

## 6. Future Meetings

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It is proposed that the second meeting of the KSM Board meeting should be scheduled for the week of June 6<sup>th</sup> 2016. The objective of this meeting would for members of the Board to make a site visit to become familiar with site conditions, terrain and climate challenges. The intent is that the sites for the WSF and the TMF and appurtenant structures will be visited to the extent feasible with available access. A site inspection allows the topography, foundation and access conditions to be appreciated, the geology and geomorphology of the sites and immediate area to be viewed and rock and surficial soil, hydrological conditions and likely hydrogeological conditions to be assessed.

This meeting will also allow the content of this report to be reviewed, and the recommendations to be discussed. Advantage should be taken for the Project Team to provide an update on any advances made in design and on any studies completed.

It is intended that the Board will assemble in Vancouver on the evening of Sunday 5<sup>th</sup> June. SG/P will make site visit and meeting arrangements commencing Monday morning. It is intended that the meeting will conclude on Friday 10<sup>th</sup> and the Board will stay on for the Saturday 11<sup>th</sup> in Vancouver to prepare the draft outline of the Meeting 2 report. Report finalization will be prepared by a writing committee during the week of June 27<sup>th</sup>.

## **7. Acknowledgements**

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The Board wishes to acknowledge the effective organization and kind hosting of the inaugural meeting by the SG/P Project Team and the KCB Design Team for the KSM Project. The preparations for the meeting were excellent, the presentations efficient and insightful and the discussion frank and full.

REPORT - MEETING NO. 1,  
INDEPENDENT GEOTECHNICAL REVIEW BOARD  
Review of Water Dam, Water Management and Tailings Storage  
Systems, KSM Project

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## **Attachment 1**

Terms of Reference for the Independent Geotechnical  
Review Board

## ATTACHMENT 1 – Terms of Reference for IGRB

# SEABRIDGE GOLD

DATE January 7, 2015

TO Rudi Fronk, Jay Layman, Andrew Robertson, Terry Eldridge, Anthony Rattue, Gabriel Fernandez, Jim Obermeyer, Ian Hutchison, Leslie Smith, Jean Pierre Tournier

FROM Peter Williams

RE: Terms of Reference for the KSM Independent Geotechnical Review Board

### BACKGROUND

Seabridge Gold Inc.'s (Seabridge) KSM (Kerr-Sulphurets-Mitchell) Project involves the development of a major gold-copper deposit located in northwest British Columbia (BC) off Highway 37, approximately 68 km by air north-northwest of Stewart, BC. The KSM Project includes four major mineralized zones, identified as the Mitchell, Kerr, Sulphurets, and Iron Cap deposits. The deposits contain significant gold, copper, silver, and molybdenum mineralization.

The KSM Project area is located in the coastal mountains of north-western BC. The proposed pit areas lie within the headwaters of Sulphurets Creek, which is a tributary of the Unuk River. The proposed Tailing Management Facility (TMF) will be located within the tributaries of Teigen and Treaty creeks. Teigen and Treaty creeks are tributaries of the Bell-Irving River, which is itself a major tributary of the Nass River. Both the Nass and Unuk rivers flow to the Pacific Ocean. Figure 1 to 3 show the general location of the KSM property and site layouts.

