



MONTANA HAZARDOUS WASTE PERMIT
Permit Number MTHWP-14-01

Issued to:
BNSF Railway Company

for the
Former Tie Treating Plant
Paradise, Montana

EPA ID Number MTD000716787

MTHWP-14-01 (Second Reissuance)

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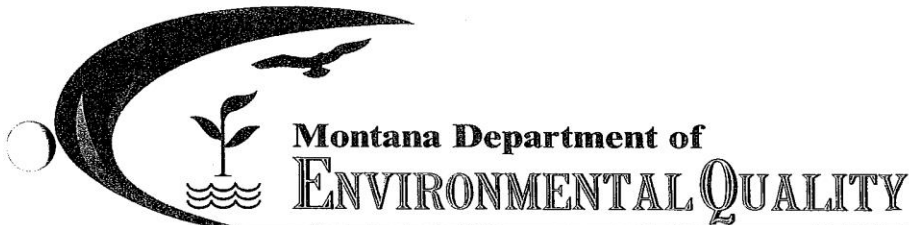
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Montana Department of Environmental Quality
Permitting and Compliance Division Waste Management and Remediation Division
Waste and Underground Tank Management Bureau
Metcalf Building
Helena, Montana

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**Montana Department of
ENVIRONMENTAL QUALITY**

**Steve Bullock, Governor
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MONTANA HAZARDOUS WASTE PERMIT

Permit No. MTHWP-14-01

Permittee: BNSF Railway Company
EPA Identification Number – MT000716787

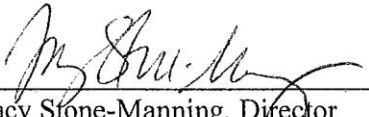
Pursuant to the Montana Hazardous Waste Act (MHWA) and regulations promulgated thereunder by the Montana Department of Environmental Quality (hereafter referred to as DEQ), a Permit is hereby issued to BNSF Railway Company, (hereafter called Permittee) for continued operation of two storage tanks and a corrective action management unit; post-closure care of a surface impoundment, waste pile unit, and land treatment unit; and implementation of facility-wide corrective action. The BNSF Railway Company Former Tie Treating Plant in Paradise, Montana (hereafter referred to as the BNSF Paradise Site) is located adjacent to the Clark Fork River in Paradise, Montana in the NW ¼ of Section 20, the SE ¼ of Section 18, and the SW ¼ of Section 17, Township 19 North, Range 25 West, Sanders County (latitude 47° 24' 00", longitude 114° 48' 30").

This Permit consists of the conditions contained herein (including those in any attachments and appendices), and the applicable requirements in Title 17, Chapter 53, Administrative Rules of Montana (ARM) as specified in the Permit. The Permittee must comply with all terms and conditions of the Permit.

DEQ presumes the Permit application, received April 14, 2011, and subsequently amended (hereafter referred to as the Application), is accurate. Where portions of the Application are incorporated herein, they are deemed to be part of this Permit.

The Permittee must inform DEQ of any changes in on-site operations or Application information that would affect the Permittee's ability to comply with the Permit conditions or applicable regulations. Any inaccuracies or misrepresentations found in the Application may be grounds for termination, modification or revocation, and reissuance of this Permit.

This Permit is effective as of October 17, 2014, and shall remain in effect through October 17, 2024, unless revoked and reissued, or terminated.

Signature: 
Tracy Stone-Manning, Director
Montana Department of Environmental Quality

Date: 9.8.14

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Module I
Standard Permit Conditions

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- I.3. Corrective Action Management Unit (CAMU) Map
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- I.5. Personnel Training
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Module I Standard Permit Conditions

I.A. **Citation Convention**

For ease of reading and referencing, where the federal rule under the Code of Federal Regulations (CFR) is incorporated by reference into the Administrative Rules of Montana (ARM), only the federal citation is used. Attachment I.1 includes a cross-reference table showing the CFR rules and corresponding ARM rules.

I.B. **Permittee**

The Department of Environmental Quality (DEQ) has issued this permit to BNSF Railway Company (BNSF) for its former tie treating plant located in Paradise, Montana (BNSF Paradise).

I.C. **Facility Description**

I.C.1. *Legal Description*

NW ¼ of Section 20, SE ¼ of Section 18, and the SW ¼ of Section 17, Township 19 North, Range 25 West, Sanders County, Montana. A regional and facility map are provided in Attachment I.2.

I.C.2. *Permitted Units Descriptions*

Permitted Units at the BNSF Paradise facility include a Waste Pile Unit (WPU), Surface Impoundment (SI), Land Treatment Unit (LTU), ~~Storage Tanks T-6 and T-7~~, and a Corrective Action Management Unit (CAMU) which encompasses the WPU, the SI, and the LTU.

I.C.2.a. *Waste Pile Unit (WPU):*

Located in the northwest ¼ of Section 20, Township 19 North, Range 25 West, Sanders County, Montana. The WPU has been closed; post-closure activities must accord with the conditions in Modules II and III of this permit. Certificate of Survey (COS) 1007, filed with Sanders County, defines the aerial extent of the ~~waste pile~~WPU. COS 2462, also filed with Sanders County, provides an update to COS 1007.

~~I.C.2.b. *Storage Tanks T-6 and T-7:*~~

~~Storage tank T-6 is located northeast of the office building and holds creosote product from tanks T-7 and T-4 prior to being shipped off-site for disposal. Storage tank T-7 is located in the product recovery shed located in the former treatment area and holds creosote product recovered from the former treatment area.~~

~~I.C.2.c.~~I.C.2.b. *Land Treatment Unit (LTU):*

Located in the northwest ¼ of Section 20 and Southwest ¼ of Section 17, Township 19 North, Range 25 West, Sanders County, Montana. The LTU has been closed; post-closure activities must accord with conditions in Modules II and

III of this permit. Certificate of Survey (COS) 982, filed with Sanders County, defines the aerial extent of the LTU.

I.C.2.d.I.C.2.c. Surface Impoundment (SI):

Located in the southwest ¼ of Section 17, and the Northwest ¼ of Section 20, Township 19 North, Range 25 West, Sanders County, Montana. The SI has been closed and is currently in post-closure. Certificate of Survey (COS) 1007, filed with Sanders County, defines the aerial extent of the SI. COS 2462 provides an update to COS 1007 and is also filed with Sanders County.

I.C.2.e.I.C.2.d. Corrective Action Management Unit (CAMU):

Located in the northwest ¼ of Section 20 and Southwest ¼ of Section 17, Township 19 North, Range 25 West, Sanders County, Montana. A map showing the areas included in the CAMU is provided in Attachment I.3. The CAMU is comprised of:

I.C.2.e.i.I.C.2.d.i. Surface Impoundment:

The southern portion of the SI described in Condition I.C.2.d. is included in the CAMU. ~~This portion of the SI houses the Product Recovery System as described in Condition I.C.2.e.ii. below.~~

I.C.2.e.ii.I.C.2.d.ii. Product Recovery System (PRS):

Located in the southern footprint of the SI and in the former retort area is a product ~~recovery building and~~ recovery well system. ~~The p~~Product recovery system utilizes approximately ~~1611~~ product recovery wells. Product ~~and water~~ recovered from these wells is ~~contained containerized and shipped off-site, routed through pipe into the product recovery building for treatment and storage.~~ ~~Treated water is then reinfiltreated into the SI.~~

I.C.2.e.iii.I.C.2.d.iii. Land Treatment Unit:

The LTU described in Condition I.C.2.c. is included in the CAMU. This portion of the CAMU is currently inactive and the LTU is in post-closure. No remediation waste from product recovery operations can be placed on the LTU.

I.C.3. *Risk-Based Clean Closure Units:*

I.C.3.a. *Land Treatment Demonstration (LTD) Plots:*

Located in the southwest ¼ of Section 17, Township 19, Range 25 West, Sanders County, Montana. The LTD plots were comprised of two active plots and a control plot constructed in 1985. The plots measure 12' x 48' each and are located north of the SI. The LTD plots are no longer in use and soils have been clean closed to residential risk-based levels. Therefore, requirements in this permit are not applicable to the LTD plots.

I.C.3.b. *Section 18 Portion of the Surface Impoundment (Section 18):*

Located in the southeast ¼ of Section 18, Township 19 North, Range 25 West, Sanders County, Montana. Surface soils in this area have been clean closed to

residential risk-based levels. Therefore, requirements in this permit no longer apply to the Section 18 portion of the SI.

I.D. Applicability

The conditions of this Module apply to the Permitted Units described in Condition I.C.2., and all solid waste management units (SWMUs) and areas of concern (AOCs) defined in Condition V.A.3.

I.E. Definitions

The terms used in this permit have the same meaning as those in the Resource Conservation Recover Act (RCRA), Montana Hazardous Waste Act (MHWA), ARM Title 17, Chapter 53, 40 CFR 124, 260, 261, 264, 268, 270, and 279, and the Federal Register dated July 27, 1990, unless this permit specifically provides otherwise. Where terms are not defined in the rules and regulations, this permit, or EPA guidance or publications, the terms shall have the meaning of a standard dictionary reference or the generally accepted scientific or industrial meaning of the term. The following terms are specifically defined in this permit.

Area of Concern (AOC) means any area at a facility having a probable release of a hazardous waste or hazardous constituent which may or may not be from a solid waste management unit and is determined by DEQ to pose a current or potential threat to human health or the environment. AOCs include areas that have been contaminated by routine and systematic releases of hazardous waste or hazardous constituents, excluding one-time accidental spills that are immediately remediated and cannot be linked to solid waste management activities. AOCs must be considered equivalent to SWMUs for the purposes of investigation and corrective action.

Contamination means any hazardous waste or hazardous constituent listed in 40 CFR Part 261 or Appendix IX of 40 CFR Part 264.

Corrective Measures means all corrective actions necessary to protect human health and the environment from all releases of hazardous waste or hazardous constituents from any permitted unit, SWMU, and/or AOC at the facility regardless of the time of placement of the waste in the unit, as required under this permit and 40 CFR 264.101. Corrective measures may address releases to air, soils, subsurface gases, surface water, or groundwater.

DEQ means the Montana Department of Environmental Quality

Director means the Director of the Montana Department of Environmental Quality.

Facility means contiguous land, structures, other appurtenances, and improvements on the land under the control of the owner or operator seeking a permit under the MHWA and ARM Title 17, chapter 53.

Hazardous Constituent means any constituent identified in Appendix VIII of 40 CFR Part 261 or Appendix IX of 40 CFR Part 264.

Hazardous Waste means a hazardous waste as defined in 40 CFR 261.3. [40 CFR 270.2]

Hazardous Waste Management Facility (HWM facility) means all contiguous land, and structures, other appurtenances, and improvements on the land, used for treating, storing, or disposing of hazardous waste. A facility may consist of several treatment, storage, or disposal operational units. [40 CFR 270.2]

Hazardous Waste Management Unit means a contiguous area of land on or in which hazardous waste is placed or the largest area in which there is significant likelihood of mixing hazardous waste constituents in the same area. Examples include a surface impoundment, a waste pile, a land treatment area, a landfill cell, an incinerator, a tank and its associated piping and underlying containment system, and a container storage area. A container alone does not constitute a unit; the unit includes containers and the land or pad upon which they are placed.

Hazardous Waste Storage Facility (HWSF) means the Permitted Units defined in Condition I.C.2.

Land Disposal means placement in or on the land, except in a corrective action management unit or staging pile, and includes, but is not limited to, placement in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, underground mine or cave, or placement in a concrete vault, or bunker intended for disposal purposes. [40 CFR 268.2]

BNSF Railway Company Part B Application means the information submitted by BNSF Railway Company in the RCRA Part B permit application submitted June 1987 and Revised May 1989, the Part B permit renewal application submitted July 1999, ~~and~~ the Part B permit renewal application received by DEQ on April 14, 2011, and the Class 3 Permit Modification request provided as an amendment to the Part B Application received by DEQ on May 16, 2019 and July 15, 2019.

Permittee means BNSF Railway Company (BNSF).

Person means an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof. [40 CFR 270.2]

Regional Administrator means the Regional 8 Administrator of the Environmental Protection Agency or his/her designee. [40 CFR 260.10 and 40 CFR 270.2]

Release means any spill, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of any hazardous waste or hazardous constituents into the environment.

Remediation Waste means all solid and hazardous wastes, and all media (including ground water, surface water, soils, and sediments) and debris that are managed for implementing clean-up. [40 CFR 260.10]

Solid Waste means a solid waste as defined in 40 CFR 261.2. [40 CFR 260.10]

Solid Waste Management Unit (SWMU) means any discernible unit at which solid waste has been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. SWMUs include MHWAs-regulated hazardous waste management units. Such units include any area at a facility at which solid waste has been routinely and systematically released.

Unit includes, but is not limited to, any landfill, surface impoundment, waste pile, land treatment unit, incinerator, injection well, contaminated groundwater collection/storage tank, drum, or other storage device, spray device, splash pad, drip pad, skimmer tank, oil water separator, container storage area, septic tank, drain field, lateral underdrain, sump, emulsion aerator device, wastewater treatment unit, elementary neutralization unit, transfer station soil ventilation device, recycling unit, underground lateral drain, French drain, waste transfer routes, pipes, sewers, and/or other interim measure or corrective action structure.

I.F. Effect of Permit

I.F.1. General

I.F.1.a. Compliance with this permit during its term constitutes compliance, for purposes of enforcement, with the MHWAs except for those requirements not included in the permit which:

I.F.1.a.i. Become effective by statute;

I.F.1.a.ii. Are later promulgated; or

I.F.1.a.iii. Are promulgated under 40 CFR 268 restricting the placement of hazardous wastes in or on the land;

I.F.1.a.iv. Are promulgated under 40 CFR 265, subpart AA, BB, or CC limiting air emissions. [40 CFR 270.4(a)]

I.F.1.b. The issuance of this permit does not convey any property rights of any sort, or any exclusive privilege. [40 CFR 270.4(b)]

I.F.1.c. The issuance of this permit does not authorize any injury to persons or property or invasion of other private rights, or any infringement of State or local law or regulations. [40 CFR 270.4(c)]

I.F.2. *Hazardous Waste Storage, Treatment, and Disposal*
The Permittee is allowed to store, treat, or dispose of hazardous waste in accordance with the conditions of this permit. Any storage of hazardous waste not authorized by this permit is prohibited.

I.F.3. *Facility-Wide Corrective Action*

I.F.3.a. The Permittee is required, under the conditions of this permit and 40 CFR 264.101, to institute facility-wide corrective action as necessary to protect human health and the environment for all releases of hazardous waste or hazardous constituents from any SWMU or AOC at the facility, regardless of the time at which waste was placed in such units.

I.F.3.b. The Permittee must implement corrective actions beyond the facility property boundary, where necessary to protect human health and the environment, unless the Permittee demonstrates to the satisfaction of the Director that, despite the Permittee's best efforts, the Permittee was unable to obtain the necessary permission to undertake such actions. The Permittee is not relieved of all responsibility to clean up a release that has migrated beyond the facility boundary where off-site access is denied. On-site measures to address such releases will be determined on a case-by-case basis.

I.F.3.c. AOCs shall receive the same level of investigation and remediation as that required by rules, regulations and statutes for SWMUs. [40 CFR 270.32(b)(2)]

I.G. **Financial Assurance**

BNSF is identified as the Holder of Financial Responsibility for the Permitted Units as described in Condition I.C.2. and for facility-wide corrective action required in Module V (Facility-Wide Corrective Action) at the Paradise, Montana facility.

I.G.1. *General Financial Assurance Requirements*

I.G.1.a. The Permittee shall comply with the requirements of 40 CFR 264.148 with regard to the incapacity of the Permittee, its guarantors, or financial institutions to provide financial assurance.

I.G.1.b. In the event that DEQ incorporates changes to 40 CFR 264 Subpart H after the effective date of this permit, DEQ may consider a revision of the financial requirements of this permit in accordance with the new subpart H requirements and modify the permit accordingly.

I.G.2. *Cost Estimates for Operations, Closure, and Post-Closure Care*

- I.G.2.a. Cost estimates must include all necessary long term costs such as operating and maintenance costs for each Permitted Unit described in Condition I.C.2., monitoring costs, and costs associated with current or future closure and post-closure care.
- I.G.2.b. All cost estimates must be in current dollars and must not incorporate any salvage value that may be realized from the sale of wastes, facility structures or equipment, land, or other assets associated with the facility.
- I.G.2.c. The Permittee must adjust the cost estimate(s) for inflation each year.
- I.G.2.d. The Permittee must adjust the cost estimate(s) if DEQ determines that additional work is required, or if any other conditions increase the cost of the work to be performed under this Permit.
- I.G.2.e. The Permittee must submit each written cost estimate to DEQ for its review and approval.
- I.G.2.f. The Permittee must keep the latest operation, maintenance, closure, and post-closure care cost estimate at the offices of the BNSF Paradise facility.
- I.G.3. *Financial Assurance Demonstration*
- I.G.3.a. The Permittee shall demonstrate continuous compliance with 40 CFR 264.146 by providing documentation of financial assurance, as required by 40 CFR 264.151 in at least the amount of the cost estimates required by Condition I.G.2. and I.G.5.c.
- I.G.3.b. In the event DEQ determines that a financial assurance instrument provided pursuant to Condition I.G. is inadequate, or otherwise no longer satisfies the requirements set forth in this Permit, within 30 days after receipt of notice of DEQ's determination, BNSF shall prepare and submit for approval a revised or alternative form of financial assurance that satisfies all requirements set forth in this Permit.
- I.G.3.c. In the event that BNSF becomes aware at any time of information indicating that any financial assurance instrument provided pursuant to Condition I.G. is inadequate or no longer satisfies the requirements set forth in this Permit, within 30 days after becoming aware of such information, BNSF shall prepare and submit for approval a revised or alternative form of financial assurance that satisfies all requirements set forth in this Permit.
- I.G.3.d. The Permittee's inability to secure financial assurance for the completion of work to be performed in accordance with this Permit shall in no way excuse performance of any other requirements of this Permit.
- I.G.4. *Liability Requirements for the Permitted Units*

The Permittee shall demonstrate continuous compliance with the requirements in 40 CFR 264.147 including the requirements to have and maintain liability coverage for sudden and non-sudden accidental occurrences in the amount of at least \$4 million per occurrence with an annual aggregate of at least \$8 million, exclusive of legal defense costs. Changed in the liability coverage mechanism must be approved by DEQ.

- I.G.5. *Financial Assurance for Facility-Wide Corrective Action*
Within 45 calendar days after receipt of written DEQ approval of the workplan for the current phase of activity required under Module V (Facility-Wide Corrective Action), the Permittee shall provide financial assurance for that phase of activity in accordance with 40 CFR 264.144 through .148.
- I.G.5.a. If the Permittee is using a financial test or guarantee, all facilities in the United States and its territories that are also being covered by the financial test or guarantee of the Permittee must be listed and the amounts covered must be included in Alternative I or Alternative II, whichever is appropriate.
- I.G.5.b. The Permittee may meet the financial assurance requirements for facility-wide corrective action with any combination of instruments being used for closure and post-closure as required by 40 CFR Part 264 provided the Permittee assures that the cost estimates for compliance with HSWA corrective action are separate from operation, maintenance, closure, and post-closure care cost estimates for the Permitted Units.
- I.G.5.b.i. Documentation of financial assurance for RCRA Facility Investigation (RFI), Interim Measures (IM), Corrective Measures Study (CMS), and Corrective Measures Implementation (CMI) may be combined with financial assurance documentation for the Permitted Units listed in Condition I.C.2.
- I.G.5.b.ii. In sections of the financial assurance documentation referring to facility-wide corrective action, the appropriate term(s) “RFI”, “IM”, “CMS”, and/or “CMI” shall be substituted for the word “post-closure” when referring to 40 CFR Part 264 Subpart H. Also, the word “Permittee” shall be substituted for the words “owner or operator” when referring to 40 CFR 264 Subpart H.
- I.G.5.c. *Cost Estimates*
The Permittee shall comply with the financial assurance requirements of 40 CFR 264.144 regarding the cost estimates for all corrective action measures required by this permit, including studies, reports, and plan submissions.
- I.G.5.c.i. The financial assurance requirements of 40 CFR 264.144 shall continue throughout the term of the permit and shall include 40 CFR 264.144(a)(1), third party costs; 40 CFR 264.144(b), annual inflation adjustments; and 40 CFR 264.144(c), revision of the cost estimate when there has been a change in the RFI, IM, CMS, and CMI activities and workplans which results in an increase in the

cost of such activities, even though the facility may have had closure certification accepted by DEQ.

I.G.5.d. **Liability Coverage**

The Permittee must provide liability coverage for third party injury and property damage claims resulting from sudden and non-sudden accidental occurrences arising from any activity performed in accordance with the corrective action provisions of this permit. The Permittee shall provide liability coverage as follows:

I.G.5.d.i. Within 45 days after receipt of written DEQ approval of the workplan for the current phase of activity, the Permittee shall provide liability coverage using one or a combination of mechanisms allowed under 40 CFR 264.147(f) through (j).

I.G.5.d.ii. The liability coverage for sudden and non-sudden occurrences arising solely from RFI, IM, CMS, and/or CMI activities shall consist of \$4 million per occurrence with \$8 million annual aggregate exclusive of legal defense costs and shall be in addition to liability insurance required under any other section of the hazardous waste regulations.

I.G.5.d.iii. If DEQ determines that the levels of liability insurance required by Condition I.G.5.d.ii. are not consistent with the degree and duration of risk associated with the RFI/CMS/CMI and/or IM activities at the facility, DEQ may adjust the level of liability insurance as may be necessary to protect human health and the environment. This adjusted level will be based on DEQ's assessment of the degree and duration of risk associated with RFI, CMS, CMI, and IM activities to determine whether cause exists for such adjustments of level or type of coverage.

I.G.6. *DEQ Draw on Financial Instrument*

If DEQ determines that the Permittee has failed to perform the activities in accordance with any of the terms or conditions of this permit, DEQ will provide written notification to the Permittee of its intent to utilize the Permittee's financial responsibility instruments for the purpose of undertaking or supplementing such performance. Notification of intent to draw on the Permittee's financial instrument will specify in detail DEQ's reasons for taking such action. DEQ may draw on any financial instrument used by the Permittee to comply with the requirements of Condition I.G.

I.H. **General Permit Application Requirements**

I.H.1. *Permit application*

Any person who is required to have a permit (including new applicants and permittees with expiring permits) shall complete, sign and submit an application to the Director as described in 40 CFR 270.10 and 40 CFR 270.70 through 270.73. [40 CFR 270.10(a)(3)]

- I.H.2. *Reapplications*
- I.H.2.a. The Permittee shall submit a new application at least 180 days before the expiration date of the effective permit, unless permission for a later date has been granted by the Director, or
- I.H.2.b. If the Permittee intends to be covered by a standardized permit, the Permit may submit a Notice of Intent as described in 40 CFR 270.51(e)(1) at least 180 days before the expiration of the effective permit unless the Director allows a later date. The Director may not allow the Permittee to submit applications or Notices of Intent later than the expiration date of the existing permit, except as allowed by 40 CFR 270(e)(2). [40 CFR 270.10(h)]
- I.H.3. *Fees*
- DEQ will assess an applicant of a hazardous waste permit a filing and review fee as specified in ARM 17.53.112.
- I.I. **Signatories to Permit Applications and Reports**
- I.I.1. All permit applications shall be signed as specified in 40 CFR 270.11(a).
- I.I.2. All reports required by permits and other information requested by DEQ shall be signed by a person described in 40 CFR 270.11(a) or by a duly authorized representative of that person. [40 CFR 270.11(b)]
- I.I.2.a. A person is a duly authorized representative only if:
- I.I.2.a.i. The authorization is made in writing by a person described in 40 CFR 270.11(a);
- I.I.2.a.ii. The authorization specifies either an individual or a position having responsibility for overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, environmental section chief, remedial project manager, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
- I.I.2.a.iii. The written authorization is submitted to DEQ. [40 CFR 270.11(b)]
- I.I.3. If an authorization under Condition I.I.2. is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Condition I.I.2. must be submitted to DEQ prior to or together with any reports, information, or applications to be signed by an authorization representative. [40 CFR 270.11(c)]
- I.I.4. As stated in 40 CFR 270.11(d), any person signing a document under Condition I.I.1. and I.I.2. must make the following certification:

I certify under penalty of law that this document and all attachments are prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

I.J. Conditions Applicable to All Permits

The conditions of 40 CFR 270.30 apply to all MHTWA permits and are hereby incorporated into this permit. [40 CFR 270.30]

I.J.1. *Duty to comply*

The Permittee must comply with all conditions of this permit, except that the Permittee need not comply with the conditions of this permit to the extent and for the duration such noncompliance is authorized in an emergency permit (40 CFR 270.61). Any permit noncompliance, except under the terms of an emergency permit, constitutes a violation of the appropriate Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. [40 CFR 270.30(a)]

I.J.2. *Duty to reapply*

If the Permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Permittee must apply for and obtain a new permit. [40 CFR 270.30(b)]

I.J.3. *Need to halt or reduce activity not a defense*

It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. [40 CFR 270.30(c)]

I.J.4. *Duty to Mitigate*

In the event of noncompliance with the permit, the Permittee shall take all reasonable steps to minimize releases to the environment, and shall carry out such measures as are reasonable to prevent significant adverse impacts on human health or the environment. [40 CFR 270.30(d)]

I.J.5. *Proper operation and maintenance*

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facility or similar systems

only when necessary to achieve compliance with the conditions of this permit. [40 CFR 270.30(e)]

I.J.6. *Permit actions*

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a permit modification, revocation, and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition. [40 CFR 270.30(f)]

I.J.7. *Property rights*

The permit does not convey any property rights of any sort, or any exclusive privilege. [40 CFR 270.30(g)]

I.J.8. *Duty to provide information*

The Permittee shall furnish to DEQ within a reasonable time, any relevant information which DEQ may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The Permittee shall also furnish to DEQ, upon request, copies of records required to be kept by this permit. [40 CFR 270.30(h)]

I.J.9. *Inspection and entry*

The Permittee shall allow DEQ, or an authorized representative, upon the presentation of credentials and other documents as may be required by law to:

I.J.9.a. Enter at reasonable times upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

I.J.9.b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

I.J.9.c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

I.J.9.d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by MSHA, any substances or parameters at any locations. [40 CFR 270.30(i)]

I.J.10. *Monitoring, Sampling and Analytical Requirements*

Samples and measurements taken for the purposes of monitoring must be representative of the monitoring activity. The method used to obtain a representative sample of wastes to be analyzed must be the appropriate method from Appendix I of 40 CFR Part 261 or an equivalent method approved by DEQ. Laboratory methods for wastes or other media must be those specified in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846),

(third edition, 1986 and most recent updates); *Standard Methods for the Examination of Water and Wastewater*, (twenty-first edition, 2005); or an equivalent method approved by DEQ. [40 CFR 270.30(j)(1)]

- I.J.11. *Signatory requirements*
All applications, reports, or information submitted to DEQ shall be signed and certified as specified in Condition I.I. [40 CFR 270.30(1)]
- I.J.12. *Reporting requirements*
- I.J.12.a. Planned changes: The Permittee shall give notice to DEQ as soon as possible of any planned physical alterations or additions to the permitted facility which will affect the regulated unit or any SWMUs and/or AOCs included in the facility-wide corrective action process. [40 CFR 270.30(1)(1)]
- I.J.12.b. Anticipated noncompliance: The Permittee shall give 30-days advance written notice to DEQ of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. [40 CFR 270.30(1)(2)]
- I.J.12.c. Transfers: This permit is not transferable to any person except after notice to DEQ. DEQ may require modification or revocation and reissuance of the permit to change the name of the Permittee and incorporate such other requirements as may be necessary under MHTA. [40 CFR 270.30(1)(3)]
- I.J.12.d. Monitoring reports: Monitoring results shall be reported at the intervals specified elsewhere in this permit. [40 CFR 270.30(1)(4)]
- I.J.12.e. Compliance schedules: Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date unless this permit specifies a different date or the Permittee has made prior written arrangement with DEQ. [40 CFR 270.30(1)(5)]
- I.J.12.e.i. DEQ may modify this permit when it determines good cause exists for modification of a compliance schedule, such as an act of God, strike, flood, or materials shortage or other events over which the Permittee has little or no control and for which there is not reasonably available remedy in accordance with Condition I.S. [40 CFR 270.41(a)(4)]
- I.J.12.f. Twenty-four hour reporting: Pursuant to 40 CFR 270.30(1)(6), the Permittee shall report any noncompliance which may endanger health or the environment. The Permittee shall report any situation that poses or presents an imminent, potential, or existing hazard to public health or the environment from any release of hazardous waste or hazardous constituent. Any such information must be reported to DEQ verbally within twenty-four (24) hours from the time the Permittee becomes aware of the circumstances.

- I.J.12.f.i. The oral report must include:
 - I.J.12.f.i.1. Information concerning release of any hazardous waste or hazardous constituents that may cause an endangerment to public drinking water supplies.
 - I.J.12.f.i.2. Any information of a release or discharge or hazardous waste or of a fire or explosion from the HWM facility, which could threaten the environment or human health outside the facility.
 - I.J.12.f.i.3. The description of the occurrence and its cause must include:
 - I.J.12.f.i.4. Name, address, and telephone number of the owner or operator;
 - I.J.12.f.i.5. Name, address, and telephone number of the facility;
 - I.J.12.f.i.6. Date, time, and type of incident;
 - I.J.12.f.i.7. Name and quantity of material(s) involved;
 - I.J.12.f.i.8. The extent of injuries, if any;
 - I.J.12.f.i.9. An assessment of actual or potential hazards to the environment and human health outside the facility, where this is applicable; and
 - I.J.12.f.i.10. Estimated quantity and disposition of recovered material that resulted from the incident. [40 CFR 270.30(1)(6)]
 - I.J.12.f.ii. A written submission shall also be provided within five (5) calendar days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the non-compliance and its cause; the period of noncompliance including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. DEQ may waive the five-day written notice requirement in favor of a written report within fifteen (15) calendar days. [40 CFR 270.30(1)(6)]
- I.J.12.g. *Manifest discrepancy report*
If a significant discrepancy in a manifest is discovered, the Permittee must attempt to reconcile the discrepancy. If not resolved within 15 days, the Permittee must submit a letter report, including a copy of the manifest, to DEQ. (See 40 CFR 264.72.) [40 CFR 270.30(1)(7)]
- I.J.12.h. *Other noncompliance*
The Permittee shall report all instances of noncompliance not reported under Conditions I.J.12.e. and I.J.12.f. at the time monitoring reports are submitted.

The reports shall contain the information listed in Condition I.J.12.f. [40 CFR 270.30(1)(10)]

I.J.12.i. *Other information*

Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to DEQ, it shall promptly submit such facts or information. [40 CFR 270.30(1)(11)]

I.J.13. Information repository

The Permittee must maintain an information repository that is held at the local public library, based on the factors set forth in 40 CFR 124.33(b). The information repository is governed by the provisions in 40 CFR 124.33(c) through (f). [40 CFR 270.30(1)(m)]

I.K. **Operation of Facility**

I.K.1. *Food Chain Crops*

No crops or commercial forage may be grown on land that has been used for the treatment of hazardous wastes at this facility. [40 CFR 264.267]

I.K.2. *Off-Site Wastes*

The Permittee shall receive no off-site hazardous wastes at the facility.

I.K.3. *Security*

The Permittee shall comply with the following security provisions:

I.K.3.a. A perimeter fence with locked access gates surrounding the active portion of the facility must control entry to the active portion of the facility at all times.

I.K.3.b. Signs must be placed a minimum of one sign per 200 feet of straight fence and at each gate to ensure a sign will be seen from any approach. Signs with the following warnings must be maintained on the perimeter fence: DANGER – UNAUTHORIZED PERSONNEL KEEP OUT. Signs must measure 10 inches by 14 inches with lettering 2 inches high and in English to ensure the signs are legible from 25 feet. [40 CFR 264.14(c)]

I.K.3.c. Groundwater monitoring wells must be protected with steel risers and locking caps.

I.K.3.d. Any hazardous waste management unit or portion of a unit located in a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood. [40 CFR 264.18(b)]

I.K.3.d.i. For existing permitted units at the BNSF Paradise facility that fall within the 100-year flood plain, in accordance with 40 CFR 264.18(b)(ii), the Permittee must

demonstrate to DEQ that no adverse effects on human health or the environment will result if washout occurs.

I.L. Institutional Controls

The following institutional controls must be followed by the Permittee for the property located in Sections 17 and 20, Township 19 North, Range 25 West, Sanders County, Montana, for as long as environmental and human health risk is associated with the property:

I.L.1. *Controlled Groundwater Area (CGA)*

The Permittee shall comply with the Department of Natural Resource and Conservation (DNRC) designated CGA. Use of site groundwater for any purpose other than remediation must be reviewed by DNRC. The CGA designation is included as Attachment I.4.

I.L.2. *Deed Notices and Restrictive Covenants*

The following institutional controls must be maintained with the appropriate authorities. Any changes to the filed deed notices and restrictive covenants must be approved by DEQ prior to filing the changes with the appropriate authorities. DEQ must be notified and given copies of the institutional control documentation within 30 days after any modifications or changes.

I.L.2.a. Deed Notices

The Permittee shall maintain the notice on all instruments of conveyance such as deeds or contracts for deeds. The notice must include the following:

- Notice provisions to subsequent purchasers and lessees that the property has been used to manage and dispose of hazardous waste, and, as applicable, use of the land is restricted;
- Notice provision that any State-required institutional or land use control or conditions on the land must be maintained;
- As applicable, notice provisions that any State-required engineering controls must be maintained for the duration of the required remediation;
- A written statement of intention by the Permittee that particular restrictions be placed on the land in perpetuity and the restrictions must “touch and concern that land.” The deed restriction must also contain a precise reflection of the parties’ intentions with regard to the scope and duration of the restrictions therein. The phrase “run with the land” must be placed in the deed restriction to ensure that any restrictions are forever binding against the owner and successors in interest; and
- Precise and easily understandable language which designates the specific activities and uses that will be allowed and the specific activities and uses that will be prohibited.

I.L.2.b. Deed Restriction

The Permittee shall maintain the restriction on the deed that includes the following:

- A requirement for notification to be sent by the owner of the property to purchasers, lessees, and tenants disclosing the existence of residual chemicals of concern;
- A requirement that the owner and successors and assigns give notice in all deeds, mortgages, leases, subleases, and rental agreements that, as applicable, there are residual chemicals of concern on the property;
- A requirement for advance notice to DEQ of any sale, lease, or other conveyance of the property;
- A requirement for notice in the deed notifying prospective purchasers that the property has been used to manage and dispose of hazardous waste, and that, as applicable, its use is restricted (notice must specify the restricted use); and
- Prohibition of deep excavation in the location of former contaminated areas and notification that the soil was remediated to 2 feet bgs.

I.L.2.c. Restrictive Covenant

The Permittee has filed a restrictive covenant with Sanders County. The restrictive covenant must continue to state that the current land use is industrial and should the property be used for residential purposes, the owner must ensure the site be reevaluated to determine whether additional remediation is needed to provide an adequate level of protection and ensure that any necessary remediation takes place. The restrictive covenant must continue to run with the land and new owners must agree to the covenant.

I.L.2.d. Actual Notice

The Permittee shall provide direct notice of environmental information by certified mail to potential successors of title in the property. Where this notice is not provided, the transaction may be voided or damages may be sought by the successors of title in the property.

I.L.3. Notice to Government Authority

The Permittee shall provide notice to DEQ within 10 days prior to completion of any land transaction.

I.L.4. Permit Continuation

I.L.4.a. Activity and land use limitations are considered to be part of the remedial action for the property and, therefore, land use controls must continue through the duration of this permit, and subsequent permits or other enforcement mechanisms as allowed in 40 CFR 270.1(c)(7).

I.L.4.b. Sale of the property to a third party must follow requirements for transfer of the permit in accordance with 40 CFR 270.30(1)(3) and 40 CFR 270.40(b).

I.L.5. *Survey Plat*

The Permittee has submitted to the local authority with jurisdiction over local land use, and to DEQ, a survey plat indicating the location and dimension of each

hazardous waste disposal unit with respect to permanently surveyed benchmarks. The plat must be maintained with both the local authority and DEQ and must continue to contain a prominently displayed note which states the Permittee's obligation to restrict disturbance of the hazardous waste disposal units. The plat and disturbance restriction notice must also be attached to all instruments of conveyance such as deeds and contracts for deeds.

I.M. Changes to Permit

I.M.1. *Transfer*

I.M.1.a. A permit may be transferred by the Permittee to a new owner or operator only if the permit has been modified or revoked and reissued under 40 CFR 270.40(b) or 40 CFR 270.41(b)(2) to identify the new Permittee and incorporate such other requirements as may be necessary under MHTA. [40 CFR 270.40]

I.M.1.b. Changes in the ownership or operational control of the facility may be made as a Class 1 modification with prior written approval of the Director in accordance with 40 CFR 270.42. [40 CFR 270.40(b)]

I.M.1.c. The new owner or operator must submit a revised permit application no later than 90 calendar days prior to the scheduled change. A written agreement containing a specific date for transfer of permit responsibility between the current and new permittees must also be submitted to DEQ. [40 CFR 270.40(b)]

I.M.1.d. Before transferring ownership of the facility, the Permittee shall notify the new owner or operator in writing of the requirements of this permit, and 40 CFR Parts 264 and 270. The Permittee shall demonstrate to DEQ that the new owner or operator has been notified of these requirements by sending a copy of the written notification to DEQ within 30 days of new owner or operator notification.

I.M.2. *Modification or revocation and reissuance*

I.M.2.a. This permit may be modified, revoked and reissued, or terminated by DEQ for cause as specified in 40 CFR 270.4, 270.30, 270.41 through 270.43.

