

## **Statement of Work for Spring 2005 Activities**

BNSF Livingston Shop Complex  
Park County, Montana

FINAL  
August 9, 2005

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## **SECTION 1.0: INTRODUCTION**

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This Statement of Work (SOW) outlines remedial design and remedial action, supplemental investigation institutional controls, monitoring and maintenance and other activities required for implementation of portions of the selected remedy for cleanup of the Burlington Northern and Santa Fe Railway (BNSF) Livingston Shop Complex Facility located in and near Livingston, Montana. The purpose of this SOW is to set forth requirements and describe necessary activities for initiation of portions of the selected remedy, as defined in the Record of Decision (ROD) issued by the Montana Department of Environmental Quality (DEQ) on September 7, 2001 (Attachment 1) to be initiated in Spring 2005. This Spring 2005 SOW provides the mechanism for initiating high priority portions of the selected remedy. The Spring 2005 SOW is anticipated to be later incorporated into the Livingston SOW, which will be an attachment to the expected Second Partial Consent Decree. The Livingston SOW shall provide the mechanism for continued implementation of the selected remedy at the Facility. BNSF shall carry out all work in compliance with the consent decree and this Spring 2005 SOW. Nothing in this SOW should be construed to conflict with the ROD.

### **1.1 FACILITY DESCRIPTION**

The BN Livingston Shop Complex Facility (the Facility) includes the Livingston Railyard (LRY) and the surrounding area where Hazardous or Deleterious Substances have been deposited, stored, disposed of, placed or otherwise come to be located. The Facility is located in Park County, Montana with the majority of it within the city of Livingston. Livingston is approximately 26 miles east of Bozeman, Montana and 100 miles west of Billings, Montana (see Figure 1-1). Contaminants of concern (COCs) at the Facility are identified in the ROD and additional COCs may be identified through future risk assessment work. Additional information on Facility background is included in Attachment 1.

### **1.2 REQUIREMENTS**

The Spring 2005 portions of the selected remedy shall be implemented by completing a number of tasks that address specific remedy components. Each task includes a number of subtasks and deliverables to ensure appropriate implementation and documentation of the selected remedy. Action-specific requirements for tasks/subtasks are included in the description of each task in Section 3. The general requirements for subtasks are described in Section 5.1.

### **1.3 REMEDY TASKS**

The selected remedy in the ROD (Attachment 1) includes 13 components under ROD Section X.C as follows:

- Volatile Organic Compound (VOC)-Containing Sludge
- VOC-Containing Soil
- Polycyclic Aromatic Hydrocarbon (PAH)-Containing Surface Soil
- Petroleum-Containing Sub-surface Soils
- Petroleum-Containing Surface Soils
- Lead-Containing Soil
- Asbestos-Containing Soil and Debris
- VOC-Containing Residue
- VOC-Containing Groundwater
- Lead-Containing Groundwater
- Petroleum-Containing Groundwater – Free Product
- Petroleum-Containing Groundwater – Dissolved Phase Petroleum
- Basement Gas

Along with the components listed above, the selected remedy also includes the following requirements:

- ROD Section X.D. Expanded Sampling and Confirmation Sampling
- ROD Section X.E. Monitoring and Maintenance
  - Worker Safety
  - Groundwater Monitoring
  - Free Product Monitoring
  - Cap Maintenance
- ROD Section X.F. Institutional Controls
  - Controlled Groundwater Area
  - Restrictive Covenants
- ROD Section X.G. Cleanup Levels (includes cleanup levels and screening levels)

A total of 6 tasks were developed for this SOW. Together, these tasks shall allow Spring 2005 initiation of portions of the ROD selected remedy outlined below. To aid in implementation of the remedy and to facilitate project management/tracking, the tasks are organized by the type of activity to be conducted. The categories of activities for tasks in this SOW are as follows:

- Remedial Design (RD)/Remedial Action (RA) Activities
- Supplemental Investigation (SI) Activities

The RD/RA activities address areas where COC-affected media are known to contain COCs at levels that do not meet cleanup levels, while the SI activities address areas where COCs potentially exist at levels that do not meet cleanup levels specified in the ROD (Attachment 1). The requirements for each SOW task are described in Section 3.0. BNSF is responsible for implementing all tasks described in Section 3, with the exception of those tasks/subtasks explicitly assigned to DEQ.

## 1.4 SCHEDULE

The project schedule to implement the SOW tasks is provided in Section 4. BNSF shall develop a master schedule, and shall prepare work plans for DEQ review and approval that set forth schedules for the implementation of the remedy.

## 1.5 DEVIATIONS

Modifications to the approved work plans or schedules may only be made with DEQ approval. Significant modifications to the approved work plans may only be made with DEQ's written authorization. Minor deviations from work plans necessitated by differing field conditions than anticipated, or reasonable professional judgments may be made without DEQ approval but must be documented in reports of field activities. Minor deviations are limited to the following:

- Moving a soil boring, well boring or test pit location a short distance from an approved location due to drill rig refusal, presence of above-grade or subsurface features (e.g. underground or overhead utilities, structures, etc.) or other obstructions which limit the positioning of the drill rig (or excavating equipment) and/or advancement of a boring or test pit at the approved location.
- Moving a surface sample location if it falls on concrete/asphalt or other surface unsuitable for sampling.
- Inability to collect a soil sample from a specified depth interval due to sample recovery (a sample from another depth close to the target depth will be collected, if possible).
- Inability to collect a sample due to inaccessibility of the medium to be sampled.
- Varying well depths and construction details based on field conditions.
- Using other acceptable equipment (submersible/peristaltic pump or bailer) to collect groundwater samples if dedicated sampling equipment is not operable (as long as the standard operating procedures have been previously provided in a sampling and analysis plan (SAP)).
- Using substantially equivalent field equipment.
- Ability to collect additional samples for chemical analysis and/or physical testing, and to perform such additional testing/analyses on the samples.

Minor inadvertent changes or omissions will be treated as minor deviations with the understanding that if the change or omission reasonably affects the scope or objectives of the work being performed, then the change or omission will be rectified by BNSF. BNSF must have DEQ's written authorization before significantly deviating from any approved task work plans or other Facility-related activities. Any such changes must be submitted in writing to DEQ for approval, and must be approved in writing by the DEQ Project Officer prior to implementation. In the case of changes proposed during field activities, changes may be requested verbally to the DEQ Project Officer but must be approved in writing by the DEQ Project

Officer prior to implementation. Where possible, DEQ's written approval shall be transmitted via e-mail or facsimile to expedite completion of field activities.

#### **1.6 DEPARTMENT OF ENVIRONMENTAL QUALITY CONTACT**

The DEQ Project Officer for the Livingston Shop Complex is Amy Sivers, (406) 841-5068, email: asivers@mt.gov. DEQ shall promptly notify BNSF of a change in DEQ's project officer. BNSF shall notify the DEQ Project Officer at least ten (10) working days prior to BNSF mobilization to the Facility before the start of work. Amy Sivers is also the DEQ contact for the Mission Wye Facility in Livingston, Montana.

## SECTION 2.0: REQUIREMENTS

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This section describes the general requirements for the SOW tasks. BNSF shall perform all activities identified in this SOW, except for review and approval of the work performed and deliverables, unless otherwise indicated. DEQ, or its designated representative, shall provide review of deliverables, and DEQ shall provide approval of deliverables, submitted under this SOW. DEQ, or its designated representative, may oversee BNSF field activities conducted under this SOW. Acceptance of plans and specifications by DEQ does not relieve BNSF of responsibility for the adequacy of the design. Each report produced for the remedial design shall include specifications for any short- or long-term operation and maintenance activities.

### 2.1 GENERAL REQUIREMENTS AND GUIDANCE

BNSF shall conduct all of the tasks in compliance with the Consent Decree and this SOW. All actions undertaken by BNSF shall comply with the BN Livingston Shop Complex ROD, including the environmental requirements, criteria and limitations (ERCLs)(Appendix A of Attachment 1) and all independently applicable requirements. The work to be performed shall also follow the relevant portions of relevant guidance documents that include, but may not be limited to, the following:

- Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Guidance, (USEPA Region IX, March 1997)
- Guidance for the Data Quality Objectives Process (EPA QA/G-4; EPA/600/R-96/055, August 2000)
- Environmental Protection Agency, Contract Laboratory Program - National Functional Guidelines for Inorganic Data Review (Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response – OSWER 9240.1-35, EPA 540-R-01-008, July 2002)
- Environmental Protection Agency, Contract Laboratory Program - National Functional Guidelines for Organic Data Review (Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response – EPA 540/R-99/008, October 1999)
- Guidance for Scoping the Remedial Design (Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response – EPA 540/R-95/025; OSWER-9355.0-43, March 1995)
- Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response EPA 540/G-89-004, October 1998)
- Guide to Management of Investigation-Derived Wastes (Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response - OSWER-9345.3-03FS, January 1992)
- Revised Policy on Performance of Risk Assessment During Remedial Investigation/Feasibility Studies (RI/FS) Conducted by Potential Responsible Parties (Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response - EPA 540-F-99-025; OSWER-9340.1-02, January 1996)

- Risk Assessment Guidance for Superfund (RAGS) Volume 1 – Parts A through D (Environmental Protection Agency, Washington, DC. – EPA/540/1-89/002, December 1989; EPA 540/R-92/003, December 1991; Publication 9285.7-01C, October 1991; and, Publication 9285.7-47; December 2001)
- Risk Assessment Guidance for Superfund (RAGS) Volume 1 – Part E (Environmental Protection Agency, Washington, DC. – EPA/540/R/99/005, July 2004)
- Human Health Toxicity Values in Superfund Risk Assessments (Environmental Protection Agency, Washington, DC. – OSWER 9825.7-53, December 2003)
- Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (Environmental Protection Agency, Washington, D.C. - OSWER 9825.6-10, December 2002)
- Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (Environmental Protection Agency, Washington, DC. – EPA 540/R/97/006, OSWER 9285.7-25; June 1997)
- Exposure Factors Handbook Volume 1 (Environmental Protection Agency, Washington, DC, Volume I - General Factors – EPA 600/P-95/002Ba; Volume II - Food Ingestion Factors – EPA 600-P-95/002Bb; Volume III - Activity Factors – EPA 600/P-95-002Bc; August 1996)
- Montana Tier I Risk-Based Corrective Action Guidance for Petroleum Releases (Montana Department of Environmental Quality, October 2003)
- Feasibility Study Analysis for CERCLA Sites with Volatile Organic Compounds in Soil (Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response – EPA 540/R-94/080; OSWER-9356.0-01, August 1994)
- Guidance for Conducting Treatability Studies under CERCLA (Environmental Protection Agency, Washington, DC., Office of Emergency and Remedial Response - EPA 540/R-92/071A, October 1992.)
- Feasibility Study: Development and Screening of Remedial Action Alternatives (Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response – EPA 9355.3-01/FS-3, November 1989)
- Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater (Environmental Protection Agency, Washington, DC. – EPA 600/R-98/128, September 1998)
- Performance Monitoring of MNA Remedied for VOCs in Groundwater (Environmental Protection Agency, Washington, DC., EPA 600/R-04/027, April 2004)
- Draft Guidance for Evaluating the Vapor Intrusion into Indoor Air Pathway from Groundwater and Soils (Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response – EPA 530-F-02-052, November 2002)
- Indoor Air Sampling and Evaluation Guide (Massachusetts Department of Environmental Protection, WSC Policy #02-430, April 2002)
- EPA Requirements for Quality Assurance Project Plans (Environmental Protection Agency, Washington, DC., EPA QA/R-5; EPA 240/B-01/003, March 2001)
- Principles and Practices of Bioventing, Volumes I and II, (Environmental Protection Agency, Washington, DC. – EPA 540/R-95/534a, September, 1996)
- Comprehensive Environmental Response, Compensation, and Liability Act, 42 USC 9601, et seq.
- DEQ Purge Water Policy
- National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan) (Environmental Protection Agency, 40 CFR 300)

- Health and Safety Plan and contingency plan requirements outlined in 29 Code of Federal Regulations 1910.120
- Characterizing Risks Posed by Petroleum Contaminated Sites: Implementation of the MADEP VPH/EPH Approach and Support Documentation (Massachusetts Department of Environmental Protection, October, 2002) (NOTE toxicity values in this document are out of date)
- Final Updated Petroleum Hydrocarbon Fraction Toxicity Values for the VPH/EPH/APH Methodology (Massachusetts Department of Environmental Protection, November 2003 – released August 10, 2004).
- Total Petroleum Hydrocarbons Criteria Working Group Series, Volumes 1 through 5 (Total Petroleum Hydrocarbons Criteria Working Group, 1997-1999) (NOTE not to be used for toxicity information)
- Guidance on Conducting Non-Time Critical Removal Actions Under CERCLA (Environmental Protection Agency, Washington, DC., Office of Emergency and Remedial Response – EPA/540-R-93-057, August 1993)
- Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites, (Environmental Protection Agency, Washington, DC., Office of Solid Waste and Emergency Response – OSWER Directive 9285.6-10, December 2002)

The list of appropriate guidance documents may be updated as deemed appropriate by DEQ.

## 2.2 REMEDY SUBTASK REQUIREMENTS

Nineteen standard subtasks (Table 2-1) were developed for the SOW tasks to implement the ROD selected remedy. The subtasks are intended to provide BNSF and DEQ with a consistent method of tracking task progression and responsibilities. The specific subtasks that pertain to the Spring 2005 activities are detailed in Section 3. The requirements for each of the Spring 2005 activities subtasks are described in Section 5.1.

**Table 2-1. SOW Subtasks**

Subtask Number	Description of Subtask
Subtask 1	Community Relations
Subtask 2	Health and Safety Plan
Subtask 3	Supplemental Investigation Work Plan [including sampling and analysis plan and quality assurance project plan (SAP/QAPP)]
Subtask 4	Implement Supplemental Investigation Work Plan
Subtask 5	Supplemental Investigation Report
Subtask 6	Risk Assessment Work
Subtask 7	Risk Assessment Documentation (including public comment period)
Subtask 8	Feasibility Study Work Plan or Engineering Evaluation/Cost

	Analysis (EE/CA) Work Plan (will not be used in Spring 2005 work)
Subtask 9	Implement Feasibility Study Work Plan or EE/CA Work Plan (will not be used in Spring 2005 work)
Subtask 10	Feasibility Study Report (including public comment period) or EE/CA Report (including public comment period) (will not be used in Spring 2005 work)
Subtask 11	Removal Work Plan (will not be used in Spring 2005 work)
Subtask 12	Implement Removal Work Plan (will not be used in Spring 2005 work)
Subtask 13	Remedial Design/Remedial Action Plan (including SAP/QAPP)
Subtask 14	Implement Remedial Design/Remedial Action Plan
Subtask 15	Institutional Controls
Subtask 16	Remedial Action Report
Subtask 17	Post-Remedial Action Monitoring & Maintenance
Subtask 18	Monitoring and Maintenance Report
Subtask 19	Communications

Remedy subtask requirements are detailed in Section 5 of this SOW.

## **SECTION 3.0: TASKS**

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The tasks described in this section provide a framework to implement the various components of the selected remedy outlined in the ROD (Attachment 1) to be initiated in Spring 2005. Some ROD selected remedy components with similar work elements/objectives are grouped together within a task to facilitate implementation. The portion of the ROD selected remedy that is addressed by the SOW task is listed at the beginning of each task description, along with a list of the applicable subtasks discussed in Section 5, and a list of task deliverables to DEQ. These lists are then followed by a summary of COC-affected media and the selected remedy, and by further description of task-specific subtask requirements.

Whether COCs may be additionally mobilized to groundwater when groundwater elevations increase above current drought levels is currently unknown.

### **3.1 REMEDIAL DESIGN/REMEDIAL ACTION ACTIVITIES**

The tasks grouped within this category represent portions of the selected remedy at the remedial design stage. The deliverables for this group of activities shall therefore consist of RD/RA plans, health and safety plans, preliminary analytical data and summary tables (for all samples collected on property outside of the railyard, and all samples collected from potable supply wells), interim reports (for some tasks), RA reports and post-RA monitoring and maintenance reports, and, as necessary, addenda to work plans and reports. In all deliverables under the Spring 2005 SOW, analytical data shall be compared to ROD cleanup levels for the Facility (see Attachment 1).

In addition to the listed subtasks for each SOW task, certain other subtasks may become necessary for completion of the SOW task based on the previous subtask. These triggers are usually noted in the individual tasks. For example, if a Remedial Action Report requires further monitoring, subtasks 17 (Post-Remedial Action Monitoring and Maintenance) and 18 (Monitoring and Maintenance Report) shall be implemented. However, the SOW does not repeat the listing of a subtask that can be triggered if the subtask has already been listed in the task. For example, if feasibility study or EE/CA activities were required, remedial action activities would follow. The remedial action activities are not listed again if previously identified for the task.

