



January 2014 Environmental Update for SLEMA Board

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January 31, 2014

Outline

1. Mine Update
2. Inspection Update
3. Regulators' Update
4. Aboriginal Update
5. Stakeholders' Update
6. Agency's Activities
7. SLEMA Reviews



Acronyms

- AANDC – Aboriginal Affairs and Northern Development Canada (previous INAC – India and Northern Affairs Canada)
- AEMP – Aquatic Effects Monitoring Program
- ARD – Acid Rock Drainage
- DFO – Fisheries and Oceans Canada
- EC – Environment Canada
- ENR – Department of Environment and Natural Resources, GNWT
- GNWT – Government of the Northwest Territories
- MVLWB – Mackenzie Valley Land and Water Board
- PK – Processed Kimberlite
- SLEMA – Snap Lake Environmental Monitoring Agency
- SNP – Surveillance Network Program
- TDS – Total Dissolved Solids
- WEMP – Wildlife Effects Monitoring Program
- WTP – Water Treatment Plant
- WMP – Water Management Pond



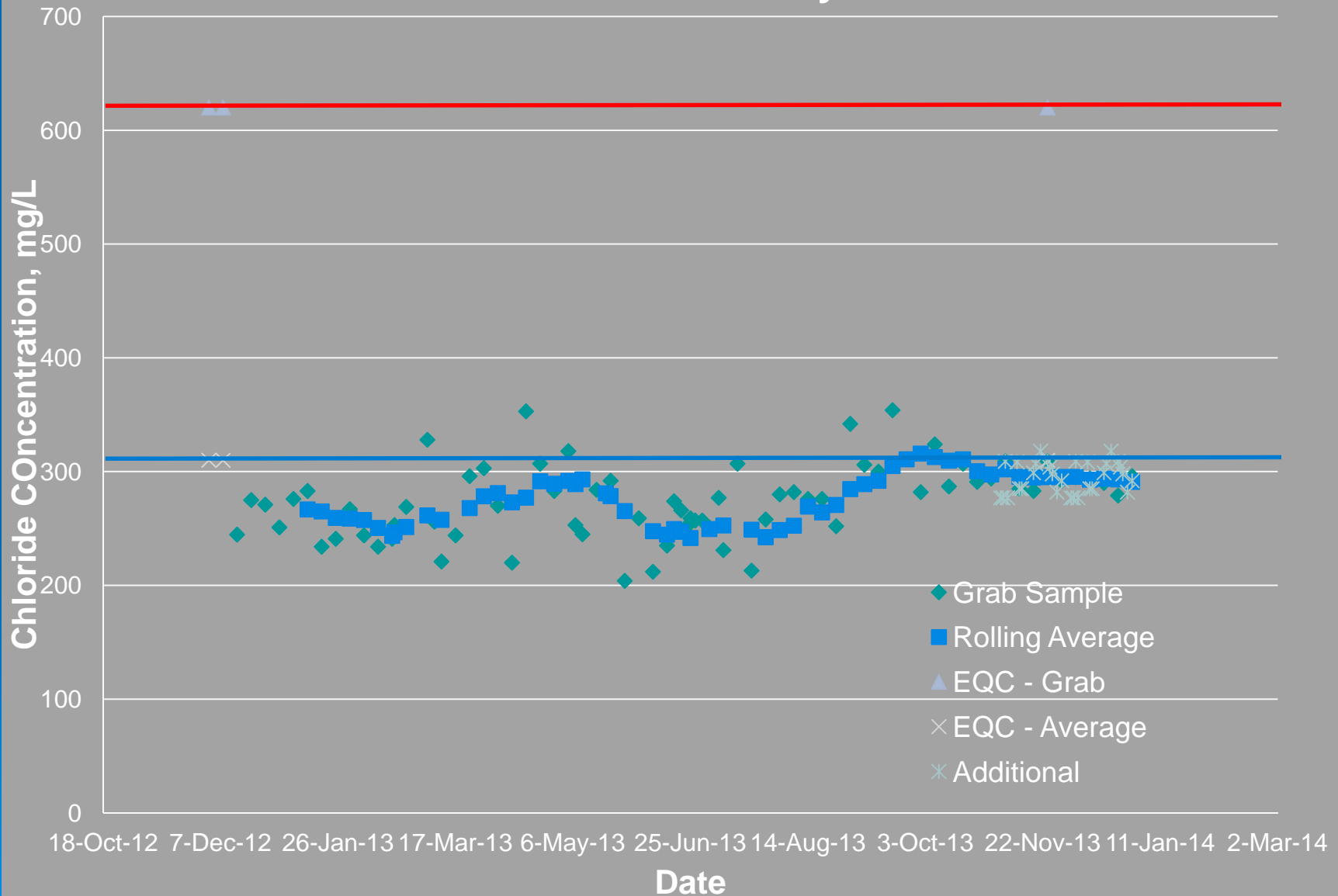
1.1 Mine Update – December 2013

- Production rate: 91.9 % of its capacity (89,694 tonnes of kimberlite processed)
- 5,277 m³ of water withdrawn from Snap Lake
- 1,196,918 m³ of treated water discharged into Snap Lake
- 81,526 tonnes of coarse reject and 69,513 m³ of slimes deposited in the North Pile
- 3 spills (0 reportable)
 - 154 hydrocarbon spills in the underground mine (5,599 liters)
- Water sampled in 7 monitoring stations
 - The monthly average for all parameters met compliance
 - In-line chloride instrumentation was installed to improve the underground water monitoring to provide an early warning system to operations
 - The Total Dissolved Solids and nutrients tables (Table 12) were revised for April to November when it was discovered that the calculation did not include the second permanent diffuser



Effluent Chloride Levels Remain Lower than the Effluent Quality Criterion

Chloride Data Analysis



1.2 Spill Reporting in January 2014

Date	Location	Waste Spilled	Amount (L)	Cause
January 5	North of the Water Management Pond	Treated sewage effluent	2,000	Cracked fuse joint in a pipe
January 14	Underground fuel bay	Diesel	2,500	Operator failure



1.3 As-Built Diffuser Drawings Stamped by Engineer

- Dated January 2, 2013
 - Submitted three as-built drawings for the second diffuser installation which was completed in October 2013



1.4 Information Session for the Amendment Application

- Dated January 6, 2013
 - Staff from De Beers and Golder Associate made presentations
 - Staff from YKDFN, MVLWB, AANDC, ENR and SLEMA asked questions and made comments



1.5 Regulatory Process for the Consideration of the Amendment Application

- Dated January 6, 2014
- Responded to AANDC's submission
 - De Beers expected that AANDC and MVLWB will agree to a process to review De Beers' amendment application
