition.

7.7.2 Level 2 and 3 Reporting

The Impoundment Incident Report Form (Appendix C) must be completed as soon as possible as a first report of the Incident. Additional reporting requirements for Level 2 and Level 3 emergency conditions are presented in the Emergency Action Plan.

SECTION 8.0 REFERENCES

Hydrometrics Inc. (Hydrometrics), 2017. Hydrologic Evaluation of the Yankee Doodle Tailings Impoundment West Ridge Area Silver Bow County, Montana. Helena Montana. July 2017.

Independent Review Panel (IRP), 2017. Report of the Independent Review Panel: Design Document for Expansion of the Yankee Doodle Tailings Impoundment, November 20, 2017.

Independent Review Panel (IRP), 2020. Report on the Independent Review Panel: Periodic Review No. 1 of Yankee Doodle Tailings Impoundment, September 12, 2020.

Knight Piésold Ltd. (KP), 2017a. Yankee Doodle Tailings Impoundment, Design Basis Report (KP Reference No. VA101-126/12-1 Rev 2), June 30, 2017.

Knight Piésold Ltd. (KP), 2017b. Yankee Doodle Tailings Impoundment, Site Characterization Report (KP Reference No. VA101-126/14-2 Rev 2), August 11, 2017.

Knight Piésold Ltd. (KP), 2017c. Yankee Doodle Tailings Impoundment, Alternatives Assessment (KP Reference No. VA101-126/12-4 Rev 2), August 24, 2017.

Knight Piésold Ltd. (KP), 2017d. Yankee Doodle Tailings Impoundment, West Embankment Drain Design Report (KP Reference No. VA101-126/13-3 Rev 2), September 6, 2017.

Knight Piésold Ltd. (KP), 2017e. Response by the Engineer of Record to Comments Submitted by Atlantic Richfield Company (KP Reference No. VA17-01525), September 8, 2017.

Knight Piésold Ltd. (KP), 2018a. Yankee Doodle Tailings Impoundment: Construction Management Plan (KP Reference No. VA101-126/12-5 Rev 3), May 1, 2018.

Knight Piésold Ltd. (KP), 2018b. Yankee Doodle Tailings Impoundment, Dam Breach Risk Assessment (KP Reference No. VA101-126/12-3 Rev 3), March 12, 2018.

Knight Piésold Ltd. (KP), 2018c. Yankee Doodle Tailings Impoundment, Stability Assessment Report (KP Reference No. VA101-126/12-2 Rev 3), March 13, 2018.

Knight Piésold Ltd. (KP), 2018d. Yankee Doodle Tailings Impoundment, Water Management Report (KP Reference No. VA101-126/12-7 Rev 3), March 14, 2018.

Knight Piésold Ltd. (KP), 2018e. Yankee Doodle Tailings Impoundment, Reclamation Overview (KP Reference No. VA101-126/12-8 Rev 5), May 2, 2018.

Knight Piésold Ltd. (KP), 2023. Yankee Doodle Tailings Impoundment, 2022 Risk Assessment Report (KP Reference No. VA101-126/27-1 Rev 0), July 7, 2023.

Montana Resources (MR), 1999. Yankee Doodle Tailings Impoundment: Design and Construction, MR Engineering and Geology Department, July 1997, revised March 1999.

Montana Resources (MR), 2022. Dust Control Plan for Yankee Doodle Tailings Impoundment, March 2022.

Montana Resources (MR), 2018b. Tailings Discharge Plan for Yankee Doodle Tailings Impoundment, December 2018.

Montana Resources (MR) 2023a. Montana Resources: Continental Mine Operations Plan, March 2023.

Montana Resources (MR) 2023b. Montana Resources: Continental Mine Reclamation Plan, January 2023

Montana Resources (MR), 2023c. Bathymetric Survey - 2023, August 8, 2023.

Montana Resources (MR), 2021c. Emergency Action Plan – Yankee Doodle Tailings Impoundment, January 2021.

Montana Code Annotated (MCA), 2021. Title 82: Minerals, Oil, and Gas, Chapter 4: Reclamation, Part 3: Metal Mine Reclamation. Accessed: December 2021.
Available at: http://leg.mt.gov/bills/mca_toc/82_4_3.htm

United States Army Corps of Engineers (USACE), 1980. Phase 1 Inspection Report, National Dam Safety Program, Warm Springs Tailings Dams and Yankee Doodle Tailings Dam. Seattle District, U.S. Army Corps of Engineers, February 1980.

United States Army Corps of Engineers (USACE), 2015. National Inventory of Dams, Yankee Doodle Tailings Dam, NIDID MT01425. Accessed November 2015.
Available at: http://nid.usace.army.mil/

SECTION 9.0 CERTIFICATION

This report was jointly prepared and reviewed by the undersigned.

Prepared:

Roanna Dalton, P.Eng.
Specialist Engineer | Associate - Knight Piésold Ltd.
Knight Piésold Ltd.