#### **3.1.3 Task C: Cinder Pile Capping**

This task addresses the portion of the ROD selected remedy that requires recontouring, capping, fencing, and restrictive covenants at the cinder pile. Draft cinder pile capping RA plans have been submitted to DEQ for review, and DEQ has provided comments to the successive versions of the draft work plan. Any asbestos-containing materials in soil or debris encountered during other work at the railyard originating

outside of the cinder pile is anticipated to be addressed in the Livingston SOW. No additional sampling to specifically screen other areas of the railyard for asbestos is required under this Spring 2005 SOW.

#### ***Portions of ROD Selected Remedy Addressed***

- Section X.C. Asbestos-Containing Soil and Debris

#### ***Subtasks***

- Subtask 1: Community Relations
- Subtask 2: Health and Safety Plan
- Subtask 13: Remedial Action Plan
- Subtask 14: Implement Remedial Action Plan
- Subtask 15: Institutional Controls
- Subtask 16: Remedial Action Report
- Subtask 17: Post-Remedial Action Monitoring and Maintenance
- Subtask 18: Monitoring and Maintenance Report
- Subtask 19: Communications

#### ***Deliverables***

- RA plan (Cinder Pile)
- Health and Safety Plan (Cinder Pile)
- Quarterly Status Reports
- RA Report (Cinder Pile)
- Post-Remedial Action Monitoring and Maintenance Reports

#### **3.1.3.1 COC-Affected Media and Remedy Summary**

All activities shall be carried out in compliance with the consent decree and this Spring 2005 SOW. This task will be addressed through the approved work plan. Ongoing monitoring and maintenance requirements for the cinder pile, and investigation and remediation of any asbestos-containing materials in soil or debris encountered during other work at the railyard originating outside of the cinder pile, is anticipated to be addressed in the Livingston SOW.

#### **3.1.6 Task F: Alluvial Aquifer Groundwater VOC Cleanup**

This task addresses the portion of the selected remedy for groundwater in the alluvial aquifer containing VOCs, and shall be conducted in stages. Stage I RD/RA activities shall further delineate VOC distributions and evaluate potential stratification of chlorinated VOC concentrations in groundwater in the alluvial aquifer, shall establish a groundwater monitoring network, and shall pilot test enhanced anaerobic bioremediation (or an alternative technology) to evaluate its efficacy in promoting the attainment of cleanup levels. Stage II RD/RA activities shall be addressed in the Livingston SOW, and shall provide the long-term remedy for cleanup of VOCs in the alluvial aquifer. The potential presence of VOCs in the groundwater in the bedrock aquifer(s) is addressed by Task L of this SOW.

**Portions of ROD Selected Remedy Addressed**

- Section X.C. VOC Containing Groundwater
- Section X.D. Expanded Sampling and Confirmation Sampling

**Subtasks – Stage I**

- Subtask 1: Community Relations
- Subtask 2: Health and Safety Plan
- Subtask 13: Remedial Design/Remedial Action Plan
- Subtask 14: Implement Remedial Action Plan
- Subtask 16: Remedial Action Report
- Subtask 18: Monitoring and Maintenance Report
- Subtask 19: Communications

**Deliverables**

- Quarterly Status Reports
- Health and Safety Plan
- Stage I RA plan – Part 1
- Stage I RA Plan – Part 2
- Preliminary Data - Private Well Monitoring
- Stage I RA Report – Part 1
- Monitoring and Maintenance Reports
- Letter proposal to evaluate rate of remediation (including proposed Natural Attenuation and Degradation Model(s)/Analytical technique(s))
- Stage I RA Report – Part 2

**3.1.6.1 COC-Affected Media and Remedy Summary**

Groundwater in the alluvial aquifer at the Facility contains VOCs and dissolved-phase petroleum that exceed cleanup levels. This task shall address VOC-containing groundwater in the alluvial aquifer; potential presence of VOCs in the groundwater in the bedrock aquifer(s) shall be addressed by Task L, and dissolved-phase petroleum-containing groundwater in the alluvial aquifer shall be addressed in Task G. Known sources of VOCs in groundwater included areas of known VOC-containing soil associated with sludge disposal, wastewater treatment/transfer systems and the electric shop vapor degreaser pit. The selected remedy for VOCs in groundwater in the alluvial aquifer is removal of source to groundwater followed by monitored natural attenuation (MNA); this task focuses on natural attenuation, coupled with pilot testing of a method to enhance natural bioremediation, or an alternative technology. The natural attenuation processes for VOCs in groundwater at the Facility include dilution, dispersion, adsorption and reductive dechlorination. Some source removal was conducted in previous interim actions.

Based on the most recent groundwater monitoring data (submitted as preliminary analytical data for sampling conducted in June 2004, and mapped in Figure 3-1), DEQ requires additional groundwater quality data to further delineate the area of groundwater containing VOCs at concentrations at or greater than the WQB-7 required reporting limit upgradient of the vapor degreaser pit source, and within the

downgradient western, eastern and northern portions of the apparent area in which groundwater contains VOC concentrations at or exceeding the WQB-7 required reporting limit. DEQ also requires that BNSF extend its monitoring network beyond the northeastern boundary of the map to delineate the downgradient extent of the area in which groundwater contains VOC concentrations at or exceeding the WQB-7 required reporting limit. There currently exists little data regarding stratification of PCE within the alluvial aquifer, particularly downgradient of the VOC source area(s).

This task has a two-staged approach. Stage I investigation activities shall include evaluation of the current monitoring well network, installation of additional wells as necessary to fill spatial gaps in the monitoring well network, monitoring of existing nested well clusters and installation of additional nested well clusters or multi-level sampling systems to evaluate the possible presence of significant vertical stratification of chlorinated VOC concentrations in groundwater, and updating of the well inventory. Stage I shall also include pilot testing of enhanced anaerobic bioremediation (or an alternative technology) to evaluate its efficacy in promoting the attainment of cleanup levels. Enhanced anaerobic biodegradation would work in concert with the selected remedy of monitored natural attenuation, by increasing reductive dechlorination (a natural process that is a component of natural attenuation of VOCs in the Livingston alluvial aquifer) in the source area(s) of VOCs in groundwater, while other natural attenuation processes (adsorption, dilution and dispersion) continued to operate throughout the area of groundwater containing VOCs.

Stage I – Part 1 shall consist of a quarterly (or more frequent if approved or required by DEQ) groundwater monitoring program to measure and confirm declining VOC concentrations, and Stage I – Part 2 shall consist of the performance of a pilot test to evaluate an *in situ* VOC remediation technology. The ROD selected remedy requires that three years of quarterly monitoring data be evaluated to evaluate whether cleanup levels will be met in a 20-year period. BNSF shall collect a minimum of one year of quarterly monitoring data, prior to conducting an evaluation of cleanup rates and projected cleanup timeframes.

Stage II of this Task shall be addressed under the Livingston SOW.

Whether COCs may be additionally mobilized to groundwater when groundwater elevations increase above current drought levels is currently unknown.

### **3.1.6.2 Subtasks**

#### ***Stage I***

All activities shall be carried out in compliance with the consent decree and this Spring 2005 SOW. BNSF shall create an initial isopleth map similar to Figure 3-1 and shall use the map to aid in identification of

baseline information data gaps, if any. BNSF may add a caveat outlining any concerns regarding appropriateness of isopleth mapping. BNSF may elect not to prepare and submit COC concentration isopleth maps that show the approximate dimensions of the area in which groundwater contains COCs at concentrations at or greater than the WQB-7 required reporting limit. In this instance, DEQ may elect to prepare this COC concentration isopleth map and BNSF shall include the map in the deliverables, subject to BNSF's ability to attribute the map to the State and provide a disclaimer, as provided in Section 5.0. BNSF shall prepare a two-part Stage I RA plan. Part 1 will propose a monitoring well network for future tasks, including installation and sampling of up to 15 new monitoring well locations as necessary (Note to BNSF – agreeing to limitation for Spring 2005 only), and Part 2 will describe a pilot test for enhanced anaerobic bioremediation (or an alternative technology). The VOC monitoring well network proposed in the Stage I - Part 1 RA Plan shall include two to four new cluster well locations to evaluate the potential for stratification of VOC concentration that might affect the implementation of the selected remedy or the characterization of the lateral extent of effected groundwater. BNSF shall update the well inventory to identify all registered domestic, commercial, industrial, irrigation, and monitoring wells (and shall also attempt to identify all unregistered domestic, commercial, industrial, irrigation, and monitoring wells) within ½-mile distance from the boundary of the groundwater area containing VOCs at concentrations at or exceeding the WQB-7 required reporting limit (this activity is also required by SOW Tasks G and L), and shall submit this inventory with the Part 1 of the Stage I RA plan. This information shall be used to refine monitoring requirements specific to VOCs. All known domestic and commercial wells located within the boundary of the area in which VOC concentrations are believed to exceed cleanup levels, and a monitoring zone established around that area based on site-specific and COC-specific characteristics, shall be sampled by BNSF for VOCs at least annually unless data demonstrate that a lesser frequency is protective of public health, safety, and welfare. The Stage I - Part 1 RA plan shall include collecting and analyzing samples on a routine basis, and reporting. The ROD selected remedy requires that groundwater monitoring include natural attenuation parameters. VOCs, depth to groundwater (if accessible), pH, temperature, and specific conductance are the natural attenuation and other parameters that DEQ requires BNSF to monitor. BNSF may also choose to include other MNA parameters in the Stage I – Part 1 RA plan (e.g. dissolved oxygen, nitrate, ammonia, ferrous iron, sulfate, alkalinity, redox potential and chloride) for use in subsequent pilot test system design or natural attenuation modeling or other analytical techniques.

Following DEQ approval of the Part 1 of the Stage 1 RA plan, BNSF shall implement the plan, and evaluate success of plan implementation (i.e., were all wells installed as per the plan, did sampling results indicate that the installed wells fill necessary data gaps). If DEQ determines that further well installation or other work is necessary to effectively establish a monitoring well network, DEQ may require the installation of up to 15 (Note to BNSF – agreeing to limitation for Spring 2005 only) new monitoring wells and BNSF shall address that work through Stage I RA plan addenda submitted for approval to DEQ. If COC concentration stratification is observed in the alluvial aquifer, (i.e., the area of groundwater

containing COC concentrations at or greater than the WQB-7 required reporting limit is potentially much larger than the area characterized by available monitoring data due to the previously undetected effects of stratification), DEQ may require that up to 15 additional clustered monitoring wells be placed along the boundary of groundwater containing VOCs to evaluate whether such stratification has a significant effect on the characterization of the extent of affected groundwater (i.e., the area of groundwater containing COC concentrations at or greater than the WQB-7 required reporting limit is clearly much larger than the area characterized by available monitoring data due to the previously undetected effects of stratification). If it is determined that stratification has a significant effect on the prior understanding on the lateral extent of groundwater containing VOCs (i.e., the area is clearly much larger than the area characterized by available monitoring data due to the previously undetected effects of stratification), then DEQ may require additional monitoring wells to characterize the extent of VOCs in alluvial aquifer groundwater.

BNSF shall then prepare a Stage I – Part 1 RA report that describes Stage I – Part 1 activities. The Stage I – Part 1 RA report shall describe the installation of new monitoring wells, provide results of groundwater sampling, describe the results of the investigation of potential stratification of VOCs in alluvial aquifer groundwater, and include an updated private well inventory.

The Stage I – Part 2 RA Plan (pilot test work plan) for enhanced anaerobic bioremediation (or an alternative technology) will contain a groundwater monitoring plan to provide data with which to evaluate the performance of the remedial technology in terms of the 20-year ROD-specified cleanup. The Stage I – Part 2 RA plan shall include collecting and analyzing samples on a routine basis, and reporting. The ROD selected remedy requires that groundwater monitoring include natural attenuation parameters. VOCs, depth to groundwater (if accessible), pH, temperature, and specific conductance are the natural attenuation and other parameters that DEQ requires BNSF to monitor. BNSF may also include other MNA parameters (e.g. dissolved oxygen, nitrate, ammonia, ferrous iron, sulfate, alkalinity, redox potential and chloride) for use in evaluation of the pilot test technology(ies) and in subsequent natural attenuation modeling or other analytical techniques. Additional monitoring parameters, such as dissolved metals that might be mobilized by the proposed pilot test technology, shall be incorporated into the Stage I – Part 2 RA Plan at the direction of DEQ, depending on the pilot test technology(ies) proposed by BNSF.

BNSF has requested the pilot testing specified in this task. BNSF shall prepare Part 2 of the Stage 1 RA plan to describe the pilot test to be performed using enhanced anaerobic bioremediation (or an alternative technology). Part 2 of the Stage I RA plan will be submitted separately from, and after, submittal of Part 1; however, Parts 1 and 2 of Stage I may overlap such that pilot testing begins before submittal of the Stage I - Part 1 RA report. BNSF shall conduct the pilot test activities in compliance with the approved pilot test work plan (i.e., Part 2 of the Stage 1 RA plan), and shall prepare annual monitoring reports, as appropriate. The pilot test work plan will specify monitoring to evaluate the efficacy of the technology piloted. The annual interim reports (each of which may include Part 1 and 2 RA plan implementation

results under a single cover) shall include a summary table of current and historical analytical VOC data compared to cleanup levels; graphs showing the trends for VOC concentrations over time for each well for which sufficient data are available; groundwater potentiometric maps indicating groundwater flow direction during each sampling event; updated isopleths of VOCs in groundwater at concentrations at or greater than the WQB-7 required reporting limit for the sampling events that occurred during highest and lowest water levels of that year, (including isopleths for multiple depths in the alluvial aquifer if significant contaminant stratification is observed in Part 1 of Stage I); an updated private well inventory; and, a proposed monitoring plan for the coming year. DEQ shall evaluate each year's proposed monitoring plan based on the previous year's data including COC distribution and changes in dimensions of the area of groundwater containing VOC concentrations at or exceeding the WQB-7 required reporting limit (and any new information that becomes available) and shall determine if any changes to monitoring locations, parameters or frequency are necessary. All known domestic and commercial wells located within the boundary of the area in which VOC concentrations are believed to exceed cleanup levels, and a monitoring zone established around that area based on site-specific and COC-specific characteristics, shall be sampled by BNSF for VOCs at least annually unless data demonstrate that a lesser frequency is protective of public health, safety, and welfare. The annual monitoring reports shall be integrated into the annual monitoring and maintenance report required by Subtask 18 of this SOW.

After a minimum of one year's quarterly groundwater monitoring using the monitoring well network established in Stage I – Part 1 of this Task and the receipt of sufficient pilot testing data to permit evaluation of the piloted technology, BNSF shall submit a letter proposal to DEQ for use of a model(s) or other analytical technique(s) that considers site-specific information and data to evaluate the rate of remediation for VOCs at the Facility. The use of multiple models or analytical techniques may be necessary, as the specific attenuation processes operating in the source area and in downgradient areas will likely be different. BNSF and DEQ shall have a scoping meeting to discuss the models/techniques to be used, input parameters, and assumptions to be made. If use of the models/techniques is approved by DEQ, BNSF shall then perform the analysis using the approved models/techniques. When completed, BNSF shall prepare a Stage I – Part 2 RA report(s) that summarizes the activities conducted, data collected, the modeling/analysis performed including calibration results, sensitivity analyses, and the uncertainty with model predictions. DEQ shall review the report and may provide additional evaluations. The Stage I – Part 2 RA report shall also provide an updated private well inventory. DEQ shall determine whether remediation of VOCs is occurring or will occur at an acceptable rate using data provided in the Stage I Parts 1 and 2 RA Reports and using EPA guidance including that listed in Section 2.1 of the SOW. In the time period between the start of data evaluation activities and the issuance of a DEQ decision as to effectiveness of remediation, BNSF shall continue groundwater monitoring at the Facility as per the Stage I – Part 1 work plan unless a different monitoring frequency is approved by DEQ.

### 3.1.7 Task G: Groundwater Dissolved-Phase Petroleum Cleanup

This task addresses the portion of the selected remedy for groundwater containing dissolved petroleum, and shall be conducted in Stages. Stage I RD/RA activities shall provide further delineation of dissolved-phase petroleum in groundwater and shall establish a groundwater monitoring network for further stages unless data acquired during preparation of the Stage I RA Plan demonstrate that dissolved petroleum concentrations in groundwater do not exceed screening levels, in which case BNSF may propose a Stage I RA Plan that consists of confirmation sampling to demonstrate that no further action is needed. Stages II and III shall provide the long-term remedy for meeting ROD groundwater cleanup levels for dissolved-phase petroleum in groundwater within a 20-year period, and shall be addressed in the Livingston SOW. VOC-containing groundwater is addressed under Task F of this Spring 2005 SOW.