 - De Beers anticipated that MVLWB will cooperate with the Mackenzie Valley Review Board to conduct an efficient and focused process to review this specific aspect of the Application related to TDS



1.6 Winter Road Construction

- Notification to the AANDC Inspector dated January 8, 2014
 - Construction commenced on January 6, and the start date for traffic is projected to be January 22
- Responded to Inspector's notice dated January 8 and provided the names and contacts of the persons in charge of the field operation, on January 8



1.7 Responses to SLEMA Comments on November 2013 Monthly SNP Report (I)

- Dated January 14, 2014
 - Responded to SLEMA's e-mail dated December 31, 2013
- Question 1: De Beers modified the amount of discharge from the Water Treatment Plant for August to October 2013. Is there anything wrong with previous reporting?
 - *Modification to the amount of discharge from the Water Treatment Plant (WTP) for August to October 2013 occurred because discharge values were not including flow from the second diffuser. The total volume table had been linked to the incorrect tab in the working document. Upon observation of the error the values were re-calculated in the SNP*



1.7 Responses to SLEMA Comments on November 2013 Monthly SNP Report (II)

- Question 2: the amount for the recycled water in Table 21. Water Budget was changed in the November 2013 SNP Report. Clarification is requested
 - *The changes regarding the water budget for recycled water in Table 21 occurred due to discrepancies of inputs versus outputs. It was noted that recycled water was not metered in the WTP, and therefore, not capturing usage outside of the Process Plant. A flow meter was installed in April 2013 and started logging data for May 2013. The Environment department was unaware that the meter had been installed until November, at which time the volumes were re-calculated. The period from January to April was based on an average volume from previous months*



1.8 Responses to Questions during Information Session dated January 6, 2014

➤ Dated January 14, 2014

- Responded to stakeholders' questions
 - Chloride site-specific water quality objective
 - TDS effluent quality criterion
 - Toxicity data for Daphania
 - Species sensitivity distributions



1.9 Water Management Plan

- Submitted revised Water Management Plan (WMP), including Figure 2-2, on January 16, 2014
- Submitted Table of Changes for the WMP on January 21



1.10 EAARs 2010 and 2011

- Dated January 21, 2014
 - Requested AANDC to approve EAARs 2010 and 2011
 - Provided two response letters to SLEMA in 2012 and 2013
 - Did not respond to GNWT letter, but agreed to complete related work in 2014



2. Inspection Update

- AANDC Inspector – Patrick Kramers
- No inspection reports received in January 2014