Figure 1 General Location Map



Figure 2 KSM Site Layout

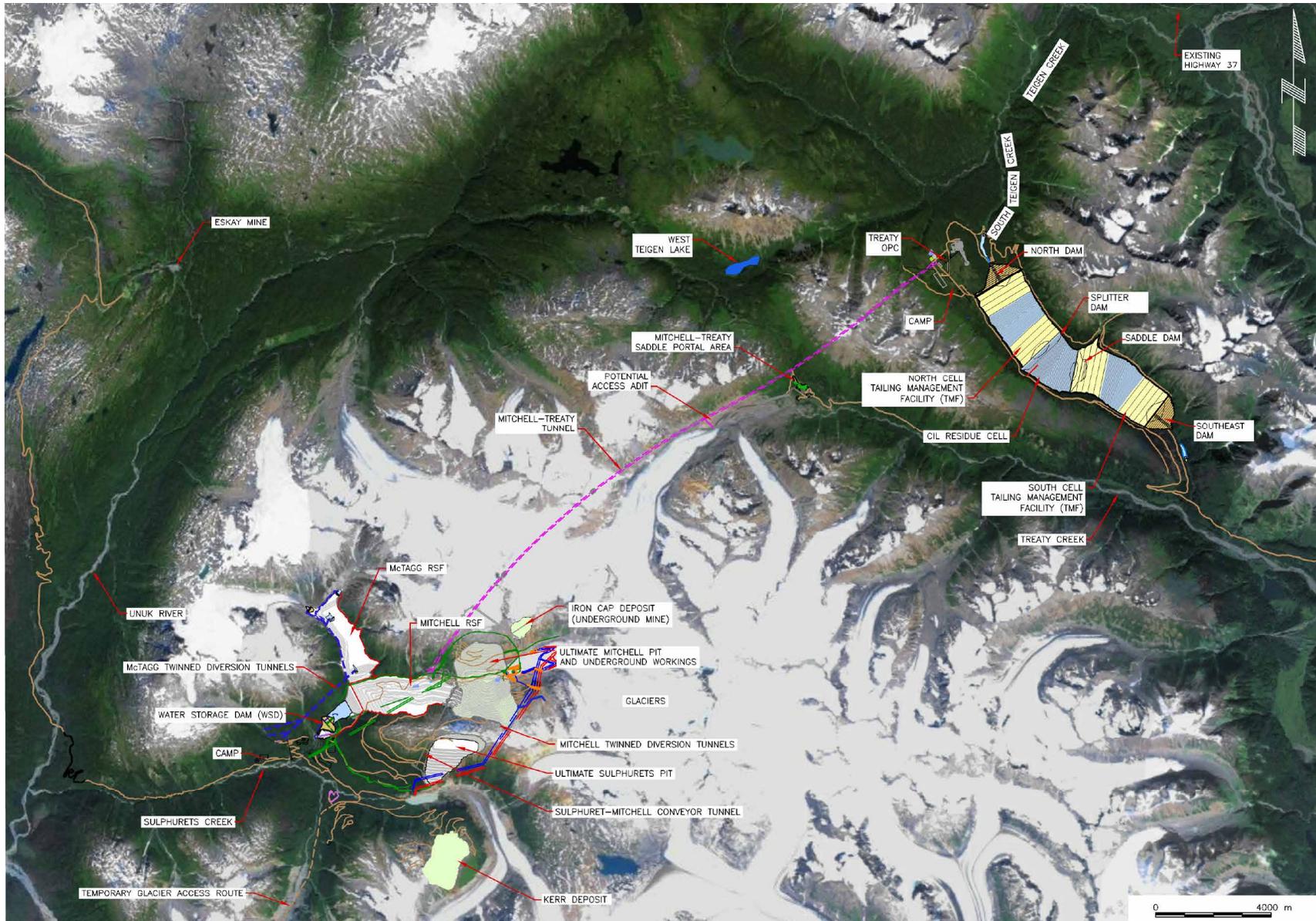
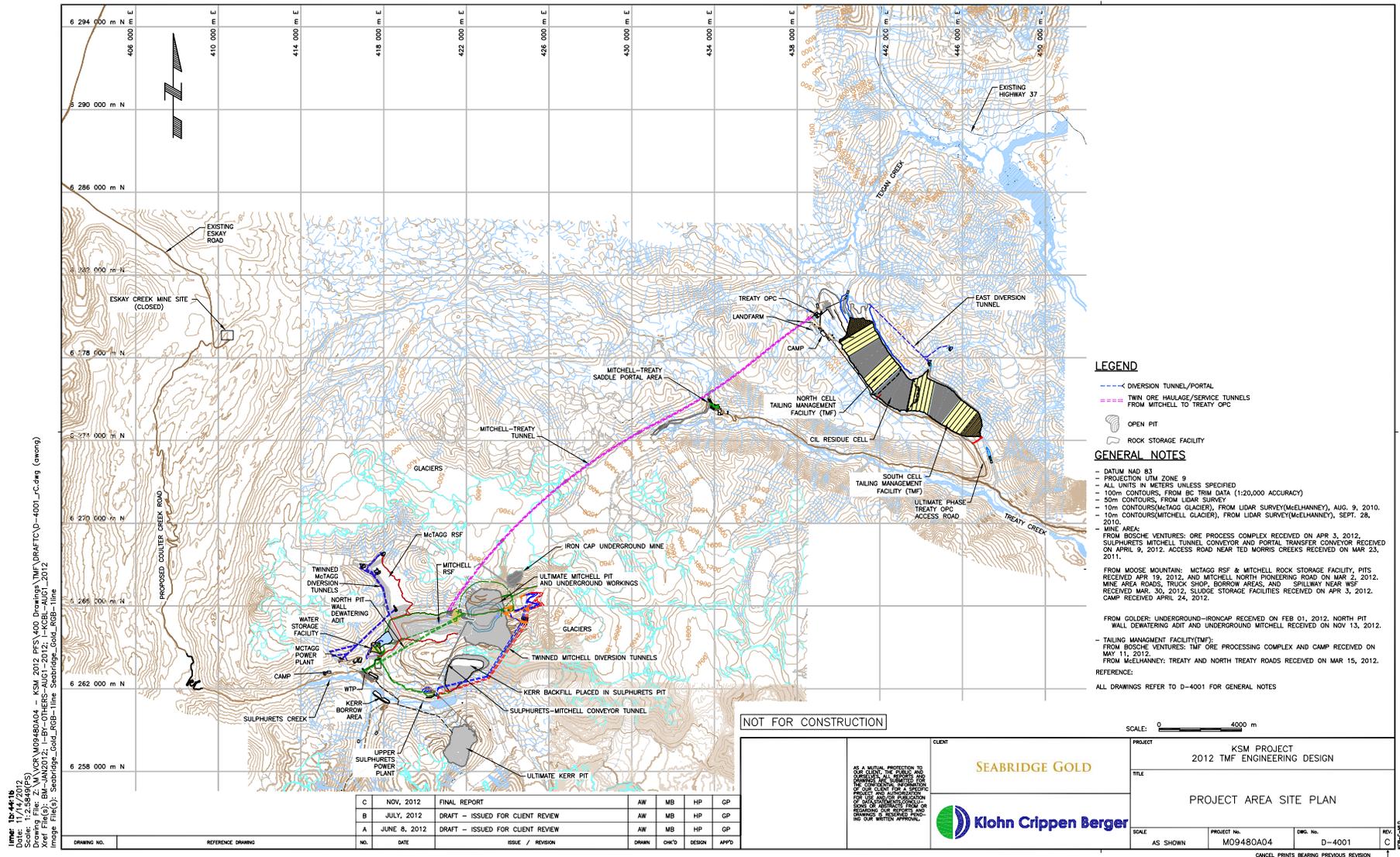