#### ***Portions of ROD Selected Remedy Addressed***

- Section X.C Petroleum-Containing Groundwater, Dissolved Phase Petroleum
- Section X.D. Expanded Sampling and Confirmation Sampling

#### ***Subtasks – Stage I***

- Subtask 1: Community Relations
- Subtask 2: Health and Safety Plan
- Subtask 13: Remedial Design/Remedial Action Plan
- Subtask 14: Implement Remedial Action Plan
- Subtask 16: Remedial Action Report
- Subtask 19: Communications

#### ***Deliverables***

- Quarterly Status Reports
- Health and Safety Plan
- Stage I RA plan
- Preliminary Data - Private Well Monitoring
- Stage I RA Report

#### **3.1.7.1 COC-Affected Media and Remedy Summary**

The primary sources of dissolved-phase petroleum in groundwater are petroleum-containing soils, including free product, associated with the depot and freight train refueling areas. The selected remedy for dissolved-phase petroleum constituents in groundwater is free product and subsurface soil remediation (that will be addressed in Tasks D and E of the Livingston SOW) followed by monitored natural attenuation. This task focuses on monitored natural attenuation. The ROD specifies that the monitoring period for natural attenuation of dissolved-phase petroleum shall commence once free product has met cleanup levels. If Facility characterization work demonstrates that free product has met cleanup levels at the Depot refueling area, BNSF shall initiate natural attenuation monitoring for dissolved-phase petroleum in groundwater in that particular portion of the Facility. . If data demonstrate that dissolved petroleum concentrations in groundwater do not exceed screening levels in the Depot area, BNSF may

propose a confirmation sampling plan to demonstrate that no further action is needed for dissolved petroleum in this area.

Potential petroleum-containing groundwater at the former C & P Packing property shall be investigated separately under the Livingston SOW, and groundwater containing dissolved-phase petroleum in that portion of the Facility may later be addressed through this Task as determined appropriate by DEQ.

If data demonstrate that dissolved petroleum concentrations in groundwater do not exceed screening levels in the freight train refueling area where free product is still present, BNSF may propose a confirmation sampling plan to demonstrate that no further action is needed for dissolved petroleum in this area.

This task has a three-staged approach. Based on recent groundwater monitoring data (submitted as preliminary analytical data for sampling conducted in June 2004 and March 2005), additional data are being required to further delineate the area of dissolved-phase petroleum in groundwater in the vicinity of the center of the railyard, where VOC and dissolved-phase petroleum appear intermingled. Stage I investigation activities shall include evaluation of the current monitoring well network, sampling existing wells for dissolved petroleum to evaluate the dissolved petroleum concentration present in groundwater, and installation of up to 15 additional wells as necessary to fill spatial gaps in the monitoring well network (this limitation applies to Spring 2005 work only). The ROD selected remedy requires that remediation of dissolved-phase petroleum occur only in areas in which free product has met cleanup levels. Thus, the Depot area is able to enter Stage I at the present time; however, areas of the Facility currently known to exhibit the presence of free product on top of the water table shall need to complete Task D before entering Stage I of this Task unless data demonstrate that dissolved petroleum concentrations in groundwater do not exceed screening levels. Stage I shall also include collection of baseline data regarding manganese and iron concentrations in the area of dissolved-phase petroleum in groundwater. Iron and manganese are by-products of the diesel weathering process, and can impact beneficial use of groundwater.

If data acquired during preparation of the Stage I RA Plan demonstrate that dissolved petroleum concentrations in groundwater do not exceed screening levels, BNSF may propose a Stage I RA Plan that consists of confirmation sampling to demonstrate that no further action is needed. If monitoring for natural attenuation is initiated under Stage I and Stage I sampling results show that screening levels for dissolved-phase petroleum are not exceeded in either the depot area, the freight-train refueling area, or both, BNSF may request to commence monitoring to confirm that dissolved-phase petroleum concentrations at the Facility meet cleanup levels.

Stages II and III of this Task shall be addressed in the Livingston SOW.

Whether petroleum may be additionally mobilized from soils to groundwater when groundwater elevations increase above current drought levels is currently unknown.

### 3.1.7.2 Subtasks

#### *Stage I*

All activities shall be carried out in compliance with the consent decree and this Spring 2005 SOW. BNSF shall create an initial isopleth map similar to Figure 3-1 using available concentrations of dissolved-phase petroleum and shall use the map to aid in identification of baseline information data gaps. BNSF can add a caveat outlining any concerns regarding appropriateness of isopleth mapping. BNSF may elect not to prepare and submit COC concentration isopleth maps that show the approximate dimensions of the area in which groundwater contains COCs at concentrations at or greater than the standard reporting limits for dissolved-phase petroleum for the analytical method used. In this instance, DEQ may elect to prepare this COC concentration isopleth map and BNSF shall include the map in the deliverables, subject to BNSF's ability to attribute the map to the State and provide a disclaimer, as provided in Section 5.0. BNSF may elect to sample monitoring wells as necessary to provide data to aid in the preparation of this map, in which case groundwater sampling will be conducted in accordance with the protocols and procedures presented in the *Standard Operating Procedures for Ground Water Sampling*, prepared by Envirocon, Inc. dated August 1990 with the following clarifications:

- Wells may be purged and groundwater samples collected with a disposable bailer, a dedicated bladder pump, a peristaltic pump, or other substantially equivalent equipment.
- Equipment blanks will not be collected when dedicated or disposable purging/sampling equipment is used.
- Field parameters will be monitored using an appropriate YSI meter (current model) or other substantially equivalent equipment.
- Decontamination will be conducted using a non-phosphorus detergent (i.e., alconox, liquinox or equivalent) and triple rinsed with de-ionized water. Methanol will only be used if samples are collected from wells with LNAPL present.
- If samples are shipped via UPS, UPS will not be required to sign the chain-of-custody record. The chain-of-custody record signed by field personnel will already be sealed inside the cooler and secured with a custody seal.
- Groundwater samples shall be analyzed for:
  - EPH screen, followed by EPH fractionation if screening values are exceeded, by Massachusetts Department of Environmental Protection (MADEP) Method.
- Groundwater samples may also be analyzed for one or more of the following:
  - Volatile petroleum hydrocarbons (VPH) by MADEP Method with MBTEXN

- Diesel-range organics (DRO) including DRO, DRO as diesel and extractable petroleum hydrocarbons (EPH) screen using EPA Method 8015 modified
- Polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270 in select ion monitoring (SIM) mode, if necessary
- Nitrate + nitrite and ammonia by EPA Methods 353.2 and 350.1, respectively
- Sulfate by EPA Method 300.0
- Iron by EPA Method 200.7
- Total carbonate and bicarbonate alkalinity by EPA Method 310.1
- Hardness by EPA Method 200.7
- Total dissolved solids (TDS) by EPA Method 160.1
- Orthophosphate by EPA Method 365.1
- Methane gas by GC/PID
- Ferrous iron and sulfide (Hach kit).
- Inorganic natural attenuation parameters may be analyzed using the listed methods or another equivalent method.

Three bore volumes will be evacuated from the well prior to sample collection unless low-flow (micro-purge) techniques have been approved by DEQ prior to sample collection. Purge water will be managed in accordance with DEQ's purge water policy and in accordance with the requirements for handling, sampling, treatment and disposal of groundwater potentially containing F001-F002 listed wastes, as outlined in DEQ's letter to BNSF dated October 8, 2004.

BNSF shall prepare a work plan that proposes a monitoring well network for future tasks, including installation and sampling of up to 15 new wells as necessary (this limitation applies to Spring 2005 work only). The SAP and QAPP component of the Stage I work plan shall include identification of baseline information data gaps, establishment of an appropriate monitoring network (including installation of any necessary monitoring wells), quarterly collection and analysis of samples for petroleum hydrocarbons, natural attenuation parameters and field parameters, and reporting.

The monitoring parameters for the initial round of data collection shall include volatile petroleum hydrocarbons (VPH), extractable petroleum hydrocarbons screen (EPH) by the Massachusetts Method (followed by EPH parameters and polycyclic aromatic hydrocarbons if screening levels are exceeded); manganese; field parameters including pH, temperature, specific conductance, and depth to groundwater (if accessible); and, MNA parameters including: dissolved oxygen, nitrate, ammonia, ferrous iron, sulfate, alkalinity, and redox potential. BNSF may also choose to include other MNA parameters as necessary for use in subsequent natural attenuation modeling. DEQ expects that the Stage I work plan will include collection of these parameters during the first year of monitoring in order to fill baseline data gaps, but that the monitoring plan for Stage II sampling may include a reduced number of parameters. If data acquired during preparation of the Stage I RA Plan demonstrate that dissolved petroleum concentrations

in groundwater do not exceed screening levels and BNSF proposes a Stage I RA Plan that consists of confirmation sampling to demonstrate that no further action is needed, BNSF may propose monitoring of previously detected petroleum fractions (e.g. VPH and/or EPH) without monitoring of MNA parameters.

The Stage I RA plan for MNA shall include all components listed in Subtask 13 regarding groundwater monitoring networks. The Stage I RA plan must include an updated well inventory. Following DEQ approval of the work plan, BNSF shall implement the work plan, and evaluate success of work plan implementation (i.e., were all wells installed as per the work plan, did sampling results indicate that the installed wells fill all data gaps).

Once Stage I RA activities have created a satisfactory well network for monitoring of dissolved-phase petroleum in groundwater, BNSF shall update the well inventory to identify all registered domestic, commercial, industrial, irrigation, and monitoring wells (and shall also attempt to identify all unregistered domestic, commercial, industrial, irrigation, and monitoring wells) within ½-mile distance from the boundary of dissolved-phase petroleum concentrations at or greater than the standard method reporting limits for the analytical methods for EPH and VPH (this activity is also required by SOW Tasks F and L). This information shall be used to refine groundwater monitoring specific to dissolved-phase petroleum. All known domestic and commercial wells located within the boundary of the area in which dissolved-phase petroleum concentrations are believed to be above cleanup levels, and a monitoring zone established around that area based on site-specific and COC-specific characteristics, shall be sampled by BNSF for EPH screen (EPH) (followed by EPH parameters and polycyclic aromatic hydrocarbons if screening levels are exceeded) at least annually unless data demonstrate that a lesser frequency is protective of public health, safety, and welfare. All known domestic and commercial wells located within the boundary of the area in which dissolved-phase petroleum concentrations are believed to be above cleanup levels, and a monitoring zone established around that area based on site-specific and COC-specific characteristics, shall be sampled by BNSF for VPH during the first round of private well sampling following finalization of this SOW. Future VPH sampling of domestic and commercial wells shall be required by DEQ if indicated based on the results of the initial round of VPH sampling.

BNSF shall then prepare an RA report that describes Stage I activities. The Stage I RA report shall provide final details of the monitoring well network established in Stage I, including the private well inventory.

If the groundwater sampling conducted during preparation of or under the Stage I RA Plan indicates that cleanup levels are not exceeded in either the depot area, the freight-train refueling area, or both, then BNSF may choose to submit a Stage I RA work plan or work plan addendum that proposes a minimum of one year of quarterly sampling to confirm that cleanup levels are met at that portion of the Facility. If confirmation sampling demonstrates that dissolved-phase petroleum cleanup levels are met Facility-wide,

then BNSF shall prepare an RA report that describes confirmation sampling activities and proposes an ongoing groundwater monitoring schedule. Once DEQ has approved such an RA Report, BNSF may propose to conduct annual monitoring of select facility wells for dissolved-phase petroleum under Task N of the Livingston SOW.

### **3.2 SUPPLEMENTAL INVESTIGATION ACTIVITIES**

The general tasks grouped within this category represent portions of the ROD selected remedy where Supplemental Investigation (SI) activities are required. The deliverables for this group of activities consist of one or more SI work plans and reports. If the results of any investigation(s) indicate that appropriately calculated exposure point concentrations of Hazardous or Deleterious Substances are present above ROD cleanup levels, then risk assessment activities and RD/RA activities may also be included in that task, and under the Livingston SOW, remedy selection activities may also be included in that task and RD/RA activities shall be required. (BNSF shall calculate exposure point concentration calculations in accordance with guidance listed in Section 2.1; when fewer than 20 data points are available, discussions with DEQ will determine whether the data are adequate to calculate the Upper Confidence Limit (UCL). Exposure point concentration calculations are appropriate only for evaluation of soils with regard to human health-based cleanup levels.) In all deliverables under the Spring 2005 SOW, analytical data shall be compared to ROD cleanup levels for the Facility, (see Attachment 1).

#### **3.2.1 Task I: Basement VOC Gas Investigation and Removal**

The ROD selected remedy includes basement gas (indoor air) sampling at representative residences within the area of groundwater containing VOCs to determine if residences and businesses have indoor air concentrations of VOCs above EPA screening levels for ambient air. This task shall be implemented in stages by first conducting screening-level indoor air sampling in the vicinity of the identified area of VOC-containing groundwater. If screening levels are exceeded in inhabitable structures, are reproducible, and are reasonably attributable to vapor intrusion by VOCs partitioning from groundwater, then expanded sampling, calculation of site-specific cleanup levels, and implementation of protection systems shall be conducted as needed to meet cleanup levels unless the VOCs in groundwater are not related to the Facility. BNSF shall use appropriate methods to evaluate whether VOCs are attributable to vapor intrusion or other possible sources. "Inhabitable structures" shall mean residential dwellings and commercial/industrial buildings that have been built for, and are suitable for, occupancy by humans. The meaning of "inhabitable structures" shall not include bins, hoppers, grain elevators, wellhead housings, mechanical equipment housings, nor dog houses.

BNSF shall compare sampling results with indoor air screening levels specified in Table 3-1 below<sup>1</sup>:

**Table 3-1. Indoor Air Screening Levels**

Contaminant	Air (ug/m <sup>3</sup> ) <sup>f</sup>
VOCs:	
Tetrachloroethene	0.81
Trichloroethene	0.11*
Cis-1,2-Dichloroethene	35
Vinyl Chloride	0.48*
Trans-1,2-Dichloroethene	70
* Screening levels for these compounds were modified based on Johnson-Ettinger modeling, as described in the 2 <sup>nd</sup> Draft Supplemental Investigation Work Plan for Indoor Air (Kennedy/Jenks, June 2005) which is available for public review at the Livingston-Park County library and other information repositories.	

**Portions of ROD Selected Remedy Addressed**

- Section X.C. VOC Basement Gas

**Subtasks – Stage I**

- Subtask 1: Community Relations
- Subtask 2: Health and Safety Plan
- Subtask 3: Supplemental Investigation Work Plan
- Subtask 4: Implement Supplemental Investigation Work Plan
- Subtask 5: Supplemental Investigation Report
- Subtask 19: Communications

**Subtasks – Stage II – if triggered**

- Subtask 1: Community Relations
- Subtask 2: Health and Safety Plan
- Subtask 3: Supplemental Investigation Work Plan
- Subtask 4: Implement Supplemental Investigation Work Plan
- Subtask 5: Supplemental Investigation Report
- Subtask 6: Risk Assessment Work
- Subtask 7: Risk Assessment Documentation (includes public comment)
- Subtask 13: Remedial Design/Remedial Action Plan
- Subtask 14: Implement Remedial Action Plan
- Subtask 15: Institutional Controls
- Subtask 16: Remedial Action Report
- Subtask 17: Post-Remedial Action Monitoring and Maintenance

<sup>1</sup> Since publication of the ROD, EPA has published new draft guidance for evaluation of basement gas (Evaluating the Vapor Intrusion into Indoor Air – EPA 530-F-02-052, November 2002). In order to maintain protectiveness, the EPA screening levels shown in Table 3-1 shall be used for Task I. Two EPA screening levels were modified as described in Table 3-1.

- Subtask 18: Monitoring and Maintenance Report
- Subtask 19: Communications

**Deliverables**

- Stage I SI Work Plan
- Health and Safety Plan
- Preliminary Data - Indoor Air Sampling Results
- Quarterly Status Reports
- Stage I SI Report

If triggered:

- Draft Risk Assessment Documentation
- Final Risk Assessment Documentation
- Stage II SI Work Plan
- Stage II SI Report
- RD/RA Plan
- RA Report
- Post-RA Monitoring/Maintenance Reports

**3.2.1.1 COC-Affected Media and Remedy Summary**

Previous investigations, described in the ROD, indicated that indoor air at some residences and businesses near the railyard contained concentrations of VOCs. DEQ requires that additional characterization of VOC concentrations in indoor air be performed to update the available data using more recent EPA sampling methodology. This portion of the selected remedy requires BNSF to conduct a staged indoor air investigation of selected residences and businesses to measure detectable concentrations of VOCs and compare those concentrations to screening levels provided in the ROD<sup>2</sup> (Table 3-1 levels as confirmed or modified by appropriate risk assessment work described in Section 5.1.6 and 5.1.7). Residences and businesses shall be selected for screening based on location with respect to the VOC concentrations in the alluvial aquifer groundwater in the area. Based on the screening level investigation, additional required work may include an expanded indoor air survey and implementation of engineering controls to prevent indoor air VOCs from exceeding cleanup levels. If screening levels are exceeded due to subsurface vapor intrusion from VOCs, BNSF shall develop site-specific cleanup levels for indoor air based on the Baseline Risk Assessment and parameters provided to BNSF by DEQ in Attachment 2 of this SOW. The ROD selected remedy requires all residences and businesses that have indoor air VOC concentrations from subsurface vapor intrusion above site-specific cleanup levels for indoor air to have a protection system installed at no cost to the owner, unless the VOCs in indoor air are not related to the Facility. In order to remain protective, these systems must be

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<sup>2</sup> Since publication of the ROD, EPA has published new draft guidance for evaluation of basement gas (Evaluating the Vapor Intrusion into Indoor Air – EPA 530-F-02-052, November 2002). In order to maintain protectiveness, the EPA screening levels shown in Table 3-1 shall be used for Task I. Two EPA screening levels were modified as described in Table 3-1.

maintained until cleanup levels are continually met without operation of the system. BNSF shall install and maintain a protection system at all inhabitable residences and businesses with indoor air levels resulting from VOCs from subsurface vapor intrusion above site-specific cleanup levels for indoor air, at no cost to the owner.