I.M.2.b. When a permit is modified, only the conditions subject to the modification are reopened. [40 CFR 270.41]

I.M.2.c. If a permit modification is requested by the Permittee, DEQ shall approve or deny the request according to the procedures of 40 CFR 270.42. Otherwise, a draft permit must be prepared and other procedures in 40 CFR Part 124 followed. [40 CFR 270.41]

I.M.3. *Permit modification at the request of the Permittee*

I.M.3.a. Class 1 modification: Class 1 modifications are listed in Appendix I of 40 CFR 270.42. For Class 1 modifications, the Permittee shall follow the procedures specified in 40 CFR 270.42(a).

- I.M.3.a.i. Class 1 permit modifications identified in Appendix I by an asterisk may be made only with the prior written approval of DEQ.
- I.M.3.b. Class 2 modifications: Class 2 modifications are listed in Appendix I of 40 CFR 270.42. For Class 2 modifications, the Permittee shall follow the procedures specified in 40 CFR 270.42(b).
- I.M.3.c. Class 3 modifications: Class 3 modifications are listed in Appendix I of 40 CFR 270.42. For Class 3 modifications, the Permittee shall follow the procedures in 40 CFR 270.42(c).
- I.M.3.d. Other modifications: In the case of modifications not explicitly listed in Appendix I of 40 CFR 270.42, the Permittee shall follow the procedures in 40 CFR 270.42(d).
- I.M.3.e. Temporary authorizations: Upon request of the Permittee, DEQ may, without prior public notice and comment, grant the Permittee a temporary authorization in accordance with 40 CFR 270.42(e). The temporary authorization must have a term of not more than 180 days.

I.M.4. *Termination of permits*
DEQ may terminate a permit during its term, or deny a permit renewal application for the causes listed in 40 CFR 270.43.

I.N. **Expiration and Continuation of Permits**

I.N.1. *Duration of permits*

I.N.1.a. This permit shall be effective for a fixed term not to exceed 10 years. [40 CFR 270.50(a)]

I.N.1.b. Except as provided in 40 CFR 270.51, the term of this permit shall not be extended by modification beyond 10 years. [40 CFR 270.50(b)]

I.N.2. *Continuation of Expiring Permits*

I.N.2.a. Pursuant to 40 CFR 270.51, the conditions of an expired permit continue in force until the effective date of a new permit if:

I.N.2.a.i. The Permittee has submitted a timely application under 40 CFR 270.14 and the applicable sections in 40 CFR 270.15 through 40 CFR 270.29 which is a completed (under 40 CFR 270.10(c)) application for a new permit; and

I.N.2.a.ii. DEQ through no fault of the Permittee, does not issue a new permit with an effective date under 40 CFR 124.15 on or before the expiration date of the previous permit.

I.N.2.b. Permits continued under 40 CFR 270.51 remain fully effective and enforceable. [40 CFR 270.51(b)]

- I.N.2.c. When the Permittee is not in compliance with the conditions of the expiring or expired permit, DEQ may choose to do any or all of the options specified in 40 CFR 270.51(c).
- I.N.2.d. Pursuant to 40 CFR 270.51(d), if a Permittee has submitted a timely and complete application, the terms and conditions of an EPA-issued RCRA permit continue in force beyond the expiration date of the permit, but only until the effective date of DEQ's issuance or denial of a Montana RCRA permit.
- I.O. **Personnel Training**
The Permittee shall conduct personnel training as required by 40 CFR 264.16. This training program must follow the description outlined in Attachment I.5. The Permittee shall maintain training records and documents as required by 40 CFR 264.16(d) and (e).
- I.P. **Preparedness and Prevention**
The Permittee must have a preparedness and prevention plan for the facility and implement the plan in accordance with Attachment I.6. [40 CFR 264, subpart C]
- I.Q. **Contingency Plan and Emergency Procedures**
The Permittee must have a contingency plan for the facility and implement the plan in accordance with Attachment I.7. [40 CFR 264.51]
- I.R. **Recordkeeping and Reporting**
- I.R.1. *Operating record*
Pursuant to 40 CFR 264.73, the Permittee must keep a written operating record at the offices of BNSF. At a minimum, the following information must be recorded and maintained in the operating record for the time specified below:
- I.R.1.a. Retained Until Facility Closure
- I.R.1.a.i. A description and the quantity of each hazardous waste received, the method(s) and dates(s) of storage, treatment, and disposal at each Permitted Unit.
- I.R.1.a.ii. Records and results of waste analysis and waste determinations performed as specified in 40 CFR 264.73(b)(3).
- I.R.1.a.iii. Monitoring, testing, analytical, and QA/QC data for all monitoring conducted at the site, including corrective action documentation where required by 40 CFR 264, Subpart F – Releases from Solid Waste Management Units and 40 CFR Subpart CC – Air Emission Standards for Tanks, Surface Impoundments, and Containers.
- I.R.1.a.iv. The closure plan(s) and post-closure plan(s) as required by this permit.

- I.R.1.a.v. All closure cost estimates required under 40 CFR 264.142 and post-closure cost estimates required under 40 CFR 264.144.
- I.R.1.a.vi. Certification of closure documentation as required by 40 CFR 264.115 upon completion of final closure of each Permitted Unit.
- I.R.1.b. Retained for Three Years
 - I.R.1.b.i. Summary reports and details of all incidents that require implementing the contingency plan as specified in 40 CFR 264.51(b).
 - I.R.1.b.ii. Records and results of inspections as required by 40 CFR 264.15(d).
 - I.R.1.b.iii. A certification by the Permittee no less often than annually, that the Permittee has a program in place to reduce the volume and toxicity of hazardous waste that it generates to the degree determined by the Permittee to be economically practical; and the proposed method of treatment, storage or disposal is that practicable method currently available to the Permittee which minimizes the present and future threat to human health and the environment. The certification may be met through submission of the annual hazardous waste generator report or it may be submitted in a separate waste minimization report. [40 CFR 264.73(b)(9)]
 - I.R.1.b.iv. All notices, certifications, waste analysis data, and other documentation produced pursuant to 40 CFR 268.7 for at least three years from the date that the waste that is the subject of such documentation was last sent to on-site or off-site treatment, storage, or disposal. [40 CFR 268.7(a)(8)]
- I.R.2. *Other Records*
The Permittee must maintain the following documents and any and all amendments, revisions, and/or modifications to these documents at the offices of BNSF:
 - I.R.2.a. A current copy of this permit;
 - I.R.2.b. The Part B application for this permit;
 - I.R.2.c. Personnel training documents and records as required by 40 CFR 264.16(d) and (e);
 - I.R.2.c.i. Training records on current personnel must be kept until closure of the facility; training records on former employees must be kept for at least three years from the date the employee last worked at the facility. [40 CFR 264.16(e)]
 - I.R.2.d. All progress reports, work plans and reports required in Module V (Facility-Wide Corrective Action);

- I.R.2.e. All reports required in Module II (CAMU), and Module III (Groundwater Monitoring) ~~and Module IV (Tanks T-6 and T-7)~~;
- I.R.2.f. All other documentation as required by this permit.
- I.R.3. *Availability, Retention, and Disposition of Records*
- I.R.3.a. All records, including plans, required under 40 CFR 264 must be furnished upon request, and made available at all reasonable times for inspection by DEQ or any representative of DEQ. [40 CFR 264.74(a)]
- I.R.3.b. The retention period for all records required by this permit is extended automatically during the course of any unresolved enforcement action regarding the facility or as requested by DEQ. [40 CFR 264.74(b)]
- I.R.4. *Reporting*
- I.R.4.a. Annual Report from Facilities
Pursuant to ARM 17.53.803, the Permittee must submit an annual report to DEQ, on forms obtained from DEQ.
- I.R.4.b. Generator Reporting and Annual Fee Requirements
The Permittee shall comply with the hazardous waste generator registration and reporting requirements of ARM 17.53.111, 113, 603, and 604.
- I.R.4.c. Facility-Wide Corrective Action Reporting
All reports and work plans required in Module IV (Facility-Wide Corrective Action) must be submitted within the timeframes specified within that module, unless the Permittee obtains prior approval from DEQ.
- I.R.4.d. Groundwater Monitoring Reporting
Analytical results of sampling events must be reported to DEQ within 30 days after the date the Permittee receives the analytical results. Requirements for groundwater reporting are specified in Module III (Groundwater Monitoring).
- I.R.4.e. Annual Monitoring and CAMU Operations Report
The Permittee shall submit, by April 1, an annual operations report for the previous calendar year. The report must contain the following information:
 - I.R.4.e.i. Analytical reports for all LTU monitoring conducted in accordance with Module II (CAMU).
 - I.R.4.e.ii. All groundwater monitoring analytical reporting requirements specified in Module III (Groundwater Monitoring);
 - I.R.4.e.iii. A summary of the POC and POE groundwater sampling results as required in Condition III.K. (ACL), any differences or changes observed in the

potentiometric surface or rate of groundwater flow between sampling events, and any deviations from normal QA/QC procedures or results;

- I.R.4.e.iv. A summary showing all reportable values for each groundwater monitoring well using all historical sampling analytical results (including any repeat sampling and analysis);
- I.R.4.e.v. Piezometric maps for each quarterly period;
- I.R.4.e.vi. Measurements of the depth to the bottom of each monitoring well; and
- I.R.4.e.vii. A product recovery ~~system~~-performance evaluation.
- I.R.4.f. 5 Year Performance Evaluation Report
On a 5-year schedule from issue of this permit, the Permittee shall submit, by June 1, a performance evaluation report for ~~the~~ product recovery ~~system~~ that follows the requirements of Condition II.E.86.b. (5 Year Performance Evaluation).
- I.R.4.g. Planned Changes and Anticipated Non-Compliance
The Permittee shall comply with the reporting requirements of Conditions I.J.12.a. and I.J.12.b. for planned changes to the Permitted Units specified in Condition I.C.2. or any anticipated non-compliance with permit conditions.
- I.R.4.h. Twenty-Four Hour Reporting
The Permittee shall comply with the reporting requirements in Condition I.J.12.f. for any non-compliance which may endanger health and/or the environment.
- I.S. **Confidential Information**
The Permittee may claim confidential any information required to be submitted by this permit in accordance with ARM 17.53.208.
- I.T. **Dispute Resolution**
 - I.T.1. DEQ and Permittee shall work by consensus and when a dispute arises concerning specific activities required by this permit, shall first attempt to resolve the matter informally.
 - I.T.2. Remedy approval as set forth in Condition IV.J. may not be included in the formal dispute resolution process. To ensure public comment and involvement on remedy approval, DEQ shall modify the permit. The Permittee may choose to comment on the remedy selection through the modification process.
 - I.T.3. Review Period: If no resolution is reached and the Permittee further objects or if the Permittee objects in whole or in part to any DEQ notice of disapproval or other decision or directive made pursuant to this permit, the Permittee shall notify DEQ in writing of its objections within 10 calendar days after its receipt of DEQ's

notification. This notification must include the reasons for the objection with any supporting documentation, and the Permittee's preferred alternate solutions.

- I.T.4. **Negotiation Period:** DEQ and the Permittee shall endeavor to meet promptly and work in good faith for a period of fourteen (14) calendar days from DEQ's receipt of the Permittee's written notification of objection, in an effort to reach a mutually agreeable resolution of the dispute. If the dispute is resolved, the Permittee shall submit a revised submission or implement the agreed-upon action(s) in accordance with an agreed-upon schedule.
- I.T.5. If agreement is not reached within the negotiation period, DEQ shall, within twenty-one (21) calendar days of receipt of the Permittee's written objection, provide a written statement of its decision and the reasons therefore to the Permittee signed by the Director of DEQ. Within 10 calendar days after receiving the written statement of decision from DEQ, if the Permittee continues to disagree with the decision, the Permittee may seek, by written request, a meeting with DEQ. If the Permittee request such a meeting with DEQ, such request shall stay enforcement actions or determinations of noncompliance until a decision is rendered or for up to fourteen (14) calendar days following the date of receipt by DEQ of the request, whichever occurs first.
- I.T.6. During the negotiation period, the Permittee shall be excused from performing only the requirement under this permit that is specifically the subject of such dispute. DEQ's consideration of matters placed into dispute shall not excuse, toll, or suspend any compliance obligation or deadline required pursuant to this permit. The Permittee shall take any actions required by this permit that DEQ determines are not substantially affected by the dispute.
- I.T.7. Notwithstanding the other provisions of this permit, any agreement or decision made by DEQ pursuant to Condition I.T. shall be reduced to writing, shall be deemed incorporated into this permit without further order or process, and shall be binding to the parties. Nothing herein precludes the Permittee's right to notice and hearing before the Board of Environmental Review or to judicial review after attempting resolutions pursuant to Conditions I.T.1 through I.T.4.
- I.U. **Force Majeure**
- I.U.1. The Permittee shall perform the requirements of this permit within the time limits set forth herein, unless the performance is prevented or delayed by events which constitute a force majeure. A force majeure is defined as any unforeseeable event such as a flood over which the Permittee has little or no control and for which there is not a reasonably available remedy.
- I.U.2. If any event occurs or has occurred that may delay the performance of any obligation under this permit, whether or not caused by a force majeure event, the Permittee shall notify DEQ in writing within 10 calendar days thereafter, including the reasons for the delay, the anticipated duration of the delay, all

actions taken or to be taken to prevent or minimize the delay and a schedule for the implementation of any measure to be taken to mitigate the effect of the delay. Failure to comply with the notice provisions of this section as to any individual event will constitute a waiver of the Permittee's right to assert a force majeure claim as to that event.

I.V.

State and Federal Laws

Nothing in this permit may be construed to preclude the institution of any legal action or to relieve the Permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 3009 of the RCRA, as amended.

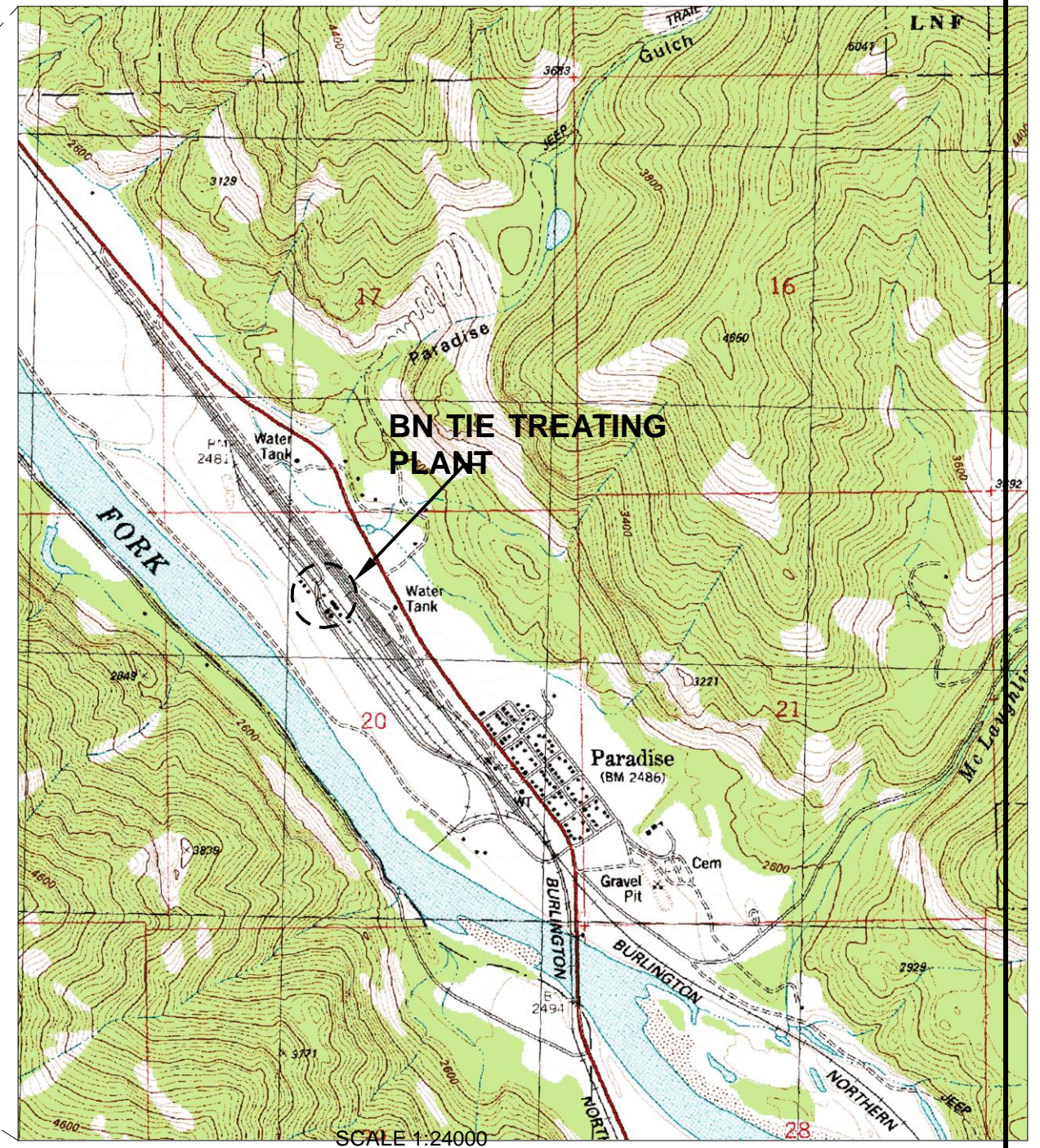
Attachment I.1

CFR to ARM Cross Reference Table

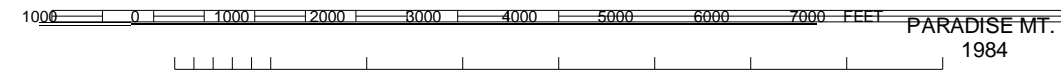
Federal Citation Incorporated by Reference	State Citation
Code of Federal Regulations (CFR)	Administrative Rules of Montana (ARM)
40 CFR 124	17.53.1201 17.53.1202
40 CFR 260	17.53.105 17.53.402 17.53.403
40 CFR 261	17.53.501 17.53.502
40 CFR 262	17.53.111 17.53.601 17.53.602
40 CFR 263	17.53.111 17.53.701 17.53.702
40 CFR 264	17.53.801 17.53.802
40 CFR 265	17.53.901 17.53.902
40 CFR 266	17.53.1001 17.53.1002 17.53.1003 17.53.1004
40 CFR 268	17.53.1101 17.53.1102
40 CFR 270	17.53.1201 17.53.1202
40 CFR 273	17.53.1301 17.53.1302
40 CFR 279	17.53.1401

Attachment I.2

Regional and Facility Location Map



UNITED STATES GEOLOGIC SURVEY
 PARADISE QUADRANGLE
 MONTANA
 7.5 MINUTE SERIES (TOPOGRAPHY)

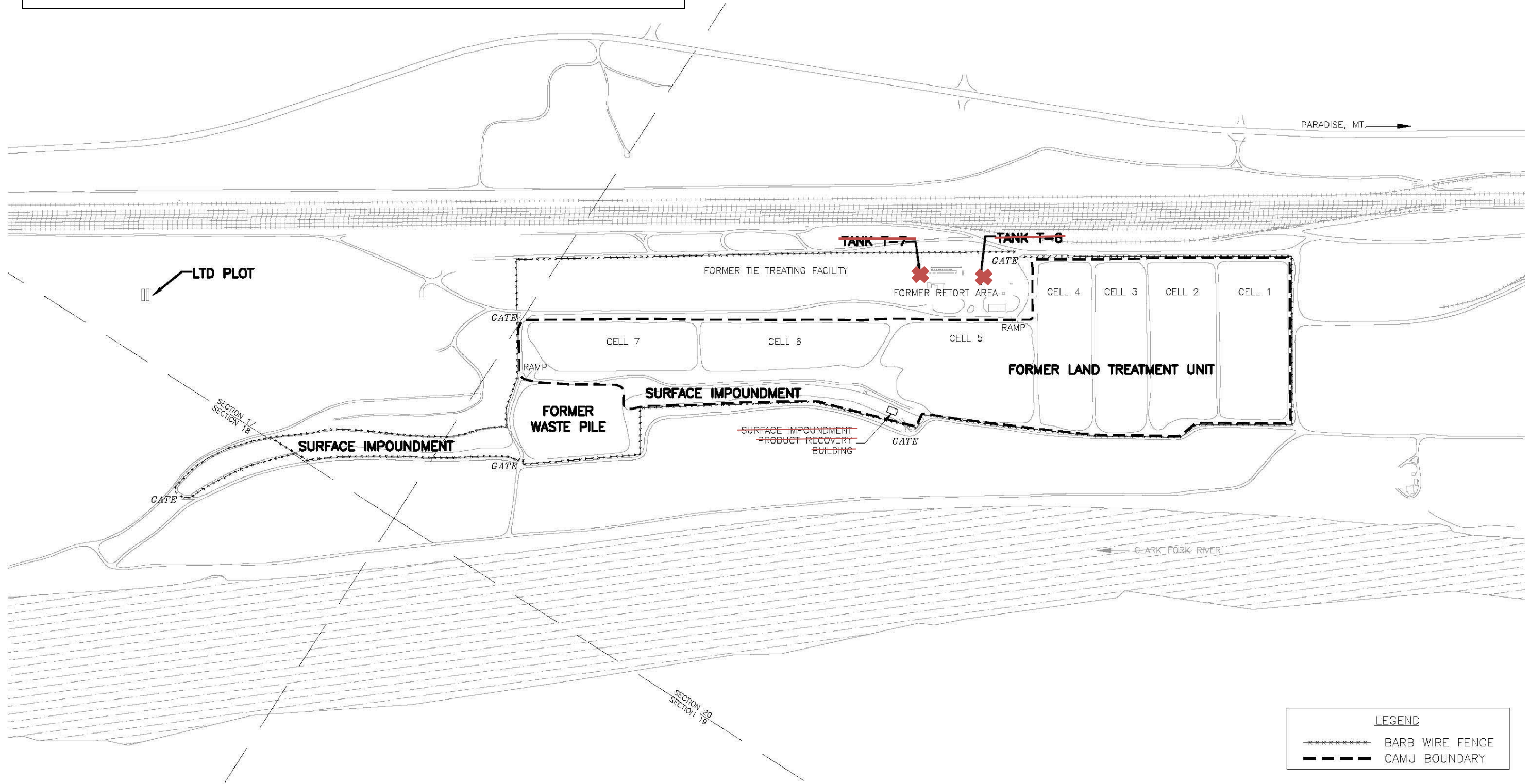


BNSF Railway Company Paradise, MT			
Site Location			
PROJECT NO. 60147069	DRAWN BY: EM/FTC	DATE: 02/07/11	FIGURE 5.2.1-1

Attachment I.3

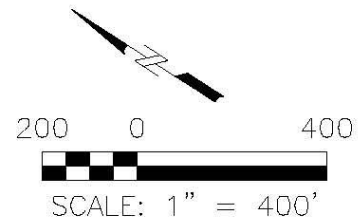
Corrective Action Management Unit (CAMU) Map

This map will be updated to remove the following text: "Tank T-7", "Tank T-6", and "Surface Impoundment Product Recovery Building", as shown in redline/strikeout on the map.



File: B:\CADD\CADD FORT COLLINS\BNSF Paradise\2011\FacilityLayout.dwg Layout: Layout1 User: marshall Plotted: Apr 05, 2011 - 2:20pm

LEGEND	
-----*	BARB WIRE FENCE
-----	CAMU BOUNDARY



BNSF Railway Company Paradise, MT			
Facility Layout			
PROJECT NO. 60147069	DRAWN BY: EM/FTC	DATE: 4/5/11	FIGURE 5.2.1-2



Attachment I.4

Controlled Groundwater Use Area Designation

BEFORE THE DEPARTMENT OF
NATURAL RESOURCES AND CONSERVATION
OF THE STATE OF MONTANA

* * * * *

IN THE MATTER OF PETITION NO. 76N-115138 TO)
THE DEPARTMENT OF NATURAL RESOURCES AND) FINAL
CONSERVATION FOR DESIGNATION OF A CONTROLLED) ORDER
GROUNDWATER AREA NEAR PARADISE, MT)

* * * * *

A Proposal for Decision in the above matter was issued June 18, 2001. Copies of the Proposal were mailed to all interested parties. The Proposal recommended designation of the Burlington Northern & Santa Fe Railway Company's old railroad tie-treating plant near Paradise, Montana as a controlled ground water area.

No objections to the Proposal were received by the Department of Natural Resources and Conservation. Therefore, the Director of the Department of Natural Resources and Conservation, having given the matter full consideration, accepts and adopts the Findings of Fact and Conclusions of Law as contained in the June 11, 2001, Proposal and incorporates them by reference.

WHEREFORE, based upon the record, the Director makes the following:

ORDER

Controlled Groundwater Area 76N-115138 is designated for all aquifers beneath the Burlington Northern and Santa Fe Railways Company property located between the railroad tracks and the Clark Fork River in the SW¹/₄ of Section 17 and the NW¹/₄ of Section 20, both in Township 19 North, Range 25 West, Sanders County, Montana. No wells for any purpose except monitoring can be installed in this area.

The controlled groundwater area does not apply to diversions required for remedial or response actions authorized by EPA or remedial or response actions undertaken by the State of Montana and diversions required for restoration actions undertaken by the State of Montana pursuant to its role as trustee for natural resources.

All new monitoring wells drilled within Controlled Groundwater Area 76N-115138 shall be installed in accordance with the EPA-approved

Standard Operating Procedure (SOP GROUNDWATER-3) for monitoring well design and construction.

The boundaries and provisions of Controlled Groundwater Area 76N-115138 may be amended if the groundwater quality within the area shows improvement to comply with applicable human health standards.

NOTICES PERTAINING TO NATURAL RESOURCE DAMAGES

1. The granting of this petition for a controlled groundwater area in no way limits any claims the State of Montana, as trustee for natural resources, may have for damage to natural resources.
2. The granting of this petition for a controlled groundwater area does not constitute an irreversible and irretrievable commitment of the groundwater resource, nor does it serve as a permit for the release of hazardous substances into the groundwater aquifer.
3. The controlled groundwater area and groundwater closure is being issued in recognition of existing contaminated conditions and does not relieve any person from liability for contamination of the groundwater.

APPEALS

The Department's Final Order may be appealed in accordance with the Montana Administrative Procedure Act by filing a petition in the appropriate court within 30 days after service of the Final Order. If a petition for judicial review is filed, the Department will transmit a copy of the tape(s) of the oral proceedings to the district court along with documentary evidence in the file. If a party to the proceeding elects to have a written transcription prepared, that party may purchase the tapes and have a transcript prepared.

Dated this _____ day of _____, 2002.

Arthur R. Clinch, Director
Department of Natural Resources
and Conservation
1625 Eleventh Avenue
Helena, Montana 59620-1601
(406) 444-2074

Attachment I.5

Personnel Training Program (5.2.12.1 of BNSF's Permit Renewal Application)

5.2.12.1 Personnel Training Program

The personnel training program for the Paradise facility consists of selected sections of this Application. Paradise facility personnel will have a copy of the program. The program will be kept on file at the Paradise Facility office and will be available for review by regulatory officials. Review and training will be conducted whenever any new personnel or subcontractors are at the Facility. The training will be conducted by a designee of BNSF, who is responsible for coordinating Facility compliance with hazardous waste regulations.

Table 5.2.12-1 presents the outline of the personnel training program to be presented to the Facility personnel involved with waste management. All of the personnel involved in any Facility activities, will be given the training program. A detailed description of the training program was provided in the 1998 Application for Part B Permit Renewal (RETEC 1998).

5.2.12.2 Training Director

The personnel training program will be directed by the BNSF manager of environmental remediation, or someone designated by him. The BNSF manager of environmental remediation or his designee has gained the qualifications required for this position through work experience, training, and education in hazardous waste management. The training director is required to be knowledgeable in solid and hazardous waste management practices specific to the facility, regulatory requirements, and the requirements of the Part B Permit. The training director is responsible for oversight of the training program, reviewing and approving the training materials and methods, and revisions or changes to the training program, as necessary.

5.2.12.3 Training for Emergency Response

This training program is designed to ensure that personnel not only handle hazardous wastes in a safe manner but also properly respond to emergency situations. The program trains hazardous waste handling/management personnel

Training elements addressing non-routine and emergency situations include:

- Procedures for locating, operating, inspecting, repairing, and replacing facility emergency equipment;
- Emergency communication procedures;
- Response to fires or explosions;
- Response to controlling waste releases; and
- Procedures for evacuation of nearby areas.

5.2.12.4 Training Schedule

All personnel will have successfully completed 40-hour Hazwoper training (29 CFR 1910.120) and the current annual 8-hour refresher courses. In addition, Facility specific Health and Safety informational training will be conducted prior to commencement of work at the Facility. All Facility personnel must successfully complete the training described in this Section within six months of their assignment to the Facility. Any personnel without this training will be supervised while on-site. Annual Facility specific training requirements are provided in the 1998 Application for Part B Permit Renewal (RETEC 1998).

5.2.12.5 Recordkeeping

Personnel training regulations (40 CFR 264.16 (d)) require that records be kept at the Facility. These records must include the job title and the personnel filling the position, as well as a written job description and the required training for each position. Currently, one employee is employed at the Facility, and has completed the required training as detailed in this section (the facility operator). A list of qualified Facility personnel is presented in **Table 5.2.7-1**. As additional workers are required for Facility activities, the

required training completion will be documented. Records will be made of the training completed by each employee and will be kept at the Paradise Facility office during the operating life of the CAMU and at least three years from the date the individual left the Facility. Subcontractors will sign a health and safety acknowledgment form after review of Facility specific health and safety requirements. When the Paradise Facility is closed, all records will be transferred to either BNSF's Helena, Montana Regional Office or the AECOM office in Billings, Montana, where they will be retained for at least three years after closure.

Table 5.2.12-1 Hazardous Waste Management Training Outline

- | | |
|-----|---|
| 1.0 | Introduction |
| | <ul style="list-style-type: none">• Overview of Hazardous Waste Regulations |
| 2.0 | Waste Characteristics |
| | <ul style="list-style-type: none">• Description of Waste Present at Facility• Required Personnel Protection Equipment• Decontamination Procedures• Permit Requirements |
| 3.0 | General Operation |
| | <ul style="list-style-type: none">• Description of the Corrective Action Management Unit• Description of Product Recovery Operations• Routine Facility Operations• Inspections• Recordkeeping and Reporting |
| 4.0 | Emergency and Contingency Procedures |
| | <ul style="list-style-type: none">• Emergency Coordinator and Organization• Emergency Procedures• Emergency Equipment• Fire and Explosion Response• Emergency Notification |

Attachment I.6

Preparedness and Prevention Plan (5.2.6 of BNSF's Permit Renewal Application)

5.2.6 [40 CFR 270.14(b)(6) and 264 Subpart C] Preparedness and Prevention

BNSF has undertaken a series of steps at the Paradise facility to prevent and to be prepared to respond to an emergency situation. A more detailed description of emergency procedures is provided in the Contingency Plan (Section 5.2.7 of this Application).

5.2.6.1 Facility Design and Operation

The Paradise Facility was designed and constructed, and is operated and maintained, to minimize the possibility of a fire, explosion, or any unplanned release of waste or waste constituents, which could threaten human health or the environment. It is important to note that the probability of a fire, explosion, or release of hazardous waste resulting in a potential threat to human health or the environment is remote because the waste stored and historically treated at the Paradise facility is non-combustible and non-reactive. Nevertheless, BNSF has implemented procedures to ensure the health and safety of Facility personnel during operation of the PRS. These health and safety procedures are specified in the Contingency Plan (Section 5.2.7 of this Application).

5.2.6.2 Emergency Communication Systems

The facility operator will generally be the only personnel on the Facility except when activities require additional employees. The Paradise Facility will be inspected according to the Inspection Plan described in Section 5.2.5 of this Application, however, should any waste or waste constituents be released from any unit, the released constituents would not result in an immediate danger to human health or the environment. Therefore, an internal alarm system at the Paradise facility is not necessary. The Paradise facility personnel will have a cellular phone in the project vehicle during inspections of the Paradise Facility. This will enable summoning assistance from the local emergency organizations, if required. A telephone also is available at the Facility office.

5.2.6.3 Emergency Equipment

The threat of fire/ignition/explosion at the Facility is minimal based on the characteristics of the waste. BNSF has established and coordinated arrangements with local authorities and emergency services. The Paradise Volunteer Fire Department (VFD) has been designated the primary emergency authority for the Paradise Facility.

Portable fire extinguishers, a first aid kit, and other emergency equipment will be maintained at the Paradise office for emergencies. Details on the specifications and quantity of the emergency equipment are provided in **Table 5.2.7-2** in the Contingency Plan.

5.2.6.4 Access to Communication and Emergency Services

Personnel on-site during inspections will have access to a cellular phone in their vehicle in order to summon off-site emergency assistance. A telephone also is available at the Facility office.

5.2.6.5 Required Aisle Space

Sufficient space is provided around the Facility to enable the unobstructed movement of emergency equipment (e.g., fire-fighting vehicles). The Facility roads, LTU aisles and berms between cells will be kept clear of obstructions at all times.

5.2.6.6 Arrangements with Local Authorities

BNSF has established and coordinated arrangements with local authorities and emergency services. A description of the organizations and their responsibilities is included in the Contingency Plan (Section 5.2.7 of this Application). The Paradise VFD has been designated the primary emergency authority for the Paradise facility. BNSF has notified local authorities of the operation of the Paradise facility and solicited their assistance

in responding to possible emergencies at the Facility.

Attachment I.7

Contingency Plan (5.2.7 of BNSF's Permit Renewal Application)

5.2.7 [40 CFR 270.14(b)(7) and 264 Subpart D] Contingency Plan

This Contingency Plan presents systematic procedures for immediate response to potential emergencies. The Contingency Plan will enable emergency coordinators to act quickly and efficiently to minimize human health hazards and adverse environmental effects.

This Contingency Plan is for the BNSF facility located in Paradise, Montana. The Facility has ~~five~~^{four} permitted regulated units: the CAMU (which includes the closed SI, closed LTU, and the SI PRS), ~~two hazardous waste storage tanks (Tanks T-6 and T-7)~~, the closed WPU, and two clean-closed LTD plots. ~~Tanks T-6 and T-7 are currently operational as part of the PRS and CAMU; the SI and WPU are under post-closure care.~~

The Paradise facility is located in the NW ¼ of Section 20, the SE ¼ of Section 18, and the SW ¼ of Section 17, Township 19 North, Range 25 West.

5.2.7.1 Emergency Coordinators

The Primary Emergency Coordinator for Paradise Facilities is the Facility manager. The Primary Emergency Coordinator has the authority to commit the resources necessary to implement the Contingency Plan. In his absence, the designated Alternate Emergency Coordinator for the Paradise Plant is the facility supervisor of the BNSF Tie Plant in Somers, Montana. The Alternate Emergency Coordinator is familiar with constituents of creosote and is properly trained in health and safety operations at both Facilities.

Table 5.2.7-1 lists the Emergency Coordinators and the organizations that can be contacted in case of emergency. This table will be reviewed annually with the Facility Health and Safety Plan (HASP) and updated as necessary as personnel or contract information changes. **Table 5.2.7-2** lists the emergency equipment available at the Facility. Both tables will be contained in all copies of the Contingency Plan.

5.2.7.2 Implementation of the Contingency Plan

The Contingency Plan will be implemented when an imminent or actual incident could threaten human health or the environment. Potential incidents are: 1) fire and/or explosion and 2) release of hazardous waste as described below.

Fire and/or Explosion

- Fire within the Facility that threatens waste management areas and where intense heat could ignite and/or release hazardous waste or hazardous waste constituents.
- Fire outside the Facility that threatens the Facility and could ignite and/or release hazardous waste constituents.
- Explosion where fragments or shock waves damage waste management areas resulting in the ignition and/or release of hazardous waste constituents.

Flooding

- Flooding that threatens waste management areas and could potentially cause release of hazardous waste constituents.

Release of Hazardous Waste

- Erosion or structural damage of containment and/or berms resulting in the release of hazardous waste or hazardous waste constituents.
- Erosion or structural damage of tank berms, containment foundations, and pumps or flanges.

5.2.7.3 Emergency Response Procedures

General Procedures

The following procedures will be implemented by the Emergency Coordinator upon the occurrence of any emergency situation which threatens human health or the environment.

1. Notify appropriate state or local organizations if their help is needed.
2. Assess the possible hazards to human health or the environment that may result from a fire, explosion, or release. The assessment will include both direct and indirect hazards (e.g., effects of any hazardous surface water run-off from the use of chemical fire retardants).
3. An evacuation of the local area is unlikely to be necessary due to the lack of residential properties in the immediate area and because the waste is not ignitable or reactive. If an evacuation should be necessary, the Emergency Coordinator for the Facility will notify the Paradise Volunteer Fire Department and the Sanders County Sheriff Department. The Emergency Coordinator then will be available to help direct the evacuation.
4. Immediately notify the government official designated as the on-scene coordinator for this area (in the regional contingency plan under CFR Part 1510 or the National Response Center at 800-424-8802). The report will include:
 - Name and telephone number of reporter;
 - Name and address of Facility;
 - Time and type of incident (e.g., release, fire);
 - Name and quantity of materials involved, to the extents known;
 - The extent of injuries, if any; and
 - The possible hazards to human health or the environment outside the Facility.
5. Take all reasonable measures necessary to ensure that fires, explosions and/or releases do not occur, recur, or spread to other parts of the Facility. These measures will include, where applicable, collecting and containing released waste and removing or isolating containers.
6. Monitor for discharges from the Facility which may result in an emergency situation.
7. Immediately after an emergency, the Emergency Coordinator will provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, or explosion at the Facility. (Note: Unless it can be demonstrated in accordance with 40 CFR 261.3(d), that the recovered material is not a hazardous waste and must be managed in accordance with all applicable requirements of the regulations.)
8. Ensure that in the affected area(s) of the Facility:

- No waste that may be incompatible with the released material is treated, stored, or disposed of until clean-up procedures are completed.
 - All emergency equipment listed in the Contingency Plan is cleaned and fit for its intended use.
9. Notify the USEPA Regional Administrator, the MDEQ, and other appropriate state and local authorities, that the requirements of paragraph 8 above have been met.
10. Note in the Facility operating record the time, date, and details of any incident that requires implementation of the Contingency Plan. Within 15 days after the incident, a written report must be submitted on the incident to the USEPA Regional Administrator and MDEQ. The report must include:
- Name, address, and telephone number of the owner or operator;
 - Name, address, and telephone number of the Facility;
 - Date, time and type of incident (e.g., fire, explosion);
 - Name and quantity of material(s) involved;
 - The extent of injuries, if any;
 - An assessment of actual or potential hazards to human health or the environment, where this is applicable; and
 - Estimated quantity and disposition of recovered material that resulted from the incident.