2.1 Inspector's Direction on Spill #12-314

- Dated December 17, 2013
 - AANDC Inspector Tracy Covey issued a Direction on 6 September 2012 in relation to the 1 June 2012 TSS exceedance event
 - Upon review of information De Beers supplied, the Inspector on record considered this event to be an isolated incident to which appropriate measures have been implemented in order to avoid reoccurrence
 - The Direction is considered satisfied



2.2 Notice on Winter Road Construction

➤ Dated January 8, 2014

- *“There is a failure to comply with the Conditions 10 and 11 of Land Use Permit MV2010D0053 in that construction of the Snap Lake winter spur road has commences”*
- Ordered De Beers to cease forthwith the construction of the Snap Lake winter spur road for a minimum of 48 hours, and comply with Conditions 10 and 11 of Land Use Permit MV2010D0053



2.3 Confirmation of Receipt of Notification and Required Information

➤ Dated January 8, 2014

- De Beers response satisfied Conditions 10 and 11
- Snap Lake winter spur road may commence in 48 hours (10 January 2014 at 2:30 p.p.)



3. Regulators' Update

➤ AANDC

- Environmental Agreement Annual Reports
- Review of the Environmental Agreement
- Liaison Meeting

➤ MVLWB

- Amendment Application



3.1 Regulators' Update – AANDC (I)

- Requested the Parties of the Environmental Agreement and SLEMA to comment the 2012 Environmental Agreement Annual Report, on December 12, 2013
 - Due on January 20, 2014
- Notified the Parties of the Environmental Agreement that AANDC and GNWT have initiated a review of the Agreement with a view to proposing amendments to it necessitated by devolution, on December 16, 2013
 - As part of the devolution of authorities, AANDC is transferring its roles in relation to the administration of Environmental Agreement to the GNWT
 - All proposed changes will be administrative in nature only and will not alter the intent or substance of the Agreement



3.1 Regulators' Update – AANDC (II)

- Held a Technical Liaison Meeting with De Beers, SLEMA and DFO on January 14, 2014
 - Reviewed the draft Terms of Reference
 - Update on EAARs 2010, 2011 and 2012
 - Roundtable updates and discussions
- Distributed the Summary of Discussion for the Liaison Meeting on January 22



3.1 Regulators' Update – AANDC (III)

- Distributed a draft of the Environmental Agreement detailing the proposed amendments to it for review to the Parties to the Snap Lake Environmental Agreement, on January 30, 2014
 - “Canada will be requesting a mutual release of Canada from all future rights and obligations it may have had under the Environmental Agreement starting from April 1, 2014”



3.2 Regulators' Update – MVLWB (I)

- Referred the Amendment Application for TDS limits to the Mackenzie Valley Environmental Impact Review Board for an Environmental Assessment (EA), on January 22, 2014
 - “The Board’s decision is based on jurisdictional questions related to the proposed change of the TDS limit set out in Recommendations 5 and 10 of the 2003 Snap Lake Report of EA and concerns about this proposed change”
 - “The Board would be supportive of a coordinated process inclusive of scoping to allow for the efficient and effective review of the TDS measure and the Application”



3.2 Regulators' Update – MVLWB (II)

- Approved the Interim Closure and Reclamation Plan (ICRP) version 3.2 on January 30, 2014
- Approved the 2013 Spill Contingency Plan on January 30



4. Aboriginal Update

- YKDFN commented EAAR 2012 on January 7, 2014
- NSMA commented Water Management Plan on January 23, 2014



4.1 YKDFN Comments on EAAR 2012

- Found it to be acceptable
- Several suggestions on how to improve the document
 - Generally, the report could be improved with additional consideration of the “big picture”
 - Specific comments provided for Section 3, 4 and 10



4.2 NSMA Comments on Water Management Plan (I)

- The NSMA seeks elaboration and clarification on how observational selection is used to manage pump operation, and how nitrates are dealt with should their levels register high in the WMP while at the same time sump levels are higher than "minimum practicable levels" which would necessitate dewatering as mentioned in comment 5. This is still unexplained later in the document in 2.4.2, pg 20



4.2 NSMA Comments on Water Management Plan (II)

- The NSMA would like the Proponent to further delve into these planned expansions, and explain specifically if the expansion is to the temporary WTP, WTP, both, or in addition to existing facilities, and what this expansion is planned to consist of
- The NSMA recommends that the Proponent create a bulleted list or table in Section 2.1.9 that shows each step of water treatment and discharge into Snap Lake, and explains how each step contributes to meeting water quality guidelines prior to release to Snap Lake. This detail may be accessible in the AEMP, however, it is a reasonable request given the context and existing information in the Plan



