

STATEMENT OF WORK

INVESTIGATION AND PREPARATION OF ENGINEERING EVALUATION/COST ANALYSIS FOR BOEING ELECTRONICS MANUFACTURING FACILITY

I. INTRODUCTION

The purpose of this Statement of Work (SOW) is to outline the general requirements to complete an investigation and preparation of an Engineering Evaluation/Cost Analysis (EE/CA) by The Boeing Company (Respondent) to address releases of hazardous substances at or from the Boeing Electronics Manufacturing Facility (“EMF or Site”) located at 7355 Perimeter Road South, Seattle, WA. The SOW Task 3 and Task 4 will be organized to follow the standard Data Quality Objectives (DQO) process contained in EPA DQO guidance. In general, the objectives of the investigation and EE/CA described in this SOW are to determine the nature and extent of contamination, particularly in groundwater, and to analyze alternatives to address the contamination as necessary.

The work under this SOW will be conducted in three phases. The first phase will include a summary of existing data, historical operations, Site configuration, and delineation of potential sources to identify specific data gaps that may need to be addressed by further sampling and analysis. The second phase may involve preparation/delivery of a data gap sampling work plan(s) and subsequent report(s). The third phase will be the preparation of the EE/CA. These phases of work are described in Tasks 2 through 4 below.

II. TASKS

TASK 1 – COMMUNICATION AND MEETING

This task delineates the requirements for the Respondent and the Environmental Protection Agency, Region 10 (EPA) to manage the three phases of this investigation and for the Respondent to provide communication with the EPA in a timely and consistent manner. This task will include, but not be limited to, the following:

- Preparation of a written project schedule for the three phases of the investigation.
- Regularly scheduled meetings and/or conference calls between the Respondent and EPA.
- Preparation of progress reports submitted to EPA in accordance with the schedule in Section III of this SOW. At a minimum, progress reports shall contain the following information regarding the preceding reporting period:
 - A description of the actions which have been taken to comply with the Settlement Agreement (including the SOW) during the previous reporting period;
 - Summaries of new findings;
 - Summaries of all deviations from any approved Work Plan, Sampling and Analysis Plan (SAP), and Quality Assurance Project Plan (QAPP);
 - Summaries of all difficulties or anticipated difficulties in meeting the schedule or objectives set forth in the SOW and Work Plan;

- Summaries of all solutions developed or planned (or implemented or initiated in exigent circumstances) to address any actual or anticipated problems or delays;
 - Changes in key personnel;
 - A description of all work planned for the next reporting period with schedules relating such work to the overall project schedule, including percentage of completion data; and
 - A list of sampling and testing reports and all other final data reports received by Respondent other than those generated pursuant to this Settlement Agreement which relate in any way to the EMF/EMF plume.
- Notification to EPA of impending field activities at least 7 days prior to field activities. This will allow EPA to determine whether oversight of any field activities will occur.
 - Distribution of deliverables. When modifying deliverables in accordance with EPA revisions or modifications, Respondent shall provide a redline version of the revised deliverables and, if requested by EPA, shall also provide a written response to each revision or modification, indicating how and where the revision or modification was addressed.

TASK 2 – SUMMARY OF AVAILABLE INFORMATION AND WORK OR EFFORTS TO DATE TO ADDRESS RELEASES

A number of reports have been prepared to date for the EMF/EMF Plume for the Model Toxics Control Act (MTCA) Voluntary Cleanup Program (VCP). To the extent any such reports are cited, copies of such reports shall be provided to EPA by Boeing. Available information will be compiled, as appropriate and necessary, to identify potential sources of releases of hazardous substances from current or historic operations at or from the Site, including groundwater thereunder or therefrom; to define potential contaminant pathways to the Duwamish Waterway; to present the conceptual hydrogeologic model; and to identify data gaps. The objectives of this task is to summarize the chronological history of the project and provide sufficient information (by referencing the existing reports) to develop the conceptual hydrogeologic model and identify data gaps. This summary will be presented in an Initial Report; the Initial Report is not intended to re-write the existing reports, but to clearly present, summarize, and reference the existing reports that comprise the Ecology record for the voluntary cleanup. A plan for addressing data gaps will be presented in the Data Gap Work Plan (Task 3) and will form the basis for additional investigations.

The information to be reviewed and evaluated, to the extent available, will include the following:

- Location and description of the Site.
- Site and surrounding area history.