Personal Injuries

The health and safety program has been established to allow Facility operations to be conducted without adverse impacts on worker health and safety (Section 5.2.8, Hazardous Prevention, of this Application). In addition, supplementary emergency response procedures have been developed to cover extraordinary conditions at the Facility.

General Emergency Procedures. All accidents and unusual events will be dealt with in a manner to minimize a continued health risk to Facility workers. In the event that an accident or other unusual event occurs, the following procedure will be followed:

- First aid or other appropriate initial action will be administered by those closest to the accident/event. This assistance will be conducted so that those rendering assistance are not placed in a situation of unacceptable risk.
- All accidents and unusual events must be reported to the Emergency Coordinator who is responsible for conducting the emergency response in an efficient, rapid, and safe manner. The Emergency Coordinator will decide if off-site assistance and/or medical treatment are required and arrange for assistance.
- All workers on-site should conduct themselves in a mature, calm manner in the event of an accident/unusual event. All personnel must conduct themselves to avoid spreading the danger to themselves and surrounding workers.

Response to Specific Situations. If an employee working in a contaminated area is physically injured, Red Cross first-aid procedures will be followed. Depending on the severity of the injury, emergency medical

response may be sought. If the employee can be moved, he will be taken to the edge of the work area (on a stretcher, if needed) where contaminated clothing will be removed and emergency first aid administered. He then will be transported to a local emergency medical facility.

If the injury to the worker is chemical in nature (e.g., over-exposure), the following first aid procedures are to be instituted.

- **Eye Exposure** – If contaminated solids or liquids get into the eyes, wash eyes immediately with appropriate solution and lifting the lower and upper lids occasionally. Obtain medical attention immediately.
- **Skin Exposure** – If contaminated solids or liquids get on the skin promptly wash the contaminated skin using soap or mild detergent and water. Obtain medical attention immediately when exposed to concentrated solids or liquids. If a skin burn occurs from contact with creosote, saturate the skin burn with water but do not attempt to remove the creosote. Apply cold water sterile dressing loosely over the burned area and obtain medical attention as soon as possible.
- **Breathing** – If a person inhales large amounts of a toxic vapor, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Obtain medical attention as soon as possible.
- **Swallowing** – When contaminated solids or liquids have been swallowed, the Poison Control Center (1-800-222-1222) will be contacted and their recommended procedures followed.

Fire and/or Explosion. If a localized fire occurs, chemical fire extinguishers will be used. If necessary and feasible, a fire blanket, soil or other inert materials should be placed on the burning area to extinguish the flames and minimize the potential for spreading. Water or foam should not be used. The Emergency Coordinator will decide whether to summon the Paradise Volunteer Fire Department for assistance.

5.2.7.4 Emergency Equipment

The emergency equipment listed in **Table 5.2.7-2** will be available at the Paradise Facility office. This equipment will be available on-site when personnel are involved in the operation of the Facility.

5.2.7.5 Coordinated Emergency Services

BNSF has made arrangements with the local authorities listed in **Table 5.2.7-1** to respond to emergency situations. Each of the organizations on the Emergency Response Team (**Table 5.2.7-1**) was provided with copies of the Contingency Plan in 1989 and updated revisions were provided in November 1989 and October 1996. The most recent copies of the letter and updated **Table 5.2.7-1** sent to these organizations are included as **Appendix D** of this Permit Renewal Application.

The Paradise VFD is the primary emergency authority for the Paradise Facility. The Emergency Coordinator is responsible for initiating contact with the responsible organizations. The Emergency Coordinator will contact the National Response Center (1-800-424-8802) in the event the Facility has a fire, explosion, or release which could threaten human health or the environment.

Evacuation Plan

Unexpected severe weather, wildfires and personnel injury could require evacuation of personnel from the Facility. Evacuation is initiated at the discretion of the personnel working at the Facility. The evacuation order is communicated by either voice, radio or visually by gestures and actions. The designated evacuation route from the Facility is:

- Southeast from the Facility to the town of Paradise.
- Northwest 7 miles on Highway 200 to the town of Plains.

The alternate evacuation route is:

- Southeast from the Facility to the town of Paradise.
- Southeast on Highway 200 for ½ mile.
- Across Clark Fork River Bridge, first right onto River road for 7 miles to the town of Plains.

Copies of Contingency Plan

The Contingency Plan will be maintained at the Facility office and by the organizations listed in **Table 5.2.7-1**. Copies of the letter and updated **Table 5.2.7-1** sent to these organizations are included as **Appendix D**.

Amendment of Contingency Plan

The emergency coordinators listed in **Table 5.2.7-1** will be review annually with the HASP and updated to reflect changes in Facility personnel or contact information. The Contingency Plan will be reviewed and amended, if necessary, whenever:

1. The Facility Permit is revised.
2. Deficiencies are noted during an emergency.
3. The Facility design, construction, operation, maintenance, or other circumstances change in a way that increases the potential for fires, explosion or releases of hazardous waste or hazardous waste constituents, or changes the response necessary in an emergency.
4. The list of Emergency Coordinators Changes.
5. The list of emergency equipment changes.

Table 5.2.7-2 List of Emergency Equipment in Paradise Site Office

Equipment	Description	Quantity	Location
Fire Extinguishers	Dry Chemical	4	Site truck, product recovery building, site office
Respirators	Organic, double element	2	Site office
Eye Wash	Saline Solution	3	Product recovery building, site office
First Aid Kit	Standard Kit	3	Site truck, product recovery building, site office
Protective Clothing	Tyvek suits	10	Product recovery building, site office
	Latex/Nitrile gloves	3 boxes	Product recovery building, site office
	Protective goggles	2	Product recovery

			building, site office
	Splash Shield	1	Product recovery building
	Hard Hats	3 (extra)	Product recovery building, site office
	Eye safety glasses	1 (extra)	Product recovery building

Module II
Corrective Action Management Unit

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Attachments

- II.1. Location of Corrective Action Management Unit and Land Treatment Unit
- II.2. Schedule of Inspection and Inspection Checklist for LTU
- II.3. LTU Post-Closure Plan
- II.4. LTU Soil Monitoring Parameters, Permit Concentration Limit, and Test Methods
- II.5. Surface Impoundment/Waste Pile Unit Post-Closure Plan
- ~~II.6. Process Flow Diagram for the Product Recovery System~~
- II.7. Waste Analysis Plan
- ~~II.8. Product Recovery System Inspection Log~~
- ~~II.9. Product Recovery System Closure Plan~~

Module II Corrective Action Management Unit (CAMU)

II.A. **Applicability**

The requirements of this permit module apply to the operation of the Corrective Action Management Unit (CAMU) at the BNSF former tie treating plant in Paradise, Montana. The CAMU consists of the existing land treatment unit (LTU), ~~the Product Recovery System (PRS)~~ and ~~the~~ portion of the Surface Impoundment (SI) ~~which houses the PRS~~. The Permittee must operate and maintain the CAMU in accordance with this Permit and applicable requirements in Title 17, Chapter 53 ARM. Attachment II.1 shows the location of the CAMU.

II.A.1. *Land Treatment Unit (LTU)*

The LTU was included in the CAMU to allow for treatment and disposal of creosote-contaminated soils, groundwater, and spent granular activated carbon from solid waste management unit (SWMU) remediation activities. Remediation waste is no longer applied to the LTU and the LTU is in post-closure care.

II.A.2. *Surface Impoundment (SI)*

The soils in the SI were excavated and the SI was subsequently closed in 1987. The SI is in post-closure care. A large area of ~~free phase~~ creosote product that has pooled at the bottom of the aquifer is located beneath the southern end of the surface impoundment. ~~Therefore, a product Product recovery system, including pumping wells for creosote product removal, a product recovery building, and an infiltration trench is being housed are located~~ at the southern end of the surface impoundment.

II.A.3. *Product Recovery System (PRS)*

~~The PRS recovers free phase creosote from contaminated groundwater. The PRS Product Recovery consists of a structurally enclosed product recovery tank system, recovery wells within the SI and the former retort area, recovery system piping and pumps, and a surface and subsurface reinfiltration trench. This portion of the PRS is located at the southern end of the SI. The product recovery well located system also includes creosote recovery in the former retort area, which is are~~ not included in the CAMU.

II.B. **Permitted Wastes**

In accordance with 40 CFR 264 Subpart S the CAMU is designated solely for the management of remediation waste. The term “remediation wastes”, as used in this permit, is defined in Condition I.E. (Definitions).

II.C. **Land Treatment Unit (LTU)**

The LTU consists of seven application areas (referred to as cells in this Permit), groundwater monitoring wells associated with the LTU groundwater monitoring system, fencing, and run-on/run-off control structures. Attachment II.1 shows the location of the LTU and each LTU cell.

II.C.1. General Post-Closure Care Requirements

- II.C.1.a. DEQ approved LTU closure certification and the LTU began its post-closure care period in 2009. Groundwater samples collected from the LTU monitoring network in the spring of 2009 represent groundwater conditions at the start of the post-closure period. Unsaturated zone soil samples collected from the LTU in the fall of 2010 represent unsaturated zone conditions at the start of the post-closure care period.
- II.C.1.b. The LTU must not receive any new remediation waste.
- II.C.1.c. The post-closure care period extends for 30 years, unless the post-closure plan is amended through a permit modification, as specified in 40 CFR 264.118(d).
- II.C.1.d. Any time preceding partial or final closure of a regulated unit subject to post-closure care requirements, or any time during the post-closure period, DEQ, in accordance with the permit modification procedures in Condition I.M (Changes to Permit) of the permit, may:
- II.C.1.d.i. Shorten the post-closure care period applicable to the hazardous waste management unit if DEQ finds that the reduced period is sufficient to protect human health and the environment (e.g., soils or groundwater monitoring results, characteristics of the hazardous wastes, application of advanced technology, or alternative disposal, treatment, or re-use techniques indicate that the hazardous waste management unit is secure); or
- II.C.1.d.ii. Extend the post-closure care period applicable to the hazardous waste management unit if DEQ finds that the extended period is necessary to protect human health and the environment (e.g., soils or ground-water monitoring results indicate a potential for migration of hazardous wastes at levels which may be harmful to human health and the environment.)
- II.C.1.e. Post-closure use of property on or in which hazardous wastes remain after partial or final closure must never disturb the integrity of the final cover or any other components of the containment system, or the function of the unit's monitoring systems, unless DEQ finds in advance that the disturbance:
- II.C.1.e.i. Is necessary to the proposed use of the property, and will not increase the potential hazard to human health or the environment; or
- II.C.1.e.ii. Is necessary to reduce a threat to human health or the environment.
- II.C.1.f. During the post-closure period, the Permittee shall continue all operations specified in this permit as necessary to maximize degradation, transformation, or immobilization of hazardous constituents within the treatment zone, including

nutrient and pH control, to the extent they are consistent with other post-closure activities. [40 CFR 264.280(c)(1)]

~~II.C.1.f.~~

II.C.1.g. The Permittee must maintain a well-established vegetative cover over all closed portions of the facility, including the LTU and the SI/WPU. The vegetative cover must be capable of maintaining growth without extensive supplemental irrigation. Noxious weed growth must be controlled and minimized. The Permittee shall ensure that off-site migration of noxious weeds is controlled.

II.C.1.h. The Permittee shall maintain all facility run-on and run-off management structures, including the LTU diking system, to adequately control precipitation and surface water run-on and run-off of hazardous constituents.

II.C.1.i. The Permittee shall control wind dispersal of hazardous waste from all closed regulated units. The Permittee shall note in the operating log any incidents of blowing soils or wastes, and document efforts made to control wind dispersal. The Permittee may use soil stabilization methods in the closed units to control airborne dispersal of wastes and surface soils.

II.C.1.j. The Permittee must continue to comply with prohibitions and conditions concerning growth of food chain crops under Condition I.K.1.

II.C.2. LTU Inspections

II.C.2.a. The Permittee shall follow the schedule of inspection for the LTU established in Attachment II.2

II.C.2.b. The inspection checklist shown in Attachment II.2 must be followed. Inspection of fencing, dikes, warning signs, road conditions, and monitoring wells must be included in the inspection.

II.C.2.c. Unusual conditions, such as ponded water or windblown soils, if present, must be noted in the inspection log.

II.C.2.d. All inspection and remediation or repair activities must be noted and maintained according to Condition I.R.4.e.

II.C.3. Post-Closure Plan

The Permittee shall comply with the post-closure requirements outlined in this Module and the Post-Closure Plan in Attachment II.3.

II.C.3.a. Location of Post-Closure Plan

The approved post-closure plan must be kept at the office of the post-closure contact specified in the post-closure plan and the Paradise facility office for the duration of the post-closure period. If the Paradise facility office is closed during

the post-closure period, a copy of the approved post-closure plan must be maintained at the office of the post-closure facility contact.

II.C.3.b. Amendment of Post-Closure Plan

The Permittee may request a permit modification in compliance with 40 CFR 270.41 to authorize a change in the approved post-closure plan in accordance with the applicable requirements of Condition I.M.2. (Modification or Revocation and Reissuance). The written request must include a copy of the amended post-closure plan for approval by DEQ.

II.C.3.b.i. The Permittee may submit a written request to DEQ for a permit modification to amend the post-closure plan at any time during the post-closure care period.

II.C.3.b.ii. The Permittee shall submit a written request for a permit modification at least 60 days prior to the proposed change in the post-closure plan, or no later than 60 days after an unexpected event has occurred which has affected the post-closure plan.

II.C.3.b.iii. DEQ may request modifications to the post-closure plan ~~under Condition III.C.3.b.~~ The Permittee shall submit the modified plan no later than 90 days after DEQ's request. Any modifications requested by DEQ will be approved, disapproved, or modified in accordance with Condition I.M.2.

II.C.4. Unsaturated-Zone Soil Monitoring

II.C.4.a. Sampling Frequency

The Permittee shall continue sampling LTU unsaturated-zone soil in compliance with Conditions II.C.4. and Attachment II.3 with the following decreasing sampling frequency:

- one (1) year after vegetation is established
- three (3) years after vegetation is established
- seven (7) years after vegetation is established
- fifteen (15) years after vegetation is established
- thirty (30) years after vegetation is established

II.C.4.a.i. During the post-closure period, DEQ may decide that more frequent BTZ soil monitoring of the LTU is necessary, at which time DEQ will notify the Permittee in writing. Examples of conditions that could warrant more frequent BTZ sampling would be the appearance of hazardous constituents in groundwater immediately downgradient of the land treatment units or damage to the vegetative cover.

II.C.4.b. Sampling Locations and Collection

The procedure for random selection of sampling sites within application cells

must be performed for each soil sampling event, as described in the Permittee's Sampling and Analysis Plan. The Sampling and Analysis Plan must be provided to DEQ for approval along with any future changes to the Sampling and Analysis Plan.

- II.C.4.b.i. When selecting sampling sites, any point that falls within 20 feet of the cell boundary must be discarded to avoid edge effects, and another random point shall be selected.
- II.C.4.b.ii. Two randomly selected sample locations from each cell must be cored to a depth of 66 inches, with the 60 to 66-inch interval selected to represent the unsaturated zone.
- II.C.4.b.iii. Core samples must be collected with equipment as described in the Permittee's Sampling and Analysis Plan, which must be approved by DEQ.
- II.C.4.b.iv. The two samples collected from each cell must not be composited.

II.C.5. Analytical Requirements

- II.C.5.a. Samples must be analyzed for the analytes/principal hazardous constituents (PHC) provided in Attachment II.4.
- II.C.5.b. The analytical methods shown in Attachment II.4 must be used unless DEQ approves an alternate analytical method.
- II.C.5.c. Sample analytical results must not exceed the required Permit Concentration Limit for soil provided in Attachment II.4.

II.C.6. Exceedances of Permit Concentration Limits

- II.C.6.a. If one of more PHCs provided in Attachment II.4 is detected at or above the permit concentration limit provided in Attachment II.4 in any soil core, DEQ must be notified within 15 days after receipt of the analytical information by the Permittee. Another soil core must be taken from the same quarter sector from which the first soil core was sampled, within 30 days after the Permittee receives the analytical information.
- II.C.6.b. Re-sampling is only necessary for the core(s) that show concentrations above permit concentration limits and only for those constituents detected.
- II.C.6.c. If the repeat sampling detects at least one constituent at or above the permit concentration limits, it is considered a statistically significant increase. DEQ shall be notified within 7 days after receipt of the analytical information by the Permittee.
- II.C.6.d. If there has been a statistically significant increase, within 90 days after receipt of the repeat sampling required in Condition II.C.6.a., the Permittee shall submit an

application to DEQ for a permit modification to the post-closure plan. The modification shall describe steps to:

II.C.6.d.i. Further evaluate the reason for the increase, and/or

II.C.6.d.ii. Remediate the zone(s) showing the statistical increase in PHCs.

II.C.7. LTU Groundwater Monitoring Requirements

Groundwater monitoring requirements for the LTU are provided in Module III (Groundwater Monitoring).

II.C.8. Reporting Requirements

The Permittee must follow the reporting requirements of Condition I.R. (Recordkeeping and Reporting) during post-closure care of the LTU.

II.C.9. Financial Assurance for Post-Closure Care of the LTU

II.C.9.a. The Permittee shall adjust the post-closure care cost for inflation within 30 days after the close of the fiscal year for BNSF Railway Company and submit the adjusted cost estimate to DEQ. This annual inflation adjustment must be calculated using the procedure outline in 40 CFR 264.142(b).

II.C.9.b. The Permittee shall revise the post-closure care cost estimate no later than 30 days after DEQ has approved a request to modify the post-closure care plan, if the change in the plan increases the cost of post-closure.

II.C.9.c. The Permittee shall demonstrate continuous compliance with 40 CFR 264.146 by providing documentation of financial assurance, as required by 40 CFR 264.151 and Condition I.G. in at least the amount of the cost estimates required by Condition II.C.9.

II.D. Surface Impoundment and Waste Pile

The SI was closed by removing visibly contaminated soil from the impoundment and temporarily storing the material in the WPU. The SI closure was completed in 1988. In 1989, the LTU was constructed and impacted soils from the WPU were applied. WPU closure was completed in 1990. The SI/WPU is currently in post-closure.

II.D.1. Post-Closure Plan for the SI/WPU

The post-closure plan for the SI/WPU is provided in Attachment II.5. Any amendments to the post-closure plan must follow the requirements set forth in Condition II.C.3.b. (Amendment of Post-Closure Plan).

II.D.1.a. General Post-Closure Operational Requirements for the SI/WPU

The Permittee must follow post-closure operational requirements set forth in Condition II.C.1.c. through II.C.1.j.

II.D.2.

Groundwater Monitoring Requirements for the SI/WPU

During the post-closure period, the Permittee shall continue groundwater monitoring at the SI/WPU in accordance with the Corrective Action Program set forth in Condition III.K. (Alternate Concentration Limit).

II.E.

Product Recovery (PR) System

The purpose of ~~the PRS~~ is to recover creosote ~~free~~ product pooled at the bottom of the aquifer beneath the southern end of the SI and in the former retort area. PR in the SI is comprised of air-lift pumps which are used to manually recover creosote product from recovery wells. PR in the former retort area is comprised of a downhole pump for creosote product recovery. The product recovery system consists of free product recovery, groundwater/free product separation, groundwater treatment, free product storage, untreated groundwater storage, and reinfiltration of treated water back into the aquifer.

~~II.E.1. PRS Units Descriptions~~

~~The PRS is comprised of the following units:~~

~~II.E.1.a. Recovery Well Network for pump recovered product and groundwater from the aquifer;~~

~~II.E.1.b. SI Well Field Piping Network for transporting recovered product and groundwater from the recovery well network into the gross separation tank(s).~~

~~II.E.1.c. Gross Separation Tank(s) for gravity separation of creosote product and co-produced groundwater received from recovery well network;~~

~~II.E.1.d. Oil/Water Separator(s) for physical separation of creosote product from groundwater received from the Gross Separation Tank;~~

~~II.E.1.e. Product Transfer Tank(s) for receipt and storage of creosote product from the Gross Separation Tank and Oil/Water Separator, and/or transfer of creosote product to Product Storage Tank or transfer for recycle;~~

~~II.E.1.f. Water Transfer Tank(s) for receipt of contaminated groundwater from the oil/water separator prior to being pumped to the granular activated carbon (GAC) treatment system. Water in the tank must either be processed through the GAC units or re-routed back to the gross separator tank.~~

~~II.E.1.g. Granular Activated Carbon Treatment System(s) for the receipt and treatment of contaminated groundwater from the water transfer tank, and for transfer of treated groundwater to the treated water storage tanks;~~

~~II.E.1.h. Treated Water Storage Tank(s) for receipt and storage of treated groundwater from the activated carbon treatment system, and for transfer of treated groundwater to the SI infiltration system or to the LTU irrigation system;~~

~~H.E.1.i. Surface Impoundment Treated Groundwater Infiltration System for infiltration of treated groundwater received from the water storage tanks. The infiltration system is comprised of a surface and subsurface infiltration trench. Treated groundwater may not be infiltrated through the SI surface infiltration trench when ground in the SI is frozen. Treated groundwater may be infiltrated through the SI subsurface infiltration trench, which is beneath frost line, throughout the year.~~

~~H.E.2. General Requirements for the PRS~~

~~H.E.2.a. The PRS may be used only for the recovery, dewatering, and recycling of creosote and the treatment of co-produced groundwater containing creosote resulting from corrective action activities required by Module V (Facility-Wide Corrective Action).~~

~~H.E.2.b. The Permittee shall treat only the following wastes in the PRS:~~

~~H.E.2.b.i. Recovered creosote from wood preserving processes;~~

~~H.E.2.b.ii. Groundwater and decontamination waters containing hazardous waste listed as EPA Hazardous Waste Number K001, (i.e., bottom sediment sludges from wood preserving processes that use creosote);~~

~~H.E.2.b.iii. Groundwater and decontamination waters containing hazardous waste listed as EPA Hazardous Waste Number F034 (i.e., wastewaters, process residuals, preservative drippage and spent formulations from wood preserving processes generated at plants that use creosote formulations); and~~

~~H.E.2.b.iv. Groundwater and decontamination waters that exhibit a hazardous waste characteristic.~~

~~H.E.2.c. No wastes that show the characteristics of ignitability (D001) or reactivity (D003) may be placed in PRS tank systems.~~

~~H.E.2.d. No waste that is incompatible with other wastes may be placed in the PRS tank or container systems.~~

~~H.E.2.e. Solid remediation waste from the PRS will consist of spent activated carbon, sediments, and sludge. These remediation wastes are generated from the separation of recovered creosote from co-produced groundwater in the PRS.~~

~~H.E.2.f. The PRS will generate treated and untreated recovered groundwater. The Permittee may use treated groundwater as irrigation water for the LTU and/or re-infiltrate treated recovered groundwater back into the underlying aquifer beneath the SI. The Permittee may ship untreated groundwater to an off-site hazardous waste treatment, storage, or disposal facility.~~

~~H.E.2.f.i. The Permittee shall not use treated groundwater as LTU irrigation water unless concentrations of all PHCs listed in Attachment II.4 are equal to or less than 1 part per billion (ppb).~~

~~H.E.2.f.ii. The Permittee shall not infiltrate treated groundwater into the PRS infiltration system wells unless concentrations of all PHCs listed in Attachment II.4 are equal to or less than 1 ppb.~~

~~H.E.3.II.E.1. Product Recovery Wells~~

~~The Permittee shall maintain and operate product recovery wells located in the southwest portion of the former SI ~~designated as part of the CAMU~~, and in the former retort area. The number of product recovery wells and their location must be approved by DEQ. DEQ-approved product recovery well information, including well number and location, must be provided in the Product Recovery ~~System~~ Operations and Maintenance Manual.~~

~~II.E.1.a. All product recovery wells must be maintained in optimum operable condition and must be capable of supporting a recovery pump ~~and control box~~.~~

~~H.E.3.a.II.E.1.b. The Permittee shall remedy any deterioration or malfunction of the product recovery wells within a week of discovery. If a remedy is not feasible in that time frame, the Permittee must submit a proposed remedy and schedule for correcting the problem within one week of discovery, for DEQ approval.~~

~~H.E.3.b. Product thickness in all recovery wells must be monitored as specified in the Operations and Maintenance Manual. Each recovery well in which product thickness measures greater than six inches must be pumped to recover accumulated creosote.~~

~~H.E.3.c. In each active product recovery well, the recovery pump timer cycles must be set to optimize recovery of creosote from groundwater. Recovery pump timer cycles must be adjusted according to performance evaluations conducted in accordance with Condition II.E.8 (PRS Performance Evaluations).~~

~~H.E.3.d. Recovery wells must be maintained in optimum operable condition.~~

~~H.E.3.e. Recovery pumps must be cleaned and inspected when removed for repair or adjustment, or when transferred to another recovery well.~~

~~II.E.2. Product Recovery Pumps~~

~~II.E.2.a. The Permittee shall maintain the product recovery pumps in such a way that maximizes removal of creosote product from the well.~~

~~II.E.2.b. Air-lift pumps must be used for the extraction of creosote product from each recovery well in the surface impoundment. A downhole pump must be used for the extraction of creosote product from the recovery well in the retort area. Alternate pumping methods may be used with DEQ approval.~~

II.E.2.c. Operation of the product recovery pumps must be in accord with the DEQ-approved Operations and Maintenance Manual.

~~II.E.4.II.E.3. Product Recovery~~ *Operation and Maintenance Requirements*

II.E.3.a. The Permittee shall operate and maintain ~~the PRS wells and pumps~~ in such a way that maximizes removal of creosote product from the base of the aquifer.

II.E.4.a.II.E.3.b. ~~The PRS~~ must be operated and maintained in accordance with the conditions of this Permit and a detailed Operations and Maintenance Manual which must be maintained by the Permittee.

II.E.4.a.i.II.E.3.b.i. Any changes or revisions made to the Operations and Maintenance Manual must be approved by DEQ. The Permittee shall provide DEQ with the most current version within two weeks after the revisions are approved.

II.E.3.b.ii. A copy of the most recent Operations and Maintenance Manual must be kept at the BNSF Paradise Facility.

II.E.3.c. In each active product recovery well, the product thickness must be monitored as specified in the Operations and Maintenance Manual.

II.E.3.d. Each product recovery well in which creosote product thickness measures greater than six inches must be evaluated in accordance with the most recent Operations and Maintenance Manual.

II.E.3.d.i. Creosote product volume in the recovery well sump must not exceed 75% of sump capacity.

II.E.3.e. The Permittee must cease pumping when water is observed in the extracted material.

II.E.3.f. Extracted creosote product must be containerized and properly stored for off-site disposal in accordance with the most current hazardous waste generator requirements.

~~The Permittee shall maintain and operate a tank treatment system for the management of recovered creosote and contaminated groundwater. The tank treatment system must be capable of year round operation, and must include the following general operational capabilities and controls:~~

~~A closed, weather protected piping system running from the recovery wells to the treatment tanks, capable of controlling back flow of recovered media;~~

~~An enclosed, weather-protected building to house the treatment and storage systems;~~

~~A secondary containment system for the treatment and storage systems which meets the requirements of Condition H.E.5.b. (PRS Tank Treatment System Secondary Containment).; and~~

~~Treatment and storage systems that are capable of separating recovered creosote from co-produced groundwater; storing and transferring recovered creosote; treating, storing, transferring, and/or disposing of co-produced groundwater; and automatic shutdown of the product recovery system (i.e., automatic feed cut-off) should upset conditions occur.~~

~~H.E.4.b.— The Permittee shall maintain and operate, as part of the PRS, the units described in Condition H.E.1. The PRS must be capable of returning creosote product or groundwater to the appropriate stage of treatment if off-specification treatment conditions occur. For example, if creosote product is observed in a water transfer tank, then contents of the transfer tank must be returned to the gross separation tank. Or, if monitoring of treated groundwater in a treated water storage tank indicates treatment requirements have not been met, then contents must be returned to the activated carbon treatment system. Attachment H.6 shows the process flow diagram for the product recovery system.~~

~~H.E.5.— PRS Control Systems and Containment Systems~~

~~H.E.5.a.— PRS Overflow Prevention Controls~~

~~The tanks within the product recovery system must be equipped with level sensing devices that trigger automatic feed cutoff to prevent spills or overflows from tank or containment systems.~~

~~H.E.5.b.— PRS Tank Treatment System Secondary Containment~~

~~In order to prevent the release of hazardous waste or hazardous constituents to the environment, the Permittee shall maintain a secondary containment system that is:~~

~~H.E.5.b.i.— Designed and operated to contain 100 percent of the capacity of the largest tank within its boundary;~~

~~H.E.5.b.ii.— Designed and operated to prevent run-on or infiltration of precipitation into the secondary containment system unless the collection system has sufficient excess capacity to contain run-on or infiltration. Such additional capacity must be sufficient to contain precipitation from a 25-year, 24-hour rainfall event;~~

~~H.E.5.b.iii. — Constructed with chemical-resistant water stops in place at all joints (if any); and~~

~~H.E.5.b.iv. — Lined with an impermeable interior coating or lining that is compatible with the stored waste and prevents migration of waste into the concrete.~~

~~H.E.5.c. — PRS Spill/Leak Response~~

~~H.E.5.c.i. — If a leak or spill to the secondary containment system is observed during inspection or operation of the PRS, the flow of hazardous waste must be stopped immediately, and all released materials must be removed within 24 hours or in as timely a manner as is possible to prevent harm to human health and the environment. The incident must be noted in the inspection log and corrective measures must be documented in the operating record.~~

~~H.E.5.c.ii. — The Permittee shall immediately carry out the provisions of the Contingency Plan required in Condition I.Q. whenever there is a fire, explosion or release of hazardous waste or constituents that could threaten human health or the environment.~~

~~H.E.6.II.E.4. PR Waste Analysis & Monitoring Requirements~~

~~H.E.6.a. — The Permittee shall follow the monitoring protocols of the Operations and Maintenance Manual and the Conditions of this section for operation and monitoring of the PRS.~~

~~H.E.6.b. — Results of all PRS monitoring activities must be noted and maintained in the operating record as required by Condition I.R.1.~~

~~H.E.6.c. — Waste Analysis~~

~~II.E.4.a. — Wastes generated from operation of the PRS-PR must be sampled and analyzed in accordance with the Waste Analysis Plan (Attachment II.76). All waste analyses shall be kept as part of the operating record.~~

~~H.E.6.d. — Treated Groundwater~~

~~H.E.6.d.i. — The Permittee shall collect water samples as outlined in the Operations and Maintenance Manual. The sample results must be used to monitor carbon effectiveness.~~

~~H.E.6.d.ii. — Activated carbon must be replaced in the GAC units when effluent stream analytical results exceed the groundwater treatment standards of Condition H.E.2.f.i.~~

~~H.E.6.d.iii. — The Permittee shall use the analytical results of the tank sample to determine compliance with the irrigation water and infiltration water treatment standards required in Condition H.E.2.f.i. and H.E.2.f.ii.~~

~~H.E.6.e.II.E.5. Operational Monitoring and Recordkeeping~~

The Permittee shall monitor and note in the operating record, ~~on a weekly basis~~ at least quarterly during recovery operations, the following operational parameters:

~~H.E.6.e.i. The duration of pump operation for each active product recovery well;~~

~~H.E.5.a.i. The condition of each product recovery well and pump;~~

~~H.E.5.a.ii. The observed measurement of creosote product thickness in each product recovery well; and~~

~~H.E.5.a.iii. The quantity of creosote transferred to the product storage tank product extracted from each recovery well.; and~~

~~H.E.5.b. Results of all PR monitoring activities must be noted and maintained in the operating record as required by Condition I.R.1.~~

~~H.E.6.e.ii.~~

~~H.E.6.e.iii. The quantity of co-produced groundwater treated through the GAC units.~~

~~H.E.7. PRS Inspections~~

~~H.E.7.a. The Permittee shall inspect the PRS quarterly.~~

~~H.E.7.b. The Permittee shall record inspections in the inspection log shown in Attachment H.8. Condition of pumping wells, tanks, pumps, valves, piping, connections, secondary containment, and the infiltration system must be included in the inspection. Leaks, releases, or system malfunctions must also be noted in the inspection log.~~

~~H.E.7.c. All inspection activities shall be noted and maintained as part of the operating record, in accordance with Condition I.R.1.~~

~~H.E.7.d. The Permittee shall remedy any deterioration or malfunction of equipment or structures within a week of discovery. If a remedy is not feasible in that time frame, within one week of discovery the Permittee must provide, for DEQ approval, a schedule for remedying the problem. Where a hazard is imminent, or has already occurred, remedial action must be taken immediately.~~

~~H.E.8-II.E.6. Product Recovery & Performance Evaluations~~

~~H.E.8.a-II.E.6.a. Annual Performance Evaluation~~

The Permittee shall perform an annual performance evaluation of the PRS operations to ensure that ~~operation of the PRS~~ it is optimized for the recovery of creosote product. Results of the evaluation must be reported in accordance with Condition I.R.4.e.vii. The annual performance evaluation must include the following:

~~H.E.8.a.i.II.E.6.a.i.~~ Evaluation of product thickness ~~and pumping duration to determine the effectiveness of the selected pump timer cycle for maximizing product recovery, regardless of generation of co-produced groundwater~~; and

~~H.E.8.a.ii.II.E.6.a.ii.~~ Evaluation of quantity of recovered creosote product compared to the estimates for maximum quantity of creosote product recovery and duration of product recovery operations to evaluate the overall effectiveness of the system.

~~H.E.8.b.II.E.6.b.~~ 5 Year Performance Evaluation

Every 5 years during PRS operations, the Permittee shall conduct a performance evaluation of PRS operations. Results of the evaluation must be reported in accordance with Condition I.R.4.f. (5 Year Performance Evaluation Report) and include the following:

~~H.E.8.b.i.II.E.6.b.i.~~ Duration of PRS operation (i.e., 5 years, 10 years, etc.) and the total quantity of recovered creosote product, to date, compared to the system design estimate of the duration of PRS operations and the associated estimate for maximum quantity of creosote product recovery;

~~H.E.8.b.ii.II.E.6.b.ii.~~ A determination, based on annual performance evaluations, whether the existing PRS method is adequate for maximizing the recovery of creosote product, and as applicable, an engineering evaluation of the feasibility, cost, and effectiveness of modifying the existing PRS;

~~H.E.8.b.iii.II.E.6.b.iii.~~ A determination, based on annual performance evaluations and current knowledge of creosote product accumulation in the facility subsurface, whether modification of existing product recovery wells or the placement of new, additional wells would enhance the recovery of creosote product, and as applicable, an engineering evaluation of the feasibility, cost, and effectiveness of modifying existing wells or the placement of new/additional wells; and

~~H.E.8.b.iv.II.E.6.b.iv.~~ A determination of the availability and applicability of other technologies and/or processes for the removal of creosote contamination from the subsurface, including an engineering evaluation of the feasibility, cost, and effectiveness of implementing a replacement technology/process.

~~H.E.8.c.II.E.6.c.~~ DEQ reserves the right to require the Permittee to evaluate a specific technology/process in accordance with the requirements of Condition II.E.86.b. DEQ's notification will identify the technology/process and the availability of any literature supporting the alternative technology/process.

~~H.E.9.II.E.7.~~ Duration of Product Recovery Operations

~~H.E.9.a.II.E.7.a.~~ Once the Permittee has determined that all existing product recovery wells have demonstrated a product thickness of less than six inches for a period of 1 year or more, the Permittee shall prepare a PRS Endpoint Analysis for approval by DEQ. The PRS Endpoint Analysis must include the following:

~~H.E.9.a.i.~~II.E.7.a.i. A comparison of the theoretical estimate of recoverable creosote product to the actual quantity of creosote product recovered, and an explanation of the difference if the actual quantity is less than the theoretic estimate; and

~~H.E.9.a.ii.~~II.E.7.a.ii. A performance evaluation that meets the requirements of Condition II.E.~~68~~.

~~H.E.9.b.~~II.E.7.b. Once DEQ has approved the Endpoint Analysis submitted by the Permittee, the Permittee may cease product recovery operations and proceed with closure of the PRS in accordance with the requirements of Condition II.E.~~810~~ (PRS Closure Requirements).

~~H.E.9.c.~~II.E.7.c. Cost estimates for ongoing operation of ~~the PRS~~ must be provided as required in Condition I.G.2.

~~H.E.10.~~II.E.8. *Product Recovery & Closure Requirements*

II.E.8.a. Closure Work Plan

II.E.8.b. Once DEQ has approved ~~to cease~~cessation of product recovery operations in accordance with Condition II.E.7.b., the Permittee must submit for DEQ approval a workclosure plan for demolition of the product recovery wells and proper disposal of any product recovery equipment.

~~H.E.10.a.~~II.E.8.c. General Closure Requirements

The Permittee shall conduct PR closure ~~close the PRS~~ in a manner that:

~~H.E.10.a.i.~~II.E.8.c.i. Controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the groundwater, surface water, or the atmosphere; and

~~H.E.10.a.ii.~~II.E.8.c.ii. Complies with the closure requirements of this permit.

~~H.E.10.b.~~II.E.8.d. Closure Performance Standards

~~The Permittee shall close the PRS portion of the CAMU in accordance with the Closure Plan shown in Attachment II.9. and the following exceptions, and/or additions:~~

~~H.E.10.b.i.~~—~~The Permittee shall complete partial and final closure activities for the PRS within 180 days after recovering and treating the final volume of recovered creosote in the PRS.~~

~~H.E.10.b.ii.~~—

~~H.E.10.b.iii.~~II.E.8.d.i. The Permittee shall notify DEQ in writing at least 60 days prior to the date on which partial closure of the regulated units, or final closure of the PRS, is expected to begin.

