



February 26, 2013

Mayor David Hill
City of Algona
402 Warde Street
Algona, Washington 98001

Subject: Comments on Vapor Intrusion Evaluation and Assessment Approach, Boeing Auburn Facility, Auburn, Washington – Agency Review Draft

Dear Mayor Hill:

ICF International performed an independent review of the *Vapor Intrusion Evaluation and Assessment Approach, Boeing Auburn Facility, Auburn, Washington – Agency Review Draft* (dated February 20, 2013) prepared by Landau Associates for The Boeing Company. Enclosed please find our comments on this document for your review and consideration. Upon your review and concurrence with our comments, either you or ICF could forward them to Ecology per Robin Harrover's request. We are also available to discuss these comments with Ecology should they desire.

Sincerely,

A handwritten signature in black ink, appearing to read "Gary Clendenin", with a long horizontal flourish extending to the right.

Gary Clendenin, PG

Enclosure

General Comments

Comment #1: The *Vapor Intrusion Evaluation and Assessment Approach* is generally consistent with the State of Washington Department of Ecology's (Ecology) *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action* (Review Draft, October 2009). Boeing's proposed approach for evaluating vapor intrusion (VI) into the future follows the tiered process recommended in Ecology's guidance. However, the approach laid out by Boeing is general in nature and does not provide any specific proposed sampling locations (for indoor air, soil gas, groundwater, etc.) within the residential areas of the City of Algona. Boeing indicates that a separate work plan will be submitted to Ecology in February 2013 that describes the specifics of any future VI assessment activities, with the assessment and reporting to be conducted in the March 2013. The City of Algona should be provided ample opportunity to review and comment on the work plan in advance of the field program.

Comment #2: Several references to the remedial investigation (RI) Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) are made in the document. These documents include important field sampling and analytical procedures and methods. Our assumption is that these plans have been reviewed and approved by Ecology. However, the City would like copies of the SAP and QAPP to perform an independent evaluation of the procedures that will be used for future field investigation activities.

Specific Comments

Comment #3: *Section 2.1.1 Cleanup Levels and Screening Levels, pgs. 2-1 and 2-2:*

The VI screening criteria for perchloroethene (PCE), trichloroethene (TCE), and vinyl chloride (VC) that Boeing is using to assess potential health impacts under residential, commercial, and industrial use scenarios are tabulated and have reportedly been approved by Ecology. The technical memorandum prepared by Landau Associates (dated September 4, 2012) that proposed the screening criteria and the subsequent correspondence with Ecology on revisions to and approval of the proposed criteria were not available for review. The screening levels (SLs) and cleanup levels (CULs) presented on page 2-2 of *VI Evaluation and Assessment Approach* document appear to be generally higher (and thus less protective) than the criteria presented in Appendix B of Ecology's *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action* (Review Draft, October 2009) and EPA's Vapor Intrusion Screening Levels (<http://www.epa.gov/oswer/vaporintrusion/guidance.html>). ICF could not independently evaluate the approach used by Landau to arrive at these less protective criteria or the appropriateness of the VI criteria. Therefore, we request copies of the technical memorandum and associated correspondence with Ecology on the acceptance of the criteria.

Comment #4: *Section 2.1.2 Vapor Intrusion Constituents of Concern, pgs. 2-2 and 2-3:*

Boeing proposes to eliminate PCE as a constituent of concern (COC) in future VI assessments. However, until the nature and extent of the shallow groundwater contamination is more fully delineated in the City of Algona residential areas located to the west of the Boeing property (see Comment #5), PCE should remain a potential constituent of concern for future VI assessments. While groundwater and soil gas concentrations have historically been below VI screening criteria, PCE has been detected in surface water bodies located to the west-northwest of the Boeing facility. While these detections have generally been low, they do suggest that PCE is a COC in off-site groundwater. Further field investigations (including VI assessments and groundwater plume delineation) in residential areas within the City of Algona should continue to analyze for and evaluate PCE as a potential COC.

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Additionally, cis-1,2-dichloroethene (DCE) has been consistently detected in groundwater samples at the Boeing facility and in wells located within the City of Algona. Boeing should explain why cis-1,2-DCE and other less frequently detected VOCs are not included as potential COCs for future VI assessments.

It is our opinion that no constituents should be eliminated from future VI assessments until the full nature and extent of groundwater contamination is determined within the borders of the City of Algona.