Prepared:

Kevin Davenport, P.Eng.
Senior Engineer
Knight Piésold Ltd.

Reviewed:

Mark Thompson
Vice President of Environmental Affairs
Montana Resources, LLC

Reviewed:

Daniel Janney
Vice President of Operations
Montana Resources, LLC

The Engineer of Record has reviewed this manual and hereby certifies the following:

- This TOMS Manual is consistent with the design of the YDTI.
- The inspections and monitoring described in this TOMS Manual are reasonably sufficient to verify that the YDTI is performing as intended and can reasonably be expected to detect deviations if they occur.
- The emergency preparedness and response plans presented in the TOMS Manual and EAP collectively describe reasonable measures that can be taken to protect human health and the environment.

Reviewed:

Daniel Fontaine, P.E.
Specialist Engineer | Associate - Knight Piésold Ltd.
Engineer of Record for the Yankee Doodle Tailings Impoundment

Approval that this document adheres to Knight Piésold Quality Systems: DDF

APPENDIX A

SITE PHOTOS

(Pages A-1 to A-9)

HsB SEEPS - NORTH SIDE

HsB SEEPS - UPPER POND AREA

NUMBER 10 POND AND WEIR

NUMBER 10 SEEPS

Montana Resources

YANKEE DOODLE TAILINGS IMPOUNDMENT

HsB SEEPS

APPENDIX A-1

DSN: RSD	DTL: RMM	04DEC2023

STAGE 1 HsB RDS DRAINAGE SYSTEM - EAST SIDE
(UNDER CONSTRUCTION)

STAGE 1 HsB RDS DRAINAGE SYSTEM - WEST SIDE
(UNDER CONSTRUCTION)

Montana Resources

YANKEE DOODLE TAILINGS IMPOUNDMENT

HsB SEEPAGE AREA

APPENDIX A-2

DSN: RSD	DTL: RMM	04DEC2023

HsB WEIR

CELL 10 PUMP

HsBCS TRANSFER POND AND PUMP

Montana Resources

YANKEE DOODLE TAILINGS IMPOUNDMENT

HsB SEEPAGE AREA

APPENDIX A-3

DSN: RSD	DTL: RMM	04DEC2023

TAILINGS BEACH - SUPERNATANT POND INTERFACE

BOOSTER 3 PUMPHOUSE AND HsBCS MANIFOLD

Montana Resources

YANKEE DOODLE TAILINGS IMPOUNDMENT

TAILINGS SYSTEM

APPENDIX A-4

DSN: RSD | DTL: RMM | 04DEC2023

TAILINGS DISCHARGE WEST EMBANKMENT

TAILINGS DISCHARGE EAST-WEST EMBANKMENT

TAILINGS DISCHARGE NORTH-SOUTH EMBANKMENT

Montana Resources

YANKEE DOODLE TAILINGS IMPOUNDMENT

TAILINGS DISCHARGES

APPENDIX A-5

DSN: RSD	DTL: RMM	04DEC2023

DOWNSTREAM EMBANKMENT SLOPE NORTH-SOUTH EMBANKMENT

UPSTREAM EMBANKMENT SLOPE EAST-WEST AND NORTH SOUTH EMBANKMENT

Montana Resources

YANKEE DOODLE TAILINGS IMPOUNDMENT

EMBANKMENT

APPENDIX A-6

DSN: RSD	DTL: RMM	04DEC2023

UPSTREAM EMBANKMENT SLOPE WEST EMBANKMENT

EXTRACTION POND

Montana Resources

YANKEE DOODLE TAILINGS IMPOUNDMENT

EMBANKMENT

APPENDIX A-7

DSN: RSD DTL: RMM 04DEC2023

RECLAIM BARGE

RECLAIM DISCHARGE INTO MILL RESERVOIRS

CONTINENTAL PIT - SARSFIELD PUMP

RECLAIM WATER JUNCTION BOX

Montana Resources

YANKEE DOODLE TAILINGS IMPOUNDMENT

RECLAIM SYSTEM

APPENDIX A-8

DSN: RSD DTL: RMM 04DEC2023

TYPICAL DRAINAGE DITCH

CLEAR WATER DITCH

SITE DRAINAGE DITCH

Montana Resources

YANKEE DOODLE TAILINGS IMPOUNDMENT

SITE DRAINAGE SYSTEM

APPENDIX A-9

DSN: RSD | DTL: RMM | 04DEC2023

APPENDIX B

IMPOUNDMENT INSPECTION LOG TEMPLATE

(Pages B-1 to B-2)

TABLE 1

MONTANA RESOURCES, LLC
YANKEE DOODLE TAILINGS IMPOUNDMENT

TAILINGS OPERATIONS, MAINTENANCE AND SURVEILLANCE (TOMS) MANUAL
INSPECTION LOG

Date: **Time:**

Inspectors:
Name: Title: Signature:

Inspection Type: DAILY WEEKLY MONTHLY OTHER EVENT (Specify):

Weather Conditions: Precipitation (24 hr.): Wind Speed:
Temperature (°F): Sky (circle): Clear Partly Cloudy Cloudy

