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DEPARTMENT OF ECOLOGY
Northwest Region Office
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July 20, 2022

Mr. David J. Hill
President/Principal Engineer
DH Environmental, Inc.
1011 SW Klickitat Way, Suite 107
Seattle, WA 98134
(davehill@dhenviro.com)

Re: **Response to *Star Forge AFFF Designation Response to Ecology's May 18, 2022 Request for Additional Information*, dated June 1, 2022 from DH Environmental and *Star Forge Response to AFFF Questions*, dated June 3, 2022 from Marten Law for:**

- **Site Name:** Jorgensen Forge Corp
- **Address**: 8531 East Marginal Way South, Tukwila, WA 98106
- **Facility/Site No**.: 2382
- **Cleanup Site ID No**.: 3689

Dear David Hill:

Thank you for submitting responses to our questions from my May 18, 2022 email to you regarding use, storage, and decommissioning of aqueous film forming foam (AFFF) systems at the above-referenced facility. We remain committed to seeing through the Interim Action at the Site to address the issues already identified in those documents. However, potential per- and polyfluoralkyl substances (PFAS) impacted concrete source material, which only came to our attention on April 26, 2022, remaining below ground at the Site is of significant concern to the Department of Ecology (Ecology). At that time, based on the letter received from Earle M. Jorgensen (EMJ) and Mr. Allan's April 27, 2022 email, Ecology understood that the parties had discussed removal of the concrete source material and that concrete removal was a foregone agreement. Hence, we were comfortable asking only for the Interim Action Work Plan (IAWP) to be revised to summarize how this would be accomplished, as noted in our email dated May 5, 2022. If this is no longer the case, then Ecology may consider re-negotiating the "Work to be Performed" section of the Agreed Order and scope of the IAWP.

Upon receipt of additional information from you on May 12, 2022, and discussions within Ecology, we realized that it was important to determine if an ongoing release of AFFF or PFAS is occurring, and that immediate mitigation of this release be conducted, as outlined in Ecology's May 18, 2022 email. Ecology sent the May 18 email in response to your waste designation email dated May 12, 2022, but our response was not limited to addressing Dangerous Waste regulation concerns. We apologize if this was not clear. Ecology understands that removal of the concrete within the vaults with known AFFF storage/use is not required under Dangerous Waste LQG closure regulations.

This letter is intended to clarify requirements under the Model Toxics Control Act (MTCA, WAC 173-340), and it is up to the parties to allocate costs and liabilities between themselves. As you know, PFAS is an emerging contaminant, and as such, Ecology is in the process of learning how PFAS contamination can differ from the traditional contaminants already known at the Site.

In response to your correspondence and the public comment provided by EMJ on April 26, 2002, Ecology completed a literature search regarding the PFAS/concrete issue. Our research indicates that the porous nature of concrete allows materials containing PFAS to infiltrate and provides many binding sites so that the contaminated concrete can serve as a continuing source of PFAS to the surrounding soil (Toase et al. 2019, ITRC 2020, Thai et al. 2022)[1]. For example, Baduel (2015) reported that PFAS penetrated 12 cm into a concrete pad at a fire training area.[2] For this reason, research is ongoing to find ways to remediate PFAS in concrete (Toase et al. 2019, CRC Care[3]).

We have the following comments on the June 1, 2022 document provided to Ecology by DH Environmental:

- Question 3a response. As noted above, Ecology is concerned with sampling the current contents of the potentially impacted vaults because of the potential ongoing MTCA release and/or presence of concrete source material. We hereby clarify that the fluids in the vaults and the concrete must be sampled and analyzed for PFAS.

- Question 4 response. Were photographs taken during inspection of the concrete vaults showing the electrical conduit penetrations through the concrete? If so, please tell us which photos to review and/or provide photographs. Ecology is interested in the condition of below-ground structures where concrete may be impacted by AFFF/PFAS.

- In our review of your documentation, Ecology could not determine whether the concrete in the press rooms and their associated vaults (660-ton press room/vault, 1,250-ton press room/vault, 2500-ton press room/vault, and Q1/Q2/Q3 quench vault) was pressure washed during decommissioning of the AFFF vessels and vault cleaning conducted at the Site to date. Ecology's recollection is that pressure washing did occur in these structures at the Site. Please clarify.