Whether COCs may be additionally mobilized from groundwater to indoor air when groundwater elevations increase above current drought levels is currently unknown.

### 3.2.1.2 Subtasks

All activities shall be carried out in compliance with the consent decree and this Spring 2005 SOW. BNSF shall prepare a Stage I SI work plan to determine the current nature and extent, if any, of VOC concentrations above screening levels in indoor air for all potentially affected inhabitable residences and businesses. The work plan shall comply with all requirements prescribed in Section 2.0 and 5.1, in addition to the task-specific requirements as follows:

- Indoor air sampling for VOCs that may potentially infiltrate living spaces must take place at the earliest point of entry from the ground surface beneath each residence. BNSF shall conduct interviews with residents and inventories of household items that may influence indoor air quality. This information shall be used to determine sampling location(s) within a residence. Canisters shall be placed inside residences with slab-built construction, residences with basements, and the residences that have already received abatement systems. Canisters shall be placed at the approximate height of the breathing zone of building occupants. Residents should be encouraged to keep windows closed, and to limit the opening and closing of entryway doors.
- Buildings selected for sampling must be occupied residences and businesses that overlie the area of groundwater containing VOCs and any additional buildings that are potentially affected by VOCs from the Facility. In addition, confirmation indoor air sampling shall be performed at locations identified in the ROD as NE-1, NE-2, NE-3, NE-4, NE-5, SE-1, SE-2, and SE-5. The initial round of indoor air sampling shall include the locomotive shop and electric shop commercial buildings on the railyard, which are located above the soil and groundwater containing the highest concentrations of VOCs at the Facility.
- Residential and commercial air samples shall be collected using Method TO-15 or an EPA method otherwise approved by DEQ that utilizes stainless steel canisters, also known as Summa canisters, to sample the ambient air. The Summa canisters and flow controllers shall be individually certified clean to the specified practical quantitation limit (PQL) for each analyte by gas chromatograph/mass spectrometer (GC/MS) in selected ion monitoring (SIM) mode. A sampling duration of 24 hours shall be used to determine potential Hazardous or Deleterious Substance concentrations measured over a 24-hour period, in consideration of residents' varying time of

occupancy during a typical day. BNSF may propose, in the SI work plan, alternative sampling procedures that meet the requirements above.

- Air samples shall be analyzed by gas chromatograph/mass spectrometer (GC/MS) in selected ion monitoring (SIM) mode for the specific COCs (as identified in the ROD and by DEQ).

BNSF shall conduct all SI activities in compliance with the approved work plan. As required by Subtask 19, BNSF must provide DEQ with preliminary analytical data and a summary table of analytical results for indoor air (including any conversions necessary to allow comparison to screening levels), within ten (10) days of receipt of reports from the laboratory. The summary table shall note any residences or businesses that exceed or are likely to exceed screening levels. BNSF shall then prepare a Stage I SI report describing the work performed, the results of the indoor air sampling (including any conversions necessary to allow comparison to screening levels), and any recommendations for follow-up (Stage II) activity.

If Stage I SI results exceed screening levels, then BNSF shall further examine potential sources of VOCs in indoor air and may perform additional investigation to evaluate whether the detected VOC concentrations are attributable to subsurface vapor intrusion. BNSF shall provide DEQ with a written work plan for such additional investigation. If screening level exceedances are found to be attributable to subsurface vapor intrusion of VOCs, BNSF shall prepare a Stage II SI work plan to expand sampling to inhabitable residences/businesses beyond the initial area of the screening level investigation in a stepwise fashion. The expanded sampling area shall initially include all buildings located above the area in which VOCs are present in groundwater at concentrations at or above one or more cleanup level, and may be further expanded as required by DEQ based on sampling results. As required by Subtask 19, BNSF must provide DEQ with preliminary analytical data and a summary table of analytical results for indoor air within ten (10) days of receipt of reports from the laboratory. The summary table shall note any residences or businesses that exceed or are likely to exceed screening levels.

On completion of Stage II SI activities, BNSF shall submit a Stage II SI report, which shall describe the work performed, provide results of the initial and expanded sampling (including any conversions necessary to allow comparison to screening levels), and provide calculations of site-specific cleanup levels for indoor air based on the Baseline Risk Assessment described in Section VII of the ROD and parameters provided to BNSF by DEQ in Attachment 2 of this SOW.

DEQ does not expect that Stage I and II indoor air sampling will take more than one year to complete. However, if indoor air sampling activities extend beyond one year, annual interim reports shall be submitted by BNSF in accordance with Subtask 18.

Based on the Stage I and II SI Reports, BNSF shall prepare an RD/RA plan, if warranted, to install and maintain VOC-gas protection systems in all inhabitable residences and businesses with indoor air levels for VOCs from subsurface vapor intrusion above cleanup levels for indoor air. The system design for VOC-gas protection must maintain the indoor air below the cleanup level. Positive pressure systems (that exclude the flux of VOCs from the subsurface into indoor air), crack sealing, vapor barriers, combinations or these technologies, or other engineered systems that can achieve the cleanup goal may be acceptable. The RD/RA plan would include a monitoring and maintenance schedule, and shall specify that BNSF shall operate the protection systems until cleanup levels are continually met without operation of the systems. BNSF shall monitor indoor air in the specified residences/businesses semi-annually, or at another lesser frequency if approved by DEQ, during operation of the protection systems and for a minimum period of one year after the systems are turned off. As in Stage I and II SI activities, BNSF must provide DEQ with preliminary analytical data and a summary table of analytical results for indoor air within ten (10) days of receipt of reports from the laboratory. The summary table shall note any residences or businesses that exceed cleanup levels or show an increase in indoor air VOC concentrations. Also, BNSF shall submit annual interim reports to DEQ that describe operation and maintenance of the protection systems and provide semi-annual monitoring results. The annual interim reports for indoor air shall be integrated into the annual monitoring and maintenance report required by Subtask 18 of the SOW. BNSF shall work with private property owners and use reasonable efforts to ensure that protection systems remain operative until cleanup levels are met, regardless of changes in ownership of private property; this may include the use of institutional controls. If institutional controls are utilized to maintain protectiveness of the remedy, proposed language will be submitted to DEQ in an RA plan or work plan addendum, and a copy of the implemented institutional control shall be submitted to DEQ in the first annual report to be submitted after the control is emplaced.

BNSF shall prepare and submit an RA Report to DEQ after confirmation sampling demonstrates that cleanup levels have been achieved, and/or that the protection systems are no longer needed. The report shall summarize all work performed, the sampling results before and after the protection systems were implemented, and confirmation sampling results. If post-remedial action monitoring and maintenance activities are identified as necessary in the RA Report, BNSF shall be required to implement those activities, and to submit annual post-remedial action monitoring and maintenance reports.

If the supplemental investigation of indoor air occurs during a period of relatively low groundwater conditions, such as are currently observed in Livingston, DEQ may require additional investigation of indoor air during possible future times of high groundwater elevation, in order to maintain protectiveness of human health. If BNSF can demonstrate, using accepted scientific methods (such as the Johnson-Ettinger model), that the change in groundwater elevation could not reasonably be expected to result in a change in indoor air VOC concentrations that could approach the cleanup levels, then additional investigation shall be limited to confirmation sampling to demonstrate that modeling is protective.

### **3.2.2 Task J: Surface Soil PAH and Surface Soil Petroleum Investigation**

This task addresses the supplemental investigation portion of the ROD selected remedy for polycyclic aromatic hydrocarbons (PAHs) and petroleum in surface soil within the Facility, unless not related to the Facility. This task is specific to the Livingston Railyard, and excludes the former C & P Packing property that will be addressed in the Livingston SOW. This Task includes supplemental investigation of PAHs and petroleum in surface soil in the vicinity of the Depot. Some soils at the Facility contain PAH concentrations exceeding the cleanup level. In addition, surface soil was not analyzed for petroleum compounds during the original RI, and petroleum was not identified as a contaminant of concern for surface soils in the March 1994 RI report. Since that time, methods to quantify risks from petroleum-containing soils have become available. DEQ has determined that petroleum in soils at certain levels poses an unacceptable risk to human health and the environment. This task requires a supplemental investigation of surface soil throughout the railyard for both PAHs and petroleum. Task J of the Spring SOW is limited to sampling of surficial soils in the railyard. Additional activities, if any, related to this Task will be addressed in the Livingston SOW. BNSF will have the option under the Livingston SOW to use risk assessment to calculate site-specific cleanup levels for petroleum-containing surface soil. If risk assessment work is completed it shall be subject to a minimum 30-day public comment period.

#### ***Portions of ROD Selected Remedy Addressed***

- Section X.C. PAH-Containing Surface Soil
- Section X.C. Petroleum-Containing Surface Soils

#### ***Subtasks***

- Subtask 1: Community Relations
- Subtask 2: Health and Safety Plan
- Subtask 3: Supplemental Investigation Work Plan
- Subtask 4: Implement Supplemental Investigation Work Plan
- Subtask 5: Supplemental Investigation Report
- Subtask 19: Communications

#### ***Deliverables***

- SI Work Plan
- Health and Safety Plan
- Quarterly Status Reports
- SI Report

#### **3.2.2.1 COC-Affected Media and Remedy Summary**

Although some data were collected during earlier RI activities, DEQ requires further delineation of the areal extent of surface soils in the railyard that may contain PAHs and petroleum above ROD cleanup

levels. ROD Section XII.B requires implementation of actions to reduce concentrations of polycyclic aromatic hydrocarbons (PAHs) in surface soils to below the cleanup levels. In addition, the ROD selected remedy in Section X.C requires implementation of actions to reduce the concentrations of petroleum in surface soil to below the cleanup levels. Therefore, an investigation of PAHs and petroleum in surface soil is identified as part of the ROD selected remedy.

The ROD cleanup levels for PAHs were derived from the risk assessment described in Section VII of the ROD and are contained in Table 2-1 of this SOW<sup>3</sup>. Petroleum in soils shall be evaluated in comparison to RBCA Tier 1 levels, or BNSF will have the option to use risk assessment to calculate site-specific cleanup levels for petroleum-containing surface soil under the Livingston SOW; if risk assessment work is completed it shall be subject to a minimum 30-day public comment period.

Task J of the Spring SOW is limited to sampling of surficial soils in the railyard. Additional activities, if any, related to this Task will be addressed in the Livingston SOW.

### 3.2.2.2 Subtasks

All activities shall be carried out in compliance with the consent decree and this Spring 2005 SOW. BNSF shall prepare an SI work plan and HSP to investigate PAHs and petroleum in surface soil following the requirements in Section 5.1. RBCA Tier 1 levels shall be used as screening levels for petroleum in the SI activities. The sampling plan shall be developed based on areas of soil containing PAHs and/or petroleum identified in the March 1994 RI report (see RI Section 3.4 on surficial soil sample results) and a visual reconnaissance of the railyard, with DEQ oversight.

BNSF shall conduct all SI activities in compliance with the approved SI work plan. Following completion of SI activities, BNSF shall prepare an SI report summarizing the results of the investigation of surface soil for PAHs and petroleum. If PAHs and/or petroleum are present in surface soil the SI report shall also identify ROD cleanup levels for PAHs and petroleum,, identify the areal extent and volume of surface soils containing PAHs and/or petroleum, include a figure showing the estimated extent and approximate boundary of soils containing PAH and/or petroleum above cleanup levels based on available data and observations, and identify the areas requiring remediation. BNSF shall adhere to PAH cleanup levels (ROD Table 1) derived from the risk assessment described in Section VII of the ROD. The cleanup levels for petroleum shall be those listed in DEQ's RBCA Tier 1 guidance (as identified in the ROD), unless alternative cleanup levels are proposed under the Livingston SOW. The SI Report must be submitted to

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<sup>3</sup> Since publication of the ROD, DEQ has published revised guidance for petroleum and PAHs in soils (*Montana Tier 1 Risk-Based Corrective Action (RBCA) Guidance for Petroleum Releases*, DEQ, October 2003); in order to maintain protectiveness, screening levels in Table 1 for petroleum and PAHs in soils may need to be altered to reflect this new version of RBCA.

DEQ within 90 days of receipt of laboratory data for this Task. If the Livingston SOW is in place within 90 days of receipt of laboratory data for this Task, the SI Report may be submitted under the Livingston SOW. If the Livingston SOW is not in place within 90 days of receipt of laboratory data for this Task, the SI Report shall be submitted under this Spring 2005 SOW, and may later be amended under the Livingston SOW if DEQ approves site-specific cleanup levels for petroleum in soils. If PAHs and/or petroleum are present in surface soil above cleanup levels, the SI report shall address whether interim measures are warranted to protect the health and safety of railyard and other workers who might be exposed to the soil prior to remedial action.

Task J of the Spring SOW is limited to sampling of surficial soils in the railyard. Additional activities, if any, related to this Task will be addressed in the Livingston SOW.

### **3.2.4 Task L: Investigation of VOCs in Bedrock Aquifer(s)**

Since publication of the ROD, new information has become available to DEQ that suggests that the bedrock aquifer underlying the Facility may contain VOCs attributable to the Facility. This task shall address this new information by requiring that BNSF conduct a supplemental investigation to determine whether VOCs are present in the bedrock aquifer(s), and, if so, to delineate the nature and extent in the bedrock aquifer(s). Due to the geological setting of the Facility, there may exist different bedrock aquifers under different portions of the Facility. This task shall be conducted following the requirements described below.

#### ***Portions of ROD Selected Remedy Addressed***

- No information was available to indicate that VOCs may be present in the bedrock aquifer at the time the ROD was published.

#### ***Subtasks***

- Subtask 1: Community Relations
- Subtask 2: Health and Safety Plan
- Subtask 3: Supplemental Investigation Work Plan
- Subtask 4: Implement Supplemental Investigation Work Plan
- Subtask 5: Supplemental Investigation Report
- Subtask 19: Communications

#### ***Deliverables***

- SI Work Plan
- Health and Safety Plan
- Preliminary Data - Private Well Monitoring
- Quarterly Status Reports
- SI Report

#### **3.2.4.1 COC-Affected Media and Remedy Summary**

At the time of ROD publication, there was no information available to DEQ indicating that the bedrock aquifer underlying the Facility had been impacted by releases from the railyard. However, limited information has recently become available which suggests that VOCs could be present in the bedrock aquifer at one monitoring well location in the vicinity of the former C&P Packing property. There currently exists very little data regarding the presence of VOCs in the bedrock aquifer(s) in other parts of the Facility. Due to the geological setting of the Facility, there may exist more than one bedrock aquifer underneath the Facility.

This task shall address these concerns by requiring that BNSF conduct a supplemental investigation to determine whether VOCs are present in the bedrock aquifer(s), and, if so, to delineate the nature and extent of such VOCs in the bedrock aquifer(s) underlying the Facility, unless the VOCs in bedrock groundwater are not related to the Facility. The Livingston SOW shall require that as necessary, remedial alternatives shall be evaluated through a feasibility study or EE/CA and remedial actions shall be conducted.

#### **3.2.4.2 Subtasks**

All activities shall be carried out in compliance with the consent decree and this Spring 2005 SOW. BNSF shall prepare an SI work plan to (1) screen the uppermost water-bearing bedrock zone beneath the Facility for the potential presence of VOC concentrations, and (2) determine the extent of VOCs in groundwater in bedrock exceeding cleanup levels, if any, following the requirements and relevant guidance in Section 2.1 and Section 5.1. The work plan shall summarize existing relevant data, propose monitoring wells to be used for the investigation, including installation and sampling of new wells as necessary, provide a map showing available information regarding the various bedrock units underlying the Facility and other pertinent geological information, and provide a SAP and QAPP for data collection and analysis. The sampling plan shall be developed based on areas of potential bedrock aquifer contamination identified from known VOC source areas and available geological information. The SI work plan shall include all relevant components listed in Subtask 3 regarding groundwater monitoring and monitoring well networks, and BNSF shall update the well inventory to identify all registered domestic, commercial, industrial, irrigation, and monitoring wells (and shall also attempt to identify all unregistered domestic, commercial, industrial, irrigation, and monitoring wells) within ½-mile distance from the boundary of VOCs at concentrations at or greater than the WQB-7 required reporting limit in the alluvial aquifer, that are screened in the bedrock aquifer(s) (this activity is also required by SOW Tasks F, G and K). This information shall be used to refine the monitoring well network used to monitor VOCs in the bedrock aquifer. All known domestic and commercial wells located within the boundary of the area in which VOC concentrations are believed to exceed cleanup levels, and a monitoring zone established around that area based on site-specific and COC-specific characteristics, shall be sampled by BNSF for

VOCs at least annually unless data demonstrate that a lesser frequency is protective of public health, safety, and welfare.