~~H.E.10.b.iv.II.E.8.d.ii.~~ The Permittee shall begin closure no later than 390 days from the date on which DEQ approves the Endpoint Analysis as defined in Condition II.E.97.a.

~~H.E.10.b.v.II.E.8.d.iii.~~ The Permittee shall remove or decontaminate all waste residues, contaminated containment system components, contaminated soils, and structures and equipment contaminated with waste, and manage them as hazardous waste.

~~H.E.10.e.II.E.8.e.~~ Reporting During Closure

The Permittee shall follow the reporting requirements of Condition I.R.4. (Reporting) during product recovery closure ~~of the PRS.~~

~~H.E.10.d.~~ Amendment of Closure Plan

~~H.E.10.d.i.~~ The Permittee shall submit a written request for a permit modification in compliance with 40 CFR 264.112(c) to authorize a change in the approved closure plan. The modification request must accord with 40 CFR 270.42 and Condition I.M.2. (Modification or Revocation and Reissuance). The written request must include a copy of the amended closure plan. The entire written request must be approved by DEQ.

~~H.E.10.d.ii.~~ The Permittee may submit a written request to DEQ for a permit modification to amend the closure plan at any time prior to the notification of partial or final closure of the PRS.

~~H.E.10.d.iii.~~ The Permittee shall submit a written request for a permit modification to authorize a change in the approved closure plan whenever:

~~H..10.E.d.iii.1.~~ Changes in operating plans or facility design affect the closure plan;

~~H..10.E.d.iii.2.~~ There is a change in the expected year of closure;

~~H..10.E.d.iii.3.~~ In conducting partial or final closure activities, unexpected events require a modification of an approved closure plan; or

~~H..10.E.d.iii.4.~~ Requested by DEQ under the conditions described in Conditions II.E.10.d.iii.1. through II.E.10.d.iii.3. above.

~~H.E.10.d.iv.~~ The Permittee shall submit a written request for a permit modification including a copy of the amended closure plan and revised cost estimates as required under Condition II.E.10.h. for approval at least 60 days prior to the proposed change in facility design or operation, or no later than 60 days after an unexpected event has occurred which has affected the closure plan. If an unexpected event occurs during the partial or final closure period, the Permittee shall request a permit modification no later than 30 days after the unexpected event. DEQ will approve, disapprove, or modify this amended plan in accordance with Condition I.M (Changes to Permit) of the permit.

~~H.E.10.d.v. DEQ may request modifications to a plan under the conditions described under Condition II.E.10.d.iii. The Permittee shall submit the modified plan within 60 days after DEQ's request or within 30 days if the change in facility conditions occurs during partial or final closure. Any modifications requested by DEQ will be approved in accordance with the procedures in Condition I.M. (Changes to the Permit) of the permit.~~

H.E.10.e.II.E.8.f. Disposal or Decontamination of Equipment and Structures

During the closure period, all contaminated equipment and structures shall be properly disposed of or decontaminated, unless otherwise specified in this Permit. By removing any hazardous wastes or hazardous constituents during closure, the Permittee may become a generator of hazardous waste and shall handle that waste in accordance with all applicable requirements of ARM 17.53.600 et seq.

H.E.10.f.II.E.8.g. Extension of Closure Period

DEQ may approve an extension of the time allowed for closure set forth in Condition II.E.10.b.i. if the Permittee complies with all applicable requirements for requesting a modification to the permit and demonstrates that the partial or final closure activities will, of necessity, take longer than the time period stipulated in this permit to complete.

H.E.10.g.II.E.8.h. Certification of Closure

Within 60 days of completion of PR closure ~~of the PRS~~, the Permittee shall submit to DEQ, by registered mail, a certification that ~~the PRS~~ has been closed in accordance with the specifications in the approved closure plan.

~~H.E.10.g.i. Closure certification for the PRS must be signed by the Permittee and an independent registered professional engineer.~~

~~H.E.10.g.ii. Documentation supporting the independent registered professional engineer's certifications must be furnished to DEQ upon request until the Permittee is released from the financial assurance requirements for closure under Permit Condition II.E.11.~~

H.E.10.h.II.E.8.i. Cost Estimate for Closure

H.E.10.h.i.II.E.8.i.i. The Permittee shall adjust the closure cost for inflation within 30 days after the close of the fiscal year for BNSF Railway Company and submit the adjusted cost estimate to DEQ. This annual inflation adjustment must be calculated using the procedure outlined in 40 CFR 264.142(b).

H.E.10.h.ii.II.E.8.i.ii. The Permittee shall revise the closure cost estimate no later than thirty (30) days after DEQ has approved a request to modify the closure plan, if the change in the plan increases the cost of closure. ~~This condition is subject to the permit modification requirements of Condition II.E.10.d. (Amendment of Closure~~

~~Plan) and 40 CFR 270.42.~~ The revised closure cost estimate must be adjusted for inflation as specified in Condition II.E.10.h.i.

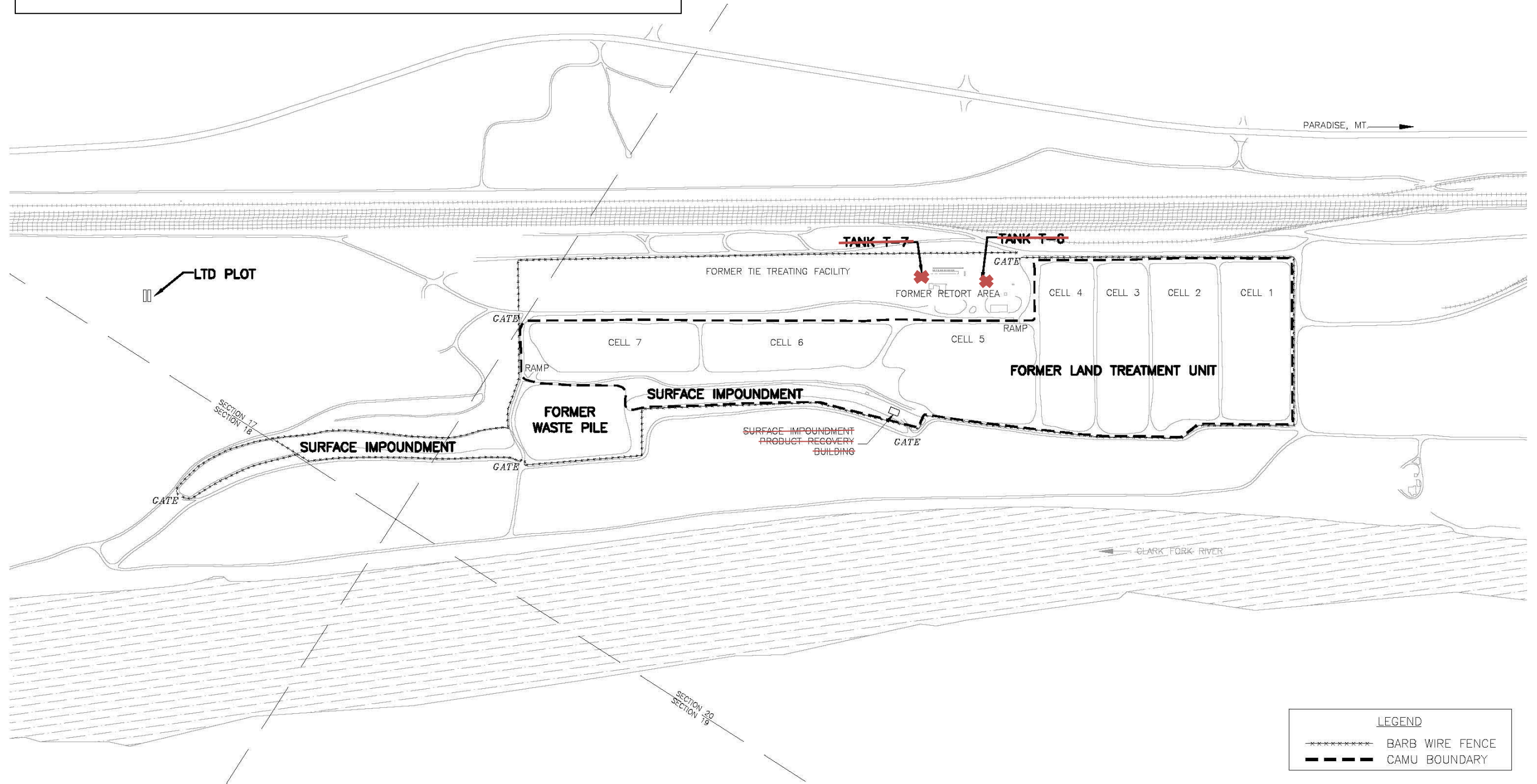
~~H.E.10.h.iii.~~ II.E.8.i.iii. The Permittee shall keep the latest closure care cost estimate at the facility.

~~H.E.11.~~ II.E.9. *Financial Assurance for Operation and Closure of ~~the Product Recovery S System~~*
The Permittee shall demonstrate continuous compliance with 40 CFR 264.146 by providing documentation of financial assurance, as required by 40 CFR 264.151 and Condition I.G. (Financial Assurance) in at least the amount of the cost estimates required by Condition I.G.2., and II.E.97.c., ~~and H.E.10.h.~~ Changes in the financial assurance mechanism must be approved in advance by DEQ.

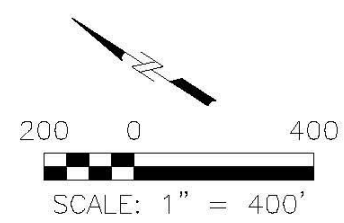
Attachment II.1

Location of Corrective Action Management Unit (CAMU) and Land Treatment Unit (LTU)

This map will be modified to remove the following text: "Tank T-7", "Tank T-6", and "Surface Impoundment Recovery Building" as shown in redline/strikeout on the map.



LEGEND	
-----	BARB WIRE FENCE
-----	CAMU BOUNDARY



BNSF Railway Company Paradise, MT			
Facility Layout			
PROJECT NO. 60147069	DRAWN BY: EM/FTC	DATE: 4/5/11	FIGURE 5.2.1-2



File: B:\CADD\CADD FORT COLLINS\BNSF Paradise\2011\FacilityLayout.dwg Layout: Layout1 User: marshall Plotted: Apr 05, 2011 - 2:20pm

Attachment II.2

Schedule of Inspection and Inspection Checklist for ~~Land Treatment Unit~~ the Paradise Facility and Operating Equipment

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Attachment II.2

Inspection Schedule for the BNSF Paradise Facility and Operating Equipment

Item	Purpose	Potential Problems	Frequency
Fencing/Gates	Limit Access	Damage	Monthly Physical Inspection
Safety Equipment	Accident Use	Availability	Monthly Physical Inspection
Berms and Dikes	Run-on and Run-off Control	Erosion	Quarterly Physical Inspection; Inspection 24-hours after 25- year storm events <u>Monthly Physical Inspection</u>
Monitor Wells	Groundwater Levels and Groundwater Quality Samples	Damage, caps locked, and surface seals	At time of sampling events; annual for wells not on a sampling schedule
Product Recovery Wells	Product Recovery Activities	Damage, leaks	Monthly Physical Inspection <u>Quarterly Physical Inspection</u>
Tank, Valves, Pipe Connections, Foundation	Contain Product and Groundwater	Corrosion, cracks, leaks	Monthly Physical Inspection
Permitted Waste Storage Tanks <u>Container Storage Area</u>	Store Recovered Product <u>Contain Product</u>	Corrosion, cracks, leaks <u>Damage, leaks</u>	Daily Physical or Webcam Inspection <u>Weekly Physical Inspection</u>
<u>Vegetative Cover</u>	<u>Cap Integrity</u>	<u>Damage, rills</u>	<u>Annual Physical Inspection</u>

Unit/Areas to be inspected: SI/WPU, CAMU, and ~~Storage Tanks (T-6 and T-7)~~Container Storage Area

Inspector: _____

Date: _____

Time: _____

Fencing/Gates:

Gates Closed? _____

Broken Wires? _____

Condition of posts/signs? _____

Safety Equipment:

Available? _____

Access? _____

Condition? _____

Treatment Area:

Erosion? _____

Run-off/Run-on controls? _____

Berms (CAMU):

General condition? _____

Erosion? _____

Tanks:

~~Containment (tank/foundation)?~~ _____

~~Secondary tanks?~~ _____

~~Webcam Daily Observation~~ _____

Pumps:

Leaks (pumps and flanges)? _____

Monitor Wells:

Damage? _____

Caps locked? _____

Surface seal condition? _____

Repairs/Remedial Action Required? _____

Units/Areas to be inspected: SI/WPU, CAMU, and ~~Storage Tanks~~

Figure 5.2.5-1 Inspection Log for the Paradise Facility

Attachment II.3
LTU Post-Closure Plan

The post-closure period for the LTU began upon the receipt and approval MDEQ of the closure certification for the entire LTU, and will continue for 30 years after the closure performance standards were met. The LTU was approved closed by MDEQ on September 9, 2009 (MDEQ 2009a); therefore, the post-closure period will run through 2039. Post-closure care will include inspection and maintenance of the vegetative cover and run-on/run-off control system; control of wind dispersal and food chain crops at the facility; continued unsaturated zone and groundwater monitoring; and inspection of the facility security system.

Vegetative Cover/Wind Dispersal

The vegetative cover will control particulate dispersal and wind and storm water erosion of any material, which may be present in the soil following closure. The vegetative cover will be inspected late summer during post-closure in years 1, 2, 3, 7, 15, and 30. If the vegetative cap is shown to be declining at any time during the post-closure period, corrective actions will be implemented as described in the *Land Treatment Unit Vegetative Cap Monitoring Plan* (AECOM 2009).

Run-on/Run-off Control System

The existing storm water management system will be maintained throughout the post-closure care period. The berms surrounding the LTU will remain in place to prevent run-on from storms and flood water from the Clark Fork River from washing out the LTU. The run-off collection berms and dikes will remain in place and collect any storm water that falls within the LTU. The run-on/run-off control system is inspected on a quarterly basis.

Food-Chain Crops

BNSF has not and does not plan to grow food-chain crops on the LTU. As part of the post-closure plan, BNSF will continue to comply with prohibition and conditions concerning growth of food-chain crops.

Groundwater Monitoring and Reporting Activities

Groundwater monitoring will be continued through the post-closure care period on a frequency of 1, 3, 7, 15, and 30 years. The groundwater monitoring locations used for the post-closure care period will be

the same as those used during the operating period of the facility.

Unsaturated Zone Monitoring and Reporting Activities

Unsaturated zone monitoring will be conducted through the post-closure care period on a frequency of 1, 3, 7, 15, and 30 years. Soil beneath the LTU will be sampled and analyzed to determine if any hazardous waste or hazardous waste constituents have migrated below the treatment zone. Soil-pore liquid samples will not be collected during post-closure care.

Facility Contact

The post-closure plan is included as an attachment to the Permit (MDEQ 2001). A copy of the Permit will be located at the office of the BNSF Manager of Remediation. BNSF will be responsible for updating the Paradise facility post-closure plan.

The Facility contact during the post-closure care period is:

Manager Environmental Remediation

BNSF Railway Company

800 Last Chance Gulch, Suite 101

Helena MT 59601

Telephone: (406) 256-4046

Whenever changes in operating plans or Facility design occur during the active life, or post-closure period that may affect this post-closure plan, or whenever there is a change in the expected year of closure, this plan will be revised at that time.

Attachment II.4

LTU Soil Monitoring Parameters, Permit Concentration Limit, and Test Methods

Analyte	Soil Permit Concentration Limit/EQL (ug/L)	EPA Analytical Method Number
Acenaphthene	330	8270
Acenaphylene	330	8270
Anthracene	330	8270
Benzo(a)anthracene	330	8270
Benzo(a)pyrene	330	8270
Benzo(a)fluoranthene	330	8270
Benzo(g,h,i)perylene	330	8270
Benzo(k)fluoranthene	330	8270
Chrysene	330	8270
Dibenzo(a,h)anthracene	330	8270
Fluoranthene	330	8270
Fluorene	330	8270
Indeno(1,2,3-cd)pyrene	330	8270
Naphthalene	330	8270
Phenanthrene	330	8270
Pyrene	330	8270

Attachment II.5
SI/WPU Post-Closure Plan

The SI was closed by removing visibly contaminated soil from the impoundment and temporarily storing the material in the WPU. The SI closure was completed in 1988. In 1989, the LTU was constructed and impacted soils from the WPU were applied. Waste pile closure was completed in 1990. Due to the presence of groundwater impacts in the immediate vicinity of the SI, BNSF implemented the GCAP (ReTeC 1989) and in 2006 incorporated the requirements for the ACL and the GCAP into the monitoring program into the Permit (MDEQ 2001). Post-closure care will include corrective action groundwater monitoring, conducted on an annual basis in POC wells and a semi-annual basis in POE wells.

Groundwater Monitoring and Reporting Activities

Groundwater monitoring will be continued through the post-closure care period. The groundwater monitoring locations used for the post-closure care period will be the same as those used during the operating period of the facility. The groundwater monitoring and reporting plan is provided in further detail in Section 5.3 of this Application.

Facility Contact

The post-closure plan is included as an attachment to the Permit (MDEQ 2001). A copy of the Permit will be located at the office of the BNSF Manager of Remediation. BNSF will be responsible for updating the Paradise facility post-closure plan.

The Facility contact during the post-closure care period is:

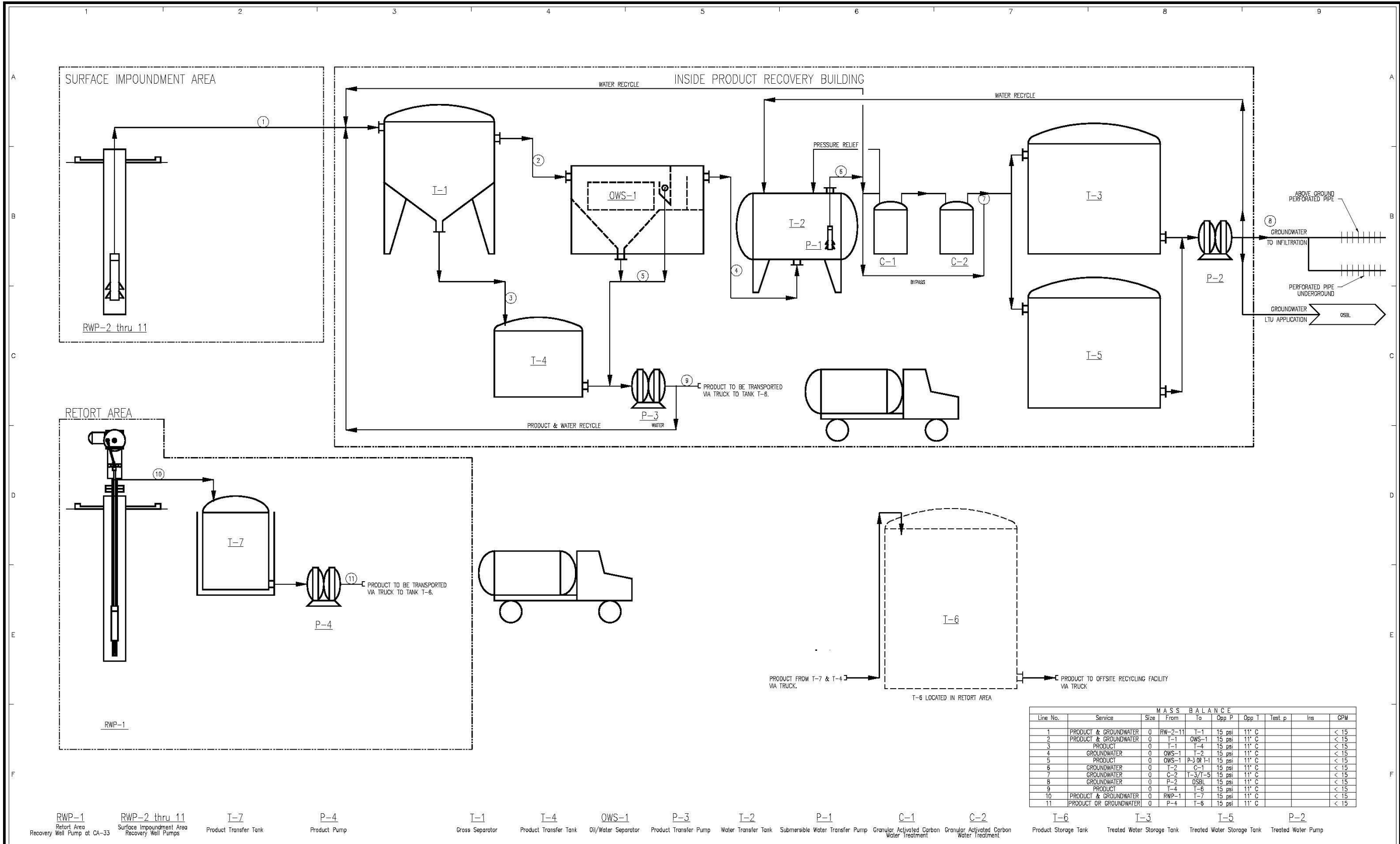
Manager Environmental Remediation
BNSF Railway Company
800 North Last Chance Gulch, Suite 101
Helena MT 59601
Telephone: (406) 256-4046

Whenever changes in operating plans or Facility design occur during the active life, or post-closure period that may affect this post-closure plan, or whenever there is a change in the expected year of closure, this plan will be revised at that time.

Attachment II.6

Process Flow Diagram for the Product Recovery System

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Line No.	Service	Size	M A S S		B A L A N C E		Opp P	Opp T	Test p	Ins	GPM
			From	To							
1	PRODUCT & GROUNDWATER	0	RW-2-11	T-1	15	psi	11'	C			< 15
2	PRODUCT & GROUNDWATER	0	T-1	OWS-1	15	psi	11'	C			< 15
3	PRODUCT	0	T-1	T-4	15	psi	11'	C			< 15
4	GROUNDWATER	0	OWS-1	T-2	15	psi	11'	C			< 15
5	PRODUCT	0	OWS-1	P-3 OR T-1	15	psi	11'	C			< 15
6	GROUNDWATER	0	T-2	C-1	15	psi	11'	C			< 15
7	GROUNDWATER	0	C-2	T-3/T-5	15	psi	11'	C			< 15
9	GROUNDWATER	0	P-2	O/SBL	15	psi	11'	C			< 15
9	PRODUCT	0	T-4	T-6	15	psi	11'	C			< 15
10	PRODUCT & GROUNDWATER	0	RWP-1	T-7	15	psi	11'	C			< 15
11	PRODUCT OR GROUNDWATER	0	P-4	T-6	15	psi	11'	C			< 15

- RWP-1
Retort Area
Recovery Well Pump at CA-33
- RWP-2 thru 11
Surface Impoundment Area
Recovery Well Pumps
- T-7
Product Transfer Tank
- P-4
Product Pump
- T-1
Gross Separator
- T-4
Product Transfer Tank
- OWS-1
Oil/Water Separator
- P-3
Product Transfer Pump
- T-2
Water Transfer Tank
- P-1
Submersible Water Transfer Pump
- C-1
Granular Activated Carbon
Water Treatment
- C-2
Granular Activated Carbon
Water Treatment
- T-6
Product Storage Tank
- T-3
Treated Water Storage Tank
- T-5
Treated Water Storage Tank
- P-2
Treated Water Pump



5									
4									
3									
2	BJB	1/13/03	AS-BUILTS						
1	RL	09/10/98	AS-BUILTS						
0	RL	04/26/96	DRAFT						
NO.	DRWN	DATE	REVISION					CHKD	DATE
								APPVD	DATE

BNSF RAILWAY COMPANY
PRODUCT RECOVERY SYSTEM
BN080-00009-220

PROCESS FLOW DIAGRAM
PARADISE, MT

CURRENT DATE	3/15/05	CADD FILE	0009PFD	DRAWING NO.	SHEET 2	REVISION	2
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Attachment II.76

Waste Analysis Plan

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**Waste Analysis Plan
(5.2.3 of BNSF's Permit Renewal Application)**

[40 CFR 270.14(b)(3) and 264.13(b)] Waste Analysis Plan

The Waste Analysis Plan (WAP) describes the procedures used to determine the physical and chemical characteristics waste generated at the Paradise Facility. This WAP includes identification of the wastes to be sampled, analytical parameters and the rationale for choosing these parameters, sampling procedures, analytical methods including quality assurance/quality control (QA/QC) procedures and data and records management.

5.2.3.1 Waste Identification

Wastes currently generated from Facility cleanup activities include remediation waste and debris, recovered creosote ~~and spent GAC~~, non-contaminated materials from remediation activities, and decontamination materials. The Facility also generates a small quantity of universal waste (e.g., fluorescent light bulbs, batteries). Personal protective equipment (PPE) and disposable sampling equipment will be decontaminated if feasible and, upon determination of no visible contamination, disposed off-site. Materials that cannot be decontaminated to a visually clean surface will be disposed of as remediation waste. Reusable equipment will be decontaminated using methods outlined in the facility standard operating procedures (SOPs) provided in Chapter 7 of the 1998 Application for Part B Permit Renewal (RETEC 1998) and is not repeated in this Application. Decontamination wastes will be managed in accordance with this section by shipment to a licensed facility for treatment and disposal.

Remediation derived wastes are generated on a case specific basis. The volume, decontamination, and disposition of each type of waste will be determined during the development and subsequent MDEQ approval of each remediation specific work plan.

Appendix C presents a copy of the Facility Waste Management Plan. The Waste Management Plan is used as a guide to determine appropriate disposal methods.

5.2.3.2 Sampling Plan

Samples will be collected and analyzed as requested by the receiving hazardous waste or treatment facility. As the process of waste generation (or waste stream) and the general characteristics of the waste and recovered creosote have not changed, frequent sampling and analysis by the receiving facilities have not been required.

5.2.3.3 Chain of Custody

A chain of custody from the field to the receiving analytical laboratory will be maintained and documented, as described in Section 5.7 of this Application. Upon receipt at the laboratory, the samples will be logged into the laboratory logbook and given a unique identification number. All samples will be inspected for damage and leakage upon receipt.

5.2.3.4 Analytical Parameters

Analytical parameters will be determined as requested by the receiving hazardous waste facility.

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Attachment II.8

Product Recovery System Inspection Log

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Inspector: _____ Date: _____
Time: _____

Fencing/Gates:
Gates Closed? _____
Broken Wires? _____
Condition of posts/signs? _____

Safety Equipment:
Available? _____
Access? _____
Condition? _____

Treatment Area:
Erosion? _____
Run-off/Run-on controls? _____

Berms (CAMU):
General condition? _____
Erosion? _____

Tanks:
Containment (tank/foundation)? _____
Secondary tanks? _____
Webcam Daily Observation _____

Pumps:
Leaks (pumps and flanges)? _____

Monitor Wells:
Damage? _____
Caps locked? _____
Surface seal condition? _____

Repairs/Remedial Action Required? _____

Units/Areas to be inspected: SI/WPU, CAMU, and ~~Storage Tanks~~

Figure 5.2.5-1 Inspection Log for the Paradise Facility

Attachment II.9
PRS Closure Plan
(5.2.13.1 of BNSF's Permit Renewal Application)

Closure Performance Standards

Closure performance standards ensure the PRS will be closed in a manner that: 1) minimizes the need for further maintenance; and 2) controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous water constituents, contaminated run-off, or waste decomposition products to groundwater, surface water, or to the atmosphere. BNSF will close the PRS by removing and/or decontaminating all hazardous materials (i.e., system equipment) and transporting residuals off-site to an approved disposal facility.

Closure/Partial Closure Activities

As noted above, recovery efforts will be terminated based on a qualitative evaluation of cumulative recovery of creosote. This evaluation will be conducted for the individual PR wells. There are 16 PR wells, 10 of which have operating PR pumps in place. Of the 16 PR wells, 12 wells are constructed with sumps that vary from 3 feet to 5.8 feet below the screened interval. For cost estimates, creosote recovery is expected to continue for 10 years. Once the PRS stops operating, all recovery wells will be removed (e.g., pumps and piping) and the wells abandoned.

At closure, treatment of contaminated debris (i.e., PRS equipment) will render the debris non-hazardous. The treatment will meet specified best demonstrated available technology (BDAT) treatment to substantially diminish the toxicity of the waste or reduce the likelihood of migration of waste constituents and leave a "clean debris surface." The treated debris will not exhibit any characteristic of hazardous waste (40 CFR 268.45(c)). A "clean debris surface" means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil or waste consisting of light shadows, slight streaks, or minor discolorations, which will be limited to no more than 5 percent of each square inch of surface area (40 CFR 268.45, Table 1). High pressure steam and water sprays are defined as BDAT treatment technology for debris and are proposed for use on the PRS components.

Following BDAT treatment and inspection, decontaminated equipment and/or debris may be reused on-site or disposed at a Subtitle D solid waste facility. Rinsate or residuals from the decontamination process or any soil with polynuclear aromatic hydrocarbon (PAH) concentrations above the risk-based cleanup levels generated in closure activities will be transported off-site to an approved disposal facility. Debris that cannot be rendered non-hazardous also will be transported off-site to an approved disposal facility.

To achieve clean closure, the product recovery system components and hazardous debris must be removed and each type of equipment or debris managed and treated based on its physical characteristics and regulatory classification. BNSF proposes to provide for closure of the PRS following guidelines established in the *Contaminated Debris Rule* (40 CFR 268.45) that allows treatment of hazardous remediation debris to render it non-hazardous prior to disposal or recycling. BNSF has identified the following steps for implementing clean closure of the PRS:

- Decommission and/or dismantle all product recovery and treatment system equipment and structures.
- Decontaminate and remove all PRS hazardous "Contaminated Debris" using high pressure steam and water spray as a BDAT technology. Decontamination activities will take place within the PRS building

or on a temporary constructed decontamination pad. Decontamination water will be collected and processed through the PRS or shipped off-site to an approved disposal facility.

- Optional off-site disposal of BDAT treated materials at a Subtitle D disposal facility.
- Ship recovered creosote to an offsite recycling facility or approved off-site disposal facility.
- Ship remediation wastes (rinsate water, residuals, spent carbon GAC, contaminated soil) to an approved off-site disposal facility.
- Dispose, reuse at another BNSF facility, or recycle any equipment that had no contact with product.
- Facility restoration and clean closure certification of the product recovery operation.

Remediation and Hazardous Waste Inventory

The PRS processes recover creosote from the bottom of the water table aquifer in the southeastern end of the SI and in the former retort area. Remediation wastes generated from product recovery include creosote and creosote residuals including co-produced groundwater water and remediation wastes. **Tables 5.2.13-1** and **5.2.13-2** list the volumes of remediation waste and debris, and PR equipment inventory expected to be encountered during the closure process.

Equipment Decontamination Requirements

All PR pump assemblies, including product discharge hoses and air supply lines, will be pulled from the PR wells. The steel piping product collection header will be drained into product collection tanks and disassembled. Recovered product, including that stored in Tanks T-6 and T-7, will be shipped to an offsite recycling facility or approved off-site disposal facility (which may include fuel recovery at a cement kiln). The product/water separation and storage tanks, piping, and valves containing product or untreated water will be removed from the PR building in the order that material is processed through the system. All tanks, piping and/or equipment that have been in contact with recovered product will be staged in the PRS building. All equipment will be decontaminated as described below.

Treated water tanks and connected piping will be segregated from the materials requiring decontamination. Materials such as pipe racks and electrical equipment that have not come in contact with recovered product will be managed independently for reuse or recycling.

Decontamination and Disposal Procedures

After completion of the remediation activities at the Facility, the existing equipment and systems will need to be properly managed through decontamination and disposal procedures. The equipment and systems requiring these procedures at closure are discussed above, and in **Tables 5.2.13-1** and **5.2.13-2**.

Decontamination

Upon removal and dismantling of the PRS, the larger pieces of equipment (e.g., tanks, oil/water separator, pumps) will be decontaminated using high pressure steam and water spray as a BDAT technology. The smaller pieces (e.g., pipes, valves, hoses) will be decontaminated using high pressure steam and water spray or will be disposed of as listed hazardous waste.

Non-hazardous Material

All non-hazardous equipment or debris removed from the CAMU and retort areas will be transported to an off-site recycling or Subtitle D land disposal facility or reused for similar applications. Recovered

product collected from the PRS will be shipped off-site for disposal or fuel recovery.

Hazardous Materials Amenable to Visual Inspection

All hazardous materials or debris removed from the CAMU and retort areas that are amenable to visual inspection must be visually inspected and certified as having a “clean debris surface.” If the material is not amenable to visual inspection, such as the inside of piping, effective decontamination will be demonstrated by testing the rinsate for hazardous constituents (**Table 5.2.13-3**). If concentrations are below the applicable regulatory thresholds for wastes managed in the system, the material will be determined clean. It then will be transported to an off-site recycling or Subtitle D land disposal facility or reused for similar applications. Remediation solids and residues from the pressure washing operation will be packaged and transported off-site to a licensed hazardous waste treatment and/or disposal facility.

Hazardous Materials Not Amenable to Visual Inspection

All hazardous materials or debris removed from the CAMU and retort areas that are not amenable to visual inspection must be dismantled, packaged and transported off-site to a licensed hazardous waste treatment and/or disposal facility as well as meet the applicable requirements for closure of tank systems. Decontamination efforts will demonstrate effective contact to all contaminated surfaces with an appropriate decontamination solution or media. Decontamination progress and/or completion will be demonstrated by testing the spent solution or media for hazardous constituents present in the wastes managed. Completion of effective decontamination will be demonstrated by hazardous constituent concentration in the rinsate being below the applicable regulatory thresholds for wastes managed in the system (**Table 5.2.13-3**).

Schedule for Closure

BNSF installed a PRS in 1996 to recover free phase and residual creosote in the SI and former retort areas. The PRS will operate until a qualitative evaluation of the cumulative recovery of creosote is complete.

Copies of Closure Plan

The closure plan is included as an attachment to the Permit (MDEQ 2001). A copy of the Permit will be located at the office of the BNSF Manager of Remediation. BNSF will be responsible for updating the Paradise Facility closure plan.

Final Closure Notification

BNSF will notify the MDEQ at least 60 days prior to the date of final closure of the PRS and the CAMU.

Certification of Closure

Periodic inspections of the closure activities will be made by an independent registered professional engineer to ensure that the Facility has been closed in accordance with the closure plan specification. Within 60 days of completion of closure, BNSF will submit to the regional administrators of USEPA and MDEQ closure certification by both BNSF and an independent registered professional engineer.

Table 5.2.13-1 Remediation Waste and Debris Inventory

Name of Waste	Generating Process or Source	Quantity
Remediation Equipment	Creosote impacted piping, tanks and pumps associated with product recovery system	See Table 5.2.13-2
Remediation Solids	Settled material from the product recovery system Spent carbon from GAC units in system	0.24 CY/yr 1,000 lb units change out every 2-3 years
Remediation Groundwater	Treated/untreated groundwater recovered – during creosote process	1500 gal per quarter

CY= cubic yards

yr = year

gal = gallons

GAC = Granulated activated carbon

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Table 5.2.13-2 – Product Recovery Equipment Inventory¹

Inventory	Description
Surface Impoundment	
<u>Product Recovery Well Field</u>	
Piping and Valves	2" Diameter Galvanized Steel Piping & Brass Valves
Pumps	2" Diameter Stainless Air Operated Pumps
Discharge Hoses	2" HDPE Product Hoses
<u>Product Recovery System</u>	
Product Storage Tank	T-1 Gross Oil/Water Separator (3,000 Gallon Polyethylene) T-2 Product Transfer Tank (550 Gallon Polyethylene) T-4 Product Storage Tank (550 Gallon Polyethylene)
Oil/Water Separator	OWS-1 Oil/Water Separator (2.4 by 7.3 foot Epoxy Coated Steel)
Pumps/Piping/Valves	Double diaphragm pumps 2" diameter galvanized steel piping and associated valves
Water Storage Tanks	T-3 Water Storage Tank (1500 Gallon Polyethylene) T-5 Water Storage Tank (1500 Gallon Polyethylene)
Granular Activated Carbon Units	GAC-1, GAC-2 1,000 lb Carbon Units
Concrete Containment Slab	Product Stained Concrete (25' x 40' 6" Thick)
Retort Area	
<u>Product Recovery System</u>	
Reciprocating Pump	2" Diameter Steel Drop Pipe & Pump Jack with Electric Motor
Product Transfer Pump	Double diaphragm pump
Product Storage Tank and Containment Tank	T-7, Product/Water Storage Tank 300 Gallon Polyethylene; Containment Tank 375 Gallon Polyethylene
Piping and Valves	2" Diameter Galvanized Steel Piping and Valves
Product Storage Tank	T-6, Product Storage Tank, 5,000 gallon Poly

¹List includes only the equipment that contacts creosote or creosote constituents.

Table 5.2.13-3—Decontamination Requirements for Closure of a Tank System Rinsate Concentration Levels

F034		K001	
Compound	Concentration	Compound	Concentration
Acenaphthene	0.059 mg/L	Napthalene	0.059 mg/L
Anthracene	0.059 mg/L	Pentachlorophenol	0.089 mg/L
Benz(a)anthracene	0.059 mg/L	Phenanthrene	0.059 mg/L
Benzo(k)fluoranthene	0.11 mg/L	Pyrene	0.067 mg/L
Benzo(a)pyrene	0.11 mg/L	Toluene	0.080 mg/L
Chrysene	0.061 mg/L	Xylenes	0.32 mg/L
Dibenz(a,h)anthracene	0.059 mg/L	Lead	0.69 mg/L
Fluorene	0.059 mg/L		
Indeno(1,2,3-cd)-pyrene	0.055 mg/L		
Napthalene	0.0055 mg/L		
Phenanthrene	0.059 mg/L		
Pyrene	0.059 mg/L		
Arsenic	0.067 mg/L		
Chromium	1.4 mg/L		
	2.77 mg/L		

mg/L = milligrams per liter

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**Module III
Groundwater Monitoring**

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- III.1. LTU Groundwater Analytes, Permit Concentration Limits, and Test Methods
- III.2. LTU Well and Alternate Concentration Limit POE and POC Well Locations
- III.3. Table 1: Analytes and Test Methods for POC Wells
Table 2: Analytes, Alternate Concentration Limit, and Test Method for POE Wells
- III.4. Statistical Evaluation and Trend Analysis for POC Wells

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Module III Groundwater Monitoring

III.A. Applicability

The requirements of this permit module apply to all groundwater monitoring wells that are required to be maintained, sampled, and analyzed as part of this permit, including the following:

III.A.1. *Land Treatment Unit (LTU)*

The LTU is currently in post-closure care. The requirements and conditions of this permit module apply during the post-closure period as defined in 40 CFR 264 Subparts F, G, and M.