Figure 3 Site Layout with Contours



## **FOCUS**

The focus of the Independent Geotechnical Review Board (IGRB) will be structural stability, integrity and capacity and associated impacts of the two main dam structures; Tails Management Facility and the Water Storage Dam. Additionally, the IGRB should consider:

- design inputs and assumptions,
- design,
- risk mitigation structures and controls,
- construction techniques and controls,
- operating techniques and controls,
- closure philosophy and controls.

## **PURPOSE**

The purpose of the Independent Geotechnical Review Board (IGRB or Board) is to:

- Provide independent opinion that the Tails Management Facility and Water Storage Dam, including all pertinent control structures or systems, meet accepted design and operational guidelines based on internationally accepted management practices.
- Provide advice and guidance on technical issues associated with the design, construction, operation and maintenance and closure of the Tailings Management Facility and Water Storage Dam, including all pertinent control structures and systems.
- If the IGRB considers it warranted, make recommendations regarding improvements to the structures or systems that will enhance the safety and/or longevity of the structures to reduce risks posed by the structures during construction, operations and closure.

The IGRB serves as a review and advisory board and any decisions regarding implementation of the Boards recommendations for site investigation, design, construction, operation and closure are the responsibility of the facility designers, Engineers of Record, and Seabridge/KSM partner.

## **Independent Review Board Protocols**

The protocols for the Independent Review Board are as follows:

### **1. Lines of Communication**

The IGRB will report to the CEO and COO of Seabridge and KSM operating partner. The IGRB will coordinate its activities with, and deliver its reports to, a designated representative of Seabridge and KSM operating partner, who will be responsible for further distribution of the reports.

### **2. IGRB Structure**

Seabridge has nominated Andy Robertson to act as Chairman of the IGRB.