Comment #5: Section 2.2.1 Tier I Shallow Remedial Investigation Groundwater Well Data, pg. 2-4: Only approximately five (5) of the 74 total shallow/water table monitoring wells currently in the RI sampling program are located within the limits of the City of Algona. Only three of these five are located in proximity to residential areas (e.g., AGW225, AGW226, and AGW228). In fact, these three wells are only located on the edge of the residential area, and not within the residential area. While the Tier I screening procedures presented in this section are generally consistent with Ecology's *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action*, the guidance clearly states (in Chapter 3) that the Tier I (and Tier II) screening steps assume that "the nature and extent of contamination in the media which contain the potential vapor intrusion source has been, or is being, adequately quantified." Since only three of the 74 shallow/water table wells (less than 5-percent of the total) are located even marginally close to the residential area of Algona, the nature and extent of the shallow, intermediate, and deep contaminated groundwater within the City of Algona borders has not been "adequately quantified" or characterized. Therefore, additional groundwater characterization in this area (in all three groundwater zones) is necessary in order to appropriately apply the Tier I VI assessment process.

Comment #6: Section 2.2.1 Tier I Shallow Remedial Investigation Groundwater Well Data, pg. 2-4: Chapter 2.3.1 of Ecology's VI guidance describes limitations on the use of the "100-foot rule", and recommends that buildings farther than 100 feet from the edge of contamination should be evaluated for possible VI impacts in certain situations. These situations include when continuous low permeability surfaces (such as concrete or asphalt) cover the ground between the contamination and the building; if sewer, gas, or other utility lines are present at the site; and when the source of contaminated soil gas is contaminated groundwater, the investigator will need to consider the future migration of VOCs in the plume. Arguably, each of the conditions described above are present at the Boeing facility and areas to the west of the facility. Therefore, it appears as if the "100-foot rule" should be used with caution. The *VI Evaluation and Assessment Approach* should be revised to account for these situations and Boeing should evaluate buildings farther than 100 feet where these conditions exist.

Comment #7: Section 2.2.2.1 Shallow Soil Gas Data Collection, pg. 2-5, 2nd paragraph: All future works plans that describe proposed sampling procedures should be provided to the City of Algona for review in advance of the field sampling efforts. This includes the RI SAP and QAPP.

Comment #8: Section 2.2.3 Tier I Shallow Groundwater Borehole Data, pg. 2-6: As discussed in Comment #4 above, the groundwater samples collected in additional areas (including residential areas within the City of Algona) should be analyzed for a longer list of VOCs than just TCE and VC. While the primary objective of these new sample points is to assess the potential for VI, a longer list of VOCs (including, but not limited to PCE and cis-1,2-DCE) should be analyzed for. The full EPA Method 8260 list should be analyzed for and reported for any new groundwater samples collected or wells

installed within the residential areas of Algona. Having these data available will allow Boeing to more fully assess the nature and extent of groundwater contamination to the west of the facility.

Additionally, this section only addresses the collection of additional shallow groundwater borehole data in areas where groundwater is less than 5-feet deep. It does not address the situation where groundwater is greater than 5-feet deep, nor does it address the installation of permanent monitoring wells. Based on the results of the shallow groundwater borehole data, Boeing should install and routinely monitor permanent groundwater wells in the Algona residential areas, particularly in instances where the borehole groundwater VOC results are elevated.

Comment #9: 2.3.2 Tier II Sampling Analyses and Procedures, pg. 2-9, 1st paragraph:

As discussed in previous comments, the list of VOC's should not be limited to just TCE and VC, but should include other commonly detected contaminants (e.g., PCE and cis-1,2-DCE), as well as other constituents detected in any new groundwater samples collected or monitoring wells installed.

Comment #10: 3.1.2 Groundwater Sampling and Groundwater Level Monitoring, pg. 3-1 and Figs. 10 and 11.

The addition of the new shallow well data to the groundwater contour maps in January 2013 (Figure 11) indicates a flow direction with a more westerly component than originally estimated based on January 2012 data (Figure 10). This provides further justification to investigate the groundwater contamination elsewhere within the City of Algona limits; not just in the north-northeastern corner of the City, but also farther to the south in the central and southern portions of the City. This is particularly important considering that the former TCE vapor degreaser located in Boeing's Building 17-07 is a possible source for the western plume. There are no off-site wells located directly west of the Building 17-07, which is located less than 500 feet from the City of Algona border.

Comment #11: 3.2.1 Residential Area Tier I Data Screening, pg. 3-2 and Fig. 17:

The basis for the delineation of the "residential data gap area" shown on Figure 17 requires explanation. While it appropriately extends both south and west of the shallow wells that have SL exceedances, why does the area not extend further south to other residential areas within the City of Algona? As discussed in previous comments, delineation of shallow, intermediate, and deep groundwater contamination directly to the west of Building 17-07 is currently insufficient, and it raises the question of whether VI could also be a concern in this residential area.

In the second to last sentence of the 1st paragraph in this section, Boeing commits to expanding the area, if necessary, to completely characterize shallow zone VOC impacts in the residential area. The criteria that will be used to determine if and when the area for additional investigation will be expanded should be provided.

Comment # 12: 3.3 Tier II Assessment, pg. 3-4:

A tabulated summary of the results of indoor air sampling conducted in Building 17-07 to compliment the sub-slab soil gas sample results provided in Figure 23 should be provided.