III.A.2. *Alternate Concentration Limit (ACL)*

An ACL was granted in 2006 under 40 CFR 264.94(b) due to the technical infeasibility of achieving background groundwater protection standards in monitoring wells on the site, as outlined in the ACL Petition submitted to DEQ on February 27, 2004. The ACL encompasses the Surface Impoundment and Waste Pile Unit (SI/WPU) and areas investigated under facility-wide corrective action (Module IV). A map showing the boundaries of the ACL is provided in Attachment III.2.

III.B. Maintenance of Wells

III.B.1. Monitoring wells must be maintained at full operation for the duration of this permit.

III.B.2. Well integrity must be monitored by the Permittee and reported to DEQ according to the following schedule:

III.B.2.a. Well depths must be measured annually; and

III.B.2.b. A visual well inspection for evidence of well damage must be performed every sampling event.

III.B.3. The Permittee must notify DEQ in writing when a well is no longer functioning properly, including a change in pumping rate, the presence of sand or silt materials, or cracked or broken casing. Written approval is required from DEQ prior to abandonment, replacement, and/or correction of improperly operating well(s). [40 CFR 264.91(b)]

III.B.4. Access to the monitoring wells must be controlled at all times. Monitoring well caps must be locked and secure when wells are not being sampled or maintained.

III.C. General Sampling Requirements

The conditions of this section are general sampling requirements for the facility. The Permittee shall also follow specific sampling procedures and sampling

schedules described in Condition III.J (LTU) and III.K (ACL) in addition to these requirements.

III.C.1. *Water Quality Indicator Parameters*

III.C.1.a. Water Quality Indicator Parameters provide additional information regarding evidence of possible groundwater contamination. The parameters are as follows:

- pH, Must be between 5 and 11;
- Temperature;
- Specific Conductance;
- Depth to Groundwater;
- Total Well Depth; and
- Total Suspended Solids, Standard Method 2540D or EPA Method 160.2, most current version, maximum limit 100 mg/L.

III.C.1.b. Water quality indicator parameters must be measured at each well that is sampled during each groundwater monitoring event.

III.C.1.c. The results of the water quality indicator parameter measurements shall serve as a basis for comparison in the event modifications are required in the monitoring network or unusual changes are noted in groundwater quality.

III.C.2. *Groundwater Elevation, Flow Rate, and Flow Direction*

III.C.2.a. The Permittee shall determine the groundwater surface elevation of all monitoring wells identified as part of monitoring well networks in this permit whenever the wells are sampled, and no less frequently than semi-annually, unless otherwise instructed by DEQ.

III.C.2.b. The Permittee shall, on a semi-annual basis, determine the groundwater flow rate and direction in the uppermost aquifer using procedures and methods approved by DEQ.

III.C.2.c. The Permittee shall use the groundwater surface elevations and flow direction to construct a contour map of the potentiometric surface.

III.C.2.d. Groundwater surface elevations, groundwater flow rate, groundwater flow direction, and potentiometric surface maps must be submitted annually to DEQ as part of the annual report, as specified in Condition I.R.4.d. (Groundwater Monitoring Reporting).

III.C.3. The Permittee shall maintain a consistent sampling program that ensures reliable monitoring results. The sampling program must include consistent sampling procedures defined in 40 CFR 264.97(d) and Conditions in this permit.

III.C.4. The sampling methods must be appropriate for groundwater sampling and must accurately measure hazardous constituents in media and waste samples.

- III.C.5. Samples must be collected, preserved, and transported, and a chain of custody record maintained in accordance with the procedures specified in the most up-to-date version of Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846). Quality assurance and quality control (QA/QC) procedures for field sampling must be followed as specified in SW-846.
- III.C.6. At least one set of field replicates, one field blank, one laboratory blank, and one trip blank when sampling for volatiles, per 20 field samples, for the period spanning the time of analysis, must be taken during each sampling event.
- III.C.7. The groundwater monitoring program must include a determination of the total depth of the well at least annually.
- III.C.8. The Permittee must visually inspect wells for evidence of damage during every sampling event.

III.D. **General Analytical Requirements**

The conditions of this section are general groundwater analytical requirements for the facility. The Permittee shall also follow specific analytical procedures described in Conditions III.J (LTU) and III.K (ACL) in addition to these requirements.

III.D.1. *Analytical Definitions*

III.D.1.a. **A reportable value** is defined as any measured concentration for an analyte which equals or exceeds the method detection limit as determined by the analytical laboratory.

III.D.1.b. **Background value** represents the quality of groundwater from a hydrogeologically equivalent source upgradient from the facility.

III.D.1.c. **The estimated quantitation limit (EQL)** is the lowest concentration of a parameter in water and soil that can be reliably determined within specified limits of precision and accuracy by the indicated methods under routine laboratory operating conditions. EQLs are based on a general estimate for the method and are generally 5 to 10 times greater than the method detection limit. Analytical laboratories may also refer to this term as the Practical Quantitation Limit (PQL) or Reporting Limit (RL).

III.D.1.d. **A critical value** for a given compound is any measured concentration that is equal to or above the permit concentration limit for the regulated units as established by DEQ.

III.D.1.e. **An exceedance** is defined as statistically significant evidence of increased contamination (40 CFR 264.98(f)).

III.D.1.f. **Permit Concentration Limit** for a given compound is a concentration value

established by DEQ for permit compliance. The permit concentration limit for each Principal Hazardous Constituent (PHC), as applied to the regulated units, is listed in Attachment III.1. For the purposes of detection groundwater monitoring, the permit concentration limits for each organic compound included in the PHC and Appendix IX list were established by DEQ from the estimated quantitation limit (EQL) found in SW-846. Permit concentration limits for inorganic compounds are equal to the maximum concentration limits established by the EPA in Attachment III.1, as set forth in 40 CFR 264.94(a)(2). For inorganic compounds not listed in Attachment III.1, the permit concentration limits will be established by using the method detection limit (MDL) found in SW-846 for those compounds.

III.D.1.g. **The method detection limit (MDL)** is defined as the sample and method-specific concentration at which there is a specified assurance of the presence and identity of a given parameter in a sample. The analytical laboratory follows the procedures in SW-846 to obtain the method detection limit. Based on nationwide laboratory experience, EPA has developed estimated method detection limits for specific parameters and methods in SW-846.

III.D.1.h. **A reportable value** is defined as any measured concentration for an analyte which equals or exceeds the method detection limit as determined by the analytical laboratory.

III.D.2. *Reporting Limits*

III.D.2.a. The reporting limits for groundwater analytical measurements shall routinely be equal to or less than the EQL for that parameter and sample type/matrix. The Permittee shall ensure that the EQLs specified for given analytical methods, constituents, and media in SW-846 are routinely achieved in all analyses.

III.D.2.b. A different SW-846 analytical method from that specified in the DEQ approved sampling workplan may be used if the laboratory cannot attain the required EQL using the specified method. Any change in the SW-846 method used must be approved by DEQ and must be noted in the corresponding analytical report submitted to DEQ.

III.D.2.c. If the laboratory is unable to meet any of the EQLs required by this permit, a written justification must be provided by the laboratory with the analytical results. DEQ reserves the right to review the justification and to accept it, reject it, or require further justification. DEQ also reserves the right to require further sampling if required EQLs are not met.

III.D.3. *Quality Assurance/Quality Control (QA/QC)*

III.D.3.a. The Permittee shall submit, on request by DEQ, the Quality Assurance Plan and the name of a contact person for each analytical laboratory used by the Permittee.

III.D.3.b. The Permittee shall ensure that all laboratory analyses undertaken as part of the

permit contain adequate QA/QC. The laboratory must be capable of evaluating quality control procedures as specified in SW-846. The laboratory must also have quality control and backup information available for specific analyses, which can be assessed if necessary.

- III.D.3.c. Any field, trip, or laboratory blanks exceeding the MDL for metal constituents and EQL for organic constituents must require an explanation in writing by the Permittee to DEQ. This explanation must be included in the resulting report.
- III.D.3.d. Data must be accepted or rejected according to criteria meeting the requirements of SW-846.
- III.D.3.e. If the Permittee is routinely unable to meet the requirement of Condition III.D.2. (Reporting Limits), the Permittee shall perform an MDL study for the problem sample types/matrices and parameters. The Permittee shall perform the MDL study according to the method described in Chapter One (definitions) of SW-846, 3rd edition. The Permittee shall report to DEQ the results of the MDL study and all supporting information requested by DEQ to verify the study.
 - III.D.3.e.i. Based on the results of the MDL study, the Permittee shall propose to DEQ an alternative quantitation limit (AQL) to be used under the permit instead of the reporting limit for the particular problem sample type/matrix and parameter. DEQ reserves the right to review the MDL study and the proposed AQL and to accept or reject the MDL study or the proposed AQL, specify a different AQL, or to require further information or testing.
- III.D.4. *Modifying Analysis Methods*

If necessary, DEQ may revise parameters or methods of analysis, including statistical analysis, for any samples, upon written notice to the Permittee. Conditions requiring revisions may include maintaining or upgrading the quality or type of data produced by the Permittee to account for background conditions, availability of improved analytical methods, the presence of better indicators, or more easily detectable parameters. DEQ may also prescribe in writing additional analysis for wastes or leachate deemed appropriate to determine whether a hazardous constituent may have originated from SWMUs or AOCs, to establish appropriate monitoring parameters, or for other rationally based reasons.
- III.D.5. *Analytical Reporting Requirements*

All groundwater analytical reports submitted to DEQ must at a minimum include the following:

 - III.D.5.a. The name of the laboratory used and the name of laboratory contact person;
 - III.D.5.b. The date of sample receipt, extraction, and/or analysis;
 - III.D.5.c. A copy of the signed chain-of-custody document;

- III.D.5.d. The designation of the sample matrix (water, soil, etc.);
- III.D.5.e. The laboratory sample preservation, preparation and/or analytical method(s) used by the laboratory, including method number references;
- III.D.5.f. The analytical data results provided by the laboratory;
- III.D.5.g. The estimated quantitation limits (EQLs) for every parameter in each sample actually achieved by the test method used by the laboratory;
- III.D.5.h. The method detection limits (MDL) for every parameter tested;
- III.D.5.i. Low concentration groundwater data reported as follows:

<u>Analyte Concentration</u>	<u>Report</u>
<MDL	Provide MDL value for analyte
>MDL but <EQL	Detected and reported as an estimated value
>EQL	Numerical concentration quantified;

- III.D.5.j. Quality control information pertinent to analysis including blanks, duplicates, matrix spike recoveries, and acceptance limits for the inorganic parameters analyzed; surrogate compound identity, recovery and acceptance limits for the organic parameters analyzed and calibration verification results; and
- III.D.5.k. A description of any deviations from the permit requirements and/or method guidelines or laboratory Quality Assurance Plan (QAP).

III.E. Background Groundwater Quality

Background groundwater quality represents the quality of groundwater that has not been affected by waste management activities at the BNSF Paradise facility.

- III.E.1. Background groundwater values for the uppermost aquifer underlying the BNSF Paradise facility are based on the following analytical data:
 - groundwater samples from wells MW-4, MW-31, MW-32 and the Paradise town domestic well, collected prior to the re-issuance of Permit Number MTHWP-88-03;
 - all data from the LTU background wells MW-52 and MW-53;
 - method detection limits and EQLs for EPA-recommended methods.
- III.E.2. For the purposes of this permit, all background concentrations for Principal Hazardous Constituents (PHCs) listed in Attachment III.1 are equal to or below the estimated quantitation limit (EQL) or Method Detection Limit (MDL), established in SW-846.

III.E.2.a. Background levels for all other hazardous constituents are assumed to be below or equal to the EQL or MDL for that method.

III.E.3. The Permittee may petition DEQ to modify the background values, based on future detection monitoring results obtained during the renewed permit term.

III.E.4. If hazardous constituents appear in both background groundwater samples and groundwater samples within the facility boundary during the same sampling event, a statistical procedure described at 40 CFR 264.280(d)(3) must be used to determine statistical significance.

III.F. Modification of Parameters or Methods of Analysis

DEQ may approve changes in parameters or methods of analysis, including statistical analysis, for any samples, upon written notice to the Permittee. Situations requiring such changes may include maintaining or upgrading the quality or type of data produced by the Permittee to account for background conditions, future conditions such as availability of improved analytical methods, the presence of better indicators, or more easily detectable parameters. DEQ may also prescribe in writing additional sampling and analysis for wastes or leachate deemed appropriate to determine whether a hazardous constituent may have originated from a unit, to establish appropriate monitoring parameters, or for other reasons.

III.G. Recordkeeping and Reporting

III.G.1. The Permittee shall enter all monitoring, testing, and analytical data into the operating record as required by Condition I.R.1. (Operating Record).

III.G.2. Monitoring Records

The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, the certification required by 40 CFR 264.73(b)(9) and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report, certification, or application, or until corrective action is completed, whichever date is later. This period may be extended by request of DEQ at any time. The Permittee shall maintain records for all groundwater monitoring wells associated groundwater surface elevations, for the active life of the facility, and for disposal facilities for the post-closure care period as well. [40 CFR 270.30(j)(2)]

III.G.3. The Permittee shall report information required in this condition in accordance with the following schedule:

III.G.3.a. Groundwater Monitoring Reporting

The Permittee shall report analytical results of sampling events and static water level readings to DEQ within 30 days after the date the Permittee (or any

representative of the Permittee contracted to process or evaluate analytical data) receives the analytical results. Analytical reports must contain the information listed in Condition III.D. (General Analytical Requirements).

III.G.3.b. **Annual Report**
An annual report must be submitted by April 1 of every year. Content requirements of the annual report are specified in Condition I.R.4.e. (Annual Monitoring and CAMU Operations Report).

III.H. **Requirements for New Wells**

III.H.1. Installation of new monitoring wells for either the LTU or ACL monitoring networks must be approved by DEQ. The Permittee shall submit well plans and specifications to DEQ for approval. The number and location of new wells and monitoring requirements for new wells must be approved by DEQ in writing prior to installation.

III.H.2. All new monitoring wells must be constructed in accordance with the provisions in 40 CFR 264.97(c).

III.H.2.a. All new monitoring wells must be constructed, developed, and maintained pursuant to the techniques described in the Technical Enforcement Guidance Document (TEGD), OSWER-9950.1, September 1986, unless DEQ approves an alternative technique. [40 CFR 264.91(b)]

III.H.2.b. All monitoring wells must be cased in a manner that maintains the integrity of the monitoring well bore hole. This casing must be screened or perforated and packed with gravel or sand, where necessary, to enable collection of ground water samples. The annular space (i.e. the space between the bore hole and the well casing) above the sampling depth must be sealed to prevent contamination of samples and ground water. [40 CFR 264.97(c)]

III.H.3. **Submittal Requirements After Well Installation**

The Permittee shall submit monitoring well completion reports which include boring logs, sieve analysis (grain size) (if performed), standard penetration tests (if performed), results from all analytical tests performed on soils (Atterberg limits, etc), water level elevations, water contour maps (including the latest surveyed wellhead reference elevations), well development results (including recharge rates), cross sections or fence diagrams, and all other pertinent data within 90 days after completion of well installation.

III.H.4. **Monitoring Requirements for New Monitoring Wells**

III.H.4.a. The Permittee must conduct at least one evaluation of the hazardous constituents listed in Attachment III.1. and/or constituents required by DEQ immediately following completion of the well. Monitoring for hazardous constituents must begin the next sampling event following well installation. If hazardous constituents are detected above permit concentration limits, the Permittee must

follow the repeat sample procedures in Condition III.J.7.a. [40 CFR 264.91(b)]

III.H.4.b. The Permittee must conduct one year of quarterly sampling for all water quality indicator parameters listed in Condition III.C.1. [40 CFR 264.91(b)]

III.I. **Closure of Existing Wells.**

The Permittee shall notify DEQ when a well is no longer properly functioning (including a marked change in pumping rate, presence of sandy or silty materials, and cracked or broken casings) or when the Permittee intends to close one or more wells associated with a monitoring well network required in this permit. DEQ may specify the conditions for replacement or correction of improperly operating well(s).

III.J. **Land Treatment Unit Groundwater Monitoring**

III.J.1. *Detection Monitoring*

DEQ has determined that monitoring evidence does not indicate groundwater contamination from the LTU at this time and therefore maintenance of a detection monitoring system [40 CFR 264.98] at the LTU is appropriate.

III.J.2. *Sampling Schedule*

The Permittee shall continue groundwater monitoring with the following decreasing sampling schedule:

- at the beginning of the post-closure period
- 1 year after the beginning of the post-closure period
- 3 years after the beginning of the post-closure period
- 7 years after the beginning of the post-closure period
- 15 years after the beginning of the post-closure period
- 30 years after the beginning of the post-closure period

III.J.2.a. During the post-closure period, DEQ may decide that more frequent groundwater monitoring of the LTU is necessary, at which time DEQ will notify the Permittee in writing. Permit conditions precipitating more frequent monitoring may include a history of repeat PHC sampling during post-closure, or a significant change in groundwater elevation or direction of flow. The Permittee may also choose to sample more frequently during the post-closure period.

III.J.3. *Monitoring Well Network*

The monitoring well network for the LTU must be approved by DEQ in writing, and must include at a minimum:

III.J.3.a. Pursuant to 40 CFR 264.97(a), the groundwater monitoring system must consist of a sufficient number of wells, installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer that:

- III.J.3.a.i. Represent the quality of background water that has not been affected by leakage from the land treatment unit;
- III.J.3.a.ii. Represent the quality of groundwater passing the point of compliance for the LTU; and
- III.J.3.a.iii. Allow for the detection of contamination when hazardous waste or hazardous constituents have migrated from the LTU to the uppermost aquifer.
- III.J.4. *Minimum Sampling Procedures and Techniques*
The groundwater monitoring program must include consistent sampling and analysis procedures that are designed to ensure monitoring results that provide a reliable indication of groundwater quality below the LTU. [40 CFR 264.97(d)]
- III.J.4.a. At a minimum the groundwater monitoring program must follow procedures and techniques specified in this permit module.
- III.J.5. *Sampling and Analysis Plan (SAP)*
The Permittee must maintain a sampling and analysis plan (SAP). The SAP and all modifications to the SAP must be approved by DEQ. [40 CFR 264.91(b)]
- III.J.6. *Analytical Requirements and Procedures*
The groundwater monitoring program must include analytical methods that are appropriate to accurately measure hazardous constituents in groundwater samples. [40 CFR 264.97(e)]
- III.J.6.a. Principal Hazardous Constituents (PHCs)
The PHCs provided in Attachment III.1 are compounds found in significant quantities in the creosote used in the tie treating operations and/or have been detected in the groundwater, and provide a reliable indication of the presence of hazardous constituents in the groundwater.
- III.J.6.b. Water Quality Indicator Parameters
Water Quality Indicator Parameters must be measured during each monitoring event as specified in Condition III.C.1. The results shall serve as a basis for comparison in the event modifications are required in the monitoring network or unusual changes are noted in groundwater quality.
- III.J.6.c. Upon written approval from DEQ, a different SW-846 method or other analytical method from those listed in Attachment III.1 may be used. [40 CFR 264.91(b)]
- III.J.7. *Exceedances of Permit Concentration Limits*
- III.J.7.a. Any well where one or more hazardous constituents are found at or above permit concentration limits (a critical value) must be re-sampled for PHCs within 30 days after the Permittee receives the information, unless DEQ has determined re-sampling is unnecessary. The Permittee may choose to re-sample immediately

upon receipt of initial data results that indicate that concentration(s) of PHC(s) have reached a critical value. Re-sample data must be provided to DEQ within 30 days after the Permittee receives the analysis results. Re-sampling need only take place at those wells where critical values are indicated. Re-sampled media need only be analyzed for those compounds exceeding critical values. Water Quality Indicator Parameters provided in Condition III.C.1.and static water levels must also be measured during every repeat sampling event. [40 CFR 264.98(f)]

III.J.7.b. Whenever one or more hazardous constituents are detected at the compliance point(s), the Permittee must institute a compliance monitoring program as defined in 40 CFR 264.99. Detected is defined as statistically significant evidence of contamination as described in 40 CFR 264.98(f). [40 CFR 264.91(a)(1)]

III.J.8. *Reporting Requirements*
The Permittee shall follow the reporting requirements of Condition I.R.4. (Reporting) during post-closure care of the LTU.

III.K. Alternate Concentration Limit (ACL) Groundwater Monitoring

III.K.1. *Regulatory Requirements for the ACL*

The ACL must meet the requirements of 40 CFR 270.14(c)(8).

III.K.2. *Point of Compliance (POC) Monitoring Program*

III.K.2.a. POC Definition

The POC is defined as a “vertical surface” located at the hydraulically downgradient limit of the waste management area that extends down into the uppermost aquifer underlying the regulated unit [40 CFR 264.95]. The POC wells shall be monitored and analyzed for statistically significant increases in contamination of groundwater based on the requirements in Condition III.K.2.f.

III.K.2.b. POC Monitoring Well Network

The POC monitoring well network must be approved by DEQ in writing and must include a sufficient number of wells, installed at appropriate locations and depths to yield groundwater samples that represent the quality of groundwater passing the point of compliance. A map of proposed POC monitoring wells is included in Attachment III.2.

III.K.2.c. POC Monitoring Frequency

POC wells must be sampled ~~biennially~~ annually in September ~~of each year~~. If external factors prevent sampling in September, the Permittee may request an extension from DEQ.

III.K.2.d. POC Sampling

When sampling POC wells the Permittee must follow the sampling requirements set forth in Condition III.C. (General Sampling Requirements).

III.K.2.e. Analytical Method for POC Well Samples

The Permittee must analyze the samples using the USEPA SW-846 Method 8270 for PAHs and Water Quality Indicator Parameters outlined in Attachment III.3, Table 1.

III.K.2.f. **Statistical Analysis**
The POC well analytical data must be evaluated using a statistical comparison to the 1992 through 1995 POC sampling analytical results data set (historical data set). The Permittee must follow the statistical evaluation and trend analysis as set forth in Attachment III.4.

III.K.2.f.i. If the statistical analysis required in Condition III.K.2.f. indicates POC analytical data exceeds the historical levels as defined in Condition III.K.2.f., a trend analysis for individual wells must be used to identify the well and area of the surface impoundment that is non-compliant.

III.K.2.f.ii. If a monitoring well that is also a monitoring well for the LTU is identified as having exceedances, the analysis must identify the area of either the land treatment unit or surface impoundment that is non-compliant.

III.K.2.f.iii. Within 30 days after receipt of analytical data showing an exceedance of historical levels, the Permittee must evaluate the results of the analysis and propose necessary corrective actions for DEQ approval.

III.K.3. *Point of Exposure (POE) Monitoring Program*

III.K.3.a. **POE Definition**

The POE is the point at which it is assumed a potential receptor may come in contact, either now or in the future, with impacted groundwater (OSWER Directive 9481.00-6C). The POE wells will be monitored and analyzed for compliance with ACL values based on requirements in Conditions III.K.3.

III.K.3.b. **POE Monitoring Well Network**

The POE monitoring well network must be approved by DEQ in writing and must include a sufficient number of wells, installed at appropriate locations and depths to yield groundwater samples that represent the quality of groundwater passing the point of exposure. A map of proposed POE monitoring wells is included in Attachment III.2.

III.K.3.c. **POE Monitoring Frequency**

III.K.3.c.i. **POE wells located northwest of the SI and LTU ~~POE wells~~ must be sampled semi-annually during the fall and early spring to coincide with high and low riverflow stages.**

III.K.3.b.i-III.K.3.c.ii. **POE wells located adjacent to the Clark Fork River must be sampled annually in early spring when the groundwater may flow towards the river.**

III.K.3.e-III.K.3.d. **Analytical Method for POE Well Samples**

Samples must be analyzed by USEPA Method 8310 (HPLC) for PAHs listed in Attachment III.3, Table 2, and for Water Quality Indicator Parameters outlined in Condition III.C.1.

III.K.3.d-III.K.3.e. Compliance Standard

Concentrations of PAH compounds at the POE wells must not exceed the designated ACL set forth in Attachment III.3, Table 2.

III.K.3.e-III.K.3.f. POE Sampling QA/QC

The Permittee must follow QA/QC requirements set forth in Condition III.D.3.

III.K.3.f-III.K.3.g. Non-Compliance with the ACL at POE Wells

If analytical results indicate PAH compounds are detected in a POE well above the ACL levels listed in Attachment III.3, Table 2, the well(s) must be resampled within 5 days to confirm results. DEQ must be notified by voice or e-mail within 3 days prior to resampling.

III.K.3.f.i-III.K.3.g.i. If resampling confirms the exceedance, the source of the exceedance must be investigated, groundwater monitoring must be continued and a corrective action plan must be developed in coordination with DEQ.

III.K.3.f.i.1-III.K.3.g.i.1. Corrective actions may include, but are not limited to, requiring additional remediation, requiring additional monitoring locations, increasing sampling frequency, adding new analytical parameters, or modifying the permit.

III.K.3.f.i.2-III.K.3.g.i.2. A corrective action plan must be submitted to DEQ within thirty days after the Permittee's receipt of the analytical results from the resampling event for DEQ approval.

III.K.4. *Monitoring Well 27*

It has been determined that monitoring well 27 does not properly fit as a POC or POE well due to its proximity to the surface impoundment and its low levels of contamination. However, DEQ believes it is an important well to continue monitoring due to its location. Therefore, the following conditions must be followed:

III.K.4.a. Monitoring well 27 must be sampled and analyzed in accordance with Conditions III.K.3.c. and III.K.3.d.

III.K.4.b. Analytical results that are equal to or greater than the ACL values set forth in Attachment III.3, Table 2, must be reported to DEQ within 30 days after the Permittee's receipt of the analytical results. DEQ shall determine appropriate corrective action for any exceedances of the values provided in Attachment III.3, Table 2.

III.K.5. *Reporting and Recordkeeping*

The Permittee shall follow reporting requirements set forth in Condition I.R.4.e. and recordkeeping requirements set forth in Condition I.R.1.a.iii.

III.K.6. *Cost Estimate*

The Permittee must follow requirements set forth in Condition I.G.2. and I.G.5.c. for developing and maintaining an accurate cost estimate for the ongoing requirements for the ACL.

III.K.7. *Financial Assurance*

The Permittee shall provide documentation of financial assurance for ongoing operations for the ACL, as required by 40 CFR 264.151 and Condition I.G. (Financial Assurance).

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Attachment III.1

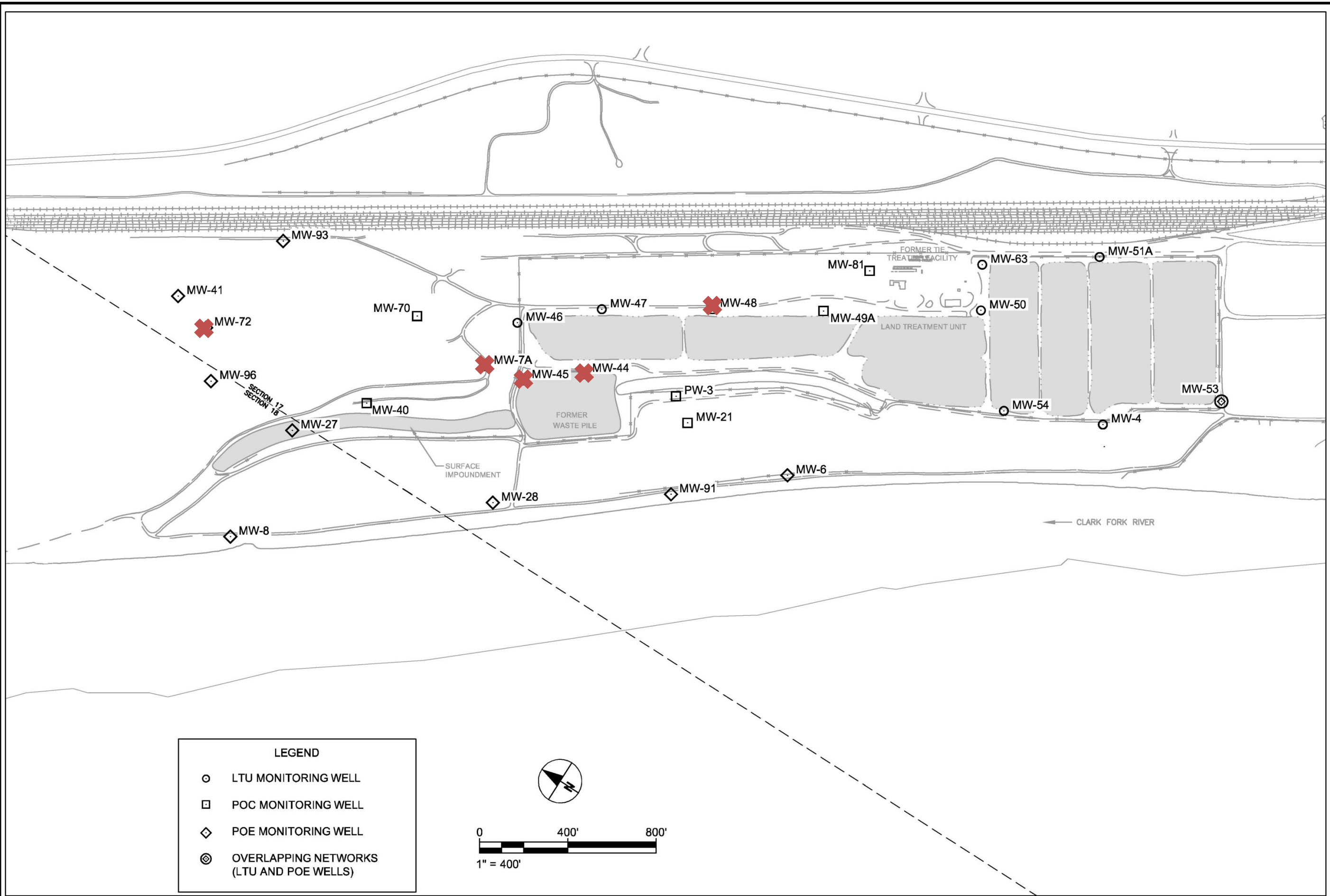
LTU Groundwater Analytes, Permit Concentration Limits, and Test Methods

Analyte/PHC	Permit Concentration Limit (ug/L)	EPA Analytical Method
Acenaphthene	10.00	8310
Acenaphthylene	10.00	8310
Anthracene	6.60	8310
Benz(a)anthracene	0.13	8310
Benzo(a)Pyrene	0.23	8310
Benzo(b)fluoranthene	0.18	8310
Benzo(g,h,i)perylene	0.76	8310
Benzo(k)fluoranthene	0.17	8310
Chrysene	1.50	8310
Dibenzo(a,h)anthracene	0.30	8310
Fluoranthene	2.10	8310
Fluorene	2.10	8310
Indeno(1,2,3-cd)Pyrene	0.43	8310
Naphthalene	10.00	8310
Phenanthrene	6.40	8310
Pyrene	2.70	8310
Water Quality Indicator Parameters		
pH	5 (lower limit) – 11 (upper limit)	Field test
Temperature	n/a	Field test
Specific Conductance	n/a	Field test
Depth to Groundwater and Total Well Depth	n/a	Field test
Total Suspended Solids	100 mg/L	160.2

Attachment III.2

Land Treatment Unit Well and Alternate Concentration Limit POE and POC Well Locations

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Attachment III.3

Table 1: Analytes and Test Methods for POC Wells

Table 2: Analytes, Alternate Concentration Limit, and Test Method for POE Wells

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Attachment III.3

Table 1: Analytes and Test Method for POC Wells

Sampled ~~bi-ennially~~annually in September

Analyte/PHC	EPA Analytical Method
Acenaphthene	8270
Acenaphthylene	8270
Anthracene	8270
Benz(a)anthracene	8270
Benzo(a)pyrene	8270
Benzo(b)fluoranthene	8270
Benzo(g,h,i)perylene	8270
Benzo(k)fluoranthene	8270
Chrysene	8270
Dibenzo(a,h)anthracene	8270
Fluoranthene	8270
Fluorene	8270
Indeno(1,2,3-cd)Pyrene	8270
Naphthalene	8270
Phenanthrene	8270
Pyrene	8270
Water Quality Indicator Parameters	
pH 5 (lower limit) – 11 (upper limit)	Field test
Temperature	Field test
Specific Conductance	Field test
Depth to Groundwater and Total Well Depth	Field test
Total Suspended Solids	160.2

Attachment III.3

Table 2: Analytes, Alternate Concentration Limit, and Test Method for POE Wells

Wells Northwest of the SI and LTU Sampled Semi-Annually

Wells Adjacent to the Clark Fork River Sampled Annually

Analyte/PHC	Alternate Concentration Limit (ug/L)	Required MDL	EPA Analytical Method
Acenaphthene	6 70 ¹	10.00	8310
Acenaphthylene	10 ²	10.00	8310
Anthracene	2100 ¹	6.60	8310
Benz(a)anthracene	0.5 ¹	0.13	8310
Benzo(a)pyrene	0.05 ¹	0.23	8310
Benzo(b)fluoranthene	0.5 ¹	.018	8310
Benzo(g,h,i)perylene	0.76 ²	0.76	8310
Benzo(k)fluoranthene	5 ¹	0.17	8310
Chrysene	50 ¹	1.50	8310
Dibenzo(a,h)anthracene	0.05 ¹	0.30	8310
Fluoranthene	130 20 ¹	2.10	8310
Fluorene	1100 50 ¹	2.10	8310
Indeno(1,2,3-cd)Pyrene	0.5 ¹	0.43	8310
Naphthalene	100 ¹	10.00	8310
Phenanthrene	6.4 ²	6.40	8310
Pyrene	830 20 ¹	2.70	8310
Water Quality Indicator Parameters			
pH	5 (lower limit) – 11 (upper limit)		Field test
Temperature	n/a		Field test
Specific Conductance	n/a		Field test
Depth to Groundwater and Total Well Depth	n/a		Field test
Total Suspended Solids	100 mg/L		160.2

¹ Circular DEQ-7 (~~October 2012~~ May 2017)

² When no DEQ-7 value was available, a site-specific, DEQ approved ACL was used

As Circular DEQ-7 values are updated, the values in this table must be modified to the most current DEQ-7 values.

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Attachment III.4

Statistical Evaluation and Trend Analysis for POC Wells

Attachment III.4

Statistical Evaluation and Trend Analysis for POC Wells (from Section 3.1 of BNSF's Alternate Concentration Limit Petition, February 27, 2004, RETEC)

Statistical Evaluation of the POC

The MDEQ and USEPA Region VIII developed a method for the statistical analysis of POC groundwater results concerning BNSF's 1996 Supplement to the ACL Petition (RETEC, 1996b) (See letter to Mr. David Seep, March 1, 1996). The statistical methodology has been further revised to reflect annual sampling at the POC and additional comments from MDEQ and USEPA. In addition to reflecting annual sampling the revisions include:

- The use of TPAH data rather than naphthalene data
- The use of the April 1992 through December 1995 data as the historical data set

This section describes the revised statistical analysis by using it to evaluate the data collected during the reporting year 2002 (December 2001 through September 2002).

The MDEQ/USEPA method for determining if the POC wells are in compliance requires that the contaminant concentrations in the POC wells are maintained within the range of historically observed concentrations. In order for this type of analysis to prove valid, groundwater sampled from the POC wells will be sampled annually, and the data for the individual wells pooled within the current year. This pooled data will then be statistically compared to the historical pooled data set. Due to the small number of samples on a yearly basis, the MDEQ/USEPA recommended the assumption that the POC well data was randomly sampled from the groundwater plume, and therefore all of the POC well data can be pooled. This means that for ten POC wells, there will be 10 potential data points for each of the current years data sets. The USEPA (1992) indicated that the Mann-Whitney test (nonparametric test) requires a minimum of 4 data points in each data set. While the proposed statistical analysis procedure will utilize 10 data points, this number should be sufficient to ensure that type I and type II errors are within acceptable limits. To ensure adequate power of the comparison tests, it is proposed that the comparison be made at the 95% confidence level. The following wells have been selected as POC wells: 7A, 21, 27, 40, 44, 45, 48, 49A, 70, 81, and PW-3.

Statistical Procedure

TPAH is the indicator contaminant for the statistical analysis of the POC wells. Based on the recommendations of the MDEQ/USEPA, the following post-closure statistical analysis will be conducted:

1. Collect one annual sample for the analysis of TPAH concentration data from each of the POC wells for the current year.
2. Compile the historical TPAH concentration data (i.e., from 1992 through 1995) from each of the POC wells.
3. Calculate a pooled-variance student t-distribution of means test at the 95% confidence level.
4. Calculate the non-parametric Mann-Whitney test at the 95% confidence level.
5. If both the t-test and Mann-Whitney test indicate that TPAH concentrations in the current year are lower than or equal to the concentrations in previous years, then the site is in compliance.

6. If both the t-test and Mann-Whitney test indicate a significant increase in the current year's TPAH data, then the Mann-Kendall trend analysis will be conducted on individual POC well TPAH concentrations to determine if a significant trend exists and appropriate actions will be taken.
7. If the site is in compliance, the statistical analysis will be conducted on the next year's TPAH concentration data.