Core members will attend or participate in all Board meetings. It is intended that meetings of the IGRB will be attended by the Core Members and such Support Members as the Chairman, in consultation with the Core Members and Seabridge/Partner, consider appropriate for participation at that meeting. Support Members will be invited to specific IGRB meetings by the Board. Support members will participate as full Board Members at the meetings they attend and participate in the deliberations of the Board and contribute to the writing of Board Reports related to that meeting.

The Board is structured into two groups, a Water Dam group and a Tails Dam group. The four Core Members of the Board have specialty experience in either the Water or Tails Dam area. The elected Chairman will also be Sub-Chairman for the group in which they participate. A Sub-Chairman will be elected for the other group from the Core Members of that group

### 3. Board Meetings and Agenda

Board meetings will be scheduled at regular intervals to suit the design, construction, operation and closure activities. The first Board meeting is to be held in March 2015. Subsequent meetings will be coordinated as required to review specific items, issues or opportunities.

The Board meeting agenda will generally comprise:

- a) a preliminary presentation session during which Seabridge and KSM operating partner and the designers will briefly summarize recent developments and current operating conditions,
- b) a site inspection and/or discussion session. Discussion sessions may be broken into two groups; a Tails Management group and a Water Storage Dam group,
- c) an IGRB Members only meeting later in the session to deliberate on what they have seen and their resulting conclusions,
- d) an IGRB presentation of its findings in a confidential closeout meeting held with key Seabridge and KSM operating partner staff and may include the engineer of record.

Attendance to any meetings will be by invite from the Board. IGRB deliberation at meetings and report preparation will be attended by the Core Members of the Board and invited Support Members.

Seabridge/KSM Operating partner may attend all meetings except the IGRB deliberation and report preparation related to a meeting.

An agenda will be prepared by Chairman prior to each meeting and should include key technical questions or topics that the Board, Seabridge/ KSM operating partner or the engineers of record wish to raise. The agenda should be circulated as a draft to Seabridge/KSM Operating partner to enable discussion with Chairman before the agenda is set. It will be an objective of the agenda to circulate reports and presentations that will be made at the meetings at least two weeks prior to the meetings and that such material will have been read prior to the meeting.

### 4. Reporting

Reporting by the IGRB will be as follows:

- At the end of each review meeting, the IGRB will, at a Closeout Meeting, make a presentation of their key findings to representatives of Seabridge and KSM operating partner, and such members of the design teams and Engineer of Record as may be invited to attend for all or part of the Closeout meeting.
- The IGRB will submit to Seabridge and KSM operating partner a brief written draft summary report at the end of each meeting followed by submission of a formal report within three weeks of the meeting. Both the draft summary and final reports will be circulated to Seabridge and KSM operating partner and the Engineer of Record for

review of technical accuracy. Suggested corrections or edits will be considered by the IGRB in the preparation of the Final Report, but changes will be entirely at the discretion of the Board.

- The IGRB will report on issues and opportunities that:
  - (i) could affect the integrity of the tails management or the water storage facilities and control systems under review,
  - (ii) may impact upon health and safety of KSM employees, contractors, or downstream lands and communities, in respect of the stability/integrity of the structures (potential environmental impact of normal construction and operating conditions is not within the mandate of the Board and health and safety impacts to be reported on do not include issues relating to water treatment, water quality or geochemistry or impacts related to them),
  - (iii) possibly affect the ability to continue operation of the facilities,
  - (iv) are outside of precedence or evolving accepted good practice (better or worse) in the industry,
  - (v) could affect future operation, such as new technology, changes in planning, environmental impacts, closure planning, and changes for economic improvement.

Seabridge/Partner will be entitled to disclose the IGRB reports to representatives of the Provincial or Federal governments, including their ministries and agencies, and to representatives of aboriginal groups potentially impacted by the KSM Project.

5. Materials to be provided to the IGRB

In accordance with the Focus and Purpose of the IGRB, it will be necessary for the design documents, construction documentation, operating manuals/procedures and operational history documentation and data, as appropriate, to be provided to the IGRB. All key design documents requiring the review of the IGRB should be circulated at least two weeks prior to the review meeting.

An FTP site will be setup containing all key documents and an index listing of all reports. From time to time, the design engineers, or Engineer of Record, will be asked where to find the most appropriate reports on a subject so the Board members can quickly access the most recent and appropriate reports.