- Current and reasonably anticipated future land use(s).
- Compilation and assessment of physical and chemical characterization data for:
 - Groundwater;
 - Soil;
 - Pore water;
 - Soil gas above the plume;
 - Stormwater from the Site;
 - Surface and subsurface sediment quality, grain size distribution, and total organic carbon (where applicable to the EMF VOC plume).
- Location, description, and elevation of historical and existing stormwater discharges originating from the Site.
- Delineation of Site outfall drainage areas.
- Structure locations (e.g. buildings, historical building footprints, runways).
- Available survey coordinates from past studies or other efforts (e.g. sediment, groundwater, and soil sample stations and locations).
- Current and historical aerial photograph review.
- Review of existing source data:
 - Summary of Boeing records including existing data reports, investigative reports, technical memorandums and listing of available Washington Department of Ecology records related to the Site;
 - Summary of the response actions taken to date;
 - Review of other potential sources within the vicinity of the Site, which may have impacted the Site or commingled with Site contaminants;
- Interviews with key personnel, if available, that have worked at the Site.
- Identification of potential historical and ongoing significant sources to the LDW from the Site.

The conceptual hydrogeologic model shall include a visual depiction of the site in 3 dimensions (cross sections are good) and provide 1) a spatial relationship of the major environmental features (topography, surface water, groundwater aquifers/aquitards, etc.); 2) sources of contamination (spill areas, USTs, landfills, ponds, etc); and 3) at least some general indication of contaminant flow paths, both horizontal and vertical.

TASK 3 – DATA GAP SAMPLING WORK PLAN AND REPORT

The work required to complete the investigation of the nature and extent of contamination, particularly of releases to groundwater, is not fully known at this time. This task may have to be phased or sequenced in accordance with data needs and/or site conditions following Task 2 of the SOW, and it may include environmental sampling of selected media for specific contamination to fill data gaps. This step may be omitted if EPA concludes (in writing) based on the Initial Report submitted under Task 2 that the nature and extent of the plume has been fully delineated. Boeing currently has MTCA VCP efforts in progress for specific locations within the EMF Plume, which EPA has not yet reviewed, to address the known plume.

The Respondent shall submit for EPA review and Approval a Data Gap Sampling Work Plan (DGSWP) after the Initial Report has been completed, as defined in Task 2 of this SOW. The DGSWP shall summarize the results of the Initial Report, including the identification of any data gaps and the conceptual site model, and make a determination that the Site, is, or is not, a historical and/or current source of contamination to the sediment or surface water of the LDW. The DGSWP will define the location, depth, media to be sampled, and the sampling and analytical methods to be utilized to fill the data gaps. Attachments to the DGSWP shall include a SAP, QAPP, and a Health and Safety Plan (HASP).

The DGSWP shall specify key tasks to be accomplished to complete the investigation of the Site. The DGSWP shall clearly describe the overall management strategy for planning, performing, and documenting investigative activities. The responsibility and authority of all organizations and key personnel involved in performing investigative tasks shall be outlined. The DGSWP shall discuss the timing/schedule for all subsequent related documents or activities described in Section III of this SOW.

Elements of the DGSWP will include, but not be limited to, the following:

- A summary of the information review completed under Task 2.
- A data gap analysis that defines the known or suspected sources of contamination, the potential pathways for contaminant migrations, and areas where sampling and analysis will be necessary to address the data gaps regarding nature and extent of contamination identified at the Site.
- A Project Management strategy, describing the strategy for managing investigative activities and achieving timely submittal of deliverables.
- A project schedule, including a timeline for completion of all investigative subtasks and for submittal to EPA of interim and final deliverables, including but not limited to the deliverables enumerated in Table 1 of this SOW.

- The composition and individual qualifications of technical team or teams of personnel and/or subcontractors responsible for investigative subtasks.
- Listing of standards, criteria, and regulations applicable to the investigation.
- A Data Management Plan:
 - A unique identification code assigned to all monitoring and sampling stations;
 - Location data and descriptive information recorded and encoded of all monitoring and sampling stations described in standard latitude and longitude coordinates or state plane coordinates;
 - Analytical results and other observations correlated with the sampling station location and descriptive code using common identification codes assigned to station locations.
- A list and description of individual investigative activities necessary to address data gaps that may include:
 - Site survey:
 - Location, description, and elevation of historical and existing outfalls associated with the Site.
 - Physical Characterization, including:
 - Groundwater chemistry, flow direction and flux and the effects of EMF plume contaminated groundwater discharge on the Duwamish Waterway;
 - Sources and discharge points for storm and surface water from the Site;
 - Receiving water chemistry, currents and sediment transport (where applicable to the EMF plume contaminated groundwater discharge).
 - Environmental Media Sampling, including:
 - Soil sampling;
 - Surface and subsurface sediment samples (where applicable to the EMF plume contaminated groundwater discharge);
 - Groundwater sampling.