A flowchart of the statistical methodology is presented in Figure 4. The 2002 groundwater results for TPAH were compared statistically to those collected for the historical period of April 1992 through December 1995. A longer history of groundwater chemistry data exists; however, some of the POC wells were not installed until mid-1991 or later. Therefore, many gaps exist in this data set, and the data set collected from 1992 to 1995 is more complete and therefore will be used for the historical comparison. In addition, previous statistical analyses conducted by BNSF indicate that the inclusion of data prior to 1992 does not affect the outcome of the comparison tests when compared to the data collected in 1995. The TPAH concentrations for the period 1992 through 2002 are presented in Table 2.

Statistical Tests

Data sets from the individual sampling quarters were combined for analysis (i.e., all data in March 2002 data was combined). The historical data set from all 1992 through 1995 data was compiled into another data set. The data sets were tested to determine the type of data distribution by using the Shapiro-Wilks W-test. The Shapiro-Wilks W-test is recommended by the USEPA (1992) for testing the normality of data. If the Shapiro-Wilks W-test results for the original data indicated that it was not normally distributed, the data was log-transformed (natural logarithm) and the test was rerun on the transformed data. If the transformed data was not determined to be normally distributed, then it was assumed to be distribution-free (i.e., non-parametric). Descriptions of the Shapiro-Wilks W-test are discussed in USEPA (1989), USEPA (1992), and Gilbert (1989). In addition, if there were greater than 50 percent non-detect values in the data set, it was considered to be distribution-free, as per USEPA (1992) guidance.

Because previous statistical analyses indicated that the groundwater data was marginally log-normal (i.e., bordering on non-parametric), two types of comparisons between the current year's data and the historical data were recommended by the MDEQ/USEPA: a pooled variance t-test conducted at the 95% confidence level, and a Mann-Whitney test. The pooled-variance t-test assumes equality of variances, but that sample sizes can be unequal. This test is appropriate only for data that is normally distributed (or normally distributed through transformation). The Mann-Whitney test (also called the Wilcoxon rank-sum test) is a non-parametric test used to determine the relationship between two data sets when the data is not normally distributed. Descriptions of the t-test and Mann-Whitney test are discussed in Gilbert (1989) and Daniels (1990).

If either or both the t-test and Mann-Whitney tests suggested that there was a change in TPAH concentrations between the 1992-1995 data and the pooled 2002 data, then a trend analysis was conducted to see if the difference was part of an overall trend. The trend was analyzed using the Mann-Kendall test (Gilbert, 1987). The statistical computer program WQStat Plus (IDT, 1998) was used to conduct the trend analyses.

Analytical Results

The pooled 1992-1995 TPAH data with pooled 2002 data, and also for the pooled 2001 data, for each sampling quarter was conducted using the Mann-Whitney and t-tests. The pooled in 1992-1995 data set was determined to be non-parametric, and therefore the results of the Mann-Whitney test are the most appropriate for comparison. The pooled 1992-1995 data mean was significantly greater than the first and second quarters in 2002, but was not significantly different from the third and fourth quarters of 2003 nor any of the sampling quarters in 2001 (Table 3).

Selection of Appropriate Sampling Period

Four of the 11 wells historically used to monitor the POC, exhibited seasonality in the data sets from 1992 through 2002 (wells 21, 40, 44, and 49A). Since seasonal variations were determined in some of the POC wells during the 2002 annual statistical review, the selection of the appropriate sampling period for the proposed annual sampling was investigated. The Historical and current data set (April 1992 through September 2002) was divided into quarterly data. Descriptive statistics (mean, median, 90th percentile, and maximum values) were calculated for each quarter of data to ascertain which quarter, if any, contained a higher number of the metric (Table 4). None of the metrics provided a clear choice of quarters in which there were a consistently greater concentration of TPAH in the individual wells. However, when the data for each year was pooled, the September sampling period appeared to have the highest mean, median, and 90th percentile concentrations.

Based on this analysis, it is recommended that the annual sampling be conducted in the third quarter (September) of each year. The samples acquired in this quarter should provide the most conservative POC well data for comparison to the historical data set.

Conclusion

A statistical analysis, based on the recommendations of the MDEQ/USEPA, was conducted on TPAH concentrations in the POC wells. The results demonstrate that TPAH concentrations are less than or equal to historical concentrations. The most appropriate sampling period for the proposed annual sampling appears to be the third quarter of the year.

Non-Compliance with the ACL

In the event that POC data exceeds the historical levels, the trend analysis for individual wells will be used to identify the well and area of the surface impoundment that is non-compliant. BNSF and MDEQ will evaluate that information to determine the need for additional corrective actions.

If PAH compounds are detected in a POE well during a sampling event above the ACL levels listed in Table 1, the well(s) will be resampled within 5 days to confirm results. If resampling confirms the exceedance, the source of the exceedance will be investigated, groundwater monitoring will be continued and a corrective action plan will be developed in coordination with the MDEQ. Corrective actions may include but are not limited to: requiring additional remediation, requiring additional monitoring locations, increasing sampling frequency, adding new analytical parameters, or modifying the permit.

Module III – Groundwater Monitoring

MTHWP-14-01

December 5, 2019

BNSF Railway Company – Former Tie Treating Plant, Paradise, MT

Attachment III.4

~~October 17, 2014~~ Draft Permit Modification

MODULE IV
Tank Storage

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- Attachment IV.1 — Tanks T-6 and T-7 Location Map
- Attachment IV.2 — Daily Operations and Weekly Inspection Logs

Module IV Tank Storage

IV.A. ~~Applicability~~

IV.A.1. ~~Permitted Tanks~~

The requirements of this module pertain to Tanks T-6 and T-7. Locations of tanks T-6 and T-7 can be found in Attachment IV.1.

IV.A.2. ~~Tank T-6~~

Tank T-6 is used to store recovered creosote product transferred from product recovery operations in both the surface impoundment and former retort area.

IV.A.3. ~~Tank T-7~~

Product recovered from the former retort area is pumped directly to tank T-7, which is housed in a small shed located within the former retort area. Product in tank T-7 is transferred to Tank T-6 once T-7 approaches full capacity.

IV.B. ~~Permitted Waste Storage~~

The Permittee may store a total volume of 5000 gallons of hazardous waste in tank T-6 and 275 gallons of hazardous waste in tank T-7, subject to this Permit and as follows:

Tank No. & Location	Capacity [gallons]	Secondary Containment Required	Description of Hazardous Waste	Hazardous Waste No.
T-6	5000	Yes	Creosote	K001 & F034
T-7	275	Yes	Creosote	K001 & F034

IV.C. ~~Prohibited Waste Storage~~

The Permittee is prohibited from storing any hazardous waste not identified in Permit Condition IV.B.

IV.D. ~~Secondary Containment and Integrity Assessments~~

IV.D.1. ~~The Permittee shall operate the secondary containment system in accordance with 40 CFR 264.193(b) through (f) and:~~

IV.D.2. ~~The secondary containment systems must be operated to prevent any migration of wastes or accumulated liquid out of the system to the soil, groundwater, or surface water at any time during the use of the tank system [40 CFR 264.193(b)(1)]; and~~

IV.D.3. ~~The secondary containment systems must be capable at all times of detecting and collecting releases and accumulated liquids until the collected material is removed. [40 CFR 264.193(b)(2)]~~

~~IV.E. ——— **Operating Requirements**~~

~~IV.E.1. ——— *Damage Protection*~~

~~The Permittee shall not place any hazardous wastes or treatment reagents in the tank system if they have the potential to cause the tank, its ancillary equipment, or a containment system to rupture, leak, corrode, or otherwise fail. The Permittee shall protect the tank systems from accelerated corrosion, erosion, or abrasion as required by 40 CFR 264.194(a).~~

~~IV.E.2. ——— *Spill and Overflow Prevention*~~

~~The Permittee must use appropriate controls and practices to prevent spills and overflows from tanks or containment systems as required by 40 CFR 264.194(b).~~

~~IV.F. ——— **Response to Leaks or Spills**~~

~~In the event of a leak or a spill from the tank system, from a secondary containment system, or if a system becomes unfit for continued use, the Permittee must remove the system from service immediately and:~~

~~IV.F.1. ——— *Spill or Leak Cessation*~~

~~Stop the flow of hazardous waste into the system and inspect the system to determine the cause of the release; [40 CFR 264.196(a)]~~

~~IV.F.2. ——— *Spill or Leak Material Removal*~~

~~IV.F.2.a. ——— Remove waste and accumulated precipitation from the system within 24 hours of the detection of the leak to prevent further release and to allow inspection and repair of the system. If the Permittee cannot meet this time period, the Permittee shall notify DEQ and demonstrate that the longer time period is required; [40 CFR 264.196(b)(1)]~~

~~IV.F.2.b. ——— If material is released to a secondary containment system, all released materials must be removed within 24 hours to prevent harm to human health or the environment. If the Permittee cannot meet this time period, the Permittee shall notify DEQ and demonstrate that the longer time period is required; [40 CFR 264.196(b)(2)]~~

~~IV.F.3. ——— *Spill or Leak Cleanup*~~

~~————— The Permittee shall immediately conduct a visual inspection of all releases to the environment and based on that inspection: (1) prevent further migration of the leak or spill to soils or surface water and (2) remove and properly dispose of any visible contamination of the soil or surface water; [40 CFR 264.196(c)].~~

~~IV.F.4. ——— *Notification and Management*~~

~~————— The Permittee shall characterize and manage all collected material in accordance with all applicable requirements of 40 CFR Parts 262-264.~~

~~IV.F.4.a. ——— Collected material discharged through a point source to U.S. waters or to a POTW is subject to the requirements of the Clean Water Act (33 U.S.C. 1251 et seq.). If~~

the collected material is released to the environment, it may be subject to reporting under 40 CFR Part 302; [40 CFR 264.196(d)]

~~IV.F.5. — *Reporting*~~

~~In accordance with 40 CFR 264.196(d)(3), within 30 days after detection of a release to the environment, a report containing the following information must be submitted to DEQ:~~

~~IV.F.5.a. — The likely route of migration of the release;~~

~~IV.F.5.b. — Characteristics of the surrounding soil (soil composition, geology, hydrogeology, climate);~~

~~IV.F.5.c. — Results of any monitoring or sampling conducted in connection with the release (if available). If sampling or monitoring data relating to the release are not available within 30 days, these data must be submitted to DEQ immediately after they become available;~~

~~IV.F.5.d. — Proximity to downgradient drinking water, surface water, and populated areas; and~~

~~IV.F.5.e. — A description of response actions taken or planned;~~

~~IV.F.6. — *Tank System Repair*~~

~~The Permittee shall take the following actions for repair of the tank system:~~

~~IV.F.6.a. — For a release caused by a spill that has not damaged the integrity of the system, the Permittee shall remove the released waste and make any necessary repairs to fully restore the integrity of the system before returning the tank system to service; [40 CFR 264.196(e)(2)]~~

~~IV.F.6.b. — For a release caused by a leak from the primary tank system to the secondary containment system, the Permittee shall repair the primary system prior to returning it to service; [40 CFR 264.196(e)(3)]~~

~~IV.F.6.c. — For a release to the environment caused by a leak from the portion of the tank system component that is not readily available for visual inspection, the Permittee shall provide secondary containment that meets the requirements of 40 CFR 264.193 before the component can be returned to service; [40 CFR 264.196(e)(4)]~~

~~IV.F.6.d. — If the Permittee replaces a component of the tank system to eliminate the leak, that component must satisfy the requirements for new tank systems or components in 40 CFR 264.193; [40 CFR 264.196(e)(4)] and~~

~~IV.F.7. — *Tank System Repair Certification*~~

~~For all major repairs to eliminate leaks or restore the integrity of the tank system, the Permittee must obtain a certification by an independent, qualified, registered~~

~~professional engineer in accordance with 40 CFR 270.11(d) before returning the system to service. The engineer must certify that the repaired system is capable of handling hazardous wastes without release for the intended life of the system. Examples of major repairs are: installation of an internal liner, repair of a ruptured tank, or repair or replacement of a secondary containment vault. [40 CFR 264.196(f)]~~

~~IV.G. — **Inspection Schedules and Procedures**~~

~~IV.G.1. — *Inspection Schedule*~~

~~IV.G.1.a. — *Daily Inspection*~~

~~The Permittee shall inspect the following components of the tank system once each operating day in accordance with Attachment IV.2 and the following: [40 CFR 264.195(b)]~~

~~IV.G.1.a.i. — Aboveground portions of the tank system to detect corrosion or releases of waste;~~

~~IV.G.1.a.ii. — Data gathered from monitoring and leak detection equipment to ensure that the tank system is being operated according to its design; and~~

~~IV.G.1.a.iii. — Construction materials and the area immediately surrounding the externally accessible portion of the tank system, including the secondary containment system, to detect erosion or signs of releases of hazardous waste (e.g., wet spots, dead vegetation).~~

~~IV.G.1.b. — *Weekly Inspection*~~

~~— The Permittee shall inspect the tank systems weekly in accordance with Attachment IV.2.~~

~~IV.G.1.c. — *Overfill Control Inspection*~~

~~The Permittee shall inspect the overfill controls, in accordance with the Inspection Schedule in Condition IV.G.1. [40 CFR 264.195(a)]~~

~~IV.G.2. — *Visual Tank Inspection*~~

~~The Permittee shall open the tanks and conduct a visual inspection every time each tank is emptied and/or liquid is placed in the tanks. For the empty tank inspection, the tank shall be emptied of sludges, residual liquids, gases and fumes. Records of the visual inspections shall be completed and kept in the operating record for the life of the tank for use in the assessment of the remaining tank life.~~

~~IV.G.3. — *Inspection Documentation*~~

~~The Permittee shall place completed inspection logs in Attachment IV.2 in the operating record for the facility. [40 CFR 264.195(d)]~~

~~IV.H. — **Recordkeeping and Reporting**~~

~~IV.H.1. — *Immediate Tank or Spill Report*~~

~~In accordance with 40 CFR 264.196(d)(1), the Permittee shall report to DEQ, within 24 hours of detection, when a leak or spill occurs from the tank system or secondary containment system to the environment, except as provided in Condition IV.H.1.a. and IV.H.1.b. If the Permittee has reported the release pursuant to 40 CFR Part 302, that report satisfies the requirements of this Permit condition.~~

~~IV.H.1.a. — A leak or spill of one pound or less of hazardous waste, or a leak or spill that is immediately contained and cleaned up, need not be reported. [40 CFR 264.196(d)(2)]~~

~~IV.H.1.b. — Releases that are contained within a secondary containment system need not be reported.~~

~~IV.H.2. — *Follow up Leak or Spill Report*~~

~~IV.H.2.a. — Within 30 days of detecting a release to the environment from the tank system or secondary containment system, the Permittee shall report the following information to DEQ: [40 CFR 264.196(d)(3)]~~

~~IV.H.2.a.i. — The likely route of migration of the release;~~

~~IV.H.2.a.ii. — The characteristics of the surrounding soil (including soil composition, geology, hydrogeology, and climate);~~

~~IV.H.2.a.iii. — The results of any monitoring or sampling conducted in connection with the release;~~

~~IV.H.2.a.iv. — The proximity of downgradient drinking water, surface water, and populated areas; and~~

~~IV.H.2.a.v. — A description of response actions taken or planned.~~

~~IV.H.2.b. — If the Permittee finds it cannot meet this time period, the Permittee shall provide DEQ with a schedule of when the results will be available. This schedule must be provided before the required 30 day submittal period expires.~~

~~IV.H.3. — *Tank Design and Integrity*~~

~~In accordance with 40 CFR 264.192(a) and 264.192(g), BNSF provided DEQ with a written statement by an independent professional engineer, certifying the proper design and installation of the tank system and the tank system's integrity, based on an on-site assessment and as-built drawings.~~

~~IV.H.4. — *Tank System Repair Certification*~~

~~— The Permittee shall submit to DEQ all certifications of major repairs to correct leaks within 7 days from returning the tank system to use [40 CFR 264.196(f)]~~

~~IV.I. **Closure and Post-Closure Care**~~

~~IV.I.1. *Closure Procedures*~~

~~At closure of the tank system(s), the Permittee shall follow the procedures for tanks T-6 and T-7 included in the PRS Closure Plan in Attachment II.10. [40 CFR 264.197(a)]~~

~~IV.I.2. *Inability to Close By Removal Or Contamination*~~

~~If the Permittee demonstrates that not all contaminated soils can be practically removed or decontaminated in accordance with the Closure Plan, then the Permittee shall close the tank system(s) and perform post-closure care following the contingent procedures in the Closure Plan in Attachment II.10. [40 CFR 264.197(b)]~~

~~IV.I.3. *Cost Estimate for Closure*~~

~~The Permittee shall provide a closure cost estimate, adjusted annually, as required in Condition I.G.2. and 40 CFR 264.197(C)(3).~~

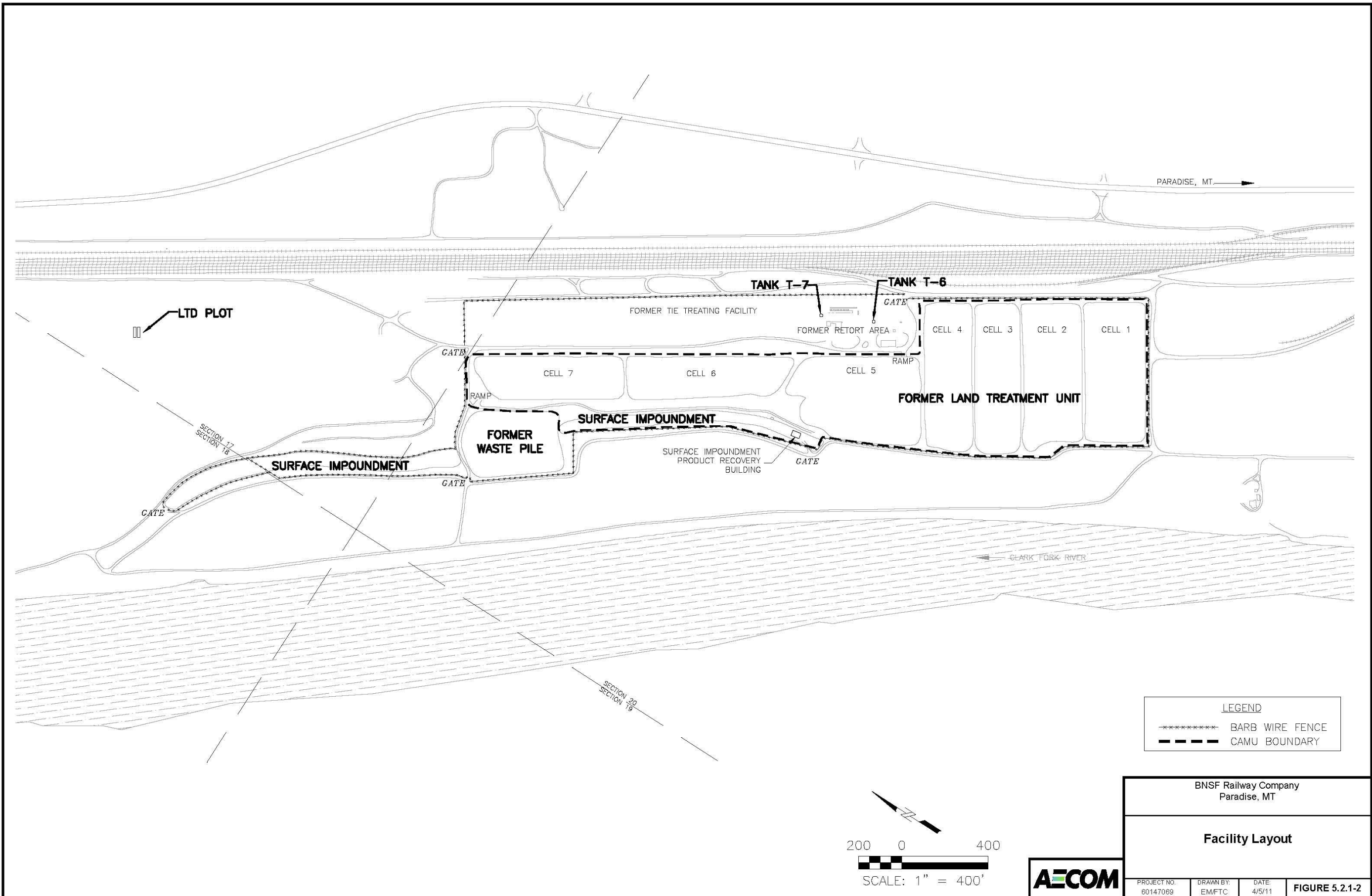
~~IV.J. **Financial Assurance for Operation and Closure**~~

~~The Permittee shall demonstrate continuous compliance with 40 CFR 264.197(C)(4) and Condition I.G. by providing financial assurance for tanks T-6 and T-7 in at least the amount of the cost estimates required by Condition IV.I.3.~~

Attachment IV.1

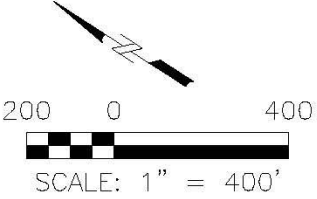
Tanks T-6 and T-7 Location Map

File: B:\CADD\CADD FORT COLLINS\BNSF Paradise\2011\Facility\Layout.dwg Layout: Layout1 User: marshall Plotted: Apr 05, 2011 - 2:20pm



LEGEND	
-----	BARB WIRE FENCE
-----	CAMU BOUNDARY

BNSF Railway Company Paradise, MT			
Facility Layout			
PROJECT NO. 60147069	DRAWN BY: EM/TC	DATE: 4/5/11	FIGURE 5.2.1-2



Attachment IV.2

Daily Operations and Weekly Inspection Logs

**Daily Tank Inspection Log
BNSF - Paradise, MT**

Date	Tank T-6	Tank T-6 Containment	Tank T-6 Piping/Valves	Tank T-7	Tank T-7 Containment	Tank T-7 Piping/Valves	Additional Comments/Action Required

Figure 5.2.5-2 Daily Tank Inspection Log

Inspector: _____

Date: _____

Time: _____

Fencing/Gates:

Gates Closed? _____

Broken Wires? _____

Condition of posts/signs? _____

Safety Equipment:

Available? _____

Access? _____

Condition? _____

Treatment Area:

Erosion? _____

Run-off/Run-on controls? _____

Berms (CAMU):

General condition? _____

Erosion? _____

Tanks:

Containment (tank/foundation)? _____

Secondary tanks? _____

Webcam Daily Observation _____

Pumps:

Leaks (pumps and flanges)? _____

Monitor Wells:

Damage? _____

Caps locked? _____

Surface seal condition? _____

Repairs/Remedial Action Required? _____

Units/Areas to be inspected: SI/WPU, CAMU, and Storage Tanks

Figure 5.2.5-1 Inspection Log for the Paradise Facility

Module IV
Facility-Wide Corrective Action

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- IV.2. Statement of Basis for Soil Remedy Selection
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- IV.5. Baseline Risk Assessment Outline
- IV.6. Corrective Measures Study Outline
- IV.7. Corrective Measures Implementation and Interim Measures Outline
- IV.8. Compliance Schedule

Module IV
Facility-Wide Corrective Action (FWCA)

The framework for corrective action requirements in this Module is based upon the guidance contained in the Federal Registers dated July 27, 1990 (55 FR No. 145, pp 30797-30884), and May 1, 1996 (61 FR No. 85, pp 19431-19464), both titled Corrective Action for Releases From Solid Waste Management Units at Hazardous Waste Management Facilities, as amended in the Federal Register dated October 7, 1999 (64, FR No. 194, pp 54604-54607).

The guidance encourages a facility-specific approach to corrective action. The Permittee may proceed with corrective action using a phase-by-phase approach or use alternative approaches, such as combining corrective action phases, grouping areas of contamination, prioritizing areas for remediation, or other facility specific approaches. Any approach taken will be dependent upon site-specific conditions and remediation objectives. The corrective action approaches must be developed through work plans and reports that must be submitted to DEQ for approval.

IV.A. Applicability

IV.A.1. *General*

The Permittee must institute corrective action as necessary to protect human health and the environment for all releases of hazardous waste or constituents from any solid waste management unit (SWMU), area of concern (AOC), or from any other source of contamination at the facility, regardless of the time at which waste was placed in such unit. [MCA 75-10-406(7) and 40 CFR 264.101(a)]

IV.A.2. *Off-Site*

The Permittee must implement corrective actions beyond the facility property boundary, where necessary to protect human health and the environment, unless the Permittee demonstrates to the satisfaction of DEQ that, despite the Permittee's best efforts, the Permittee was unable to obtain the necessary permission to undertake such actions. The Permittee is not relieved of all responsibility to clean up a release that has migrated beyond the facility boundary where off-site access is denied. On-site measures to address such releases will be determined on a case-by-case basis. [MCA 75-10-406(7) and 40 CFR 264.101(c)]

IV.A.3. *Specifics*

The Conditions of this Module apply to:

IV.A.3.a. The SWMUs and AOCs identified in Attachment IV.1 of this Module;

IV.A.3.b. Newly discovered SWMUs and AOCs discovered during the course of ground water monitoring, field investigations, environmental audits, or by other means; and

IV.A.3.c. Newly identified releases from previously identified SWMUs or AOCs discovered during the course of ground water monitoring, field investigations, environmental audits, or by other means.

- IV.A.4. *Description and Status of SWMUs and AOCs*
Attachment V.1 lists and describes the status of SWMUs and AOCs that have been identified by DEQ and the Permittee.
- IV.A.4.a. DEQ will update Attachment V.1 when changes to the status of SWMUs and/or AOCs occur or when new SWMUs and/or AOCs are identified. DEQ will send revisions to Attachment V.1 to the Permittee for inclusion in all copies of the permit.
- IV.A.5. *Reportable Spills and Releases*
Spills and releases that occur at any time within the Facility boundaries must be reported to DEQ under the Comprehensive Environmental Cleanup and Responsibility Act (§75-10-701, et seq., MCA); Hazardous Waste Act (§75-10-401, et seq., MCA); Solid Waste Management Act (§75-10-201, et seq., MCA); Underground Storage Tank Act (§75-11-501, et seq., MCA); and the Water Quality Act (§75-5-101, et seq., MCA). Spills to soil, surface water, and groundwater must be remediated to DEQ approved risk-based levels or Montana water quality standards that are protective of human health and the environment.
- IV.A.5.a. Spills and releases not remediated within a reasonable timeframe may be designated by DEQ as a new SWMU or AOC under Condition V.D, or a release from an existing SWMU or AOC under Condition V.E.
- IV.A.5.a.i. DEQ will notify the Permittee of its determination in writing. If DEQ determines that additional investigation is needed, the Permittee shall be required to prepare an RFI Work Plan as outlined in Condition V.G.1.
- IV.A.6. *Compliance Schedule*
The Permittee shall follow the Compliance Schedule of Attachment V.8. [40 CFR 264.101(b)]
- IV.A.7. *Modifications*
Permit modifications to Module V include selection of any corrective measures as outlined in Conditions V.H.2 and V.J and any subsequent significant changes to any selected corrective measures previously incorporated into this permit by modification.
- IV.B. Status of Corrective Action at Permit Issuance**
At the time of the 2014 permit reissuance, the Permittee has completed a RCRA Facility Investigation (RFI), a Corrective Measures Study (CMS), and Corrective Measures Implementation (CMI) at the BNSF Paradise Facility for the SWMUs and AOCs as listed in Attachment V.1.
- IV.B.1. The RFI was completed for all SWMUs and AOCs identified by DEQ, EPA, and the Permittee. The RFI was approved in June 1996.

- IV.B.2. The CMS was completed for those SWMUs and AOCs determined through the RFI to present a threat to human health and the environment. The CMS was conditionally approved in August 2000.
- IV.B.3. Corrective measures for soils was certified as complete in September 2003. Attachment V.2 provides the statement of basis for the selected soil corrective measures.
- IV.B.4. Corrective measures for groundwater was selected and implemented in 2006. Attachment V.3 provides the statement of basis for the selected groundwater corrective measures. Corrective measures include source control via pump-and-treat technology (Condition II.E), monitored natural attenuation supported by an Alternate Concentration Limit (Condition III.K), and land use controls (Condition I.L).
- IV.B.4.a. The Permittee must complete a 5-year review on the selected corrective measures as required in Condition V.K.6. of this permit.
- IV.B.5. Attachment V.1 presents a summary of the status of each SWMU and AOC in the corrective action process. Attachment V.1 must be updated when changes in SWMU or AOC status occur.

IV.C. Financial Assurance and Liability Coverage

The Permittee shall provide financial assurance and liability coverage for all aspects of facility-wide corrective action, as required by Condition I.G. of this permit. The purpose of financial assurance and liability coverage is to guarantee performance of and payment for the RFI, IM, CMS, and CMI activities and to provide liability insurance coverage for third-party injury and property damage claims resulting from sudden and non-sudden accidental occurrences arising from any activity performed in accordance with the corrective action provisions of this permit.

IV.D. New SWMUs and AOCs – Notification and Assessment Requirements

IV.D.1. Notification

- IV.D.1.a. In accordance with Condition V.A.5.a.i., DEQ will notify the Permittee of its determination that a spill or release under Condition V.A.5. will be classified as a new SWMU or AOC.
- IV.D.1.b. The Permittee shall notify DEQ in writing within 15 calendar days of discovery of any new spill or release associated with a release of hazardous constituents from current facility activities or from a previously unknown historical source. The notification must include, at a minimum, the following:
 - IV.D.1.b.i. The location of the spill or release;

- IV.D.1.b.ii. The available information pertaining to the nature of the wastes, including hazardous constituents, at the spill or release;
- IV.D.1.b.iii. The known extent and magnitude of the release; and
- IV.D.1.b.iv. The media(s) affected.
- IV.D.2. *Assessment Report*
If further investigation of a newly identified SWMU or AOC is required by DEQ, the Permittee must prepare and submit to DEQ, within 60 calendar days of the DEQ request, a written assessment report. At a minimum, this assessment report must include the following information:
 - IV.D.2.a. The location on a topographic map of appropriate scale as required under 40 CFR 270.14(b)(19);
 - IV.D.2.b. Designation of the type and function of the SWMU or AOC;
 - IV.D.2.c. General dimensions, capacities, and structural description (including any available plans/drawings);
 - IV.D.2.d. Dates of operation;
 - IV.D.2.e. Specification of all wastes (including any available data on hazardous constituents) that have been managed at the location; and
 - IV.D.2.f. All available information pertaining to any release of hazardous waste or hazardous constituents (including ground water, surface water, and soil analytical results).
- IV.D.3. *DEQ Action*
 - IV.D.3.a. Based on the results of the assessment report, DEQ will determine the need for further investigations of the SWMU or AOC. If DEQ determines that additional investigation is needed, the Permittee will be required to prepare an RFI Work Plan as outlined in Condition V.G.1. or an Interim Measures Work Plan as outlined in Condition V.H.1.
 - IV.D.3.b. If DEQ requires further investigation of a newly identified SWMU or AOC and the Permittee is currently implementing an RFI Work Plan, the newly identified SWMU or AOC may be included in that Work Plan. The Permittee shall prepare an addendum to the RFI Work Plan for investigation of the newly identified SWMU or AOC. The addendum must meet the requirements of Condition V.G.1.
- IV.E. Existing SWMUs and AOCs – Notifications and Assessment Requirements**
 - IV.E.1. *Notification*

IV.E.1.a. In accordance with Condition V.A.5.a., DEQ may determine that a spill or release that occurs on an existing SWMU or AOC identified in Condition V.A.4. must require additional investigation in accordance with V.E.2.

IV.E.1.b. If the Permittee discovers a previously unknown release in an existing SWMU or AOC identified in Condition V.A.4. during the course of groundwater monitoring, field investigations, environmental audits, site construction, or other means, the Permittee must notify DEQ in writing within 15 calendar days of discovery.

IV.E.1.b.i. The newly discovered releases may be from SWMUs and AOCs identified in Condition V.A.4. for which further investigation and/or corrective action was not previously required.

IV.E.1.b.ii. The notification must include, at a minimum, the following:

IV.E.1.b.ii.1. The location of the SWMU or AOC;

IV.E.1.b.ii.2. The available information pertaining to the nature of the wastes, including hazardous constituents, at the SWMU or AOC;

IV.E.1.b.ii.3. The known extent and magnitude of the release; and

IV.E.1.b.ii.4. The media(s) affected.

IV.E.2. *DEQ Action*

IV.E.2.a. If DEQ determines that further investigation of the SWMU or AOC is needed, the Permittee shall be required to prepare an RFI Work Plan as outlined in Condition V.G.1. or an Interim Measures Work Plan as outlined in Condition V.H.1.

IV.E.2.b. If DEQ requires further investigation and the Permittee is currently implementing an RFI Work Plan, the newly identified release may be included in that Work Plan. The Permittee shall prepare an addendum to the RFI Work Plan for investigation of the newly identified SWMU or AOC. The addendum must meet the requirements of Condition V.G.1.

IV.F. *New Detections in Analytical Results*

IV.F.1. *Notification*

During activities undertaken as part of any future investigation, the Permittee shall notify DEQ within 15 calendar days after the Permittee's receipt or its representative's receipt of analytical results that detect any hazardous waste or hazardous constituent that were previously not detected. The new detections may be from either documented or unidentified sources.

IV.F.2. *DEQ Action*

DEQ may require further investigation of the new detections reported in Condition V.F.1.

IV.G. RCRA Facility Investigation (RFI)

IV.G.1. *Work Plan(s)*

IV.G.1.a. *Applicability*

As directed by DEQ under circumstances set forth in Conditions V.D and V.E, the Permittee shall prepare and submit an RFI Work Plan(s). The Permittee shall submit the RFI Work Plan(s) within a timeframe specified by DEQ.

IV.G.1.b. *Contents*

The RFI Work Plan(s) should, at a minimum, address the elements as outlined in Attachment V.4 and must include:

IV.G.1.b.i. Schedules and a cost estimate for implementation and completion of specific actions necessary to determine the nature and extent of releases;

IV.G.1.b.ii. The potential pathways of contaminants releases to the air, land, surface water, and ground water; and

IV.G.1.b.iii. The risks to human health and the environment associated with the releases.

IV.G.1.c. *Deviations*

The Permittee shall provide sufficient justification and/or documentation to exclude particular units, media, or pathways associated with a unit (i.e. ground water, surface water, soil, subsurface gas, or air). Such deletions of a unit, media, or pathway from the RFI(s) are subject to the approval of DEQ. The Permittee should also provide sufficient written justification for any omission or deviation from the elements outlined in Attachment V.4. Such omissions or deviations are subject to the approval of DEQ. In addition, the RFI Work Plan(s) must include all investigations necessary to ensure compliance with 40 CFR 264.101.

IV.G.1.d. *Risk Assessment*

IV.G.1.d.i. *Contents:* The Permittee shall include in the RFI Work Plan(s) a baseline risk assessment work plan as required in Attachment V.4. The baseline risk assessment should include the elements outlined in Attachment V.4 and V.5.

IV.G.1.d.ii. *Deviation:* The Permittee may provide written justification for changes in the submittal schedule and contents of the baseline risk assessment. The Permittee may deviate from the requirements of submitting a baseline risk assessment with the RFI Work Plan(s) if prior written approval is obtain from DEQ.

IV.G.1.e. *DEQ Action*

The RFI Work Plan(s) must be approved in writing by DEQ prior to implementation. DEQ's letter approving the RFI Work Plan(s) will specify the start date of the RFI Work Plan(s) schedule.

IV.G.1.e.i. If DEQ does not approve the RFI Work Plan(s), DEQ shall either:

- IV.G.1.e.i.1. Notify the Permittee in writing of the RFI Work Plan(s)'s deficiencies and specify a due date for submission of a revised RFI Work Plan(s); or
- IV.G.1.e.i.2. Revise the RFI Work Plan(s) and notify the Permittee of the revisions and the start date of the schedule within the approved RFI Work Plan(s).
- IV.G.2. *Implementation*
The Permittee shall implement the RFI in accordance with the approved Work Plan(s).
- IV.G.3. *Notification*
The Permittee shall notify DEQ of investigation activities such as drilling, boring, or sampling undertaken pursuant to the RFI Work Plan(s), no less than 14 calendar days prior to implementation. Notification shall be made by electronic mail to the Hazardous Waste Section Project Manager for the BNSF Paradise facility.
- IV.G.4. *Progress Reports*
The Permittee shall provide DEQ with RFI progress reports. The reporting schedule for the RFI progress reports must be established in the RFI Work Plan(s); however, progress reports must be submitted at least quarterly. RFI progress reporting will commence upon DEQ approval of the RFI Work Plan(s). Subsequent changes to the frequency and scope of the RFI progress reports must be approved in writing by DEQ. The progress reports must contain at a minimum the following information:
- IV.G.4.a. A description of the portion of the RFI completed;
- IV.G.4.b. Summaries of findings;
- IV.G.4.c. Summaries of all deviations from the approved RFI Work Plan(s) during the reporting period;
- IV.G.4.d. Summaries of all problems or potential problems encountered during the reporting period;
- IV.G.4.e. Projected work for the next reporting period; and
- IV.G.4.f. Copies of daily reports, inspection reports, laboratory/monitoring data, and other pertinent information.
- IV.G.5. *Draft and Final Reports*
- IV.G.5.a. The Permittee shall prepare and submit to DEQ a draft and final RFI Report(s) for the investigations conducted pursuant to the Work Plan(s).