We have the following comments on the June 3, 2022 letter provided to Ecology by Marten Law:

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[1] ITRC. 2020. Per- and Polyfluoroalkyl Substances (PFAS). Interstate Technology & Regulatory Council (ITRC). April.
Thai, P.K., J.T. McDonough, T.A. Key, J. Thompson, P. Prasad, S. Porman, and J.F. Mueller. 2022. Release of perfluoroalkyl substances from AFFF-impacted concrete in a firefighting training ground (FTG) under repeated rainfall simulations. J. Haz. Mat. Letters. 3:100050.
Toase, D., J. Lagowski, I. Ross, P. Storch, and T. Statham. 2019. A comparison of treatment methods for PFAS impacted concrete: results from laboratory and field trials. Proceed. 8th Internatl. Contamin. Site Remed. Conf. Abstract.

[2] Baduel, C., C.J. Paxman, and J.F. Mueller. 2015. Perfluoroalkyl substances in a firefighting training ground (FTG), distribution and potential future release. J. Haz. Mat. 296:46-53.

[3] CRC Care. Remediating PFAS-contaminated concrete. Available at:
https://www.crccare.com/files/dmfile/matCAREfactsheet_concrete_Sept2018_final.pdf. Downloaded June 16, 2022.

- Ecology agrees that it is unclear when and how AFFF/PFAS were released at the Site, and how the November 2016 Bankruptcy Settlement Agreement (BSA) may interact with such contamination. However, there are elements of the history of the decommissioning process that indicate that Star Forge may have created or exacerbated a release. For example:
    - During removal of wall and ceiling panels in 2019-2020, Star Forge created a condition that allowed stormwater to enter the building and potentially mobilize PFAS in concrete exposed to stormwater and creating or enhancing the pathway to groundwater.
    - The greatest PFAS contamination in groundwater is present near the 660-ton press room/vault, which is also the area for which documentation is lacking on the decommissioning process. It is unknown if releases from the AFFF systems occurred during decommissioning activities.
    - If the concrete in vaults or at the surface was pressure washed during decommissioning, said pressure washing could have mobilized PFAS from the concrete, where present. We asked for clarification on this, above.
    - Records not kept at the time of decommissioning regarding how the decommissioning occurred has resulted in conjecture regarding how AFFF equipment was managed and/or the possibility of release.

  Ecology recognizes that EMJ may have likely also contributed and/or caused a release. This question of release timing, mechanism, and liability is for EMJ and Star Forge to work out. Ecology does not determine liability. However, Ecology has authority under MTCA to prevent actions that could foreclose future cleanup alternatives. Therefore, Ecology will determine whether there is PFAS impacted concrete, which is potential source material, may remain in place, and what administrative option will be used to address it.

- Ecology could have objected to the non-removal of concrete from all subsurface structures at the Site throughout the demolition process because remaining subsurface concrete could foreclose future cleanup alternatives. Ecology did not object to the approach of leaving the concrete in most of the subgrade structures because the concrete in most areas may provide protectiveness between contaminated soil and new backfill. However, Ecology's review of relevant literature shows that concrete is a potential source material for contributions of PFAS in groundwater. Therefore, and, Ecology will not approve a plan that results in burial of PFAS-impacted concrete at the structures and associated vaults outlined in this letter (660-ton press room/vault, 1,250-ton press room/vault, 2500-ton press room/vault, and Q1/Q2/Q3 quench vault).

Therefore, Ecology remains concerned about concrete in the AFFF vaults and possible PFAS related contamination of both soil and groundwater outside the vaults, and new soil and migrating groundwater that may penetrate clean backfill within the AFFF vaults if backfill were to be placed. Therefore, Ecology hereby requires that concrete in the above-referenced areas (660-ton press room/vault, 1,250-ton press room/vault, 2500-ton press room/vault, and Q1/Q2/Q3 quench vault) be sampled for PFAS at locations within the vaults where impacts are most likely (near sprinkler spray zones at accumulation points). It is advisable to consult Ecology regarding sampling density, locations, analytical methods and precedures prior to conducting sampling.

PFAS-containing concrete identified in these areas will require removal from the structures and associated vaults noted above prior to backfill of those areas. The aforementioned sampling and required concrete removal needs to be described in the IAWP. Alternately, Star Forge could leave PFAS-impacted concrete in place, but cannot backfill or pave over PFAS-impacted concrete structures. If PFAS-impacted concrete remains at the Site, Star Forge would have to describe in the IAWP and provide for a safe and water-tight covering of the vaults to prevent stormwater infiltration, which would also require review from Ecology's Water Quality Program. It may be technically infeasible to ensure water-tight barrier as buried vaults typically need to be pumped out on a regular basis. The IAWP will have to discuss this, and Ecology will review the demolition plan and SEPA checklist to ensure the inclusion of this provision.

Ecology encourages the parties to work together to find a solution to this issue, and I look forward to your response regarding these outstanding questions.

Sincerely,

Maureen Sanchez,
Site Manager
Toxics Cleanup Program, NWRO

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