4.2 NSMA Comments on Water Management Plan (III)

- The NSMA encourages the use of treated water on site with the end goal of reducing the amount of water removed from the lake system
- It would be beneficial to include training and education in Section 2.7.1.8 , with required training described somewhere in the Surface Water Management Protocols
- The NSMA encourages the proponent to further define all categories where action levels remain "TBD" prior to a low action level being reached in order to clearly mitigate the potential for environmental impacts and demonstrate their commitment to the transparent use of Action Levels



5. Stakeholders' Update

- Comments on Water Management Plan by
 - Environment Canada (EC),
 - Environment and Natural Resources (ENR), GNWT, and
 - AANDC
- On January 23, 2014



5.1 EC Comments on Water Management Plan

- De Beers indicates that sewage will be treated in Membrane Bioreactors (MBR) once the new sewage treatment plant is online in December 2013
 - EC requests clarification, is the new sewage treatment plant in operation?



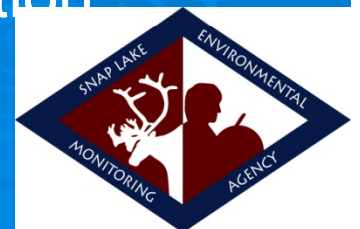
5.2 ENR Comments on Water Management Plan (I)

- ENR notes that the proponent has not identified the action levels for volumes of water entering the mine from underground sources. ENR understands that there are complications with respect to water treatment (TDS, maximum discharge etc.) that arise with increased underground water flow
 - ENR requests that the proponent develop action levels and a response framework with respect to underground water management. ENR suggests that the response framework include maximum volume and thresholds that will trigger action levels



5.2 ENR Comments on Water Management Plan (II)

- The proponent's states on pg. 43: "The magnitude of an effect is determined by comparing reference areas, background values, or benchmark values for water quality and quantity". However, the proponent does not define the threshold criteria that will be used or the statistical variance measurements that trigger the action response framework
 - The proponent must define what statistical, or alternative, measurements that constitutes an unacceptable change and provide it within the action levels



5.2 ENR Comments on Water Management Plan (III)

- ENR notes that the proponent has not provided an action level based on thermal characteristics. ENR understands that the North Pile will require permafrost aggradation, based upon the current design, for closure to reduce water seepage. As this is a closure concern, action levels should be established for the North Pile to ensure that its performance is in accordance with the design for closure
 - ENR requests that the proponent develop action levels for the North Pile with respect to thermal characteristics as per the design requirements



5.2 ENR Comments on Water Management Plan (IV)

- ENR notes that the proponent may incinerate sewage waste as an alternative method to landfill disposal. It must be demonstrated that the incinerator is capable of handling sewage waste. The proponent must also demonstrate that the sewage sludge is dewatered to levels that meet the batch requirements of the manufacturer while meeting the Canada Wide Standard (CCME) for dioxins, furans and mercury. Typically, portable batch waste Incinerators are designed to incinerate Class I/II and III waste types only. Sanitary based waste streams are not Type I, II, and III waste, and ENR does not support the use of any mobile batch waste incinerators to treat wastes they are not designed for



5.2 ENR Comments on Water Management Plan (V)

- ENR recommends that the proponent develop an alternative disposal method other than the incineration of sewage waste. Alternatively, the proponent must demonstrate that the incinerator is specifically designed for the disposal of sewage waste. The proponent must also demonstrate through formal emissions testing that the device will meet the CWS for Dioxins and Furans and Mercury (CCME) emissions when batched with sewage as per manufacturers recommendations (provided in writing)



5.3 AANDC Comments on Water Management Plan (I)

- Due to increased levels of TDS and chloride observed in recent sampling events, additional efforts should be made to highlight contingency measures in the Plan should levels in discharge water, or in Snap Lake itself, become non-compliant
- 12 specific comments are provided for water streams, water balance, Water Management Pond, etc.



5.3 AANDC Comments on Water Management Plan (II)

- AANDC recommends DBCI provide additional clarification of the type of thermal conditions that would cause concern and trigger monitoring data review and reporting. Additionally, AANDC requests that DBCI comment on the relationship between increased seepage rates from the WMP and the feasibility of freezing the retention structures to mitigate seepage rates that are currently observed, if verified in the previous comment



5.3 AANDC Comments on Water Management Plan (III)

- AANDC requests that DBCI provide rationale for the selection of sampling stations below the Water Management Pond in determining water quality trends, given the monitoring difficulties outlined. Additionally, AANDC requests that DBCI explain any inconsistencies related to seepage rates from the Water Management Pond referenced in previous comments above and the lack of water observed at SNP stations downstream of the WMP.