6. Period of service, succession planning of IGRB members, and composition.

IGRB members (Core members and Support members) will continue to serve on the IGRB until they resign from the IGRB or are terminated as members of the IGRB by Seabridge/Partner. The composition of the IGRB will change to suit the evolving needs of the KSM Project as it progresses from design/construction to operations and closure, and to ensure succession to the IGRB. Seabridge/Partner will periodically assess the Project requirements and discuss these with the IGRB and obtain recommendations on appropriate IGRB composition.

7. Seabridge/Partner will be entitled to disclose the IGRB Formal Meeting reports to representatives of the Provincial or Federal governments, including their ministries and agencies, and to representatives of aboriginal groups potentially impacted by the KSM Project.

Working papers of the Board are confidential to Seabridge/Partner and are not to be distributed.

Coordination with Seabridge/Partner is required prior to any interviews made on behalf of the Board.

Hereto agreed by:

Rudi Fronk, CEO Seabridge Gold Inc

Date: 3/11/2015  
Signature: 

Jay Layman, COO and President,  
Seabridge Gold Inc

Date: 1/28/15  
Signature: 

Andrew Robertson, Core Member

Date: 2015-03-14  
Signature: 

Gabriel Fernandez, Core Member

Date: 3/12/15  
Signature: 

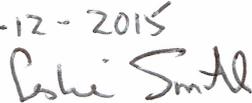
Terry Eldridge, Core Member

Date: 3/12/15  
Signature: 

Antony Rattue, Core Member

Date: 2015-03-14  
Signature: 

Leslie Smith, Support Member

Date: 3-12-2015  
Signature: 

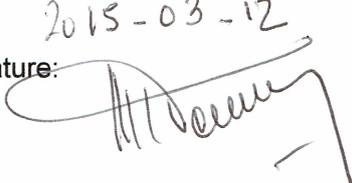
Ian Hutchison, Support Member

Date: 3-12-2015  
Signature: 

Jim Obermeyer, Support Member

Date: 3/12/2015  
Signature: 

Jean Pierre Tournier, Support Member

Date: 2015-03-12  
Signature: 

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## **Attachment 2**

### Definitions of Review Levels

## Levels of Review

There are three levels at which reviews are commonly done:

**'Audit' level:** At this level the auditor performs extensive investigation, and analysis review of all pertinent documentation to develop an independent opinion on both the general principles of designs, construction and operations and on the validity and accuracy of the key elements of the design analyses, construction control and operating methods.

**'Review' level:** At this level the reviewer generally reviews only key documents and does at least 'reasonableness of results' checks on key analyses, design values, and conclusions. The reviewer generally relies on the representations made to the reviewer by key project personnel, provided the results and representations appear reasonable and consistent with what the reviewer, in his or her experience, would expect.

**'Review at Discussion' level:** At the discussion level the reviewer is not provided with all the relevant reports and data required to perform an independent assessment or develop an independent opinion. Generally, only selective information is presented, often in meeting presentation form, and there is insufficient time to absorb and digest all the pertinent information and develop a thorough understanding of all pertinent aspects relating to the design, construction and operation. The reviewer relies on information selected by the presenter and substantially on the observations, interpretation and conclusions of the presenters.

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## **Attachment 3**

Agenda of Meeting and List of Meeting Participants

## MEMORANDUM

**TO:** Peter Williams **DATE:** March 6, 2015  
**FROM:** G. Parkinson **FILE NO:** M09480A06  
**SUBJECT:** Agenda for Independent Geotechnical Review Board (IGRB) Meeting

**Objectives:** Seabridge Gold has identified several core questions to be considered by the IGRB including the following:

- 1) Are the dams and major structures appropriately located?
- 2) Are dam sections, materials and construction methods and sequence appropriate for the site and purpose?
- 3) What, in the opinion of the IGRB, are the greatest design, construction and operating risks?
- 4) Are the facilities designed to operate effectively?
- 5) Are the facilities designed to be safe?

**Date and Location:** March 9<sup>th</sup> -12<sup>th</sup>, Kipling Room, KCB Offices, #500, 2955 Virtual Way, (East Broadway and Renfrew St.) Vancouver, Reception: 604-669-3800

**Attendees:**

**Seabridge:** Peter Williams, VP Technical Services, Seabridge Gold Inc.  
Brent Murphy, VP Environment, Seabridge Gold Inc.  
Jay Layman, Exec. President and Chief Operating Officer, Seabridge Gold Inc.

