



July 29, 2016

File: UA Hullcar Aquifer\Grace-Mar

VIA PUROLATOR and EMAIL

PAO 108389

Grace-Mar Farms Ltd.
9259 Main Street
Chilliwack BC V2P 6K2

Attention: John Kampman, Director
Margaret Tenbrinke, Director

On June 28, 2016, the Ministry of Environment acknowledged by email that we had received the Terms of Reference and Work Plan (the Plan) for Grace-Mar Farms Ltd., which was prepared by Associated Environmental, dated June 2016 and submitted under Pollution Abatement Order 108389 (the Order).

Requirement 1 of the Order requires a Terms of Reference for an Environmental Impact Assessment and a work plan be prepared by a qualified professional and submitted to the Director for approval. This letter is my approval of the Terms of Reference and the Work Plan contingent on the following:

Terms of Reference

1. Section 2.4 Receptor – must include any adjacent surface water as stated in Section 2.1 Goals.

Work Plan

2. Task 1c) *Conduct a site visit and review farming practices with the landowner to document:...* Must include: fields irrigated and irrigation rates **and schedules**....cropping practices **including crop types and rotation.**
3. Task 1d) must amend to read: **Review of a receptor survey to identify the nearest existing drinking water wells or springs.**
4. Task 2a) include a detailed map showing features and facilities.
5. Task 2b) include description of manure if moved/supplied to offsite sources.
6. Task 2d) include a typical irrigation schedule for the various fields and a list of crops planted at those fields.

7. Task 3a) Proposal to use existing wells if they have a well log showing a description of the geology from ground surface to the bottom of the aquifer, and the screens are installed in the Hullcar Aquifer 103.
Any existing wells used for comparison of groundwater quality should have saturated screen lengths no longer than those used in to-be-installed monitoring wells, and should also have the top of screen quite close to the top of the water table at time of sampling so as to obtain water quality samples representative of the water quality that is entering the water table from the unsaturated zone.
8. Task 3a) Locate at least one well on fields where nutrients have been applied to determine “background conditions”.
What is meant by background? Background conditions to the ministry are conditions prior to industrial development (i.e. unimpacted).
9. Task 3c) - Installing short (2m) screen at bottom of aquifer may not identify relevant chemistry of water draining from unsaturated zone.
Installing relatively short screens (2m length) at the bottom of the aquifer may not allow accurate characterization of nutrient loading to the water table from the unsaturated zone, if the saturated aquifer thickness is much greater than 2m. Screening across the maximum water table height (variation can be extrapolated from MOE Observation Well 409) may provide more representative data regarding nitrogen loading to the aquifer.
10. Task 3c) In borehole for proposed MW3, collect deep soil samples in the unsaturated zone to assess whether or not the best management practices being followed are resulting in acceptable nitrate (as N) concentrations in the unsaturated zone.
11. Multi-level wells will not be completed at this time, to avoid the potential for cross contamination between screened sections.
Consider multi-level wells (with up to 2m long screens) if the aquifer is thicker than 10 m. To avoid concerns about cross-contamination, different drilling techniques may be used or separate boreholes can be used with a maximum lateral offset of 5 m.
12. Task 4a and 4c: Perform slug tests or short pumping tests.
Ensure purge water from the newly developed well does not compromise the soil or water samples.
13. Task 4f: Laboratory analysis.
ToR Section 2.5 states that the EA process will assess water quality. Groundwater samples must be submitted for routine potability analysis, dissolved metals analysis and total metals analysis to better characterize background groundwater quality.

Given that the objective of the EIA “is to assess current agricultural practices and their potential to adversely affect groundwater” and that “The EIA will also consider the additive effect of farm operations on the Lands to the total nitrogen load in the aquifer, which is

likely contributed by activities on other properties located over the aquifer” it would be useful to submit groundwater samples for nitrogen isotope analysis in addition to the nitrogen analyses proposed.

14. Task 5c: Upload all water quality results directly from the laboratory to Wireless Water Database Management Services database.

In the ongoing effort to be transparent and share information, water quality data must be uploaded to the government’s EMS system. Access can be provided and location numbers provided by Ministry of Environment once Associated Environmental provides a list of well plate identifiers and UTM coordinates of sample sites.

15. Task 6a: Conduct soil sampling when field conditions permit

Must sample all fields that received manure during 2016 at three depths (0-15cm; 15-30cm; and 30-60cm). Subdivide fields into sampling areas based on crop, soil type and topography. Routine major ion analysis and metals analyses should occur, allowing comparison to water quality results. Identify fields that had elevated nitrate levels at the end of the growing season.

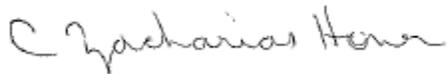
16. Task 7c) Determine if current (2014)....

Should read: Determine if current (2012)....to align with 2.3 Temporal Boundaries of the EIA.

17. Task 9 – *Per the recent Privacy Commissioner’s investigative report and Orders regarding information pertaining to Spallumcheen water quality, the EIA report will be made available on the ENV Hullcar Aquifer web page.*

18. Table 4-1 Proposed Work Schedule – *The work plan is to be undertaken within a similar timeframe as the work plan included in the H.S. Jansen and Sons Ltd. Terms of Reference and Work plan.*

Yours truly,



Christa Zacharias-Homer
Deputy Director

Cc: Devan Oldfield, Environmental Protection Officer, Compliance Team, Regional Operations Branch
Marta Green, P.Geo., Senior Hydrogeologist, Associated Environmental