Following DEQ approval of the work plan, BNSF shall implement the work plan, and evaluate success of work plan implementation (i.e., were all wells installed as per the work plan, did sampling results indicate that the installed wells fill all data gaps). The well inventory shall be updated to reflect information obtained regarding the bedrock aquifer(s) and to include all wells within ½-mile distance from the boundary of VOC concentrations at or greater than the WQB-7 required reporting limit in the bedrock aquifer(s). All known domestic and commercial wells located within the boundary of the area in which VOC concentrations are believed to exceed cleanup levels, and a monitoring zone established around that area based on site-specific and COC-specific characteristics, shall be sampled by BNSF for VOCs at least annually unless data demonstrate that a lesser frequency is protective of public health, safety, and welfare. If DEQ determines that further well installation or other work is necessary to effectively establish a bedrock aquifer monitoring well network, BNSF shall address that work through work plan addenda submitted for approval to DEQ. If no VOCs are detected in bedrock aquifer groundwater at concentrations exceeding cleanup levels, then this task shall be deemed complete by DEQ and future monitoring, if any, of the bedrock aquifer monitoring wells shall be performed under Task N of the Livingston SOW. If VOCs are detected in the bedrock aquifer below cleanup levels, monitoring of bedrock groundwater VOCs shall be conducted under Task N of the Livingston SOW, unless the VOCs in bedrock groundwater are not related to the Facility.

BNSF shall conduct all SI activities in compliance with the approved SI work plan. Following completion of SI activities, BNSF shall prepare an SI report summarizing the results of the investigation of the bedrock aquifer(s) in accordance with Section 5.1.5 of this Spring 2005 SOW. If VOCs are present in the bedrock aquifer(s) the SI report shall also identify ROD cleanup levels for VOCs in groundwater, identify the areal and vertical extent of groundwater containing VOCs, include a figure showing the estimated extent and approximate boundary of bedrock groundwater containing VOCs above cleanup levels based on available data and observations, and identify the areas requiring remediation.

The Livingston SOW shall require that if groundwater from the bedrock aquifer(s) contains VOCs in excess of cleanup levels then BNSF shall conduct remedy selection and RD/RA activities, unless the VOCs in bedrock groundwater are not related to the Facility.

## **SECTION 4.0: SCHEDULE**

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This section describes the project schedule for implementation and completion of Spring 2005 SOW tasks, and organization and timetable for task deliverables.

### **4.1 PROJECT SCHEDULE AND PRIORITY SUBTASKS**

BNSF shall prepare a master project schedule for Spring 2005 SOW Tasks and all associated subtasks using an appropriate project tracking mechanism. The master schedule shall incorporate the information in Tables 4-1 and 4-2 and shall show task and subtask timeframes, and the time periods when the work shall be conducted. Many of the tasks shall be conducted concurrently. BNSF must submit a master schedule to DEQ within six weeks of finalization of this SOW.

### **4.2 PROJECT DELIVERABLES**

As required in each specific task in Section 3.0, BNSF shall prepare RA plans and SI work plans. Additional work plans may be necessary depending on the results of supplemental investigations and remedial activities. To avoid redundancy and to facilitate document preparation and review, BNSF shall prepare a single, comprehensive health and safety plan (HSP) contained in a three-ring binder for all RD/RA and SI work plan activities, as outlined in Subtask 2. Task-specific health and safety plans shall then be submitted to DEQ as attachments to the comprehensive HSP when task-specific work plans are prepared. BNSF also may choose to prepare a single, comprehensive SAP and QAPP (within a three-ring binder) for all RD/RA and SI work plan activities that require sample collection and analysis. Task-specific SAP and QAPP requirements can then be submitted to DEQ as attachments and inserted into the comprehensive document when work plans are prepared.

BNSF may choose to submit the RD/RA plans and SI work plans as stand-alone documents that reference the comprehensive HSP. Alternatively, BNSF may choose to organize/group RD/RA plans and SI work plans into one or more documents, using three ring binders so that work plans for additional tasks can be inserted into the binders as tasks are implemented. In either case, the work plans must either contain a task-specific SAP/QAPP (as required in Section 5.1) or shall reference a comprehensive SAP/QAPP (if one is prepared).

**Table 4-1. Schedule for Spring 2005 SOW Subtasks and Deliverables**

TASK	SUBTASK/DELIVERABLE	IMPLEMENTATION SCHEDULE
Task C – Cinder Pile Capping	Remedial Action Plan & HSP	Work Plan approved February 4, 2005
	Remedial Action – Construction Activities	Initiated March 2005
	RA Activities and Implementation of Institutional Controls	To be completed within one year of approval of RA plan, excluding ongoing monitoring and maintenance
Task F – Alluvial Aquifer Groundwater VOC Cleanup	Phase I RA Plan & HSP	Due by June 1, 2005
	Well inventory	Due by June 1, 2005
	Implement Stage I Part I RA Plan	To be initiated within 30 days of approval of RA Plan; to be completed within 18 months of approval of RA plan
Task G – Groundwater Dissolved-Phase Petroleum Contamination Cleanup	Stage I RA Plan & HSP	Due by June 1, 2005
	Implement Phase I RA Plan	To be initiated within 30 days of approval of RAP; to be completed within 18 months of approval of RAP
Task I – Basement VOC Gas Sampling and Removal	Phase I SI Work Plan & HSP	Due by March 31, 2005
	Implement Phase I SI Work Plan	To be initiated within 30 days of SI WP approval; to be completed within one year of SI WP approval
Task J – Surface Soil PAH/Petroleum Contaminant Investigation	SI Work Plan & HSP	Due by June 1, 2005 (NOTE to BNSF – trying to stagger deliverables to allow review time - we can discuss this) -
	Implement SI Work Plan	To be initiated within 30 days of SI WP approval; to be completed within one year of SI WP approval
Task L – Bedrock Aquifer VOC Contamination Investigation	SI Work Plan & HSP	Due by July 1, 2005
	Implement SI Work Plan	To be initiated within 30 days of SI WP approval; to be completed within 18 months of SI WP approval

**Table 4-2. Deliverable Timetable**

Deliverable	Description	Completion Schedule
Subtask 3 – SI work plan	Submit draft SI work plan	Within 1 year of the determination that an SI is needed
	Incorporate DEQ comments and provide final plan	Within 6 weeks of receipt of DEQ comments
Subtask 5 – SI report	Submit draft SI report	Within 8 weeks of receipt of analytical results

	Incorporate DEQ comments and provide final report	Within 6 weeks of receipt of readily-addressable DEQ comments*
Subtask 7 – Risk Assessment Amendment	Submit draft risk assessment amendment	Within 6 months of the determination that risk assessment work is needed
	Incorporate DEQ comments and provide final draft risk assessment amendment	Within 6 weeks of receipt of readily-addressable DEQ comments*
	Incorporate relevant public comments as directed by DEQ and provide final amendment	Within 4 weeks of receipt of relevant public comments from DEQ
Subtask 13 – RD/RA plan	Submit draft RD/RA plan	Within 6 months of the determination that remedial action is needed
	Incorporate DEQ comments and provide final RD/RA work plan	Within 6 weeks of receipt of readily-addressable DEQ comments*
Subtask 16 – RA report	Submit draft RA report	Within 4 months of completion of RA activities
	Incorporate DEQ comments and provide final report	Within 6 weeks of receipt of readily-addressable DEQ comments*
Subtask 18 –Monitoring and maintenance report	Submit draft annual monitoring and maintenance report with proposed monitoring and maintenance schedules	Within first quarter of following year for monitoring and maintenance conducted the previous year
	Incorporate DEQ comments and provide final report/schedules	Within 6 weeks of receipt of readily-addressable DEQ comments*
Subtask 19 – Communications	Submit quarterly status reports	Every three months from Spring 2005 SOW effective date
	Annual Reports (incorporating annual interim reports and monitoring and maintenance reports)	In the first quarter of the following year
DEQ may require revisions to submitted documents. Multiple revisions may be necessary and the schedule will be extended accordingly.		

\* "Readily-addressable DEQ comments" means comments that can be readily addressed through discussion and edits/changes to the text, table or graphical presentations. It does not include comments requiring additional field work, research, and/or re-performance of calculations, modeling or data interpretation (e.g., graphing and mapping). In cases where this type of effort is required, further response time will be allocated and DEQ will provide a schedule extension in writing.

## **SECTION 5.0: REMEDY SUBTASK REQUIREMENTS**

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This section describes the actions and deliverables that shall be required of each subtask. See Table 2-1 for a list of all SOW subtasks.

DEQ shall review all deliverables submitted by BNSF in accordance with the Consent Decree and this Spring 2005 SOW. DEQ will endeavor to provide review in a timely manner. Deliverables may require revision prior to DEQ approval; DEQ will endeavor to identify all deficiencies in the initial draft of the deliverable.

The review process shall also allow for public comment for deliverables as specified in the SOW. Where the review process requires public comment, the deliverable shall be distributed to the repositories for public documents to begin a 30- to 60-day public comment period. Upon completion of the public comment period, DEQ shall consider appropriate public comments.

After review of any deliverable, DEQ shall: (1) approve, in whole or in part, the deliverable; (2) approve the deliverable upon specified conditions; (3) modify the deliverable to cure the deficiencies and approve the modified deliverable; (4) disapprove, in whole or in part, the deliverable, directing that BNSF modify the deliverable; or (5) any combination of the above. Any modification made at the direction of DEQ may be attributed to DEQ in the body of the document so long as it does not affect the readability of the document. In all cases, BNSF may attach a disclaimer of DEQ-directed changes as an appendix to the deliverable. DEQ shall not modify a deliverable under subsections (3), (4), or (5), above, without first providing BNSF at least one opportunity to cure within a reasonable time frame, except where to do so would cause serious disruption to the Work or where previous deliverable(s) have been disapproved due to material defects and the deficiencies in the deliverable under consideration.

BNSF shall proceed to take any action required by the deliverable, as approved or modified by DEQ, subject only to its right to invoke the Dispute Resolution procedures set forth in Section 15 of the Consent Decree.

DEQ and BNSF shall provide the opportunity to consult with each other during the review of deliverables or modifications under this part. It is envisioned that BNSF's Project Coordinator and the DEQ Project Officer will, in the first instance, attempt to resolve disputes before referring them to dispute resolution. To assist in the early resolution of technical issues, the State and BNSF may agree to seek advice or opinions from a mutually agreeable, independent, impartial, technical third party.

## **5.1 SUBTASK REQUIREMENTS**

### **5.1.1 Subtask 1: Community Relations**

DEQ shall manage community relations and BNSF shall provide community relations support to DEQ, at DEQ's request. DEQ shall manage community relations in accordance with the Community Involvement Plan, dated June 1991, with amendments and updates as described below:

#### ***Updated Community Relations Plan (CRP)***

DEQ may re-conduct community interviews and prepare an updated Community Relations Plan (CRP).

#### ***Prepare Fact Sheets***

DEQ shall prepare fact sheets that inform the public about Facility cleanup activities. DEQ will provide draft fact sheets to BNSF in advance of releasing them to the public. An initial fact sheet shall be prepared describing a schedule for BNSF compliance with the SOW. Subsequent fact sheets shall include information related to specific remedial designs, activities to be expected during construction, provisions for responding to emergency releases and spills, and any potential inconveniences such as excess traffic and noise that may affect the community during SOW activities. These fact sheets shall be issued at least annually and before commencement of remedial action.

#### ***Public Hearings, Meetings and Availability***

DEQ shall conduct public hearings, meetings, and open houses as needed. BNSF shall assist in the preparation of presentation materials and be reasonably available for attendance at public meetings and hearings as requested by DEQ to comply with public participation requirements of CECRA.

#### ***Maintain Information Repository and Mailing Lists***

DEQ shall maintain Facility mailing lists, and a repository of information on activities related to the Facility-specific investigations and remedial design. The information repositories shall be located at:

- Department of Environmental Quality  
Remediation Division – Hazardous Waste Site Cleanup Bureau  
1100 North Last Chance Gulch  
Helena, MT 59620-0901  
Telephone (406) 841-5000
  
- Livingston-Park County Public Library  
228 West Callender  
Livingston, MT 59047  
Telephone (406) 222-0862

- Montana State University - Renne Library,  
Bozeman Campus, Building # 36,  
Bozeman MT 59715  
Telephone (406) 994-3119

DEQ shall continue coordination with the Park County Environmental Council (PCEC) and any other EPA Technical Assistance Grant- (TAG)-funded or other citizen group that may form.

#### ***Additional Community Relations Responsibilities***

BNSF shall assist in the preparation of presentation materials and be reasonably available for attendance at public meetings and hearings as requested by DEQ to comply with public participation requirements of CECRA. Additional community relations tasks may include holding informational meetings before a remedy task is conducted, providing Facility tours, or providing information regarding the status or progress of remedial actions and investigations conducted at the Facility.

#### ***Public Comments***

Documents that shall require public comments are risk assessment amendments (Subtask 7) and feasibility study reports and EE/CA reports (Subtask 10). BNSF shall submit these documents and related materials to DEQ, and DEQ will forward them to the repositories listed above.

### **5.1.2 Subtask 2: Health and Safety Plan**

A Facility-wide, comprehensive Health and Safety Plan (HSP) shall be submitted to DEQ before any SOW tasks requiring fieldwork are implemented. Individual, activity-specific HSPs shall then be submitted as necessary as attachments to the Facility-wide HSP prior to implementation of the individual activities. Each HSP shall address the health and safety of personnel implementing the SOW at the Facility. DEQ will review, but will not approve, HSPs. Measures to be undertaken during the implementation of specific activities described in Work Plans to protect the health and safety of other personnel present at the Facility, such as railyard workers and health and safety of the Livingston community (including residents where activities shall be performed) shall be addressed in work plans (i.e., see Subtasks 3 and 12) that are subject to DEQ review and approval.

Worker safety is a part of the ROD selected remedy that is inherent to all activities that require a HSP. Health and safety plans following protocols at least as protective of public health, safety, and welfare as those of on-site operators such as MRL and Talgo-LRC, LLC, shall be implemented for SOW tasks that require the presence of personnel implementing the SOW in the railyard, and BNSF shall coordinate with on-site operators during development and implementation of health and safety plans.

All activities shall be carried out in compliance with the consent decree and this SOW. The Facility-wide comprehensive HSP shall include the components listed below, and shall be updated as necessary by BNSF through addenda, if information changes occur:

- Any standard operating procedures for health and safety activities (e.g., calibration of field screening equipment and documentation of calibration, work zone and perimeter air monitoring, personal air monitoring).
- A description of required health and safety training for personnel, including OSHA training requirements, first aid/CPR training requirements, asbestos training and track safety training requirements.
- A description of medical surveillance requirements for personnel implementing the SOW.
- Telephone numbers and other contact information for emergency response services, MRL and Talgo-LRC, LLC, utility companies and other important contacts.
- A description of utility markout procedures.
- A contingency plan in compliance with 29 *Code of Federal Regulations* 1910.120.
- A map and directions to the nearest hospital emergency room.
- A description of any check-in or sign-in requirements for personnel implementing the SOW at the Facility.
- Identification of hazardous materials utilized during work (e.g., for laboratory sample preservation) and required handling procedures.
- A description of required decontamination procedures for personnel and any health and safety-related equipment, including protocol for disposal of decontamination wastes.

The Facility-wide, comprehensive HSP shall be updated via addenda as necessary by BNSF.

Activity-specific health and safety plans shall include the components listed below:

- A reference to the Facility-wide comprehensive HSP and any addenda to the Facility-wide comprehensive HSP.
- A description of activities to be performed and applicable standard operating procedures, if not already described in the Facility-wide HSP.
- An identification of all health and safety risks posed by the work to be performed, including a list of COCs, an identification of potential exposure pathways, identification of potential receptors, and a list of mechanical and other risks.
- Description of and justification for any expected deviations from the Facility-wide comprehensive HSP.
- Identification of project health and safety personnel, including designation of on-site health and safety officer(s).
- A description of personal protective equipment (PPE) to be utilized during each stage of the work and maintenance required for PPE.
- A description of any personal, work zone, and perimeter air monitoring requirements, as appropriate, including laboratories to be used for analysis of air samples, and including description of calibration requirements and associated documentation for field screening of air quality.
- For activities requiring air monitoring, a response framework for responding to air monitoring exceedances.

- Any training requirements not specified in the Facility-wide HSP.
- A description of work zone boundary delineation and how access to the work zone shall be controlled.
- A description of any other work requirements (e.g., time of day work shall be performed, any prescribed rest breaks, any prescribed fluid intake requirements for workers).
- Identification of hazardous materials to be utilized during work and required handling procedures, if not included in the Facility-wide HSP.
- A description of required decontamination procedures for personnel and any health and safety-related equipment, in compliance with all laws, and protocol for disposal of decontamination wastes, including used personal protective equipment, if not included in the Facility-wide HSP.
- A description of any medical surveillance requirements not described in the Facility-wide HSP.
- Telephone numbers and other contact information for any emergency contacts not provided in the Facility-wide HSP.
- A contingency plan, if different from that in the Facility-wide HSP, in compliance with 29 *Code of Federal Regulations* 1910.120.
- A description of any necessary coordination with ongoing Facility, including railyard, operations and any necessary coordination with the community.