- IV.G.5.a.i. The Draft RFI Report(s) must be submitted to DEQ for review in accordance with the schedule in the approved RFI Work Plan(s).
- IV.G.5.a.ii. The Final RFI Report(s) must be submitted within 45 calendar days after receipt of DEQ's comments on the Draft RFI Report(s), unless an alternative schedule is approved in writing by DEQ.
- IV.G.5.b. Contents
 - IV.G.5.b.i. General: The RFI Report(s) must include an analysis and summary of all required investigations of those units included in the RFI Work Plan(s). The summary must describe the type and extent of contamination, including sources and migration pathways, and a description of actual or potential human or ecological receptors.
 - IV.G.5.b.ii. Risk Assessment: The RFI Report(s) must include a baseline risk assessment for both environmental and human receptors unless DEQ has approved in writing a deviation. The human health baseline risk assessment must include, but is not limited to, a residential exposure scenario. The baseline risk assessment should address the elements outlined in Attachment V.5. The Permittee should provide written justification for any omissions or deviations from the elements outlined in Attachment V.5.
 - IV.G.5.b.iii. Background Information: The RFI Report(s) must describe the extent of contamination (qualitative and quantitative) in relation to background levels. Background levels must be indicative of the area surrounding the facility and must not be impacted by facility operations.
 - IV.G.5.b.iv. Data Quality: The Permittee shall ensure that the data generated during the investigation are sufficient in quality (e.g., quality assurance procedures have been followed) and quantity to describe the nature and extent of contamination, potential threat to human health and/or the environment, and to support a Corrective Measures Study (CMS), if necessary.
- IV.G.5.c. DEQ Action
 - IV.G.5.c.i. DEQ will review the Draft RFI Report(s) and approve the Draft RFI Report(s) and specify that the Final RFI Report(s) must be submitted pursuant to Condition V.G.5.a., or disapprove the Draft RFI Report(s). If DEQ disapproves the Draft RFI Report(s), DEQ will notify the Permittee in writing of the Draft RFI Report's deficiencies and specify a due date for submission of a revised Draft RFI Report(s).
 - IV.G.5.c.ii. DEQ will review the Draft and/or Final RFI Report(s) and notify the Permittee of the need for further investigative action, the need for implementing Interim Measures as set forth in Condition V.H., and/or the need for a CMS as set forth in Condition V.I.

IV.G.5.c.iii. DEQ will notify the Permittee if DEQ determines, upon review of the RFI Report(s), that no further action is required for SWMUs and AOCs described in the RFI Report(s).

IV.G.6. *Groundwater Monitoring*
Groundwater monitoring must continue as outlined in the RFI Work Plan(s) unless altered by implementation of a DEQ-approved Corrective Measures Implementation (CMI) Work Plan(s) pursuant to Condition V.K., or a DEQ approved revision is made to the RFI Work Plan(s) at the Permittee's or DEQ's request during the period between completion of the RFI Report(s) and the implementation of the CMI Work Plan(s).

IV.H. Interim Measures

IV.H.1. *Work Plan(s)*

IV.H.1.a. *Applicability*

As directed by DEQ under circumstances set forth in Conditions V.D and V.E, the Permittee shall prepare and submit an IM Work Plan(s) for any unit that poses an immediate or potential threat to human health or the environment. The IM Work Plan(s) must be submitted within 30 calendar days of receipt of such notification. If DEQ determines that immediate action is required, DEQ or an authorized representative may verbally direct the Permittee to act prior to the Permittee's receipt of DEQ's written notification. Interim measures may be conducted concurrently with other investigations required under the terms of this permit.

IV.H.1.b. *Contents*

The IM Work Plan(s) must ensure that the interim measures are designed to mitigate any immediate or potential threat(s) to human health or the environment. The IM Work Plan(s) should address, at a minimum, the elements listed in Attachment V.7. The Permittee must provide sufficient written justification for any omissions or deviations from the minimum requirements in Attachment V.7. Such omissions or deviations are subject to written approval of DEQ.

IV.H.1.c. *DEQ Action*

The IM Work Plan(s) must be approved in writing by DEQ prior to implementation. DEQ shall specify the starting date of the IM Work Plan(s) schedule in its written approval.

IV.H.1.c.i. If DEQ disapproves the IM Work Plan(s), DEQ shall either:

IV.H.1.c.i.1. Notify the Permittee in writing of the IM Work Plan(s)'s deficiencies and specify a due date for submitting of a revised IM Work Plan(s); or

IV.H.1.c.i.2. Revise the IM Work Plan(s) and notify the Permittee of the revisions and the start date of the schedule within the approved IM Work Plan(s).

IV.H.2. *Public Participation*

DEQ may require a permit modification in accordance with Condition I.M.2. for the proposed IM to allow public participation on Draft IM Work Plan(s).

IV.H.3. *Implementation*

The Permittee shall implement the interim measures in accordance with the approved IM Work Plan(s).

IV.H.4. *Notification*

The Permittee shall notify DEQ of investigation activities (such as drilling, boring, or sampling) or remedial activities undertaken pursuant to the IM Work Plan(s) no less than 14 calendar days prior to implementation. Notification must be made by electronic mail to the Hazardous Waste Section Project Manager for the BNSF Paradise facility.

IV.H.4.a. The Permittee shall notify DEQ as soon as possible of any planned changes, deletions or additions to the IM Work Plan(s). Notification must be made by electronic mail to the Hazardous Waste Section Project Manager for the BNSF Paradise facility. Such changes, deletions, or additions are subject to DEQ approval.

IV.H.5. *Progress Reports*

The Permittee shall provide DEQ with IM progress reports. The reporting schedule for the IM progress reports must be established in the IM Work Plan(s); however, progress reports must be submitted at least quarterly. Subsequent changes to the frequency and scope of the IM progress reports must be approved by DEQ. The IM progress reports must contain at a minimum the following information:

IV.H.5.a. A description of interim measures implemented and/or completed;

IV.H.5.b. Summaries of progress and/or results;

IV.H.5.c. Summaries of deviations from the approved IM Work Plan(s), and problems encountered during the reporting period;

IV.H.5.d. Projected work for the next reporting period; and

IV.H.5.e. Copies of all daily reports, inspection reports, laboratory/monitoring data, and other pertinent information.

IV.H.6. *Final Report(s)*

The Permittee shall prepare and submit an IM Final Report(s) to DEQ within 45 calendar days after completion of interim measures. The IM Report(s) must contain at a minimum the following information:

IV.H.6.a. A description of interim measures implemented;

- IV.H.6.b. Summaries of results;
- IV.H.6.c. Summaries of all problems encountered; and
- IV.H.6.d. Summaries of accomplishments and/or effectiveness of interim measures.

IV.I. Corrective Measures Study (CMS)

IV.I.1. *Work Plan(s)*

IV.I.1.a. Applicability

IV.I.1.a.i. The Permittee shall prepare and submit to DEQ a draft CMS Work Plan(s) for units that require a CMS. The Work Plan(s) must be after notification by DEQ that a CMS is required, within a timeframe specified by DEQ. The CMS Work Plan(s) must be developed to meet the requirements of Condition V.I.1.b.

IV.I.1.a.ii. As necessary, units requiring interim measures may be addressed in a CMS Work Plan and Report.

IV.I.1.b. Contents

IV.I.1.b.i. The CMS Work Plan(s) should, at a minimum, address the elements in Attachment V.6. The CMS Work Plan(s) must include schedules of implementation and completion of specific actions necessary to complete a CMS.

IV.I.1.b.ii. The Permittee shall provide justification and/or documentation for any unit deleted from the CMS Work Plan(s). Such deletions of a unit are subject to the written approval of DEQ. The CMS must be conducted in accordance with the approved CMS Work Plan(s).

IV.I.1.b.iii. The Permittee should also provide sufficient written justification for any omissions or deviations from the minimum requirements of Attachment V.6. Such omissions or deviations are subject to the written approval of DEQ.

IV.I.1.b.iv. The scope of the CMS Work Plan(s) must include all investigations necessary to ensure compliance with 40 CFR 264.101.

IV.I.1.c. DEQ Action

The CMS Work Plan(s) must be approved in writing by DEQ prior to implementation. DEQ shall either approve or disapprove in writing the CMS Work Plan(s).

IV.I.1.c.i. If DEQ disapproves the CMS Work Plan(s), DEQ shall either:

IV.I.1.c.i.1. Notify the Permittee in writing of the CMS Work Plan(s)'s deficiencies and specify a due date for submitting of a revised CMS Work Plan(s); or

- IV.I.1.c.i.2. Revise the CMS Work Plan(s) and notify the Permittee of the revisions and the start date of the schedule within the approved CMS Work Plan(s).
- IV.I.2. *Implementation*
The Permittee shall implement the CMS according to the schedules specified in the CMS Work Plan(s).
- IV.I.3. *Notification*
IV.I.3.a. The Permittee shall notify DEQ of investigation activities (such as drilling, boring, or sampling) or remedial activities undertaken pursuant to the CMS Work Plan(s), no less than 14 calendar days prior to implementation. Notification must be made by electronic mail to the Hazardous Waste Section Project Manager for the BNSF Paradise facility.
- IV.I.4. *Draft and Final Report(s)*
IV.I.4.a. Schedule
The Permittee shall prepare and submit to DEQ a draft and final CMS Report(s) for the study conducted pursuant to the approved CMS Work Plan(s).
- IV.I.4.a.i. The Draft CMS Report(s) must be submitted to DEQ in accordance with the schedule in the approved CMS Work Plan(s).
- IV.I.4.a.ii. The final CMS Report(s) must be submitted to DEQ within 45 calendar days after receipt of DEQ's comments on the draft CMS Report(s), unless an alternative schedule is approved by DEQ.
- IV.I.4.b. Contents
The CMS Report(s) must include an evaluation of each remedial alternative and present all information gathered under the approved CMS Work Plan(s), including a summary of any bench scale or pilot test conducted. The CMS Final Report(s) must contain adequate information to enable DEQ to make a decision on remedy selection, as described under Condition V.J.
- IV.I.4.c. DEQ Action
IV.I.4.c.i. DEQ will review the Draft CMS Report(s), approve the Draft CMS Report(s), and specify that the Final CMS Report(s) must be submitted pursuant to Condition V.I.4.a., or disapprove the Draft CMS Report(s). If DEQ does not approve the Draft CMS Report(s), DEQ shall notify the Permittee in writing of any deficiencies and specify a due date for submittal of a revised Draft CMS Report(s).
- IV.I.4.c.ii. DEQ may require the Permittee to further evaluate additional remedies or particular elements of one or more proposed remedies.
- IV.I.4.c.iii. The Permittee will be notified if DEQ determines, upon review of the CMS Report(s), that no further action is warranted for the unit(s) described in the CMS.

IV.J. Remedy Approval and Permit Modification

IV.J.1. *Approval*

DEQ shall select corrective action remedies for the site. DEQ may select a remedy from the Final CMS Report(s), reject any alternative in the Final CMS Report(s), or prescribe a different remedial alternative or remedy performance standard. DEQ will base its selection, at a minimum, on protection of human health and the environment, including site-specific human and ecological receptors, existing law and regulations, and guidance. The remedy and justification for selection of the remedy will be presented in a document called a Statement of Basis.

IV.J.2. *Permit Modification*

After selection of a remedy, DEQ will initiate a permit modification to incorporate into the permit the remedy and the Statement of Basis in accordance with 40 CFR 270.41. The Permittee shall implement the requirements of Condition V.K. (Corrective Measures Implementation) when DEQ issues the permit modification incorporating the selected remedy.

IV.K. Corrective Measures Implementation (CMI)

IV.K.1. *Work Plan(s)*

IV.K.1.a. *Applicability*

The Permittee shall prepare and submit a Draft CMI Work Plan(s) following modification of the permit to incorporate the selected remedy. The Draft CMI Work Plan(s) must be submitted within 90 calendar days after finalization of the permit modification.

IV.K.1.b. *Contents*

The CMI Work Plan must, at a minimum, address the elements listed in Attachment V.7. The Permittee should provide sufficient written justification of any omissions or deviations from the minimum requirements in Attachment V.7.

IV.K.1.c. *DEQ Action*

The CMI Work Plan(s) must be approved in writing by DEQ prior to implementation. The letter approving the CMI Work Plan(s) must specify the start date of the CMI Work Plan(s) schedule.

IV.K.1.c.i. If DEQ does not approve the CMI Work Plan(s), DEQ shall either:

IV.K.1.c.i.1. Notify the Permittee in writing of the CMI Work Plan(s)'s deficiencies and specify a due date for submitting of a revised CMI Work Plan(s); or

IV.K.1.c.i.2. Revise the CMI Work Plan(s) and notify the Permittee of the revisions and the start date of the schedule within the approved CMI Work Plan(s).

IV.K.1.d. *Notice to Government Authority*

The Permittee shall provide notice to DEQ within ten (10) calendar days prior to completion of any land transaction.

IV.K.2. *Implementation*

The Permittee shall implement the approved CMI Work Plan(s) in accordance with the schedule specified in the Work Plan(s).

IV.K.3. *Notification*

IV.K.3.a. The Permittee shall notify DEQ of investigation activities (such as drilling, boring, or sampling) or remedial activities undertaken pursuant to the CMI Work Plan(s), no less than 14 calendar days prior to implementation. Notification must be made by electronic mail to the Hazardous Waste Section Project Manager for the BNSF Paradise facility.

IV.K.3.b. The Permittee shall give verbal notice to DEQ as soon as possible of any planned changes, deletions or additions to the CMI Work Plan(s). Verbal notification shall be followed by formal written notification. Changes, deletions, or additions to the CMI Work Plan are subject to DEQ approval.

IV.K.3.c. For significant changes, the Permittee shall submit an amended CMI Work Plan(s) to DEQ for approval. The amended CMI Work Plan(s) must include, but is not limited to, a description of changes to the selected remedy and justification of the change(s).

IV.K.4. *Remedy Changes*

Changes to the selected remedy after permit modification may be made upon written approval from DEQ. DEQ may determine an additional permit modification is necessary if proposed changes to the selected remedy are substantial enough to warrant public participation.

IV.K.5. *Progress Reports*

IV.K.5.a. The Permittee shall provide DEQ with progress reports on implementation of the CMI Work Plan(s). The reporting schedule for the CMI progress reports must be established in the CMI Work Plan(s); however, reports must be submitted at least quarterly. Subsequent changes to the frequency and scope of the CMI progress reports must be approved by DEQ.

IV.K.5.b. All CMI reports in Conditions V.K.5.a must contain at a minimum the following information:

IV.K.5.b.i. A description of corrective measure implemented and/or completed;

IV.K.5.b.ii. Summaries of progress and/or results;

IV.K.5.b.iii. Summaries of deviations from the approved CMI Work Plan(s), and problems encountered during the reporting period;

- IV.K.5.b.iv. Projected work for the next reporting period; and
- IV.K.5.b.v. Copies of all daily reports, inspection reports, laboratory/monitoring results, and other pertinent information.
- IV.K.6. *Five-Year Review*
Five years after issuance of this permit, the Permittee must evaluate the implementation and performance of the remedy in order to determine if the remedy continues to be protective of human health and the environment.
- IV.K.6.a. *Applicability*
The Permittee shall review data and other pertinent site-specific information, including sampling and monitoring plans, analytical results, operation and maintenance reports, and/or other documentation of corrective measures performance to determine the following:
 - IV.K.6.a.i. Whether the remedy is functioning as intended as set forth in the Statement of Basis and Corrective Measures Work Plan;
 - IV.K.6.a.ii. Whether the exposure assumption, toxicity data, cleanup levels, and corrective measures objectives used at the time of the remedy selection are still valid; and
 - IV.K.6.a.iii. Whether new information indicates the corrective measures will not achieve the corrective measures objectives, or is not protective of human health or the environment.
- IV.K.6.b. *Report*
The Permittee shall submit a report to DEQ which presents the findings and conclusions of the review, including identification of any issues, recommendations, follow-up actions, and a determination as to whether the corrective measures are protective. The report must contain the data and information necessary to support all findings and conclusions.
 - IV.K.6.b.i. The report must be submitted by April 1, 2020 and five years following that date, until permit reissuance, termination, or another enforceable mechanism is issued to the Permittee for the BNSF Paradise Facility.
 - IV.K.6.b.ii. The report may be submitted in conjunction with the Annual Monitoring and CAMU Operations Report required in Condition I.R.4.e. of this permit.
- IV.K.6.c. *Department Action*
IV.K.6.c.i. DEQ will review the five-year review report, and determine what actions, if any, must be taken. Upon approval, DEQ will:

- IV.K.6.c.i.1. Notify the Permittee by written letter of actions that must be taken to improve and/or enhance the current remedy and a schedule for implementation;
- IV.K.6.c.i.2. Notify the Permittee by written letter that no action is required; or
- IV.K.6.c.i.3. Change the remedy, as allowed in Condition V.K.4. (Remedy Changes).
- IV.K.6.c.ii. If DEQ does not approve the report, DEQ shall either:
 - IV.K.6.c.ii.1. Notify the Permittee in writing of deficiencies and specify a due date for submitting of a revised report; or
 - IV.K.6.c.ii.2. Revise the report and notify the Permittee of the revisions and any actions that must be taken as set forth in Conditions V.K.6.c.i.1., V.K.6.c.i.2., and V.K.6.c.i.3.

IV.L. Completion of Corrective Measures

IV.L.1. *Applicability*

Conditions under this section (V.L.) apply to completion of facility-wide corrective measures, completion of corrective measures specific to a group of SWMUs/AOCs, or completion of corrective measures for a specific unit identified in Condition V.A.

IV.L.2. *Corrective Measures Completion Certification Report*

- IV.L.2.a. The Permittee shall prepare and submit a Corrective Measures Completion Certification Report to DEQ within 45 days of completion of corrective measures conducted under Condition V.K.
- IV.L.2.b. The Corrective Measures Completion Certification Report must at a minimum contain the following information:
 - IV.L.2.b.i. A description of all corrective measures completed;
 - IV.L.2.b.ii. Summaries of results and documentation of attainment of performance requirement;
 - IV.L.2.b.iii. Summaries of all problems encountered;
 - IV.L.2.b.iv. Summaries of accomplishments and/or effectiveness of corrective measures; and
 - IV.L.2.b.v. Certification that corrective measures have been completed in accordance with the approved CMI Work Plan(s) as per Condition V.K., and/or Interim Measures Work Plan(s) as per Condition V.H.
 - IV.L.2.b.v.1. The certification must be signed by the Permittee and by an independent, registered professional engineer(s) skilled in the appropriate technical discipline(s). Documentation supporting the independent professional engineer(s)

certification must be furnished to DEQ upon request until DEQ approval of the Corrective Measures Completion Certification Report.

IV.L.3. *DEQ Approval*

DEQ shall review the Corrective Measures Completion Certification Report and, if necessary, notify the Permittee in writing of any deficiencies and specify a due date for submitting of a revised report. DEQ shall approve the Corrective Measures Completion Certification Report when all deficiencies have been addressed to its satisfaction.

IV.L.4. *Permit Modification*

After approval of the Corrective Measures Completion Certification Report, DEQ will initiate a modification incorporating the completion of the corrective measures into the permit. The modification will remove the unit(s) associated with the completed corrective measures from further permit action unless releases are discovered from those units as set forth in Condition V.E. The permit modification will be in accordance with 40 CFR 270.41.

IV.M. **Modification of the Corrective Action Compliance Schedule**

If at any time DEQ determines that modification of the Compliance Schedule (Attachment V.8) is necessary, DEQ may initiate a modification to the schedule in accordance with the procedures contained in 40 CFR 270.41. The Permittee may also submit a request for modification in accordance with 40 CFR 270.42.

IV.N. **Plan and Report Requirements**

IV.N.1. All plans and schedules are subject to approval by DEQ prior to implementation. The Permittee shall revise and implement all submittals and schedules as specified by DEQ.

IV.N.2. Work plans, reports, and other required documentation must be submitted in accordance with the approved schedule. Extensions of the due date for submittals may be granted by DEQ based on the Permittee's demonstration that sufficient justification for the extension exists.

IV.N.3. The Permittee shall submit an amended RFI Work Plan or Plans to DEQ if the Permittee or DEQ determines that an Assessment Report required under Condition V.D.2. or RFI Work Plan required under Condition V.G. no longer satisfies requirements under this Permit or 40 CFR 264.101.

IV.N.3.a. DEQ will notify the Permittee in writing of its determination.

IV.N.3.b. The amended RFI Work Plan(s) must be submitted to DEQ within 90 calendar days of the Permittee's determination or DEQ's written notification.

IV.N.4. All reports must be signed and certified in accordance with 40 CFR 270.11.

IV.N.5. The Permittee shall provide one hard copy and one electronic copy of all work plans and reports to DEQ and one hard copy of all work plans and reports to the Environmental Protection Agency, Region 8.

Attachment V.1

List of Solid Waste Management Units and Areas of Concern and Location Map

Attachment V.1

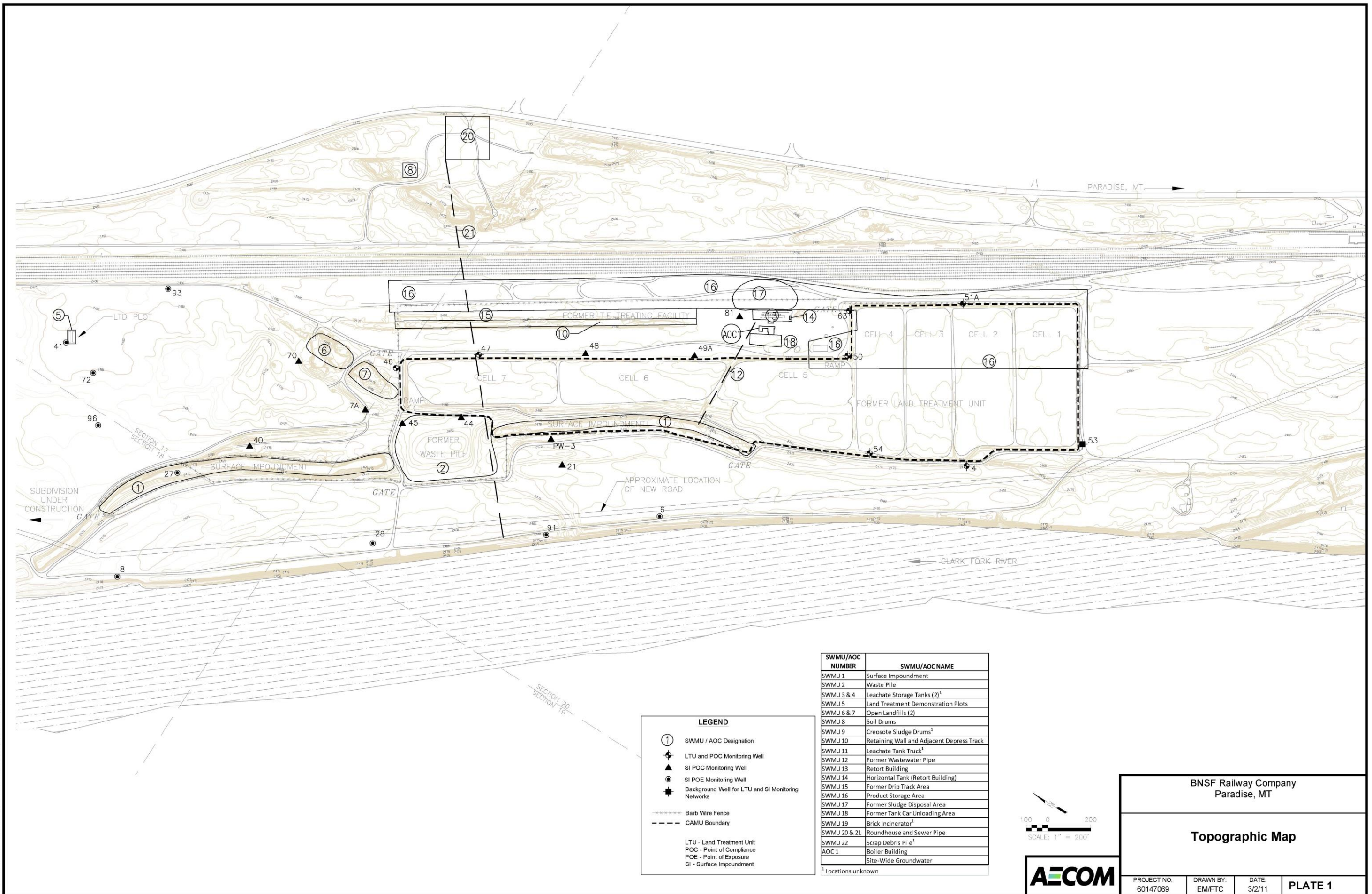
List and Location of Solid Waste Management Units and Areas of Concern

SWMU/AOC #	SWMU/AOC Name	Phase I RFI Status	Phase II RFI Status	CMS Status	CMI Status
SWMU 1	Surface Impoundment	NR	NR	NR	NR
SWMU 2	Waste Pile	NR	NR	NR	NR
SWMU 3 and 4	Leachate Storage Tanks (2)	NR	NR	NR	NR
SWMU 5	Land Treatment Demonstration Plots	NR	NR	NR	NR
SWMU 6 and 7	Open Landfills (2)	C	C	C	C
SWMU 8	Soil Drums	NFA	NR	NR	NR
SWMU 9	Creosote Sludge Drums	NFA	NR	NR	NR
SWMU 10	Retaining Wall and Adjacent Depress Track	C	C	C	C
SWMU 11	Leachate Tank Truck	NFA	NR	NR	NR
SWMU 12	Former Wastewater Pipe	C	C	C	C
SWMU 13	Retort Building	C	C	C	C
SWMU 14	Horizontal Tank (Retort Building)	IM/NFA	NR	NR	NR
SWMU 15	Former Drip Track Area	C	C	C	C
SWMU 16	Product Storage Area	C/NFA	NR	NR	NR
SWMU 17	Former Sludge Disposal Area	C	C	C	C
SWMU 18	Former Tank Car Unloading Area	C	C	C	C
SWMU 19	Brick Incinerator	NFA	NR	NR	NR
SWMU 20 and 21	Roundhouse and Sewer Pipe	C	C/NFA	NR	NR
SWMU 22	Scrap Debris Piles	NFA	NR	NR	NR
SWMU 23	Land Treatment Unit	NR	NR	NR	NR
AOC 1	Boiler Building	NFA	NR	NR	NR
*	Groundwater	C	C	C	IP

* Groundwater includes all SWMUs and AOCs

Corrective Action Status

IP: In Progress
 C: Complete
 R: Required
 NR: Not Required
 NFA: No Further Action
 IM: Interim Measures



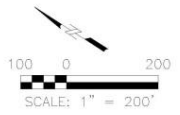
LEGEND

- ① SWMU / AOC Designation
- ⊕ LTU and POC Monitoring Well
- ▲ SI POC Monitoring Well
- SI POE Monitoring Well
- Background Well for LTU and SI Monitoring Networks
- Barb Wire Fence
- - - - - CAMU Boundary

LTU - Land Treatment Unit
 POC - Point of Compliance
 POE - Point of Exposure
 SI - Surface Impoundment

SWMU/AOC NUMBER	SWMU/AOC NAME
SWMU 1	Surface Impoundment
SWMU 2	Waste Pile
SWMU 3 & 4	Leachate Storage Tanks (2) ¹
SWMU 5	Land Treatment Demonstration Plots
SWMU 6 & 7	Open Landfills (2)
SWMU 8	Soil Drums
SWMU 9	Creosote Sludge Drums ¹
SWMU 10	Retaining Wall and Adjacent Depress Track
SWMU 11	Leachate Tank Truck ¹
SWMU 12	Former Wastewater Pipe
SWMU 13	Retort Building
SWMU 14	Horizontal Tank (Retort Building)
SWMU 15	Former Drip Track Area
SWMU 16	Product Storage Area
SWMU 17	Former Sludge Disposal Area
SWMU 18	Former Tank Car Unloading Area
SWMU 19	Brick Incinerator ¹
SWMU 20 & 21	Roundhouse and Sewer Pipe
SWMU 22	Scrap Debris Pile ¹
AOC 1	Boiler Building
	Site-Wide Groundwater

¹ Locations unknown



BNSF Railway Company
Paradise, MT

Topographic Map

PROJECT NO. 60147069	DRAWN BY: EM/FTC	DATE: 3/2/11	PLATE 1
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Attachment V.2
Statement of Basis for Soil Remedy Selection

**STATEMENT OF BASIS
BURLINGTON NORTHERN & SANTA FE RAILWAY COMPANY
PARADISE TIE TREATING PLANT SITE
PARADISE, MONTANA**

**MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
MAY, 2001**

OPPORTUNITIES FOR PUBLIC INVOLVEMENT

DEQ Announces Proposed Decision for Treatment and Control of Contaminated Soils at the Paradise Tie Treating Plant

PUBLIC COMMENT PERIOD: May 2, 2001 through June 15, 2001

PUBLIC MEETING: Wednesday, May 23, 2001

LOCATION: Methodist Clubhouse
Paradise, Montana

TIME: 6:30 – 9:00 p.m.

SITE INFORMATION:

Plains Public Library
108 West Railroad
Plains, MT 59859

Montana Department of Environmental Quality
1520 East Sixth Street
Helena, MT 59620

SEND COMMENTS TO:

Ann Kron
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P.O. Box 200901
Helena, MT 59620-0901
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Phone: (406) 444-5824

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DECISION SUMMARY

The Department of Environmental Quality (DEQ) has determined that the proposed Alternative 4 remedy, as described in this Statement of Basis and the draft hazardous waste permit, is the best proposed remedy for addressing risks from potential exposure to contaminated surface soils at the Paradise Site owned by BNSF. Alternative 4 provides permanent reduction in the contaminant mass through biological treatment at the permitted on-site land treatment unit (LTU). Other treatment methods may provide faster treatment, but at much greater cost. The preferred soil remedy involves excavation of the contaminated surface soils, biological treatment of the contaminated soil in the on-site LTU, backfilling the excavated areas with clean soil, and establishing a vegetative cover over the areas. BNSF evaluated several alternative remedies for the soil contamination. DEQ considered all of the corrective measures options and their components evaluated by BNSF. DEQ and EPA worked together closely in evaluating the alternatives and the preferred remedy. Through the remedial actions and institutional/government controls, risk posed by the site surface soils will not exceed the acceptable one-in-a-hundred-thousand cancer risk level to the public. The preferred surface soil remedy will be protective of human health and the environment.

SITE INFORMATION

The Montana Department of Environmental Quality (DEQ) is proposing a remedy for the treatment and control of contaminated surface soil at the site of the former Paradise Tie Treating Plant (Paradise Site) owned by Burlington Northern and Santa Fe Railway Company (BNSF). The Paradise Site is located in northwestern Montana near the Town of Paradise.

INTRODUCTION

Because BNSF managed hazardous waste on-site they were required to obtain a hazardous waste permit under the Resource Conservation and Recovery Act (RCRA) and the Montana Hazardous Waste Act (MHWA). RCRA is the federal law under which regulations concerning the management, treatment, storage, and disposal of hazardous waste are implemented. The MHWA is the state equivalent to RCRA. The Hazardous and Solid Waste Amendments of 1984 (HSWA) amended RCRA and included a requirement that owners and operators of hazardous waste facilities

remediate releases of hazardous wastes or hazardous constituents from solid waste management units (SWMUs) and areas of concern (AOCs). A SWMU is any unit that was used at any time to manage waste, regardless of whether the unit was intended for that purpose. For example, the drip track area is a SWMU because waste creosote dripped off the drying railroad ties and into the soil over time. An AOC is any area at a facility having a probable release of a hazardous waste or hazardous constituent that may or may not be from a SWMU. The HSWA corrective action requirements are established in Section 3004(u) of RCRA and 75-10-406(7) Montana Code Annotated (MCA) of MHW. The requirements are codified in federal regulations at 40 Code of Federal Regulations (CFR) Section 264.101, as incorporated by reference in the Administrative Rules of Montana (ARM) 17.53.801.

Through HSWA, Congress required permits issued to hazardous waste facilities contain corrective action requirements for SWMUs/AOCs. The Montana Legislature has directed the DEQ to adopt a state equivalent program. The DEQ was authorized as the lead for corrective action in 2000. BNSF managed wastes in a number of SWMUs and AOCs at the Paradise Site. Some of these units contain creosote-contaminated soils or contaminated groundwater that require remediation. In 1989, the Environmental Protection Agency (EPA) issued a HSWA Permit for the Paradise Site which required BNSF to investigate all facility SWMUs/AOCs and develop a corrective measures study for the SWMUs/AOCs which are contaminated above acceptable levels. Figure 1 shows the locations of the SWMUs and AOCs at the Paradise Site. Under State authority the remedy selection is incorporated into the new hazardous waste permit.

CORRECTIVE ACTION PROCESS

The corrective action process generally comprises six activities. These activities are not always undertaken as a linear progression towards final facility cleanup, but can be implemented flexibly to most effectively meet site-specific corrective action needs. These six activities are:

RCRA Facility Assessment (RFA)

Often the first activity in the corrective action process is the RFA. The objective of the RFA is to identify potential and actual releases from SWMUs/AOCs and make preliminary determinations about releases, the need for corrective action, and interim measures. The EPA completed the RFA for the Paradise Site in 1989.

Interim/Stabilization Measures:

Interim/stabilization measures are short-term actions taken to respond to immediate threats to human health or prevent damage or contaminant migration to the environment. Interim or stabilization measures may be taken at any time in the corrective action process. BNSF has completed several interim measures since the closing of the site. Further information on these can be found in the Interim Measures section of this document.

RCRA Facility Investigation (RFI)

The RFI takes place when releases, or potential releases, have been identified and further investigation is necessary. The purpose of the RFI is to gather enough data to fully characterize the nature, extent, and rate of migration of contaminants to determine the appropriate response action. For the Paradise Site, a Phase I RFI report was completed in June 1994 and a Phase II RFI report was completed in July 1996.

Corrective Measures Study (CMS)

After the RFI is completed and the regulatory agency determines that cleanup is necessary, the regulatory agency may request the owner/operator to conduct a CMS. The purpose of the CMS is to identify and evaluate cleanup alternatives, called corrective measures, for releases at the facility. The recommended measures are reviewed by the regulatory agency. The regulatory agency then selects the best remedy, given the site-specific considerations. When a remedy is selected, the facility's permit is modified to include the remedy and is subject to public review and comment. The selected remedy for the Paradise Site will be included in the current permit reissuance. The CMS was completed in July 1999. DEQ and EPA conditionally approved a remedy in August 2000.

Statement of Basis

This document describes the basis for remedy selection and provides the public with an opportunity to comment on the remedy. When selecting a remedy the following are considered: short- and long-term reliability and effectiveness; reduction of toxicity, mobility, or volume of hazardous constituents; implementability; and costs.

Corrective Measures Implementation (CMI)

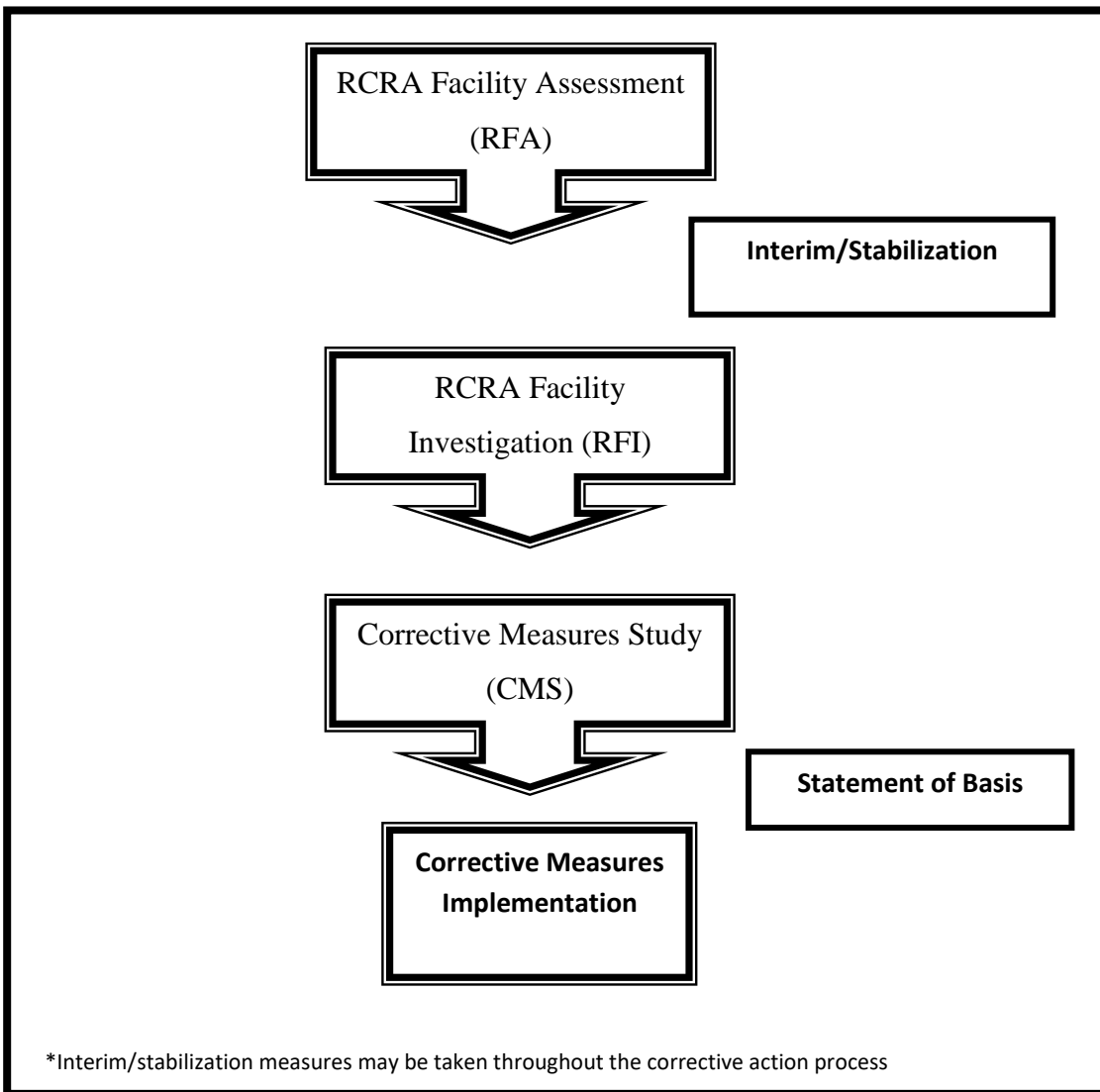
Once a remedy has been selected, the facility enters the CMI phase of corrective action. During

the CMI, the owner/operator of the facility implement the chosen remedy. Requirements for the CMI for the Paradise Site are included in the draft permit.

