I. Data for each media:
- Surface soil (0-1 ft bgs) – voc, svoc/pah, metal, pest/pcb (2.3.1)
- Shallow soil (0-15) – voc, svoc/pah, pest/pcb, metal (2.3.2)
- Deep soil (>15) – voc (2.3.3)
- Shallow soil gas (0-15) – voc (2.3.4)
- Deep soil gas (>15 to water table) – voc (2.3.5)
- Indoor air – voc (2.3.6)
- Groundwater (water table only) – voc (2.3.7)

II. Data Analysis

1) Validation (3.1)
   a) Our RI data – validation per QAPP.
   b) Others’ data – reviewed for minimal acceptance, criteria (Apx A):
      i) Certified mobile or fixed lab, approved EPA reference methods.
      ii) Documentation, QC standards consistent with Del Amo QAPP.
      iii) Level II data accepted if 10% level IV-equivalent data available for verification.
      iv) Analyte specific, with identification and quantitation confirmed following precision, accuracy, completeness standards (per Del Amo QAPP).
      v) Lab data includes matrix spike/ms duplicates, lab control samples, method blanks, holding times, internal standards, serial dilutions. Absence of one of ms/msd, method blanks, or serial dilutions was OK if all others were present.
      vi) 44% found acceptable.
   c) Data types used for each parcel – table 10.

2) Processing (3.2)
   a) Composites – for each composite, the result (mean) was used as the value for its composited locations. (3.2.1)
   b) Mobile & fixed lab results (3.2.2)
      i) For soil gas “splits/co-located” samples where one analyzed at on-site and one at off-site lab.
      ii) Highest value of the two was used to represent that location. When both ND, lowest detection limit used (assumed to be most accurate).
   c) Soil gas & soil matrix results (3.2.3)
      i) Soil gas results were converted to soil matrix equivalents for direct exposure calculation.
      ii) Soil matrix results were converted to soil gas equivalents for inhalation exposure calculation.
3) **Exposure Area of Potential Concern (EAPC) selection (3.3)** – each parcel designated an exposure area. Exposure areas of potential concern were ones meeting any criteria:

a) Parcel contains any of the 12 groundwater contamination source facilities *(Figure 3)*

b) A voc, svoc, pest/pcb exceeded its residential PRG.

c) A metal exceeded its ambient breakpoint and its PRG.

d) [Some clarification is being sought regarding other criteria that I think we used, including potentially elevated soil gas, potentially elevated indoor air, not having performed indoor air sampling, parcel is surrounded by other EAPCs, and minimal data was collected.]

e) Selected parcels and rationale shown in *table 11, see also Figure 3.*

4) **Contaminant of Concern (COPC) selection (3.4)**

a) All chemicals identified on-site were included.

b) Selected for each EAPC and each media individually.

c) Selection criteria: *(3.4.2)*

i) Inorganics had to exceed background.

ii) Organics had to exceed 5% prevalence (positive detect in 5% of samples).

iii) Both had to exceed toxicity threshold of 1/10” residential PRG (for soil gas, used ambient air PRG).

iv) Results are in *table 12a, analysis is in Appendix C.*

5) **Exposure Point Concentration (EPC) calculation (3.5)**

a) Reasonable Maximum Exposure (RME) – defined as 95% upper confidence limit (95UCL) of arithmetic mean or max observed concentration, whichever is lower. Three formulas used to calculate 95UCL:

i) T-based confidence interval,

ii) Land confidence interval for lognormal distributions,

iii) Chebychev conservative confidence interval for skewed distributions.

b) Determining which method to use *(3.5.2)*, steps:

i) Evaluate distribution first for both normal and lognormal distribution using Shapiro-Wilk goodness-of-fit test. Determined best distribution type fit, t-based or Land, for use as "preferred estimator" for EPC.

ii) If neither t-based or Land fit adequately, but sample size was adequate, Chebychev formula used as preferred estimator for EPC.

iii) Preferred estimator was used if value was lower than the data max.

iv) If preferred estimator exceeded data max, or if data did not fit normal or lognormal distributions and sample size was less than five, then data max was used as EPC.

v) [Due to variation in detection limits, there were some cases where the ½ detection limit value exceeded the max detect. In such cases, we used the higher value.]

c) Central Tendency, arithmetic average, also calculated for comparison.

d) Used non-detects in EPC calculation by assigning each ND a value of ½ their detection limit.

e) Resulting EPCs are shown in *Table 12a.*
III. Exposure Assessment

1) Exposure Pathways (4.2.4 and Figure 18)
   a) Commercial worker
      i) Surface soil - ingestion, dermal contact, dust inhalation (outdoor).
      ii) Shallow soil/gas - ingestion, dermal contact, dust and vapor inhalation (outdoor);
          indoor inhalation.
      iv) Indoor air – indoor inhalation.
   b) Hypothetical resident
      i) Shallow soil/gas - ingestion, dermal contact, dust and vapor inhalation (outdoor); indoor
         inhalation.
   c) Trench worker
      i) Shallow soil/gas - ingestion, dermal contact, dust and vapor inhalation (outdoor).

2) Chemical Intake (4.3)
   a) Estimate EPC – described in previous section. Modeled EPCs . . .

   b) Estimate Average Daily Dose (ADD) for non-carcinogens, and Lifetime Average Daily Dose (LADD) for carcinogens, for COPCs for each exposure pathway. (4.3.3)
      i) ADD or LADD = EPC x Summary Intake Factor.
      ii) Ingestion, dermal contact, inhalation (dust, vapor) ADD and LADDs calculated.

         (1) Inhalation of indoor vapors – two tiers of analysis
            (a) Tier 1 – Johnson Ettinger (JE) model (4.3.6.1 and Appendix E), no
                degradation, run for shallow soil, deep soil and groundwater; each result used
                as an EPC and calculated risk separately; run for commercial and for
                residential receptors.
                   (i) Groundwater – modeled values calculated using max groundwater
                       concentration value site-wide for each chemical (not parcel specific).

            (b) Tier 1 – indoor air data from direct sampling, used as EPC.

            (c) Tier 2 – Dominant Layer Model (DLM), incorporated biodegradation, used for
                parcels where Tier 1 modeling showed risk exceeding 10⁻⁶ or HI 1.0. (4.3.6.2
                and Appendix F)
                   (i) Biodegradation constant determined by calibrating model to soil gas
                       vertical profiles from 2 site areas, Pits and MW20.
                   (ii) Used shallow soil/soil gas data and groundwater data. Preferred use of
                        shallow soil/gas data wherever sufficient data (6+ samples) existed.
                   (iii) Calculated EPC and risk for each scenario.

   c) Exposure parameters are shown in Tables 13, 14, and 15. (4.3.1)

3) Ecological Screening – found no exposure pathway to ecological receptors.

IV Toxicity Assessment
V. Risk Characterization
1) Commercial Worker Scenario - Results in Table 20, Figure 21 (outdoor), Figure 22 (indoor).
2) Residential Scenario – Results in Table 21.
3) Trench Worker Scenario – results in Table 22.

VII. Uncertainties Assessment
1) COPC selection, estimation of chemical concentrations
   a) Random sampling
   b) Spatial representation
   c) Detection limit
   d) Distribution assumption
   e) Partitioning and transport modeling
   f) Temporal
2) Exposure Assumptions
3) Chemical toxicity
4) Risk characterization