DEQ understands most railroads request wells installed in active railyards to be flush mounted to prevent tripping hazards. BNSF and its contractor(s) shall coordinate with MRL about safety protocols MRL uses to protect MRL workers while working amongst active rail tracks. Construction personnel installing and operating remedial systems such as the diesel recovery system shall follow safety rules within the railyard at least as protective as those that MRL workers follow. BNSF shall coordinate with on-site operators during development and implementation of health and safety plans.

Implementation of health and safety plans shall occur as part of implementation of work plans for investigation, remedial action, or monitoring and maintenance or other activities, and is therefore not included as a separate subtask in the SOW. BNSF shall be required to submit and implement activity-specific health and safety plans, as necessary, for activities to be performed as part of cleanup of the Facility, including any activities not described in this SOW but later deemed necessary or pertinent to remedial objectives.

### **5.1.3 Subtask 3: Supplemental Investigation Work Plan**

The supplemental investigation (SI) work plan shall outline all activities necessary or appropriate to identify the existence, nature, and extent of a release, or the threat of a release, for determining the need for a remedial action, choosing or taking remedial action, or as otherwise appropriate. . All activities shall be carried out in compliance with the consent decree and this SOW. The SI work plan shall be carried out consistent with guidance listed in Section 2.1. Each SI work plan shall fulfill the requirements described below. Nothing herein shall be construed as limiting BNSF's option to combine SI activities for multiple tasks in a work plan to streamline the process.

***Pre-Work Plan Meetings***

Before or concurrent with developing work plans, BNSF shall attend one or more pre-work plan meetings with the DEQ Project Officer, if requested by either BNSF or DEQ. At the meetings, BNSF shall present an outline of the general approaches that it proposes to use for the work plan. The purpose of a pre-work plan meeting is to ensure that task objectives are clear to both parties.

***Work Plan Requirements***

BNSF shall prepare SI work plans in compliance with the requirements listed under this section and Section 2.1. SI work plans shall be consistent with the guidance listed in Section 2.1. Each SI work plan shall be accompanied by a task-specific HSP, as outlined in Subtask 2. The SI work plans shall also include the components listed below.

- A brief narrative or table of previous work performed with references to the documents wherein the work was reported; a map of the Facility, or maps of individual areas of the Facility, compiling previous sampling locations; for SI work involving groundwater sampling, an isopleth map(s) compiling previous groundwater sampling results; a table(s) compiling previous sampling results; and, any other relevant information.
- A statement of the potential problems posed by the area or COC of concern, and a description of how these potential problems shall be addressed by the objectives of the investigation.
- The manner in which the investigation satisfies the investigation requirements of the ROD.
- Results of a data quality objectives analysis conducted in accordance with EPA QA/G-4 cited in Section 2.1.
- The ROD cleanup levels or alternative DEQ-approved cleanup levels for the area of concern and potential constituents of concern.
- A timetable for implementing the investigation. BNSF shall provide a schedule including start and completion dates or timeframes for significant activities to be performed under the particular work plan; this schedule shall comply with Section 4.0 of the SOW.
- A description of activity-specific protective measures, as necessary, to address community safety and health as related to the SI work, including any proposed community air monitoring plans, a response framework for responding to air monitoring exceedances, noise monitoring plans, traffic management plans, and any other monitoring or planning proposed to reduce short-term disturbances during remedial action.
- A description of how access, security, contingency procedures, and management responsibilities shall be handled.
- A description of how waste disposal shall be handled and identification of any permits necessary to conduct the investigation.
- A statement that applicable health and safety regulations shall be met during the investigation.
- A description of how compliance with each ERCL and each independently applicable requirement shall be achieved.

- A work plan-specific sampling and analysis plan, including a Quality Assurance Project Plan.

The SI work plan shall include a provision for preliminary analytical data and a summary data table to be submitted to DEQ within ten (10) days of receipt of the data from the laboratory for all samples collected from all potable supply wells, and all samples collected from outside the railyard including private well samples, indoor air/basement gas samples, residential soil samples and any other samples collected. Preliminary analytical data shall consist of laboratory data sheets and laboratory quality control sheets. BNSF is not required to provide quality review of preliminary analytical data prior to submittal to DEQ. (BNSF shall provide final analytical data, which has been reviewed for quality control purposes by BNSF, with SI reports, RA reports, and annual monitoring and maintenance reports.)

The SI work plan must include a work plan-specific sampling and analysis plan (SAP) that defines sampling and data collection methods that shall be used for the project. The work plan-specific SAP may reference a comprehensive SAP to fulfill many of the requirements of this section. The SAP shall describe sampling objectives, sampling equipment and procedures, and sample handling and analysis. The SAP must also include a Quality Assurance Project Plan (QAPP) describing quality assurance and quality control protocols. The SAP shall be written so that a field sampling team trained in environmental sampling methods, but unfamiliar with the Facility would be able to gather the samples and field information required. The SAP shall be a major component of the SI work plan and shall include the following elements and/or reference a comprehensive SAP where these elements can be found:

- Access authorization for BNSF, DEQ and authorized agents of both parties.
- Monitoring well installation information (if wells are to be constructed), including:
  - well construction methods (provide Standard Operating Plan [SOP] and reference with a brief narrative);
  - well completion methods, materials, and rationale;
  - location of wells and rationale;
  - Facility map showing proposed well locations and well identification (ID) numbers;
  - well development procedures; and
  - Topographic survey data, based on the North American Vertical Datum (NAVD) of 1988 as referenced from a nearby U.S. Geological Survey marker, U.S. Coast and Geodetic Survey marker, or other similar marker if available for location and elevation of completed monitoring wells.
- Schedules or timeframes for sampling of environmental media and cleanup confirmation sampling.
- Monitoring well(s) tentative installation schedules (if applicable).
- Sampling information, including details of:
  - methods (provide SOPs with brief narratives, also identify in a data collection table);
  - proposed locations and ID numbers (shown on a map, and in the data collection table);
  - order of sample collection (if applicable);
  - sample media and objectives (also identify in the data collection table);
  - QA/QC samples and field methods (also identify in the data collection table);
  - chain-of-custody procedures;

- shipping and handling arrangements;
  - analytical parameters, including:
    - justifications for analyses;
    - a table showing data quality objectives;
    - confirmation that method detection limits shall meet data quality objectives;
    - sample containers, preservation, and holding times;
    - analytical method numbers; and
    - provision for both DEQ and landowner split sample opportunity;
  - field analytical service considerations; and
  - rationale for special studies.
- Supplies and equipment list.
  - Instrument calibration.
  - Decontamination procedures, including:
    - entry and exit controls, if needed;
    - equipment decontamination protocols; and,
    - disposal of wastes, including debris and residue, resulting from sampling effort in compliance with all laws and considering EPA guidance for management of investigation-derived wastes during Superfund site inspections and in accordance with DEQ's purge water policy.
  - Details of field verification methods, including survey locations of soil and source samples, monitoring wells and other sampling locations.
  - A quality assurance project plan (QAPP) consistent with guidance in SOW Section 2.1 that includes details of proposed procedures for data validation.
  - A tentative list of personnel assigned to manage and perform fieldwork.

The SAP and QAPP shall be developed consistent with the guidance listed in Section 2.1 and shall be modified in compliance with DEQ comments to each work plan. To minimize redundancy in SAP preparation, BNSF may choose to prepare a single, Facility-wide comprehensive SAP and QAPP for all Tasks. Task-specific components to the SAP can then be submitted to DEQ as new attachments to the comprehensive SAP when SI work plans are prepared.

#### ***Groundwater-Specific Monitoring Requirements***

A network of wells for the purposes of groundwater monitoring is or may be required under Tasks F, G, and L of this Spring 2005 SOW. For any SI activity that involves COC-containing groundwater, and for which sufficient and appropriate historical Facility data are available, the SI work plan will include preliminary COC concentration isopleth maps that show the approximate dimensions of the area in which groundwater contains COC concentrations at or greater than the reporting limit (as specified in WQB-7, or if no reporting limit is specified in WQB-7, as specified in the standard analytical method). BNSF will provide COC isopleth maps of the distribution of the values contoured. The LNAPL thickness or analyte concentration will be printed adjacent to each well used to generate the respective map(s). COC concentration distribution maps will include isopleths for different vertical depth intervals of the aquifer if

significant vertical stratification of COC concentrations is demonstrated by the data. BNSF can add a caveat outlining any concerns regarding appropriateness of isopleth mapping. BNSF may elect not to prepare and submit COC concentration isopleth maps that show the approximate dimensions of the area in which groundwater contains COCs at concentrations at or greater than the WQB-7 (or standard method) required reporting limit. In this instance, DEQ may elect to prepare this COC concentration isopleth map and BNSF shall include the map in the deliverables, subject to BNSF's ability to attribute the map to the State and provide a disclaimer, as provided in Section 5.0. The SI work plan shall identify areas where additional information is needed to better define the groundwater portion of the Facility (i.e. groundwater containing COC concentrations at or greater than the reporting limit specified in WQB-7 or in the standard method).

SI work plans that include a groundwater monitoring component shall include a map showing the proposed monitoring well network relative to the estimated boundaries of groundwater containing COC concentrations at or greater than the WQB-7 (or standard method) reporting limit, and a monitoring schedule consisting of a table that lists the wells to be sampled, analytical and field parameters, and sampling frequency. The monitoring schedule shall be keyed to the map showing the locations and screen intervals of wells for each monitoring well network. The map should also include information from the private well inventory. All known domestic and commercial wells located within the estimated boundaries of the area in which COC concentrations are believed to exceed cleanup levels, and a monitoring zone established around that area based on site-specific and COC-specific characteristics, shall be sampled at least annually for the relevant COCs unless data demonstrate that a lesser frequency is protective of public health, safety, and welfare. BNSF must provide DEQ with preliminary analytical data and a table summarizing analytical results for domestic and commercial wells within ten (10) days of receipt of reports from the laboratory. The reports shall note any wells that exceed cleanup levels or contain reported analyte concentrations close to cleanup levels.

The SI work plan shall include provisions for re-sampling of potable supply wells that exceed cleanup levels within ten (10) days of receipt of data from the laboratory, and re-sampling of other domestic and commercial wells that exceed cleanup levels within thirty days of receipt of analytical data from the laboratory, and shall also include provisions for semi-annual sampling thereafter until cleanup levels are met over a one-year sampling period. The plan shall also require that, for domestic and commercial wells used to provide water for potable supply that exceed or shall exceed (based on trend analysis) cleanup levels, BNSF shall prepare a work plan addendum and shall provide DEQ-approved alternate water supplies for potable supply to the affected well owners.

All monitoring well networks shall comply with the following requirements, unless a different configuration of monitoring points or prior data serves the same purpose:

- Monitoring well networks shall include a longitudinal, centerline transect using wells upgradient (background), within, and downgradient (outside of) the area of groundwater containing COCs.
- Monitoring well networks shall include two or more lateral transects perpendicular to groundwater flow within and beyond (outside of) the known boundaries of groundwater containing COCs.
- The well locations and top of casing measuring points in the monitoring well networks shall be surveyed and referenced based on the NAVD of 1988 as referenced from a nearby U.S. Geological Survey marker, U.S. Coast and Geodetic Survey marker, or other similar marker if available by a licensed surveyor.
- Global Positioning Systems (GPS) may be used for pinpointing well locations if their accuracy is deemed by DEQ to be appropriate to the scale of the project.

#### **5.1.4 Subtask 4: Implement Supplemental Investigation Work Plan**

All activities shall be carried out in compliance with the consent decree and this Spring 2005 SOW. BNSF shall perform all SI field activities in compliance with the SI work plan, which shall include a SAP and QAPP, and the HSP. BNSF shall notify the DEQ Project Officer at least ten (10) working days prior to BNSF mobilization to the Facility before the start of work unless a different notice period is agreed to by DEQ. All laboratory data collected under this subtask, including private well samples, indoor air/basement gas samples, residential soil samples and any other samples collected from private property, shall be submitted to DEQ within ten (10) days of receipt of the preliminary analytical data from the laboratory.

#### **5.1.5 Subtask 5: Supplemental Investigation Report**

All activities shall be carried out in compliance with the consent decree and this Spring 2005 SOW. BNSF shall prepare SI reports in compliance with the requirements listed under Section 2.1. The SI reports shall also include the components listed below.

- A description of the work performed.
- Narrative of unforeseen problems and deviations from the work plan or SAP, including:
  - all opportunistic samples; and
  - any other changes.
- General field observations, including (as applicable):
  - groundwater characteristics, flow and survey information;
  - soil conditions and characteristics; and
  - field screening, visual or odoriferous signs of COCs.
- Monitoring well installation information (if wells are constructed), including:
  - well construction methods (reference Standard Operating Plan [SOP] and reference with a brief narrative);
  - well completion methods, materials, and rationale;
  - well construction logs;

- well development logs;
  - location of wells and rationale;
  - Facility map showing final well locations and well identification (ID) numbers;
  - well development procedures; and
  - results of topographic survey, based on the NAVD of 1988 as referenced from a nearby U.S. Geological Survey marker, U.S. Coast and Geodetic Survey marker, or other similar marker if available, for location and elevation of completed monitoring wells.
- Sampling information, including details of:
    - Methods and equipment (provide brief narratives, also identify in a sample summary table);
    - sample locations and ID numbers (shown on a map, and in the sample summary table);
    - order of sample collection, if applicable;
    - results of topographic survey, based on the NAVD of 1988 as referenced from a nearby U.S. Geological Survey marker, U.S. Coast and Geodetic Survey marker, or other similar marker if available, for location and elevation of installed soil borings or completed test pits;
    - sample media and objectives (also identify in the sample summary table);
    - QA/QC samples and field methods (also identify in the sample summary table);
    - chain-of-custody procedures and forms;
    - shipping and handling arrangements;
    - analytical parameters, including:
      - confirmation that method detection limits met data quality objectives;
      - sample containers, preservation, and holding times;
      - analytical method numbers; and
      - description of DEQ and landowner split sample collection (also include in the sample summary table); and
    - field analytical service results.
- Narrative describing QA/QC samples and procedures, including calibration of field screening equipment.
- Description of decontamination procedures used, including:
    - entry and exit controls, if used;
    - equipment decontamination protocols; and,
    - disposal of wastes, including debris and residue, resulting from sampling effort.
- A statement that compliance with each ERCL and each independently applicable requirement was achieved.
- Tables of analytical results compared to screening/clean-up levels identified in the ROD, including results from previous sampling; if used, exposure point concentrations must be appropriately calculated.
- A discussion of analytical results and data evaluation pertinent to the goals of the Facility investigation.
- A discussion of quality assurance and data validation, including data validation results.
- A map (drawn to scale) identifying sample locations, sample numbers, sample media, and COC concentrations.
- Groundwater potentiometric flow maps showing direction of flow, during each sampling/measurement event, as DEQ determines to be applicable.
- Groundwater COC concentration isopleth maps that show the approximate dimensions of both the area in which groundwater contains COCs at concentrations at or greater than the WQB-7 human health values and the area in which groundwater contains COCs at concentrations at or greater

than the WQB-7 (or standard method) required reporting limits, for the sampling events that occurred during highest and lowest water levels of that year, and for other sampling events as DEQ determines to be applicable. BNSF will provide COC isopleth maps of the distribution of the values contoured. The LNAPL thickness or analyte concentration will be printed adjacent to each well used to generate the respective map(s). COC concentration distribution maps will include isopleths for different vertical depth intervals of the aquifer if significant vertical stratification of COC concentrations is demonstrated by the data. BNSF can add a caveat outlining any concerns regarding appropriateness of isopleth mapping. BNSF may elect not to prepare and submit COC concentration isopleth maps that show the approximate dimensions of the area in which groundwater contains COCs at concentrations at or greater than the WQB-7 (or standard method) required reporting limit. In this instance, DEQ may elect to prepare this COC concentration isopleth map and BNSF shall include the map in the deliverables, subject to BNSF's ability to attribute the map to the State and provide a disclaimer, as provided in Section 5.0.

- Conclusions.
- Evaluation of need for and justification of any additional sampling.
- Copies of original field log books including date, time, personnel and activity information as an appendix. Boring logs, well completion logs, well development logs and well sampling logs may be typed up or otherwise computer-generated for the SI report, provided that all pertinent notes from the original log are transcribed into the final version that accompanies the report.
- A photographic log of sample locations and cores sampled (as applicable) and prominent Facility features as an appendix, where non-permanent sampling locations are used, or as otherwise determined to be appropriate by DEQ or BNSF.
- Copies of raw analytical data and laboratory validation (as applicable) packages as an appendix; and, copies of QA/QC or data validation checklists and/or reports by BNSF or its contractors.