Physical characterization of groundwater chemistry and hydrogeologic conditions including effects relative to the Duwamish Waterway have been and will be investigated as part of the Plant 2 January 1994 Resource Conservation Recovery Act (RCRA) Corrective Action Order (RCRA Order). This information will be used to evaluate potential data gaps relative to the EMF plume. Surface and subsurface sediment sampling and investigations along the shoreline relating to the EMF plume will be conducted as part of the Plant 2 RCRA Order process in order to fully characterize the

EMF plume relative to possible sources and risks of like contaminants originating from Plant 2.

Samples collected pursuant to the Plant 2 RCRA Order relating to the EMF Plume will be collected, analyzed and reported on in a manner equivalent to samples collected pursuant to this Settlement Agreement, and vice versa for samples collected on Plant 2 property pursuant to this Settlement Agreement.

The DGSWP will be submitted to EPA in draft format for review and revision or modification. Following satisfactory incorporation of EPA revision(s) or modification(s), the Final DGSWP, with the schedules for performance of related activities and submission of deliverables, shall be incorporated into this SOW by reference and shall be implemented in accordance with the approved schedule.

A) Sampling and Analysis Plan

Respondent shall submit to EPA a SAP for review and approval in accordance with the document submittal schedule set forth in Section III of this SOW. The purpose of the SAP is to provide the specifics of the data gap sampling program and to obtain the necessary information needed to fill the data gaps summarized in the DGSWP.

The SAP shall describe the sampling objectives, the rationale for the sampling approach (based in part on the data gaps identified during the summary of existing data) and plans for data use, and shall provide a detailed description of sampling tasks, consistent with EPA standard methods, ASTM International (originally known as the American Society for Testing and Materials or ASTM) methods, Puget Sound Estuary Program (PSEP), or other protocols, as applicable. The SAP shall describe specifications for sample identifiers; operation of major sampling equipment (e.g. drilling equipment); the type, number, and location of samples to be collected; the analyses to be performed; descriptions of sampling gear and methods to be used; documentation of samples; sample containers, collection and handling; and the sampling schedule.

The SAP shall describe the data quality objectives (DQOs), and identify and describe measures that will be taken during performance of all sampling and analysis tasks to ensure fulfillment of the DQOs. DQOs will reflect criteria or threshold values used for potential future remedial decisions.

B) Quality Assurance Project Plan

Respondent shall submit to EPA a QAPP for investigation sampling and analysis activities for review and approval by EPA in accordance with the document submittal schedule set forth in Section III of this SOW. DQOs will reflect the criteria or threshold values used for potential future remedial decisions. The QAPP shall be prepared in accordance with EPA Requirements for Quality Assurance Project Plans (QA/R-5), March 2001(Reissued May 2006),

EPA/240/B-01/003; and EPA Guidance for Preparation of Quality Assurance Project Plans, EPA/240/R-02/009, December 2002, QA/G-5 and in accordance with the requirements of the EPA Contract Laboratory Program (CLP – OLC03.2 or OLM04.3 or more recent statement of work for organic analysis) and shall contain the following elements:

- Title and Approval Sheet
- Table of Contents
- Distribution List
- Project/Task Organization
- Problem Definition/Background
- Project/Task Description
- Quality Objectives and Criteria for Measurement Data
- Special Training Needs/Certification
- Documents and Records
- Sampling Process Design (Experimental Design)
- Sampling Methods
- Sample Handling and Custody
- Analytical methods (including parameters, preparation and analysis methods, reporting limits, and volume of sample required for each matrix)
- Quality Control (including number/type of quality control samples, spikes and replicates required)
- Instrument/Equipment Testing, Inspection, and Maintenance
- Instrument/Equipment Calibration and Frequency
- Inspection/Acceptance of Supplies and Consumables
- Non-direct Measurements
- Data Management
- Assessments and Response Actions
- Reports to Management
- Data Review, Verification, and Validation
- Verification and Validation Methods
- Reconciliation with User Requirements

Where some of the QAPP information overlaps with the information required in the SAP, references to the appropriate section(s) of the SAP may be made in the QAPP.

