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August 26, 2021

BENOIT PICARD
SHELL CANADA PRODUCTS
400-4TH AVENUE SW, PO BOX 100 STATION M
CALGARY AB T2P 2H5
benoit.picard@shell.com

FS-LF Variance
Service Request No.: 3050022
FS Bulk Plant
Installed at address: 3975 KEELE ST, DOWNSVIEW

Dear BENOIT PICARD,

Re: Variance from Clause 3.3.1.3.2 of the Liquid Fuels Handling Code, O. Reg. 217/01

This is in response to your variance application involving a tank berm extension at the Shell Keele Terminal.

Your variance request was to allow native materials that may exhibit a permeability greater than 1×10^{-6} cm per second for a minimum period of 72 hours under the full hydrostatic head of product within the dike.

Please be advised that your variance application has been approved because you have provided the following information:

The combination of construction materials combined with Keele Terminal's environmental monitoring and Prevention and Emergency Response Plan provide a tank berm with an equivalent level of safety to that of the code requirement. Details of each element are discussed below:

1. Natural Containment Features
Preliminary testing of the native subgrade and reworked native fill that would be used to construct the berm extension shows similarity to the soil comprising the berm walls and floor of the existing main tank farm. The data indicates that existing native soil that will comprise the berm extension floor should meet the permeability requirement in the code but that the extension walls will have a permeability similar to the existing berm walls.
2. Environmental Monitoring
 - a. Annual monitoring of wells located outside the tank farm berm would flag any changes in groundwater conditions. Monitoring of headspace vapour readings and depth to groundwater in selected monitoring wells is carried out and groundwater samples from selected existing monitoring wells are collected and submitted for laboratory analysis. The results are compiled in an annual report.
 - b. Monthly leak detection is carried out in monitoring wells installed down gradient of aboveground storage tanks located within the existing main tank farm berm. The monitoring includes measurement of the headspace vapour readings and inspection of the groundwater surface in each well for presence of floating free-phase product. All results are recorded and compiled and maintained in Shell files. No leak detection wells will be added to the berm extension as it will not contain any tanks.

- c. The Keele Terminal is staffed 24 hours per day. The operators conduct regular inspections of the tank farm berms during their rounds.
- d. Storm water that accumulates in the existing main tank farm berm is visually inspected for evidence of potential petroleum hydrocarbon impact before it is pumped through the existing oil/water separator system operated in accordance with a Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA). Storm water accumulations in the berm extension would be managed in the same way. A related application for ECA amendment has been submitted to the MECP.

3. Product Release Prevention Measures

Petroleum product releases can occur due to equipment failure or tank overfilling. A tank rupture is not considered a credible product release scenario. The Hazard and Effects Management Process (HEMP) is a structured and systematic analysis methodology involving the identification, assessment and control of hazards, and the recovery from effects caused by a release of the hazards. Continued application of HEMP over a number of years has resulted in comprehensive engineered controls and robust management systems which together ensure that risks associated with Shell's operations are managed to levels which are as low as reasonably practicable (ALARP).

The following barriers ensure that the risk of product release is minimized and in the case of a loss of primary containment (LOPC), the volume released to the tank farm is limited:

- a. The maximum working level or normal fill level (NFL) is the highest level to which a tank is routinely filled with product under normal operations;
- b. A pre-rail car or pre-pipeline verification calculation is carried out to validate that sufficient ullage is available below the NFL in the receiving tank;
- c. Audible high level alarms (HLA) after NFL both inside the control room and outside on the terminal property indicates to the operator that an action is required. The operator will immediately stop rail car unloading and/or immediately contact the pipeline operator to request the flow to the tank be diverted or stopped.
Note: a DRT (demonstrate responsive time) exercise is performed every year to validate the alarm settings;
- d. Audible high-high level alarms (HHLA) both inside the control room and outside on the terminal property indicates to the operator that immediate action is required. In addition, it triggers an automatic shutdown of the product inlet motor operated valve (MOV) to the tank;
- e. Hourly reconciliation procedure by Terminal operators requires investigation when out of tolerance;
- f. Instrumentation is maintained per manufacturers' recommendations and testing is carried out on a monthly basis;
- g. Tanks are inspected and maintained per API 653 requirements.

4. Emergency Response Protocols

The Keele Terminal utilizes the Shell Incident Management System (Shell IMS) in the event of an emergency. The elements of the Shell IMS model were developed and refined from actual incidents and are derived from the Incident Command System. Shell maintains and exercises its Emergency Response Plan (ERP) which ensures that any product release is immediately addressed through a standard approach to emergency response. A copy of the ERP is available at the Terminal and an electronic copy is available on the ShellNet. The "Roadmap for Initial Assessment and Response" details all steps to be followed from the moment a LOPC is detected or if the potential for product release is identified. In the ERP, all relevant product containment and clean up equipment is listed as well as emergency contacts, emergency service providers, regulatory notification requirements and remedial action plan.

Please be advised that this variance will not take effect until 15 days from the date of posting the decision on the environmental registry. This decision of the Director is subject to a right of appeal, under the Environmental Bill of Rights, if such an appeal is filed within 15 days from date of posting. In the event an appeal is filed, this decision of the director may be subsequently stayed, disallowed or significantly altered. Notice of an appeal will be placed on the Environmental Bill of Rights registry.

This variance is allowed under the authority of subsection 36.(3)(c) of the *Technical Standards and Safety Act, 2000*, (the "Act") and subject to such conditions as may be specified herein, being that:

- The installation dealt with in this variance must be inspected and may be periodically audited by TSSA. Please contact Mary Ferrari at 416-768-5306 or by email at mferrari@tssa.org to arrange for the initial inspection;
- Non-conformity with the conditions specified shall thereby cause the allowed variance to become null and void;
- The applicant accepts full responsibility for any and all damages resulting from the use of the thing to which the variance applies. The applicant further accepts full responsibility for any impacts to the health and safety of any person in consequence of the allowance of the variance or of non-conformity with the conditions specified. The Technical Standards and Safety Authority accepts no responsibility for any such damages or impacts;
- In the event of any claims against the Technical Standards and Safety Authority arising from allowance of the variance or non-conformity with the conditions specified, the applicant agrees to indemnify the Technical Standards and Safety Authority and agrees to hold it harmless from such claims and attendant costs;
- The variance process is subject to public access under the TSSA Access and Privacy Code (available upon request). The fact that a variance has been granted and information about any public conditions, such as a requirement to post a sign, may be released on request. Subject to law and the TSSA Access and Privacy Code, proprietary information will not be subject to release;
- The applicant shall pay the fee associated with the review of the variance; and
- A copy of the variance letter shall always be kept readily available and permanently legible in the vicinity of the appliance/equipment.

This variance only relates to the Act and regulations made thereunder and does not exempt you from compliance with other applicable regulatory requirements. The installation may be subject to an inspection to ensure compliance with the terms of the variance.

Should you have any questions or require further assistance, please contact Marek Kulik at 416-734-3465 or by email at mkulik@tssa.org. When contacting TSSA regarding this file, please refer to the Service Request number provided above.

Yours truly,



Zenon J. Fraczkowski, P. Eng.
Manager, Fuels Safety Engineering
Delegated Authority under section 36(3) (c) of TSS Act

c. Mary Ferrari, TSSA (mferrari@tssa.org)
Sat Viridi, TSSA (svirdi@tssa.org)

<p>A legible copy of this letter shall be kept readily available near the appliance/equipment. This variance is not valid unless all variance conditions in this letter have been met.</p>
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