If exposure point concentrations are calculated, they shall be calculated in accordance with guidance listed in Section 2.1; when fewer than 20 data points are available, discussions with DEQ will determine whether the data are adequate to calculate the UCL. Exposure point concentration calculations are appropriate only for evaluation of soils with regard to human health-based cleanup levels. In all deliverables under the Spring 2005 SOW, analytical data shall be compared to ROD cleanup levels for the facility, (see Attachment 1).

Each SI report shall be accompanied by electronic versions of all laboratory data, survey data, other pertinent data, tables and figures.

#### **5.1.6 Subtask 6: Risk Assessment Work**

The ROD selected remedy requires adherence to cleanup levels (Table 1 of Attachment 1), which were established either under the Facility-wide risk assessment (Section VII of ROD) or from other resources as indicated in the ROD. As described under specific remedy tasks in Section 3.0, for those values that are screening levels in the ROD, BNSF has the option of either adhering to cleanup levels set forth in ROD Table 1, or conducting site-specific risk assessment amendments to establish site-specific cleanup levels, pursuant to this Subtask. Risk assessment activities shall comply with the guidance listed in

Section 2.1 of this SOW. For this Spring 2005 SOW, this Subtask is only applicable for generation of indoor air cleanup levels.

If triggered under Task I, BNSF shall prepare an amendment to the Facility-wide risk assessment to develop site-specific cleanup levels for COCs in indoor air that are protective of human health, safety and welfare. BNSF shall calculate these site-specific cleanup levels based on the site conceptual exposure model (SCEM), the exposure and toxicity information, and the equations provided by DEQ in Attachment 2 of this Spring 2005 SOW.

#### **5.1.7 Subtask 7: Risk Assessment Documentation**

BNSF shall submit to DEQ a draft amendment to the Facility-wide risk assessment that addresses each proposed cleanup level. The amendment shall include an explanation of the SCEM, the exposure parameters and toxicity information, and the equations provided in Attachment 2 and used to calculate the site-specific cleanup levels. The amendment shall include sufficient detail for public review. Draft risk assessment amendment review and approval by DEQ shall be followed by a minimum 30-day public comment period. After the public comment period, BNSF shall incorporate relevant public comment as directed by DEQ and prepare a final risk assessment amendment for DEQ review and approval. Once site-specific cleanup levels have been calculated and have received final approval, these levels may be compared to the data collected for the Facility to determine where additional remedial action is necessary.

#### **5.1.8 Subtask 8: Feasibility Study Work Plan or EE/CA Work Plan**

Remedy selection activities, including feasibility studies and engineering evaluation/cost analyses (EE/CAs), shall not be part of the Spring 2005 SOW activities. The Livingston SOW shall address remedy selection activities.

#### **5.1.9 Subtask 9: Implement Feasibility Study Work Plan**

Remedy selection activities, including feasibility studies and engineering evaluation/cost analyses (EE/CAs), shall not be part of the Spring 2005 SOW activities. The Livingston SOW shall address remedy selection activities.

#### **5.1.10 Subtask 10: Feasibility Study Report**

Remedy selection activities, including feasibility studies and engineering evaluation/cost analyses (EE/CAs), shall not be part of the Spring 2005 SOW activities. The Livingston SOW shall address remedy selection activities.

**5.1.11 Subtask 11: Removal Work Plan**

Small-scale, straightforward removal actions may be allowed under the Livingston SOW, but shall not be part of the Spring 2005 SOW activities.

**5.1.12 Subtask 12: Implement Removal Work Plan**

Small-scale, straightforward removal actions may be allowed under the Livingston SOW, but shall not be part of the Spring 2005 SOW activities.

**5.1.13 Subtask 13: Remedial Design/Remedial Action Plan**

The remedial design (RD)/remedial action (RA) plan shall outline all activities necessary to implement the remedial action for a particular component of the selected remedy. The remedial action plan describes activities that will be conducted to implement a portion of the selected remedy; the remedial design details and addresses the technical requirements of the remedial action plan, and culminates in the production of engineering plans and specifications. A remedial action plan is required for all remedial activities under this Spring 2005 SOW; however, a remedial design is only required for those remedial actions that require engineering drawings or specifications. Remedial action plans and remedial designs shall generally be submitted together to DEQ, because the remedial action plan shall include an explanation of the implementation, operation and maintenance of the remedial design.

Nothing herein shall be construed to limit BNSF's option to combine RD/RA's for multiple remedy components and/or SOW tasks in a work plan to streamline the process. For some SOW Tasks, DEQ has determined that sufficient data have been collected at the Facility for characterization and selection of a remedial approach. For some other tasks, performance monitoring may be deemed necessary by DEQ to evaluate the effectiveness of planned remedial actions or systems and shall be incorporated into the RA plan. For other tasks, the RD/RA plan shall be prepared after SI activities. All activities shall be carried out in compliance with the consent decree and this Spring 2005 SOW. BNSF shall prepare RD/RA plans in compliance with the requirements listed under Section 2.1 and shall be consistent with the guidance provided by the document specified in Section 2.1. Development of each RD/RA plan requires the elements described below.

***Pre-work Plan Meeting***

Before or concurrent with developing work plans, BNSF shall attend one or more pre-work plan meetings with the DEQ Project Officer, if requested by either BNSF or DEQ. At the meetings, BNSF shall present an outline of the general approaches that it proposes to use for the work plan. The purpose of a pre-work plan meeting is to ensure that task objectives are clear to both parties. Prior to submitting an RD and/or

an RA plan, BNSF may submit to DEQ details of the RD components and general process of design to be used to complete the RD and develop the RA plan, for DEQ approval.

### ***Remedial Action Plan Requirements***

BNSF shall prepare a remedial action (RA) plan, which may be accompanied by a remedial design (RD). Where engineering design is not involved in an RA plan, BNSF shall submit a draft RA plan for review and comments prior to submitting the final RA plan. Each RD/RA plan shall be accompanied by a task-specific HSP, as outlined in Subtask 2. Final RA plans should contain the following, as appropriate:

- A brief narrative or table of previous work performed with references to the documents wherein the work was reported; a map of the Facility, or maps of individual areas of the Facility, compiling previous sampling locations; for RD/RA activities work involving groundwater sampling, an isopleth map(s) compiling previous groundwater sampling results; a table(s) compiling previous sampling results; and, any other relevant information.
- A description of the DEQ selected remedy.
- The ROD cleanup levels for the Facility or DEQ approved site-specific cleanup levels.
- The manner in which the RD/RA Plan satisfies the requirements of the ROD.
- A statement of the potential problems posed by the task and a description of how these potential problems shall be addressed by the objectives of the remedial design.
- A description of additional characterization, if any, necessary prior to remedial action and a schedule for implementation.
- A description of pilot testing, if any, necessary prior to remedial action and a schedule for implementation.
- A description of the RD components and general process of design that were used to complete the RD and develop the RA plan. The description should include, to the extent applicable:
  - a description of each task,
  - significant/substantive assumptions used in developing the remedial design,
  - a description of design elements included in the 50% design and 95% designs submitted to DEQ; and
  - a description of design quality assurance/quality control procedures
- Identification and summary narrative of relevant feasibility studies or reference(s) to where this information is found the FS report or EE/CA.
- A description of how implementation of the RA plan is expected to reduce to acceptable levels unacceptable risks to public health, safety, welfare and the environment at the Facility.
- A description of how compliance with each ERCL and each independently applicable requirement shall be achieved.
- A timetable for implementation of the RD/RA work plan and for any necessary monitoring of the Facility after the proposed measures are completed. BNSF shall provide a schedule including

specific start date and estimated completion timeframes for significant activities to be performed under the particular work plan; this schedule shall comply with Section 4.0 of the SOW.

- Description of plan for collection of confirmation samples, if applicable. A task-specific SAP and QAPP, if applicable, for conducting sampling and analysis required by the task and that shall measure achievement of cleanup goals. The SAP must be prepared in compliance with SAP requirements described under Subtask 3.
- A description of any institutional controls that shall be used to maintain protectiveness of the remedy, including proposed language for institutional controls.
- Description of procedures for evaluation of remedial action effectiveness, including evaluation of effectiveness of any proposed institutional controls.
- A description of expected post-remedial action monitoring and/or maintenance that shall be necessary to maintain the effectiveness of the selected remedy.
- A statement that applicable health and safety regulations shall be followed during implementation of the remediation proposal.
- A description of the measures to be undertaken to protect the health and safety of the community from potential risk related to remediation activities, including any proposed community air monitoring plan, a response framework for responding to air monitoring exceedances, a noise monitoring plan, traffic management plans, and any other monitoring or planning proposed to reduce short-term disturbances during remedial action.
- A description of how access, security, contingency procedures, and management responsibilities shall be handled.
- A description of expected final disposition of used PPE, debris, residue and other waste materials generated during the task or remaining after the task.
- Identification of any permits necessary to conduct the proposed activities.

The RA plan shall include a provision for all preliminary analytical data collected under this subtask including analytical data for private well samples, indoor air/basement gas samples, residential soil samples and any other samples collected from private property, to be submitted to DEQ within ten (10) days of receipt of the data from the laboratory.

#### ***Remedial Design Requirements***

Where engineering design is performed, BNSF shall submit an RD, consisting of 50% and 95% design packages, along with a draft RA plan for DEQ review and approval. The scope and content of the 50% and 95% design packages shall be established in the pre-work plan meetings and may be submitted to DEQ for approval during the RD process. The RD shall consist of design drawings and specifications (stamped and signed by a licensed professional engineer (P.E.)) for constructed features of the RA for which drawing and specifications are normally and customarily prepared, including engineering controls.

**Groundwater Monitoring Requirements**

For any activity that involves COC-containing groundwater, BNSF shall prepare and submit with the RA Plan, preliminary COC concentration isopleth maps that show the approximate dimensions of both the area in which groundwater contains COCs at concentrations at or greater than the WQB-7 human health values and the area in which groundwater contains COCs at concentrations at or greater than the WQB-7 (or standard method) required reporting limits. BNSF will provide COC isopleth maps of the distribution of the values contoured. BNSF can add a caveat outlining any concerns regarding appropriateness of isopleth mapping. BNSF may elect not to prepare and submit COC concentration isopleth maps that show the approximate dimensions of the area in which groundwater contains COCs at concentrations at or greater than the WQB-7 (or standard method) required reporting limit. In this instance, DEQ may elect to prepare this COC concentration isopleth map and BNSF shall include the map in the deliverables, subject to BNSF's ability to attribute the map to the State and provide a disclaimer, as provided in Section 5.0. Where applicable based on the task, the RA plan shall identify areas where additional information is needed to better delineate the distribution of COC concentrations in groundwater, including the approximate extent of groundwater containing COC concentrations at or greater than the WQB-7 (or standard method) required reporting limit. As an example, Figure 3-1 shows the apparent extent of groundwater containing the VOC tetrachloroethene (PCE), based on water quality data collected by BNSF in 2004. The PCE concentration contours in Figure 3-1 are approximate and are inferred based on concentration gradients observed between adjacent wells.

The implementation of Tasks F, G, and M of this Spring 2005 SOW may require establishment of a network of wells for the purposes of groundwater monitoring. RA plans that include a groundwater monitoring component shall include a map showing the monitoring well networks relative to the estimated boundaries of groundwater containing COC concentrations at or greater than the WQB-7 (or standard method) required reporting limit, and a monitoring schedule consisting of a table that lists the wells to be sampled, analytical and field parameters, and sampling frequency. The monitoring schedule shall be keyed to a map showing the locations and screen intervals of wells for each monitoring well network. The map should also include information from the private well inventory. All known domestic and commercial wells located within the estimated boundary of the area in which COC concentrations are believed to exceed cleanup levels, and a monitoring zone established around that area based on site-specific and COC-specific characteristics, must be sampled at least annually for the relevant COC(s) unless data demonstrate that a lesser frequency is protective of public health, safety, and welfare. BNSF shall submit preliminary analytical data and a table summarizing analytical results within ten (10) days of receipt of the data from the laboratory.

The RA plan shall include provisions for periodic re-sampling of domestic and commercial wells that exceed cleanup levels. The plan also shall require that, for domestic and commercial wells that provide water for potable supply that exceed or shall exceed (based on trend analysis) cleanup levels for COCs,

BNSF shall prepare a work plan addendum and shall provide DEQ-approved alternate water supplies for potable supply to the affected well owners. BNSF must provide DEQ with interim reports summarizing analytical results for domestic and commercial wells within ten (10) days of receipt of reports from the laboratory. The reports shall note any wells that exceed cleanup levels, or that contain reported analyte concentrations close to cleanup levels.

All monitoring well networks shall comply with the following requirements, unless a different configuration of monitoring points or prior data serves the same purpose:

- Monitoring well networks shall include a longitudinal, centerline transect using wells upgradient (background), within, and downgradient (outside of) the area of groundwater containing COCs.
- Monitoring well networks shall include two or more lateral transects perpendicular to groundwater flow within and beyond (outside of) the known boundaries of groundwater containing COCs.
- The well locations and top of casing measuring points in the monitoring well networks shall be surveyed and referenced based on the NAVD of 1988 as referenced from a nearby U.S. Geological Survey marker, U.S. Coast and Geodetic Survey marker, or other similar marker if available by a licensed surveyor.
- Global Positioning Systems (GPS) may be used for pinpointing well locations if their accuracy is deemed by DEQ to be appropriate to the scale of the project.

#### ***Confirmation of Effectiveness***

At the completion of any remedial action other than implementation of institutional controls and capping, collection of confirmation samples and comparison of confirmation sample results to cleanup levels is required to document the effectiveness of the remedial action. The effectiveness of institutional control components of a remedial action shall be confirmed through a long-term monitoring plan that includes monitoring of, for example, activities on the property affected by the institutional control, and checking of property deeds to ensure that institutional controls are visible. The effectiveness of capping shall be confirmed through monitoring and maintenance, and monitoring and maintenance reporting. Each RA plan must include a description of procedures for confirming the effectiveness of the remedial action, and must include contingency plans describing procedures to be followed if the remedial action is determined to not be effective. Contingency plans can follow one of three routes: 1) a contingency plan could include details of supplementary remedial actions to be implemented during remedial action, procedures for confirmation of effectiveness after supplementary remedial actions were implemented, and documentation in the RA report; 2), a contingency plan could consist of preparation and submission for DEQ approval of a separate RA plan addendum; or, 3) a contingency plan could consist of preparation of the RA report incorporating documentation that the RA was determined to be not effective, to be followed by submission to DEQ of a new and separate RA plan. Further remedial action shall always be required by DEQ if confirmation sampling indicates appropriately calculated exposure point concentrations exceed

cleanup levels, or if review of institutional controls reveals that those controls are not effective in protecting human health, safety and welfare.

#### **5.1.14 Subtask 14: Implementation of Remedial Action Plan**

BNSF shall conduct all remedial action activities and confirm remedial effectiveness in compliance with RD/RA plans and HSPs. All activities shall be carried out in compliance with the consent decree and this Spring 2005 SOW. Analytical data for private well samples, indoor air/basement gas samples, residential soil samples and any other samples collected from private property or not submitted under another Task, shall be submitted to DEQ within ten (10) days of receipt of the data from the laboratory.

#### **5.1.15 Subtask 15: Institutional Controls**

As applicable under the tasks in Section 3.0, institutional controls shall be required to maintain the selected remedy. The ROD selected remedy requires that restrictive covenants be placed on the railyard, and specifically the cinder pile and the former C & P Packing property, to restrict these properties to certain uses. For the railyard property, cleanup levels for soils are based on a worker exposure scenario. For the former C & P Packing property, the cleanup level is based on an industrial scenario. Restrictive covenants for these properties shall state that the use must remain industrial or commercial, as appropriate, as long as COC concentrations remain above residential levels. Commercial/industrial zoning as applied by the county and city offers another level of institutional control, and will be recommended by DEQ. The ROD selected remedy also requires restrictive covenants for the cinder pile cap, to restrict access and to help ensure the integrity of the cover. For the free product and dissolved petroleum areas, and VOC, lead (if confirmed) and any other area in which groundwater contains COC concentrations at or greater than the WQB-7 (or standard method) required reporting limit, at the Facility, DEQ may require that restrictive covenants be put in place to limit the use of groundwater and to prevent the possible expansion of the area of groundwater containing COCs by operation of extraction wells near the area's boundaries. In the event that indoor air remedial actions are implemented (SOW Task I), BNSF shall attempt to reach agreement with the landowners to maintain effective operation of the remedial systems, at no cost to the owner, until cleanup levels are maintained without the use of such systems. BNSF shall work with private property owners to attempt to reach agreements that gas protection systems remain operative in inhabitable structures until cleanup levels are met, regardless of changes in ownership of private property; this may include the use of institutional controls. If institutional controls are utilized to maintain protectiveness of the remedy, proposed language will be submitted to DEQ in an RA plan or work plan addendum, and a copy of the implemented institutional control shall be submitted to DEQ in the first annual report to be submitted after the control is emplaced.