Instrumentation Data Collected: Yes No **Details:**

Samples Collected: Yes No **Details:**

WEST EMBANKMENT

LOCATION	INSPECTION COMPLETED	ITEM	ITEM PRESENT		PHOTO	COMMENTS
			YES	NO		
Crest of Dam		Cracking, Subsidence, Depressions				
		Erosion				
		Lateral Deformation				
Upstream Face		Cracking, Subsidence, Depressions				
		Erosion				
		Pipeline Corridor				
Downstream Face		Cracking, Subsidence, Depressions				
		Erosion				
		Seeps, Damp or Soft areas				
Extraction Pond		General Review				
Active Embankment Construction		Location and Elevation Reviewed				
		Surface Preparation				

EAST-WEST EMBANKMENT

LOCATION	INSPECTION COMPLETED	ITEM	ITEM PRESENT		PHOTO	COMMENTS
			YES	NO		
Crest of Dam		Cracking, Subsidence, Depressions				
		Erosion				
		Lateral Deformation				
Upstream Face		Cracking, Subsidence, Depressions				
		Erosion				
		Pipeline Corridor				
Downstream Face		Cracking, Subsidence, Depressions				
		Erosion				
		Seeps, Damp or Soft areas				
Seep 10 Bench		Overview of HsB Photo				
		Seep 10 Stilling Basin				
		Seep 10 V-Notch Weir				
		Seep 10 Inflows				
Active Embankment Construction		Location and Elevation Reviewed				
		Surface Preparation				
Pipe Ramp Construction		Cracking, Subsidence, Depressions				
		Erosion				
		Survey Stake Locations for Expansion				

TABLE 1

MONTANA RESOURCES, LLC
YANKEE DOODLE TAILINGS IMPOUNDMENT

TAILINGS OPERATIONS, MAINTENANCE AND SURVEILLANCE (TOMS) MANUAL
INSPECTION LOG

NORTH-SOUTH EMBANKMENT

LOCATION	INSPECTION COMPLETED	ITEM	ITEM PRESENT		PHOTO	COMMENTS
			YES	NO		
Crest of Dam		Cracking, Subsidence, Depressions				
		Erosion				
		Lateral Deformation				
Upstream Face		Cracking, Subsidence, Depressions				
		Erosion				
		Pipeline Corridor				
Downstream Face		Cracking, Subsidence, Depressions				
		Erosion				
		Seeps, Damp or Soft areas				
Active Embankment Construction		Location and Elevation Reviewed				
		Surface Preparation				

YANKEE DOODLE TAILINGS IMPOUNDMENT

LOCATION	INSPECTION COMPLETED	ITEM	ITEM PRESENT		PHOTO	COMMENTS
			YES	NO		
General		Pond Elevation and Location Reviewed				
		Water pooling/ponding against Embankment				
		Lowest Crest Elevation Determined				
Tailings Discharges		Active Discharge Locations				
		Pipeline leakage				
		Pipeline wear/damage				
Reclaim Water Pipeline		Pipeline wear/damage				
		Pipeline leakage				

HORSESHOE BEND

LOCATION	INSPECTION COMPLETED	ITEM	PHOTO	COMMENTS
Horseshoe Bend and Precipitation Plant		Upper HSB Pond		
		Lower HsB Pond		
		HsB Seepage to Upper Pond		
		HsB Seepage to Houligan Pond		
		Precipitation Plant Overflow Box Leak		
		Precipitation Plant Overflow/Cell 10 Pump		
		HsB Weir		
		Muddler Pump and Overflow		
		HsB WTP Influent Pump (P1-16) and Transfer Pond		
		Leach Pump Head Tank (Weir)		
		BMFOU Pilot Project Facilities		

Additional Notes:

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REV	DATE	DESCRIPTION	PREP'D	RVW'D

APPENDIX C

IMPOUNDMENT INCIDENT REPORT FORM

(Page C-1)

IMPOUNDMENT INCIDENT REPORT FORM

Date of Incident: _____ Time of Incident: _____

Report filed by :_____

Embankment Incident Location: _____

Nature of the Incident: _____

_____

_____

_____

Mitigation measures taken:_____

_____

_____

_____

Is the incident resolved? Yes / No Photos taken: Yes / No

Did tailings or water discharge from the embankment? Yes/ No (circle)
If Yes, where did the discharge flow and for how long? i.e. path of travel, final destination, duration_____

_____

_____

Who was notified of the incident?_____

_____

Extent of Incident Impacts:_____

_____

_____

Would changes to the operational procedures reduce the likelihood of incident reoccurrence? Yes / No

Additional Monitoring Required:_____

_____

Additional Comments:_____

_____

_____

Is a follow-up Incident Report required? Yes/No
Follow-up Report responsibility (author name): _____

Signed: _____ Date: _____

Signature Manager of Engineering and Geology: _____
Incident Reference Number: _____ (assigned by Manager of Engineering and Geology)