5.3 AANDC Comments on Water Management Plan (IV)

- AANDC disagrees that low action levels be amended once they have been exceeded and that sufficient effort should be placed into the initial establishment of these levels.
 - DBCI should instead focus their attention on responses including confirmation of the low action level and investigation of trends. While site-specific benchmarks could be established prior to the establishment of Low Action Levels, they should only be reviewed during the establishment of Medium and High Action Levels



5.3 AANDC Comments on Water Management Plan (V)

- AANDC requests information on the ability of the Water Management Pond to act as a contingency holding area including an approximate length of time to reach capacity under multiple seasons/scenarios (freshet, plant malfunction, etc). Additionally, DBCI should outline additional contingency measures in the event capacity is surpassed in the WMP.



5.3 AANDC Comments on Water Management Plan (VI)

- AANDC recommends that DBCI expand on information provided related to response planning to enable DBCI to respond sufficiently to any action level triggers. The explanation should include information on timelines and any potential processes that DBCI would anticipate occurring, as well as an outline of the components and information that would be included in any Response Plan as may be required



6. Agency's Activities

- SLEMA staff attended the meeting of Liaison Committee of Snap Lake Environmental Agreement as observers on January 14, 2014
- Three comment letters issued in January 2014
 - Comments of TDS Limit Amendment Application on January 16
 - Comments on EAAR 2012 on January 20
 - Comments on Water Management Plan on January 23



7. SLEMA Reviews

- Amendment Application for Water Licence Limits
- Environmental Agreement 2012 Annual Report
- Water Management Plan



7.1 Amendment Application for Water Licence Limits

- De Beers proposed significant changes of Effluent Quality Criteria (EQCs) after toxicity studies and water quality modeling efforts
 - Higher limits for TDS related parameters
 - Removal of all metal limits except Aluminum – EA related measures?



TDS Limits Proposed by De Beers

- De Beers developed a Site Specific Water Quality Objective (SSWQO, 684 mg/L) for TDS, and proposed the change of the approach for managing TDS, i.e. the in-lake compliance limit (350 mg/L) be removed from the Water Licence and replaced with the end-of-pipe limits (Effluent Quality Criteria):
 - The average TDS concentrations from samples collected over a 30-day period in treated effluent should remain below 684 mg/L (the Average Monthly Limit, AML) and
 - The maximum concentration in any grab sample should remain below 1,003 mg/L (the Maximum Daily Limit, MDL)



Preliminary Review

- Effluent TDS data in the past few years (2009 to 2013) indicate that there are no TDS values above the proposed MDL, but there are a few TDS values above the proposed AML
- The existing Water Treatment Plant (WTP) was designed to remove particulates through flocculation, sedimentation, and filtration, and does not remove TDS
 - it is confirmed in the information session for the Amendment Application, dated January 6, 2014, that no TDS removal facility will be installed in 2014
 - As a result, TDS levels in the treated effluent will remain high



Comments and Recommendations from the Environmental Analyst

- TDS EQC (684 mg/L) is risky if it takes effective in the near future
 - SSWQO for TDS is safe for now
 - it is very possible that there will be exceedances of the proposed AML until the TDS removal facility is in place and is functioning properly
- It is recommended that De Beers resubmit an appropriate AML with a feasible timeline



7.2 Environmental Agreement 2012 Annual Report

- De Beers drafted the EAAR 2012 in August 2013, and submitted the draft version for initial review. SLEMA made comments for the draft EAAR on October 25. De Beers responded to SLEMA comments on November 21 and officially submitted the EAAR 2012 on December 2



Comments from the Environmental Analyst

- In general, the EAAR 2012 fulfills the criteria established within the Environmental Agreement



Recommendations for Improving the EAAR Reporting

- The following items, but not limited to, may be helpful for readers to understand the mine operation, and environmental monitoring, management and performance:
 - photos of the mine site showing the change from previous years to current year, especially the North Pile
 - photos of the wildlife at or near the mine site from wildlife monitoring,
 - figures of water quality of the effluent, the lake and downstream, and figure of air quality and emission over years showing the trend of environmental quality change, etc.



7.3 Water Management Plan

- The Plan was submitted on October 1, 2013
 - Initial comments from SLEMA were communicated to De Beers via e-mails in November and December 2013



Comments Recommendation from the Environmental Analyst

- The Plan provides enough information for surface water management, but is lack in the information of the underground mine water management. It is recommended that De Beers provide related information for review
- 12 specific comments are provided for water streams, water balance, and SNP