C) Health and Safety Plan

Respondent shall submit to EPA a HASP for investigation sampling and analysis activities in accordance with the document submittal schedule set forth in Section III of this SOW. The HASP must be consistent with the requirements of CERCLA, the Occupational Safety and Health Administration (OSHA), and the Washington Safety and Health Administration (WSHA). The HASP shall identify specific monitoring and management responsibilities and activities to ensure the protection of human health and to promote safety for the activities

associated with investigation sampling. The HASP shall be modified as necessary for changes or revisions to the SAP and QAPP.

In accordance with the document submittal schedule set forth in Section III of this SOW, prior to preparation of the Engineering Evaluation and Cost Analysis, the Respondent shall submit to EPA an Investigation Data Summary Report including all data from investigations conducted during this task. The schedule for submittal of the Investigation Data Summary Report is dependent upon whether additional sampling is needed. The data shall also be submitted in electronic format such as Excel or similar spreadsheet software.

All data submitted to EPA must be of known and documented quality. Respondent will be responsible for ensuring and monitoring the quality of the data obtained from its contract laboratory.

EPA reserves the right to reject or qualify any data not generated/collected in accordance with the Settlement Agreement.

TASK 4 – ENGINEERING EVALUATION AND COST ANALYSIS

In accordance with the document submittal schedule set forth in Section III of this SOW, the Respondent shall submit to EPA an Engineering Evaluation and Cost Analysis (EE/CA) Report for EPA review.

At a minimum, the EE/CA must include the following information/topics. Information may be included by references to specific reports but shall include sufficient summary of salient points, and may include data derived pursuant to the Plant 2 RCRA Order that is applicable to the EMF EE/CA). Additional information/topics may also be added.

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- 3.3. Site geology and hydrogeology
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- 3.6. Nature and extent of contamination
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 - 3.7.1. Groundwater extraction/treatment
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- 3.8. Risk evaluation

4. Removal action goals and objectives
 - 4.1. Removal action schedule
 - 4.2. Applicable or relevant and appropriate requirements
 - 4.3. Interim cleanup level goals

5. Identification and analysis of removal action alternatives
 - 5.1. Development of removal action alternatives
 - 5.1.1. No action
 - 5.1.2. In-situ air sparging with soil vapor extraction
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 - 5.1.4. Enhanced reductive dechlorination
 - 5.1.5. Such other alternatives as may be necessary or desirable based on results of the investigation(s) under this Settlement Agreement
 - 5.2. Comparative analysis of alternatives
 - 5.2.1. Overall protection of human health and the environment
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 - 5.3. Recommended alternative

6. List of References, including the title, date and author of referenced documents

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The EE/CA will be submitted to EPA in draft format for review, comment, revision or modification, and approval. Following the satisfactory incorporation of EPA comments, the Final EE/CA shall be incorporated into this SOW by reference.

III. SCHEDULE OF DELIVERABLES AND NOTIFICATIONS

The schedule for notifications to EPA or submission of major deliverables to EPA under this Settlement Agreement is described below. Where a deliverable due date is triggered by EPA notification, comments, or approval, the starting date for the period shown is the date the Respondent received such notification, comments or approval, by certified mail, return receipt requested, unless otherwise noted below. Where a date is triggered by EPA's receipt of a deliverable, the starting date for the period shown is the date EPA receives the deliverable by certified mail, return receipt requested or the date of authorized EPA signature on a hand-deliver form.

Except for monthly email progress reports, documents become final upon approval by EPA.

Table 1		
Schedule for Submission of Major Deliverables and Activities		
	Deliverable	Due Date^a
1.	Initial Report	Two months after the Settlement Agreement ^b effective date.
2.	Draft Data Gap Sampling Work Plan	Three months after the Settlement Agreement ^b effective date.
3.	Investigation Activities	Initiate one month after the EPA approval of the Data Gap Sampling Work Plan.
4.	Monthly email Progress Reports	30 days after the Settlement Agreement ^b effective date.
5.	Investigation Data Summary Report	To be defined in the Data Gap Sampling Work Plan or in the event there is not a DGSWP submittal, due date will be negotiated/agreed upon with EPA.
6.	Engineering Evaluation and Cost Analysis	Two months after the EPA acceptance date of the Investigation Data Summary Report.

^a Due dates shown are for initial draft deliverables. Revised deliverables (including one redline version) are due 30 days from receipt of EPA comments or revisions/modifications. Documents become final upon approval by EPA.

^b Settlement Agreement (Administrative Settlement Agreement and Order on Consent) is effective upon signature by both EPA and Respondent.