**IGRB:** Dr. Andrew Robertson, IGRB Chairman, Tails Dam Sub-group Chairman, Core Member  
Anthony Rattue, IGRB Vice Chairman, Water Storage Dam Sub-group Chairman, Core Member  
Dr. Gabriel Fernandez, Water Storage Dam, Core Member  
Terry Eldridge, Tailing Facility, Core Member  
Jim Obermeyer, Tailings and Water Dam Geotechnical, Support Member  
Dr. Ian Hutchison, Civil and Water Management, Support Member  
Dr. Jean-Pierre Tournier, Asphalt Core Rock-fill Dams, Support Member  
Dr. Leslie Smith, Hydrogeology, Support Member

**KCB:** Harvey McLeod (HM), RSF geotechnical and WSD water mgmt.  
Garry Stevenson (GS), WSD  
Howard Plewes (HP), KSM tailings facility  
Graham Parkinson (GP), Project Manager, site investigations  
Andrew Hovey (Not Available), Hydrogeologist  
Bob Chambers BC (part time attendance), Reviewer,

### **Coordination of Members During Meeting**

During speciality sessions the tailings dam group will comprise Robertson, Eldridge, Obermeyer and Hutchison. The water dam group will comprise Rattue, Fernandez, Tournier and Smith. It is anticipated that Hutchison and Smith may move between groups for sessions on ground and surface water evaluations and management.”

To the extent possible the scheduling of presentations will be such that Smith and Hutchison can attend all Ground and Surface water presentations – by moving between groups. Where this is not practical they will have to catch up on this independently with other members. They will be able to keep a record of materials and discussions that should be passed on to the other.

To facilitate this, all introductory slides presented by KCB and slides presented at both workshops will be provided in handout binders and on the memory sticks. The memory sticks will also contain the entire data room previously made available on the IGRB website and FTP site.

**Table 1 Overall Agenda**

Day	Time	Subject	Lead
Sunday, March 8 <sup>th</sup>	6:00 pm	IGRB Travel Day and Group Dinner, La Piazza Dario Restaurant (walking distance from KCB offices).	
Monday, March 9 <sup>th</sup>	8:30 -9:30	Introductions – KCB Offices, Kipling Room, Safety Share - General and purpose of IGRB - KSM, Panel and KCB introductions.	Peter Williams
	9:30 –10:30	KSM Project overview, current project status, EA / MAPA commitments.	Brent Murphy
	10:45-11:30	Overview of interaction between environmental issues and design constraints. Permitting and construction permission and oversight, stakeholder’s interest and expectations, and the audience for the IGRB report. .	Brent Murphy / Peter Williams
	11:30-12:00	KCB overview, role on project, timeline, interaction with other consultants, PEA, PFS, PFS Update, EA, MAPA, potential construction schedules	GP
	12:00-12:30	Lunch	
	12:30 – 1:15	Mine Area general overview for all – WSD location and Mine Facilities.	HM
	1:15 – 2:30	Tailings Area general overview for all – TMF alternatives assessed and rationale for selected site.	HP
	2:30 – 4:30	Breakout for Mine Area and WSD Workshop (Kipling Room). Presentation by designers of WSD Area site investigations and site conditions including topography, seismicity, geology, hydrology and hydrogeology.	KCB
	2:30 – 4:30	Breakout for Tailings Area Workshop (Telford Room). Presentation by designers of TMF Area site investigations and site conditions including topography, seismicity, hydrology and geology and how these affected site selection and design basis.	KCB
Tuesday, Tuesday March 10 <sup>th</sup>	8:30 – 4:30	Mine Area and WSD Workshop (Kipling Room, see separate agenda, Table 1). Presentations of WSD design basis and design components.	KCB
	8:30 – 4:30	Tailings Area Workshop (Telford/Leonoff Rooms, see separate agenda, Table 2). Presentations of TMF designs.	KCB
Wednesday, March 11 <sup>th</sup>	8:30 – 10:00	Continuation of Mine/WSD Workshops in Kipling/Telford rooms as required.	KCB
	10:00 – 12:30	IGRB Board Sub-Board / Board Discussions	IGRB
	12:30 – 2:30	Cross presentation of Mine area and Tailings area IGRB sub-boards to each other with designers present	IGRB
	2:30-4:30	Discussion of findings in light of Mt. Polley Review Panel Recommendations	ALL
Thursday, March 12 <sup>th</sup>	8:30 – 2:30	IGRB Working Session, Terzaghi Room.	Andy Robertson - IGRB
	2:30 – 4:30	IGRB presentation to Seabridge and designers, Kipling Room. Discussions: Path forward and conclusion of IGRB workshop.	ALL

