Comments on Boeing Draft Groundwater CMS and DTSC SOB

Please correct misspelling of Boeing (Boing) on page https://dtsc.ca.gov/santa-susana-field-laboratory-boeing-gw-cms-and-dtsc-sb/

DTSC Statement of Basis

Tables 3F and 3G incorrectly includes titanium (without isotopic identification) as "radiochemistry." Please correct to identify titanium as a metal. Table 5 correctly identifies titanium as a metal.

In Tables 3A, 3B, 3C, 3F, 3G, 3H, 3I, 3J, 3K, 3L, 3M and 5, replace "radiochemistry" with 'radionuclides." Radiochemistry are the analytical method(s) used to quantify radionuclide concentrations.

Table 5 lists DTSC's proposed groundwater cleanup objectives for all constituents of concern (CoC). Identified radionuclide cleanup levels are all proposed to be MDL (method detection level), together with a footnote stating,

> *The Settlement Agreement states in Exhibit 17 that "Background refers to the amount of a particular constituent appearing naturally in the environment. For constituents that are anthropogenic, the background value is zero and non-detect at the detection limit is used as a proxy for zero." Therefore, the laboratory MDL (method detection limit) will be the media cleanup level for each anthropogenic chemical, as approved by DTSC.*

This may make pragmatic sense for anthropogenic radionuclides in SSFL groundwater. However, Boeing and DTSC are aware that background levels of anthropogenic radionuclides (Cs-137, Cs-134, Sr-90, Pu-239/240, Pu-238, Eu-152 and Eu-155) exist in soil at measurable concentrations (EPA 2012), and are due to weapons test fallout, not due to SSFL operations. Although these contaminants could also exist in Boeing groundwater, concentrations would undoubtedly be small and could be less than MDL.[1]

However, naturally occurring radionuclides are another matter. U-234, U-235, U-238, Th-234, Th-232, Th-230, Th-231, Th-228, Ra-226, Ra-228, Po-210, Pb-210, Pb-214, B-214, and K-40 are ubiquitous in soil and rock and therefore it is not surprising that these radionuclides may also be detected in SSFL groundwater. H-3 is continuously created by cosmic ray interaction wth nitrogen and oxygen in the upper atmosphere. H-3 interacts with water to form tritiated water that enters the planet's hydrologic cycle.

[1] Area IV does have several wells with acknowledged H-3 and Sr-90 contamination from site operations.

Section 6.1 of the DTSC SOB states,

> *"Boeing concluded that background levels were achievable."*
> *"Because background levels are achievable, DTSC has set media cleanup goals at background levels in both groundwater and the bedrock vadose zone."*

Have background levels for naturally occurring radionuclides (uranium isotopes, thorium isotopes, their progeny, and K-40) in SSFL groundwater been evaluated (as was done for soil)? If yes, then where is the data and report? If no, then how does Boeing determine if these undefined levels are achievable? Does achievable mean *"the labs can measure concentrations at and below these undefined background levels"* or does achievable mean *"we can cleanup groundwater and demonstrate that we have met these undefined background levels?"*

Given that background levels of these radionuclides certainly exist in SSFL groundwater (as more than four decades of well monitoring has demonstrated), and that laboratory detection limits are certainly below these background levels, attempts to cleanup to the MDLs (as stated in Table 5) will be equivalent to cleanup to levels BELOW background. This is clearly not what Boeing and DTSC intend. Clearly, some editing of Table 5 is necessary to clarify that a cleanup level of MDL for naturally occurring radionuclides is not intended. If Boeing and DTSC require a cleanup level of background, then they should say so, and specify what that background concentration level is.

Exhibit 17 of the Settlement Agreement states, *"Technical and economic feasibility analysis is an iterative process and will be updated as the project progresses."* This appears to be yet another unworkable example of *"changing the goal posts during the game."*

Groundwater remediation at SSFL by all RPs is allegedly controlled by the risk assessment methodology of the 2007 Consent Order. Why does the Boeing Settlement Agreement now appear to be using background (zero dose, zero risk) for radionuclide remedial goals for groundwater (in addition to soils that was so loudly proclaimed in 2022)? This appears to be more restrictive than DOE and NASA groundwater risk-based 2007 Consent Order requirements.

Boeing Draft Groundwater CMS Report

All excess lifetime cancer risk (ELCR) estimates for radionuclides are based on a **gross** exposure point concentration (EPC) with no background subtraction. Background for radionuclides in SSFL groundwater **has not been evaluated therefore is incorrectly assumed to be zero**. All gross radionuclide EPCs appear to be less than EPA's drinking water MCLs.

Conclusions

DTSC (and Boeing) have again fallen into the trap of striving for unimplementable goals … cleaning up to below drinking water MCLs … cleaning up to MDLs (which are laboratory dependent and will shift over time) … and cleaning up to an undefined background level.