All activities shall be carried out in compliance with the consent decree and this Spring 2005 SOW. For remedial activities requiring implementation of institutional controls, BNSF shall submit to DEQ for approval, as part of an RA plan, an institutional control description to restrict the use of real property in compliance with §75-10-727 MCA. The institutional control shall apply to the area delineated by DEQ to mitigate the risk posed to public health, safety, and welfare. Once approved, BNSF shall attempt to reach agreements with owners that place the restrictive use on the subject real property as specified in the RA plan and as part of the remedial action, and a copy of the covenant shall be included as an attachment to the appropriate RA report. Institutional controls can be removed as set forth in §75-10-727 MCA. The effectiveness of institutional control components of a remedial action shall be confirmed through a long-term monitoring plan that includes monitoring of, for example, activities on the property affected by the institutional control, and checking of property deeds to ensure that institutional controls are visible.

#### **5.1.16 Subtask 16: Remedial Action Report**

All activities shall be carried out in compliance with the consent decree and this Spring 2005 SOW. BNSF shall prepare RA reports in compliance with the requirements listed under Section 2.1. Specifically, the reports shall include the components listed below as deemed appropriate for each SOW task by DEQ:

- A brief narrative or table of previous work performed with references to the documents wherein the work was reported; a map of the Facility, or maps of individual areas of the Facility, compiling previous sampling locations; for RA work involving groundwater sampling, an isopleth map(s) compiling previous groundwater sampling results; a table(s) compiling previous sampling results; and, any other relevant information.
- A description of the components of the remedial action.
- A statement of the potential problems posed by the COC-containing media and a description of how these potential problems have been addressed by the remedial action.
- Identification of problems encountered in work plan implementation and details of any deviations from the RD/RA plan.
- The ROD cleanup levels for the Facility or DEQ approved site-specific cleanup levels.
- The manner in which the RD/RA satisfies the requirements of the ROD.
- Documentation of confirmation of effectiveness of the remedial action, including results of confirmation sampling, if conducted, with tables of analytical results compared to clean-up levels identified in the ROD, including results from previous sampling.
- Description of how exceedances in confirmation samples were addressed, including, if necessary, conducted or proposed additional sampling/monitoring or remedial actions and maintenance.
- A description of how implementation of the RD/RA plan reduced to acceptable levels any unacceptable risks to public health, welfare, safety, and the environment at the Facility.

- A description of how compliance with each ERCL and each independently applicable requirement was achieved.
- A narrative of general field observations, as applicable, including groundwater flow and survey information, soil conditions and characteristics, and visual or odoriferous signs of the presence of COCs.
- Description of QA/QC samples and procedures and a discussion of quality assurance and data validation.
- Identification of any permits obtained or waived by DEQ to conduct the proposed remedies.
- A description of any engineering controls implemented to maintain protectiveness of the remedy.
- As-built construction drawings of any engineered structures, including any engineering controls, stamped and signed by a P.E.
- Map(s) drawn to scale identifying remedial action area, confirmation sample location, sample numbers, sample media, and COC concentrations.
- Groundwater flow maps using potentiometric contours if groundwater cleanup is included in the task, showing groundwater flow during each sampling event as determined appropriate by DEQ.
- Groundwater COC concentration isopleth maps that show the approximate dimensions of both the area in which groundwater contains COCs at concentrations at or greater than the WQB-7 human health values and the area in which groundwater contains COCs at concentrations at or greater than the WQB-7 (or standard method) required reporting limits, for the sampling events that occurred during highest and lowest water levels of that year, and for other sampling events as DEQ determines to be applicable. BNSF will provide COC isopleth maps of the distribution of the values contoured. The LNAPL thickness or analyte concentration will be printed adjacent to each well used to generate the respective map(s). COC concentration distribution maps will include isopleths for different vertical depth intervals of the aquifer if significant vertical stratification of COC concentrations is demonstrated by the data. BNSF can add a caveat outlining any concerns regarding appropriateness of isopleth mapping. BNSF may elect not to prepare and submit COC concentration isopleth maps that show the approximate dimensions of the area in which groundwater contains COCs at concentrations at or greater than the WQB-7(or standard method) required reporting limit. In this instance, DEQ may elect to prepare this COC concentration isopleth map and BNSF shall include the map in the deliverables, subject to BNSF's ability to attribute the map to the State and provide a disclaimer, as provided in Section 5.0.
- A demonstration that institutional controls were implemented and are effective to maintain protectiveness of the remedy.
- A description of final disposition of materials, debris and residue generated during the task or remaining after the task, including waste disposal documentation as an appendix.
- Schedule and timeframe during which the work was performed.
- A post-remedial action maintenance and monitoring plan (with SAP/QAPP and HSP) to maintain and document the effectiveness of the selected remedy, including effectiveness of any implemented institutional controls.
- Copies of original field log books including date, time, personnel and activity information as an appendix. Boring logs, well completion logs, well development logs and well sampling logs may be typed up or otherwise computer-generated for the SI report, provided that all pertinent notes from the original log are transcribed into the final version that accompanies the report.

- A photographic log of sample locations and cores sampled (as applicable), remedy components and remedial activities, and prominent Facility features as an appendix, where non-permanent sampling locations are used, or as otherwise determined to be appropriate by DEQ or BNSF.
- Copies of raw analytical data and laboratory validation (as applicable) packages as an appendix; and, copies of QA/QC or data validation checklists and/or reports by BNSF or its contractors.

If exposure point concentrations are calculated, they shall be calculated in accordance with guidance listed in Section 2.1; when fewer than 20 data points are available, discussions with DEQ will determine whether the data are adequate to calculate the UCL. Exposure point concentration calculations are appropriate only for evaluation of soils with regard to human health-based cleanup levels. In all deliverables under the Spring 2005 SOW, analytical data shall be compared to ROD cleanup levels for the facility (see Attachment 1).

Each RA report shall be accompanied by electronic versions of all laboratory data, survey data, other pertinent data, tables and figures.

Upon review of the RA report, DEQ may require additional confirmation sampling in areas where limited sampling was conducted. Additional confirmation sampling shall be addressed through a work plan addendum and a report addendum, or through a separate RD/RA Work Plan and HSP, and a separate RA Report.

#### **5.1.17 Subtask 17: Post-Remedial Action Monitoring & Maintenance**

All activities shall be carried out in compliance with the consent decree and this Spring 2005 SOW. BNSF shall conduct post-remedial action sampling, post-remedial action monitoring and post-remedial action maintenance to monitor the effectiveness of the remedial action in compliance with the requirements of Subtasks 3, 5, 12, and 15, unless otherwise determined on a task-specific basis by DEQ. Post-remedial action monitoring and maintenance is required whenever COC concentrations remain above cleanup levels and where institutional controls are required. Post-remedial monitoring and maintenance plans shall be included in the RA reports for tasks as described in Section 3.0. BNSF shall conduct all post-remedial monitoring and maintenance activities in compliance with RA plans and RA reports. Any necessary revisions to post-remedial action monitoring and maintenance plans shall be identified in the annual monitoring and maintenance report, which shall include a monitoring schedule for the following year.

### 5.1.18 Subtask 18: Monitoring and Maintenance Report

All activities shall be carried out in compliance with the consent decree and this Spring 2005 SOW. If post-remedial action monitoring or maintenance is required for remedy tasks, BNSF shall provide DEQ with annual post-remedial action monitoring and maintenance reports that include the following elements as determined applicable by DEQ.

- A description of work performed during the reporting year, by task.
- General field observations, including: groundwater potentiometric maps indicating groundwater flow direction during each quarterly sampling event and for other sampling events as determined appropriate by DEQ, and survey information; soil conditions and characteristics; and visual or odoriferous signs of remedy failure.
- Deviations from the post-remediation monitoring SAP, including all opportunistic samples and any other changes.
- Details of QA/QC samples and procedures and a discussion of quality assurance and data validation.
- Tables of analytical results compared to clean-up levels identified in the ROD, or alternative DEQ-approved site-specific cleanup levels, including results from previous monitoring.
- A discussion of analytical results that differ from those expected based on past data; or, a statement that results were consistent with past data.
- Map(s) drawn to scale identifying sample location, sample numbers, sample media, and COC concentrations (if monitoring of COC concentrations is taking place).
- Groundwater COC concentration isopleth maps that show the approximate dimensions of both the area in which groundwater contains COCs at concentrations at or greater than the WQB-7 human health values and the area in which groundwater contains COCs at concentrations at or greater than the WQB-7 (or standard method) required reporting limits, for the sampling events that occurred during highest and lowest water levels of that year, and for other sampling events as DEQ determines to be applicable. BNSF will provide COC isopleth maps of the distribution of the values contoured. The LNAPL thickness or analyte concentration will be printed adjacent to each well used to generate the respective map(s). COC concentration distribution maps will include isopleths for different vertical depth intervals of the aquifer if significant vertical stratification of COC concentrations is demonstrated by the data. BNSF can add a caveat outlining any concerns regarding appropriateness of isopleth mapping. BNSF may elect not to prepare and submit COC concentration isopleth maps that show the approximate dimensions of the area in which groundwater contains COCs at concentrations at or greater than the WQB-7 (or standard method) required reporting limit. In this instance, DEQ may elect to prepare this COC concentration isopleth map and BNSF shall include the map in the deliverables, subject to BNSF's ability to attribute the map to the State and provide a disclaimer, as provided in Section 5.0.
- An updated well inventory including a list of wells, current owners, locations, (including a cross-reference to a well location map), and well use. To the extent reasonably available the address of current owner, driller, date drilled, static water level, lithologic logs, well depth, and well construction design must be included. The report shall include a map to scale using reference points to show the locations of these wells and documentation of any required efforts to verify the presence or absence of unregistered wells.

- A discussion of task-specific maintenance activities, including any deviations from maintenance plans.
- A description of final disposition of materials, debris and residue generated during the monitoring and maintenance activities or remaining after the monitoring and maintenance activities, including waste disposal documentation as an appendix.
- Evaluation of need for additional sampling/monitoring or remedial actions or maintenance.
- Copies of original field log books including date, time, personnel and activity information as an appendix. Boring logs, well completion logs, well development logs and well sampling logs may be typed up or otherwise computer-generated for the monitoring and maintenance report, provided that all pertinent notes from the original log are transcribed into the final version that accompanies the report.
- A photographic log of sample locations and cores sampled (as applicable) and prominent Facility features as an appendix, where non-permanent sampling locations are used; remedy components or remedial activities conducted; and structures inspected or otherwise monitored, as determined to be appropriate by DEQ or BNSF.
- Copies of raw analytical data and laboratory validation (as applicable) packages as an appendix; and, copies of QA/QC or data validation checklists and/or reports by BNSF or its contractors.
- Task-specific monitoring schedules (consisting of a list of monitoring sites, parameters and frequency) for the following year.
- Task-specific maintenance schedules (consisting of a list of maintenance activities, inspections and frequency) for the following year.
- Proposed revisions to previous monitoring and maintenance plans/schedules for the following year.

Annual monitoring and maintenance reports shall include interim reporting for Tasks F, G and L. Tasks C, F, G, I and L include monitoring and maintenance requirements; other tasks may also include monitoring and maintenance requirements and therefore be included in the annual monitoring and maintenance report, based on results of supplemental investigations or remedial activities.

Each monitoring and maintenance report shall be accompanied by electronic versions of all laboratory data, survey data, other pertinent data, tables and figures.

The post-remedial action monitoring and maintenance reports, as required for various tasks in Section 3.0, shall be combined into one annual comprehensive monitoring and maintenance report. This report shall describe the monitoring and maintenance results for the previous year and include a proposed monitoring and maintenance schedule (based on monitoring and maintenance plans in RA plans and RA reports) for the following year. The report shall be submitted to DEQ within the first quarter of the year following that in which the activities were conducted. DEQ has the option to require additional monitoring and maintenance and additional monitoring and maintenance reporting if new conditions arise or new information becomes available.

The report shall also include summaries of monitoring results compared to cleanup levels (with laboratory reports as an appendix), graphs of key parameter concentrations over time, Facility inspection results, potentiometric maps, revised COC isopleth maps (based on results of Tasks F, G, M and other applicable Tasks) that delineate areas of groundwater containing COC concentrations at or above WQB-7 (or standard method) required reporting limits, a discussion of any changes in COC concentration distributions and the dimensions of the area of groundwater containing COC concentrations at or greater than WQB-7 (or standard method) required reporting limits, summary evaluations of pilot tests, and other reportable requirements of tasks previously described in this SOW.

### **5.1.19 Subtask 19: Communications**

#### ***Weekly Communications***

BNSF and/or its contractor(s) shall communicate at least weekly with the DEQ Project Officer, either in face-to-face meetings or through conference calls during field activities, unless mutually waived for a given period. This communication is important to ensure that any potential issues are quickly addressed, and to resolve any problems that arise during implementation of the selected remedy.

#### ***Preliminary Analytical Data and Summary Tables***

BNSF must provide DEQ with preliminary analytical data and a table summarizing analytical results for potable supply wells, and all wells located outside of the railyard, indoor air/basement gas, residential soils or other samples collected from property outside of the railyard, within ten (10) days of receipt of reports from the laboratory. Preliminary analytical data shall consist of laboratory data sheets and laboratory quality control sheets. BNSF is not required to provide quality review of preliminary analytical data prior to submittal to DEQ. (BNSF shall provide final analytical data, which has been reviewed for quality control purposes by BNSF, with SI reports, RA reports, and annual monitoring and maintenance reports.) The summary table and accompanying text shall note any wells that exceed cleanup levels or contain reported analyte concentrations close to cleanup levels. Exceedances or projected exceedances of cleanup levels shall be addressed (via immediate and continued re-sampling and provision of a DEQ-approved alternate water supply in the case of water wells providing water for potable supply) through addenda to the work plan under which the sampling was conducted.

#### ***Quarterly Reports***

BNSF shall prepare at least quarterly status reports that provide the status of the progress of each of the SOW tasks including identification of any laboratory data received or field activities conducted, copies of laboratory data received, and field logs and other data obtained in the field. The quarterly status reports shall note any unusual or unanticipated results from any activities, including sampling/monitoring activities, required by the SOW. The quarterly status report shall also include any laboratory data

received or results of any field activities conducted that are not set forth in another deliverable in the SOW. If a SOW task has not been implemented by the time that a status report has been prepared, then the report shall note when the task is expected to begin and end. These progress reports shall be made available to the public and the reporting period shall begin upon the effective date of this Spring 2005 SOW.

### ***Annual Monitoring & Maintenance Reports***

As required by Subtask 18, BNSF shall prepare and submit an annual report for the Facility to DEQ within the first quarter of the following year. Annual monitoring and maintenance reports shall also include any annual interim reporting required for Tasks F and G. Compared to quarterly status reports, the annual reports shall include interpretation of the results including BNSF's data validation. Results consistent with past results and expectations may be so described without further elaboration. The annual report will also include recommendations for subsequent action, as appropriate.

### ***Report Distribution***

DEQ will be responsible for distributing documents to the three document repositories listed in Subtask 1 of the SOW. BNSF shall be responsible for submitting documents to DEQ and to the Park County Environmental Council or other citizen-representative organization as determined by DEQ. DEQ requires that electronic copies of all draft and final documents be submitted to DEQ, in order to expedite DEQ review and allow for electronic exchange of documents with the public.

For the documents listed below, BNSF shall submit two draft hard copies and one draft electronic copy of each document to the DEQ Project Officer, and one hard copy of each draft document to the Park County Environmental Council or other citizen-representative organization as determined by DEQ; and, BNSF shall submit four final hard copies and one electronic copy to the DEQ Project Officer, and one final hard copy to the citizen-representative organization:

- SI Work Plan
- HSP
- SI Report
- RA Work Plan
- RA Report
- Annual monitoring and maintenance reports

Risk assessment amendments shall undergo a public comment process. Prior to the public comment period, BNSF shall submit two draft hard copies and one draft electronic copy of each document to the DEQ Project Officer for DEQ review. After any DEQ-required revisions to the document and once DEQ has approved the draft document for public release, BNSF shall submit four draft hard copies and one draft electronic copy of each document to the DEQ Project Officer, and one hard copy of each draft

document to the Park County Environmental Council or other citizen-representative organization as determined by DEQ. After the public comment period, incorporation of the community acceptance criteria, and final approval by DEQ, BNSF shall submit four final hard copies and one final electronic copy to the DEQ Project Officer, and one final hard copy to the citizen organization. All activities shall be carried out in compliance with the consent decree and this SOW.

Quarterly status reports shall not be subject to DEQ approval and therefore shall be submitted in final form only (no draft required). For quarterly reports, BNSF shall submit four hard copies to the DEQ Project Officer, and one copy to Park County Environmental Council or other citizen-representative organization as determined by DEQ.

Preliminary analytical data reports and summary tables reports containing results of sampling of private wells, indoor air/basement gas, residential soils or other samples collected from private property, shall be submitted to DEQ only. BNSF shall submit two hard copies and one electronic copy of each preliminary analytical data report, summary tables and accompanying text to the DEQ Project Officer.

**ATTACHMENT 1**  
**RECORD OF DECISION**

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**ATTACHMENT 2**  
**RISK ASSESSMENT PARAMETERS**

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