**Table 2 Details of WSD and Mine Area Workshop Agenda (Kipling Room)**

Day	Discussion Area	Subject	Lead
Afternoon Monday March 9 <sup>th</sup>	WSD Site Conditions	WSD Area site investigations and overall site conditions including topography, seismicity, regional geology, hydrology and hydrogeology	HM
Tuesday, March 10 <sup>th</sup>  and  Morning of Wednesday, March 11 <sup>th</sup>	WSD Design Criteria and Facility Design	WSD design criteria/basis, location; foundation geology	HM
		WSD borrow materials and material properties.	
		WSD design alternatives and design section(s).	
		WSD construction schedule and interaction with mine plan.	
		Seepage mitigation and FEFLOW Modeling	
		Reservoir management, pond levels and treatment rates, extreme events, spillway, snow avalanche wave, Dam Break assessment	
	RSF Design	RSF design basis, foundations, dump design, potential Se capture	GP
	WSD Water Management	Mitchell Glacier diversions – design basis, contact / non-contact water separation, glacial inlets, tunnels.	GP
		McTagg RSF diversions - design basis, inlets, tunnels.	GP
		Staging of internal mine area operating and closure diversions.	GP
	Uncertainties, Data Gaps and Path Forward	Risk assessment and management (geotechnical, water, environment, construction, operations, closure)	HM
		Site investigation requirements: hydrogeology, WSD and RSF drain borrow sources, lead time for borrow, ABA testing, Ice and diversion inlet condition ( geotechnical, water flow, water quality)	GP
		WSD design development, detail foundation development plan, material properties, dam design cross section, construction fill material and sources, snow avalanche design, spillway design.	GS
Diversion optimizations. Construction period: water management, sediment control, ARD management. Identification of long lead time items such as; completion of designs, obtaining required information		GP	
Discussions and Topics as Required by IGRB	Performance of designs, assessments of current levels of design effort of components, data gaps and development of path forward to advance to next stages of design.	IGRB / KCB	

**Table 3 Tailings Management Area Workshop Agenda (Telford Room)**

Day	Discussion Area	Subject	Lead
Afternoon Monday March 9 <sup>th</sup>	TMF Site Characterization	TMF Area site investigations and site conditions including topography, seismicity, hydrology and geology and how these affected site selection and design basis.	GP/HP
Tuesday, March 10 <sup>th</sup>  and  Morning of Wednesday, March 11 <sup>th</sup>	Tailings Design Criteria	Tailing characterization	HP
		Facility and Geotechnical design criteria – storage, stability, consequence	HP
		Water management design criteria - extreme events, maintenance flow requirements, discharge criteria, diversion criteria	HP
	Tailings Deposition Plan and Water Management	Tailings staging plans	HP
		Water management and diversions	HP
		Water balance	HP
		Management of water surplus – TSS, seasonal storage, discharge pipelines and outlet diffusers	HP
	Design of Tailings Management Facilities	North and South Dam design sections	HP
		CIL cell design: Liner, sub-aqueous deposition	HP
		Diversions, managing extreme events	HP
		Hydrogeology, seepage mitigation, water quality	AH
		Closure Plan and Dam Break Assessments	HP
	Uncertainties, Data Gaps and Path Forward	Site investigations – borrow sources, faults, investigation of new seepage dam locations	GP
		Detail design process and potential design optimizations.	HP
		Construction period: constructability, fill availability, water management, sediment control, ARD management. Identification of long lead time items such as; completion of designs, obtaining required information and main elements of construction schedule. Review of “Best Available Tailings Technologies”	HP/GP
Discussions and Topics as Required by IGRB	Performance of Designs with respect to Design Criteria, Site Conditions and development of path forward	IGRB / KCB	