See Figure 2 for a flowchart showing the corrective action process.

The purpose of this document, which is called a Statement of Basis, is to 1) identify the proposed

Figure 2. Flowchart of the RCRA Corrective Action Process



corrective action remedy and explain the reasons for its selection, 2) describe all the remedies considered, 3) seek public review and comment on all remedies considered and on any other plausible remedies, and 4) provide information on how the public can be involved in the remedy

selection process. DEQ encourages residents and other interested parties to read and comment on this Statement of Basis and the CMS done by BNSF to evaluate remedy alternatives. BNSF performed a CMS of several options for correcting surface soil contamination problems at the Paradise Site.

A final remedy for the site surface soils will be selected only after the public comment period has ended and the DEQ has reviewed and considered the information submitted during this period. Changes may be made to the proposed remedy or another remedy selected if public comments or additional data indicate the changes would result in a more appropriate solution. DEQ will summarize the comments and provide responses at the end of the public comment period. The comment summary and DEQ's responses will become part of the public record for the site.

PROPOSED REMEDY

DEQ proposes to address surface-soil contamination at the Paradise Site by excavation and on-site treatment. Contaminated soil would be excavated from former SWMUs at the site. The excavated areas would then be backfilled with clean fill and soil, and a vegetative cover would be established on the area. The excavated soil would be treated on site at the existing Land Treatment Unit (LTU). A list of the SWMU can be found in Appendix A of the draft permit.

Land treatment at the site involves the controlled application of creosote contaminated material to the soil surface and incorporation of that material into the upper soil zone. The objectives of land treatment are to transform, immobilize, and degrade hazardous contaminants within the upper five feet of the soil. This is called the treatment zone. Aerobic microorganisms in the soil break down and degrade organic contaminants into less harmful compounds. Land treatment of creosote-impacted soil first occurred in the fall of 1989 in the Paradise LTU. During LTU operation, the total levels of creosote-related contaminant were reduced by 99 percent. The last waste application on the LTU was in 1994. Currently, the LTU is closed and no new waste is allowed to be treated on the unit.

The existing LTU can be reopened to treat the contaminated soils if DEQ approves its use as a special area for treating site cleanup wastes. Such an area is known as a corrective action management unit (CAMU). The CAMU could only be used to treat contaminated material related

to the cleanup of the Paradise Site. BNSF would operate the LTU as a CAMU according to the requirements of the hazardous waste permit. After the treatment standards are met, BNSF would be required to close the CAMU. DEQ is required to justify the reasons for approving the CAMU and make the information available to the public. The CAMU justification is provided in Attachment A of this document. The public comment period for the selected soil remedy also includes the opportunity for the public to comment on the use of the LTU as a CAMU.

BACKGROUND

The Paradise Site is located about three-quarters of a mile northwest of the Town of Paradise and five miles south of the town of Plains. The unincorporated Town of Paradise is the only population center within five miles. The site is south of Highway 200, on the northern bank of the Clark Fork River. BNSF and its predecessors owned the property between the river and the primary railroad tracks at the time of tie treating operations. Currently, a rail right-of-way extending 200 feet on either side of the railroad tracks is owned by Montana Rail Link. The site land use was industrial and agricultural prior to abandonment of the railroad tie treating facility in 1982. The BNSF property currently has mixed land use including agriculture, and open space. A portion of the site consists of an inactive LTU and a closed surface impoundment currently regulated by a hazardous waste permit issued by DEQ.

The former tie treating plant operated from 1908 to 1982. Creosote was the only wood preservative known to have been used at the plant. Creosote is produced from coal tar and is a mixture of hundreds of compounds, primarily semi-volatile organic compounds. Polynuclear aromatic hydrocarbons (PAHs) are semi-volatile organic compounds that generally account for 85 percent (by weight) of the chemical constituents of creosote. Creosote is denser than water. When creosote is released to groundwater it typically collects at the bottom of aquifers as a dense non-aqueous phase liquid (DNAPL).

Railroad ties were treated with creosote at elevated pressures and temperatures in the treatment (retort) building. Wastewater from the plant was discharged through a buried pipe into a surface impoundment located southwest of the plant site. The impoundment is a former channel of the Clark Fork River and was used during plant operations as a settling basin for recovery and reuse of creosote.

Freshly treated ties were transported to the drip track area west of the treatment building. The area consisted of two parallel rows of narrow-gauge tracks and is approximately 1,000 feet in length and 60 feet wide. Freshly treated ties were allowed to drip onto the underlying track and soils. The depress track, south of the drip track, was used to remove the treated ties. It was located five feet lower than the drip track to make it easier to load treated ties onto boxcars. The depress track area is about 1,800 feet long and 30 feet wide. A retaining wall was built between the drip track and depress track. Three notches in the retaining wall allowed surface liquids to drain from the drip track into the depress track area.

BNSF was required to perform a site-wide investigation and clean up by the EPA under a Waste Minimization and Corrective Action Permit (EPA Permit). EPA issued the permit to BNSF (then Burlington Northern Railroad) for the Paradise Site in 1989. The EPA Permit required BNSF to investigate and correct releases of hazardous wastes and constituents from the identified SWMUs and AOCs.

EPA identified 22 SWMUs/AOCs at the Paradise Site during a RFA of the site in 1989. EPA then required that BNSF perform a RFI to investigate the contamination related to the SWMU/AOCs. A risk assessment was performed to ascertain risks to human health and the environment from exposure to the site contamination.

Upon review of the RFI and risk assessment, EPA required BNSF to include eight SWMUs in the CMS because of unacceptable risks to human health or the environment (SWMUs 6, 7, 10, 12, 13, 15, 17, and 18). Through further investigation, it was determined that SWMU 6 did not need to be included in the corrective action remedy at the site.

Reports from the CMS, RFI, and Risk Assessment are available at the public library in Plains, Montana. This Statement of Basis highlights key information from, but is not a substitute for, those documents.

In 1989, the State of Montana's DEQ issued BNSF a hazardous waste Part B Permit for post-closure care of the surface impoundment. The impoundment was contaminated with creosote sludges from wastewater discharge. The sludge that collected in the surface impoundment was

classified as a hazardous waste in 1980 (EPA hazardous waste code K001). BNSF closed the impoundment in 1984, and recovered the creosote from the impoundment for reuse at the tie plant in Somers, Montana in 1985. BNSF removed 20,000 cubic yards of the remaining surface sludges and most contaminated soils from the surface impoundment and deposited the material into a permitted on-site waste pile in 1985. BNSF constructed the LTU and transferred the sludge and soil in the waste pile to the LTU for biological treatment in 1989, after the State approved its operation under BNSF's hazardous waste permit.

In December 2000, EPA delegated the HSWA corrective action program to the State of Montana. The DEQ is proposing to reissue BNSF's hazardous waste permit. BNSF's hazardous waste permit will incorporate the EPA Permit requirements as well as the requirement to carry out the soil remedy once selected.

SUMMARY OF SITE RISKS

As part of the RFI, BNSF performed a baseline risk assessment. A risk assessment studies the health risks of exposure to the chemicals contaminating a site. A baseline risk assessment estimates what the risks would be if there were no additional cleanup or control of the site contaminants.

The risk assessment was performed in two phases. BNSF reported the first phase of the 1993 RFI Baseline Risk Assessment (RETEC, 1993) and then reported an update of the risk assessment in the Corrective Measures Study (CMS) Workplan (RETEC, 1997). BNSF evaluated the risks to humans, plants, and animals that might be exposed to site contaminants.

In the human health risk assessment, BNSF evaluated the potential risks to industrial workers at the site and to potential future residents. (Note: BNSF has reported that future residential use of the site is not intended) BNSF determined potential risks of exposure to contaminants in the soil and groundwater at the site.

The chemicals of concern in the risk assessment were based on data from site samples collected during the RFI. Those chemicals of most concern for potential human health and the environment are the polynuclear aromatic hydrocarbons (PAHs) from creosote. Low levels of volatile organic compounds (benzene, toluene, ethylbenzene, and xylene) from former plant operations also were

detected above background levels at the site. These chemicals were also included in the risk assessment.

In the human health risk assessment, BNSF evaluated both the cancer and the non-cancer health risks from exposure to the site chemicals. Cancer risks are estimated as the increased chance, over a lifetime, of a person's developing cancer as a result of exposure to a potential cancer-causing chemical (carcinogen). Non-cancer health risks were assessed by determining the hazard index (HI), or the adverse effects of being exposed to several chemicals at one time.

A baseline risk assessment conducted at the Paradise Site evaluated human health and ecological risk based on current and future land uses. The estimated cancer risks for the site are within the EPA acceptable range of one-in-ten-thousand to one-in-one-million for all potential receptors with the exception of future resident adults and children. Potential receptors included representative wildlife species characteristics of northwest Montana, industrial workers, trespassing children, construction workers, and potential future residents.

BNSF also studied the risks of contaminant exposure at each SWMU to identify the SWMUs that create the greatest risk and may need cleanup or control. Two receptors were evaluated on a SWMU-specific bases: 1) the on-site industrial worker (the most likely receptor for the site), and 2) the on-site resident child, the receptor associated with the highest potential cancer risk in the site-wide risk assessment. The SWMU-specific risk results indicated SWMUs 10, 13, 15, and 18 contributed the majority of estimated risk for both receptors. The proposed remedy addresses the contaminated surface soil at these SWMUs.

Cleanup levels for the site soils were established to ensure that in the future no person would be exposed to unsafe levels of chemicals. Action levels to protect the health of industrial workers and residents were calculated for carcinogenic PAHs (cPAH). The soil action level protective of on-site industrial workers is 40 parts per million (ppm), and 20 ppm for potential site residents.

The soil action levels for human health correspond to a 1×10^{-5} total lifetime cancer risk (i.e., one person out of a hundred-thousand is estimated to be at risk of developing cancer if the site is not cleaned up). The action level was calculated based on the relative risk and average concentration of

each individual cPAH: benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenz(a,h)anthracene. Areas of the site where the concentration of cPAHs in the surface are greater than the action levels are shown in Figure 2-2 and Table 2-7 of the CMS report.

BNSF also evaluated the potential for PAHs to impact ecological life forms (e.g. deer mouse, shrew, etc.) on-site and in surrounding ecological communities. In addition, potential impacts to off-site wildlife were evaluated including PAH migration to off-site media. The evaluation showed the most likely receptors are primarily soil invertebrates and the small vertebrate species that forage on invertebrates. The concentrations detected at the site may also cause negative impacts to both survival and reproduction in small mammals, and possible impacts on the survival of insectivorous bird species. The risks from exposure to contaminated materials at the site are low for larger omnivorous and carnivorous species for the following reasons. The site may only represent a small portion of their foraging range and they are therefore unlikely to spend a significant amount of time onsite. In addition, PAHs do not build up in the tissues of animals that are higher in the food chain.

BNSF calculated cleanup action levels for risks to represent small mammals and invertebrates. The ecological cleanup levels are higher in concentration than the human action levels. Therefore, controlling exposure to concentrations at human health action levels would also protect the wildlife.

INTERIM MEASURES

BNSF has completed or begun several interim measures to address contamination at the site. As described above, BNSF recovered creosote from the surface impoundment and recycled it at another facility. BNSF removed the remaining sludges and contaminated soils from the surface impoundment and treated the waste at the on-site LTU after temporary storage in a waste pile. BNSF also treated 4,500 cubic yards of soil excavated from the drip track SWMU at the LTU. BNSF has begun removal of free-phase creosote from the groundwater in the former treatment building area and the southeast portion of the surface impoundment. BNSF recycles the recovered creosote at another facility outside of Montana. BNSF installed alternate municipal water supply wells for the Town of Paradise in 1987.

SCOPE OF CORRECTIVE ACTION

This proposed remedy is limited to the surface soils portion of the CMA. DEQ will propose the groundwater remedy in a future modification of BNSF's permit. Any remaining work needed to address potential sediment contamination in the Clark Fork River also will be included in a future permit modification.

SUMMARY OF ALTERNATIVES

BNSF developed the following eight remedy alternatives for addressing surface soil contamination at the Paradise Site. Several of the alternatives have common activities such as excavation.

1. No Further Action
2. Cover Impacted Areas
3. Excavation of Impacted Areas and On-Site Thermal Desorption (thermal treatment)
4. Excavation of Impacted Areas and On-Site Land Treatment (bioremediation)
5. Excavation of Impacted Areas and Off-Site Disposal
- 6/7. Combination of Covering Impacted Areas, Excavation, and On-Site Treatment
8. Phytoremediation Cover (vegetation) on Impacted Areas

Alternatives 2 – 8 all include the use of institutional controls, such as deed restrictions, to restrict land access and use of the impacted areas; the use of a product recovery system to recover creosote from the aquifer; and the use of long-term groundwater monitoring.

Alternative 2 – 8 also include the same corrective action remedy for SWMU 10. SWMU 10, (the depress track and retaining wall), differs from the other SWMUs in that the depression, and therefore the impacted soil, is located 8 – 10 feet below the surrounding land surface. BNSF proposed to cover SWMU 10 by filling the length of the depression to grade with clean gravel. The top two feet of fill would be clean soil with a vegetative cover.

Below are brief descriptions of each alternative.

Alternative 1 – No Further Action:

Alternative 1 would not provide any additional means to prevent exposure to contaminated soil. This alternative provides a baseline with which to compare other alternatives.

Alternative 2 – Cover SWMUs:

Alternative 2 consists of placing a two-foot clean fill cover over impacted surface soil at SWMUs 7, 12, 13, 15, 17, and 18. SWMU 10 would be filled to grade (8-10 feet) with fill. BNSF would cover the SWMU areas where the concentration of contaminants in the surface soil is greater than a health-based action level. BNSF has two estimates of the area to be covered. The smaller area is based on the soil action level for an industrial worker. The larger area is based on the soil action level for a resident.

Alternative 3 – Excavation and Thermal Desorption:

Alternative 3 involves excavation of the impacted soil from SWMUs 7, 12, 13, 15, 17, and 18 for on-site thermal treatment, and the backfilling of SWMU 10 as described in Alternative 2. Soil would be excavated and staged in a stockpile area pending treatment. A mobile thermal desorption unit would be used to heat the finer soil material in a chamber and destroy the contaminant vapors or the vapors would be cooled and collected as condensate. The condensate would be separated into oil and water. The water would be reused in the process or applied as waste to the LTU, and the oil would be recycled. BNSF estimates four to six months to obtain an air permit from DEQ for the mobile treatment unit and two months for excavation and treatment. The treated material would be used to backfill the excavated areas. The thermal treatment process requires that soil be heated to sufficient temperatures to drive off the contaminants.

Soil would be excavated to either meet industrial or residential action levels. If a larger volume of soils is excavated to meet residential action levels, unimpacted gravel would be separated from the soil, washed, and used along with the treated material as backfill in the excavation areas. Wash-water would be collected, allowed to settle, and reused in the gravel pressure wash. Settled solids and soil would thermally be treated with the fine-grained soil. Excess wash-water would be applied to the LTU.

Alternative 4 – Excavation and Land Treatment:

Alternative 4 consists of excavation of the impacted soil from SWMUs 7, 12, 13, 15, 17, and 18 for on-site land treatment (bioremediation), and the backfilling of SWMU 10 as described in Alternative 2. Impacted soil would either be excavated in one batch and stockpiled in the LTU until spreading, or excavated in smaller portions and spread directly to the LTU. SWMUs 7, 12, 13, 15, 17, and 18 would be backfilled with clean fill.

Soil would be excavated to either meet industrial or residential action levels. If a larger volume of soils is excavated to meet residential action levels, unimpacted gravel would be separated from the soil, washed, and used along with the treated material as backfill in the excavation areas. Wash-water would be collected, allowed to settle, and reused in the gravel pressure wash. Settled solids and soil would be treated with the fine-grained soil. Excess wash-water would be applied to the LTU.

Land treatment involves the controlled application of impacted material to the soil surface and incorporation of that material into the upper soil zone. The objectives of land treatment are to transform, immobilize, and degrade hazardous contaminants within the treatment zone of the soil (usually the upper five feet). The bioremediation technology makes use of the breakdown and transformation of organic contaminants by aerobic microorganisms in the upper soil layer. Land treatment of creosote contaminated soil was initiated at the Paradise Site in 1989. During that time, the total levels of the creosote-related contaminants were reduced by 99 percent in the Paradise LTU. BNSF estimates three years to biodegrade the excavated soil on the LTU.

Alternative 5 – Excavation and Off-Site Disposal:

Alternative 5 involves excavation of the impacted soil from SWMUs 7, 12, 13, 15, 17, and 18 for off-site disposal, and backfilling SWMU 10 as described in Alternative 2. SWMUs 7, 12, 13, 15, 17, and 18 would be backfilled with clean fill.

Soil would be excavated to either meet industrial or residential action levels. If a larger volume of soils is excavated to meet residential action levels, unimpacted gravel would be separated from the soil, washed, and used along with the treated material as backfill in the excavation areas. Wash-

water would be collected, allowed to settle, and reused in the gravel pressure wash. Settled solids and soil would be sent off-site for disposal. Excess wash-water would be applied to the LTU.

Only specially licensed and trained haulers would be allowed to transport the contaminated material. Open trucks would not be allowed. The finer soil material would be transported to a permitted hazardous waste disposal facility. Excavation and separation would take approximately one month.

Alternative 6 – Covering, Excavation, and Land Treatment:

Alternative 6 represents a combination of Alternatives 2 and 4. Impacted soils at SWMUs 12, 13, and 18 would be covered as described in Alternative 2 to either meet industrial or residential action levels. SWMU 10 would be backfilled as described for Alternative 2. Impacted soils from SWMUs 7, 15, and 17 would be excavated and land treated on-site.

Soil from SWMUs 7, 15, and 17 would be excavated to meet either industrial or residential action levels. If a larger volume of soils is excavated to meet residential action levels, unimpacted gravel would be separated from the soil, washed, and used as backfill in the excavation areas. Wash-water would be collected, allowed to settle, and reused in the gravel pressure wash. Settled solids and soil would land treated on-site. Excess wash-water would be applied to the LTU.

Alternative 7 – Covering, Excavation, and Land Treatment:

Alternative 7 represents a combination of Alternative 2 and 4. Impacted soils at SWMUs 12, 13, 15, and 18 would be covered as described in Alternative 2 to either meet industrial or residential action levels. SWMU 10 would be backfilled as described for Alternative 2. Impacted soils from SWMUs 7 and 17 would be excavated and land treated on-site.

Soil would be excavated to meet either industrial or residential action levels. If a larger volume of soils is excavated to meet residential action levels, unimpacted gravel would be separated from the soil, washed, and used as backfill in the excavation areas. Wash-water would be collected, allowed to settle, and reused in the gravel pressure wash. Settled solids and soil would be treated with the

fine-grained soil. Excess wash-water would be applied to the LTU.

Alternative 8 – Phytoremediation:

Alternative 8 would involve phytoremediation of surface soils in SWMUs 7, 12, 13, 15, 17, and 18, and backfilling SWMU 10 as described for Alternative 2. A vegetative cover would be established to enhance biodegradation for the long-term treatment of surface soil impacts. Six-inches of topsoil would be applied to SWMUs 12, 13, and 18 due to the high concentration of contaminants. No soil cover would be added to SWMUs 7, 15, or 18. A fescue/ryegrass/clover mixture will be planted in the SWMUs. Supplemental organic matter (manure or composted manure/sawdust) and fertilizer would be added to support vegetative growth and the establishment of these native grasses. Supplemental irrigation might be necessary to establish and maintain a healthy vegetative cover.

EVALUATION OF THE PROPOSED REMEDY

DEQ is proposing Alternative 4 to address soil contamination associated with SWMUs 7, 10, 12, 13, 15, 17, and 18. Alternative 4 consists of excavation of the impacted soil from SWMUs 7, 12, 13, 15, 17 and 18 for on-site land treatment and backfilling SWMU 10 as described for Alternative 2. However, DEQ's preference for backfill material for SWMUs 7, 12, 13, 15, 17, and 18 is imported clean soil with a vegetative cover as originally proposed and evaluated by BNSF in the first version of the CMS. Similarly the proposed measure for SWMU 10 would include at least two-feet of imported clean soil with cover vegetation. Clean gravel could be used for the underlying fill material at SWMU 10 (i.e., from two feet below grade to the current depth of the SWMU). DEQ proposes excavation and treatment of soils to the industrial action level of 40-ppm cPAHs. Impacted soil would either be excavated in one batch and stockpiled in the LTU until spreading or excavated in smaller portions and spread directly to the LTU. SWMUs 7, 12, 13, 15, 17, and 18 would be backfilled with clean fill. Access to and use of the site SWMUs and CAMU would be restricted indefinitely by institutional controls.

BNSF would only be allowed to treat remediation wastes from the site cleanup at the site's LTU. The contaminated soil at the site must be managed as hazardous waste because it was contaminated by listed hazardous wastes. To prevent significant complications and costs for site cleanups, laws allow relief from specific requirements when cleanup wastes, such as contaminated soil, are treated

in a unit designated as a corrective action management unit (CAMU). DEQ is proposing to designate the LTU and a portion of the surface impoundment at the Paradise Site as a CAMU so it can be reopened to treat wastes from the remaining site cleanup activities.

Based on the CMS, BNSF proposed Alternative 7 as the corrective measure to control exposure to impacted soil at the seven SWMUs requiring corrective action. Alternative 7 involves placing a 24-inch thick gravel cover over impacted surface soil in the impacted areas of SWMUs 12, 13, 15, and 18 to prevent exposure to the soil. In addition, surface soil exceeding the industrial action level in SWMUs 7 and 17 would be excavated and treated in the LTU. These areas would be backfilled with gravel. SWMU 10 would be backfilled to grade with gravel.

DEQ and EPA prefer a modified Alternative 4 as the corrective measure to address soil impacts. The modified Alternative 4 differs from Alternative 7 in two ways: 1) contaminated surface soil would be excavated and land treated from SWMUs 7, 12, 13, 15, 17, and 18 instead of excavating and land treating soils from SWMUs 7 and 17; and 2) clean soil would be used to backfill these SWMUs instead of gravel. DEQ and EPA prefer Alternative 4 because it offers permanent reduction of the contamination for SWMUs 12, 13, and 1, rather than controlling exposure with a gravel cover at those SWMUs. Based on modeling performed by BNSF, they have determined that there will be little change in the concentration of the soil contaminants even after 100 years without biodegradation. Permanent reductions in toxicity, mobility, or volume are preferred to exposure control. Permanent reductions are protective of human health and the environment in the long-term and remove the risks associated with the potential failure of engineering or institutional controls. A good example of the potential failure of institutional controls was demonstrated when BNSF's predecessors lost control over a portion of land that they planned to include in the corrective action remedy for the surface impoundment. Permanent reductions in site contaminants will require less reliance on institutional controls to limit exposure to site contaminants.

SELECTION CRITERIA

DEQ and EPA evaluated the alternatives to identify which remedy would provide the best relative combination of the following four criteria: 1) be protective of human health and the environment; 2) attain media cleanup standards; 3) control the source(s) of releases to reduce or eliminate, to the extent practicable, further releases of hazardous waste (including hazardous constituents) that might

pose threats to human health or the environment; and 4) comply with applicable standards for waste management. Remedies may attain cleanup standards through various combinations of removal, treatment, engineering, and institutional controls.

To ensure the remedy chosen best meets the four criteria listed above, each potential remedy was assessed in the following areas:

- **Technical Performance:** Based on performance, reliability, implementability, and safety. Performance was evaluated on the effectiveness and useful life of the alternative. Reliability was evaluated based on the operation and maintenance requirements and the demonstrated reliability of the approach. The implementability of each potential remedy was measured by its constructability or ease of installation, operation and maintenance requirements, permitting requirements, and the time required for the measure to achieve a given performance. The safety of nearby communities as well as the safety of site workers was also evaluated. Table 1 shows the technical performance evaluation for each of the proposed remedies.
- **Environmental Concerns:** An environmental assessment was performed for each remedial alternative. This assessment focused on both the short- and long-term beneficial and adverse effects on the facility conditions and pathways of contamination addressed by each alternative. Table 2 shows the environmental concerns evaluation for each of the proposed remedies.
- **Human Health Concerns:** Each alternative was evaluated to assess the short- and long-term impacts on human health. Alternatives were evaluated to determine how each protects human health during and after implementation of the corrective measure. Table 2 shows the human health concerns evaluation for each of the proposed remedies.
- **Regulatory Compliance:** The effects of relevant Federal, State, and local regulations were assessed for each of the alternatives. Table 2 shows the regulatory compliance evaluation for each of the proposed remedies.
- **Cost:** BNSF developed preliminary capital and operating costs for each alternative. Capital costs include equipment purchase and installation, instrumentation and controls, site work, engineering, and utilities. Operating parameters include labor, utilities, materials, facility maintenance, analytical, and disposal costs. Table 1 shows the cost evaluation for each of the proposed remedies.

Determinations Made from the Selection Criteria

Technical Performance

DEQ's preferred alternative would effectively destroy contaminant mass through biological land treatment. Bioremediation is a preferred technology (presumptive remedy) for contaminated soils at wood-treating sites such as Paradise. Land treatment of creosote-impacted soil has been successfully accomplished at Paradise since the fall of 1989. Upon completion of biological treatment of impacted soil and backfilling of the excavated areas, the risk of exposure to impacted soil would be permanently reduced and minimized.

Reliability

DEQ's preferred remedy involves land treatment. Treatment has reduced the initial concentration of 9,800-mg/kg total PAHs applied to the LTU in 1989 by 99.9 percent. Operation of the LTU would include analytical sampling, tilling, irrigation, and fertilization at the frequency required by BNSF's hazardous waste permit. Failure of the LTU could allow exposure to impacted soil in the unit or allow the spread of impacts beyond the unit. However, the impacted soil is currently spread over several SWMUs. Placement of the impacted soils from SWMUs on the LTU would consolidate the contaminated surface soils to a more controlled area on the site. The volume of soil requiring treatment could exceed estimated volumes during excavation operations.

Implementability

There are no technical obstacles to the land treatment remedy preferred by DEQ since the LTU is already constructed and has successfully treated Paradise soil in the past. Regular agricultural operations, such as tilling and irrigation, and monitoring would be required as specified in BNSF's hazardous waste permit. Highly specialized equipment and personnel would not be required to implement land treatment. BNSF estimates that it will take 4 weeks to excavate the volume of soil necessary to meet industrial action levels and 15 weeks to excavate the volume of soil needed to meet residential action levels.

Safety

The implementation of DEQ's preferred alternative could impact the safety of nearby communities and site workers since impacted soil would be exposed and handled during remediation actions. However, some contaminated soil is already exposed on the surface of the SWMUs. Normal construction-site safety precautions would be necessary during remediation to ensure the safety of site workers and nearby residents.

Although exposure could potentially occur during remediation activities in the SWMUs, the site health and safety plan has been in use since 1989 to minimize potential exposure. LTU management and operations requirements in BNSF's hazardous waste permit are designed to minimize fugitive dust emissions to the local community.

A much larger volume of contaminated soil (20,000 cubic yards) was excavated at the site in 1985. The soil remained in a waste pile for approximately four years until it was placed on the newly permitted LTU in 1989. Air monitoring was performed at the site during excavation of the surface impoundment wastes from the waste pile and application of wastes to the LTU. Monitoring continued beyond the loading process and into the treatment (tilling) period. The air quality assessment showed that during the "worst case" emission period when loading and operating the LTU, emissions from the LTU were below the federal health standards for ambient air quality for particulate matter. In DEQ's preferred soil remedy, a much smaller volume of less contaminated soil (approximately 6,220 cubic yards) would be excavated for treatment. Any stockpiling of the excavated soil before treatment would be for a short duration. The new hazardous waste permit includes requirements for air quality monitoring during excavation and remediation of soils and during the application of remediation soils to the LTU. The permit also requires BNSF to implement dust control measures on the LTU and on roads used for transporting the contaminated soil to the LTU. These requirements are to ensure that BNSF creates no emissions that impact human health and the environment.

Environmental Concerns

DEQ's preferred alternative would reduce the surface soil contaminant mass, which will reduce the long-term environmental exposure.

Human Health Concerns

Implementation of DEQ's preferred alternative would have minimal short-term impacts on human health associated with remediation activities since soil would be exposed and handled. Land treatment of impacted soil from the SWMUs would destroy contaminant mass and remove the potential for long-term exposure from the soil.

Excavation of soils where the contamination is greater than the industrial action level of 40 ppm cPAH will also address most of the areas where the soil contamination exceeded the residential action level. Most of the areas that exceeded the residential action level of 20 ppm cPAH will be excavated because soils in the area also exceeded the industrial action level.

Regulatory Compliance

No regulatory compliance issues have been identified relative to implementation of DEQ's preferred alternative.

Cost

Capitol costs for DEQ's preferred alternative total \$483,530 for industrial action levels. Costs include excavation, land treatment, and backfill of impacted areas. Annual operating and maintenance costs are estimated at \$47,740 to \$64,740, depending on the year of operation. These totals include LTU operation, cover maintenance, institutional controls, and the prospective groundwater remedy, which will be proposed in a subsequent permit modification. Estimated present worth costs of \$1,535,548 are based on a total project life (operation and monitoring) of 30 years.

PUBLIC PARTICIPATION

DEQ and EPA have informed the public of the corrective action activities at the Paradise Site through a variety of outreach activities, including fact sheets and public meetings. The Agencies also have periodically briefed a local citizens group, which is called the Paradise Creosote Monitoring Committee (PCMC), on the status of the corrective action. Through this public comment, the DEQ is seeking input from the community on the preferred remedy and the cleanup

alternative described in this document. The public may also comment during a 45-day period on remedy alternatives not addressed in the CMS or this document. DEQ has set a public comment period from May 2, 2001 through June 15, 2001 to encourage public participation in the remedy selection process. The comment period includes a public meeting on May 23, 2001 at the Methodist Clubhouse in Paradise, Montana, at which DEQ will present the Statement of Basis, answer questions, and accept both oral and written comments.

DEQ will prepare a Response to Comments after reviewing oral and written comments. DEQ will then finalize this Statement of Basis and include both documents in the public record for the site. DEQ will announce the availability of the final Statement of Basis and Response to Comments to the local newspaper and to those on the site mailing list.

The selected remedy will be carried out under BNSF's hazardous waste permit once the permit is effective. Under the permit, BNSF will prepare a work plan called a Corrective Measures Implementation (CMI) Plan to address the details of the surface soil remedy. DEQ must approve the CMI Plan before BNSF can carry out the work.

REFERENCES

U.S. EPA, RCRA Facility Assessment for Burlington Northern Railroad Tie Treating Facility, April 1989.

U.S. EPA, Advance Notice of Proposed Rulemaking Federal Register (61 FR 19432), May 1, 1996.

U.S. EPA, Treatment Technology Performance and Cost Data for Remediation of Wood Preserving Sites, October 1997.

Retec, RCRA Facility Investigation Work Plan for the BN Paradise Tie Treating Facility, September 1991.

Retec, Baseline Risk Assessment, October 1993.

Retec, Final Phase I Report, RCRA Facility Investigation, BN Tie Treating Plant, Paradise, Montana, August 1994.

Retec, Final Phase II Report, RCRA Facility Investigation, BN Tie Treating Plant, Paradise, Montana, July 1996.

Retec, Corrective Measure Study Workplan, Paradise Tie Treating Plant, Paradise, Montana, June 1997.

ThermoRetec, RCRA Corrective Measures Study for Solid Waste Management Units, BNSF Paradise Tie Treating Plant, Paradise, Montana, July 12, 1999.

ThermoRetec, Letter to EPA Transmitting Updated Cost Table, August 20, 2000.

TABLE 1. TECHNICAL PERFORMANCE EVALUATION OF ALTERNATIVE SURFACE SOIL REMEDIES*

Alternative	Alternative Description	Performance	Reliability	Implementability	Short-Term Safety	Cost (total present worth)
1 No Further Action	Continue existing institutional controls	Poor Exposure potential for impacted soils	Poor	Very good No action required.	No issues for implementation	\$601,000
2 Clean Cover	Cover SWMUs; Backfill SWMU 10; Add institutional controls.	Good Soil exposure controlled	Good, but requires long-term maintenance	Very good, simple construction method. 4 weeks to excavate to industrial levels 7 weeks to excavate to residential levels	Very good, no soils handling	Industrial action level: \$919,000; residential: \$986,000
3 Thermal Desorption	Excavation and on-site thermal desorption; Backfill SWMU 10; Add institutional controls.	Very good Soil exposure source removed	Good, but complicated method and equipment	Good, requires thermal desorption contractor and permitting. 5 weeks to excavate to industrial levels 20 weeks to excavate to residential levels	Low, soils must be handled and emissions from treatment managed. High temperatures and complex equipment pose unique hazards.	Industrial action level: \$3,026,000; residential: \$11,602,000

4	Excavation and on-site land treatment; Backfill SWMU 10; Add institutional controls.	Good Soil exposure source moved to LTU and treated	Good, proven method, simple	Good, already implemented on site 4 weeks to excavate to industrial levels 15 weeks to excavate to residential levels	Good, soils must be handled, screening and farm equipment safety issues	Industrial action level: \$1,535,548; residential: \$3,772,000
5	Excavation and off-site disposal; Backfill SWMU 10; Add institutional controls.	Very good Soil exposure source removed to off-site facility	Good, simple method, limitations on permitted disposal facility	Off-site land disposal not feasible without exemption 4 weeks to excavate to industrial levels 15 weeks to excavate to residential levels	Good, soils handling and transport; does not include farming or screening equipment	Industrial action level: \$4,370,000; residential: \$17,483,000
6	Excavation and on-site land treatment SWMUs 7, 15, & 17; Cover SWMUs 12, 13, 18; Backfill SWMU 10; Add institutional controls.	Good Soil exposure source moved to LTU and treated or controlled	Good, proven simple methods; covers require maintenance	Good, already implemented on site, simple construction method 4 weeks to excavate to industrial levels 6 weeks to excavate to	Good, soils must be handled, screening and farm equipment safety issues	Industrial action level: \$1,158,000; residential: \$1,825,000

				residential levels		
7 Combination	Excavation and on-site land treatment SWMUs 7 & 17; Cover SWMUs 12, 13, 15, & 18; Backfill SWMU 10; Add institutional controls.	Good Soil exposure source moved to LTU and treated or controlled	Good, proven simple methods; covers require maintenance	Good, already implemented on site, simple construction method 4 weeks to excavate to industrial levels 6 weeks to excavate to residential levels	Good, soils must be handled, screening and farm equipment safety issues	Industrial action level: \$990,000; residential: \$1,375,000
8 Phyto-remediation	Cover (6") SWMUs 12, 13, & 18; Phyto-remediation for SWMUs 7, 12, 13, 15, 17, & 18.	Poor More exposure potential for impacted soils until degradation complete. Possible slow rate of degradation.	Low, failure possible due to range of environmental factors	Good, simple construction method, irrigation likely required Unknown time period to excavate to soil action levels	Very good, no soil handling	Residential action levels \$932,000

** Tables 1 & 2 are modified tables from the 1998 CMS*

TABLE 2. EXPOSURE CONCERNS EVALUATION OF ALTERNATIVE SURFACE SOIL REMEDIES*

Alternative	Alternative Description	Environmental Concerns	Human Health Concerns	Regulatory Compliance
1 No Further Action	Continue existing institutional controls	Allows exposure to impacted soils	No additional short-term exposure. Continued long-term exposure source.	Does not meet regulatory requirements.
2 Clean Cover	Cover SWMUs; Backfill SWMU 10; Add institutional controls.	Controls soil contact exposure pathway	No additional short-term exposure. Long-term exposure source covered.	Meets regulatory requirements. Requires institutional controls.
3 Thermal Desorption	Excavation and on-site thermal desorption; Backfill SWMU 10; Add institutional controls.	Removes soil exposure source	Potential short-term exposure from excavation and screening. No long term exposure source.	Meets regulatory requirements. Requires institutional controls and air permit.
4 Land Treatment	Excavation and on-site land treatment; Backfill SWMU 10; Add institutional controls.	Reduces soil exposure source	Potential short-term exposure from excavation and screening. No long term exposure source.	Meets regulatory requirements. Requires institutional controls.
5 Off-site Disposal	Excavation and off-site disposal; Backfill SWMU 10; Add institutional	Removes soil exposure source	Potential short-term exposure from excavation and screening. No long term exposure source.	Meets regulatory requirements. Requires institutional controls and air permit and exemption for

	controls.			disposal facility.
6 Combination	Excavation and on-site land treatment SWMUs 7, 15, & 17; Cover SWMUs 12, 13, 18; Backfill SWMU 10; Add institutional controls.	Reduces soil exposure source in SWMUs 7,15, & 17. Controls soil contact exposure pathway in SWMUs 12, 13, & 18.	Potential short-term exposure from excavation and screening. No long term exposure source if maintained.	Meets regulatory requirements. Requires institutional controls.
7 Combination	Excavation and on-site land treatment SWMUs 7 & 17; Cover SWMUs 12, 13, 15, & 18; Backfill SWMU 10; Add institutional controls.	Reduces soil exposure source in SWMUs 7 & 17. Controls soil contact exposure pathway in SWMUs 12, 13, 15 & 18.	Potential short-term exposure from excavation and screening. No long term exposure source if maintained.	Meets regulatory requirements. Requires institutional controls.
8 Phyto-remediation	Cover (6") SWMUs 12, 13, & 18; Phyto-remediation for SWMUs 7, 12, 13, 15, 17, & 18.	Limits exposure to impacted soil; unknown period of time required.	Potential short-term exposure during planting. Possible continued long-term exposure source.	Unknown whether regulatory requirements will be met. Requires institutional controls.

Attachment V.3
Statement of Basis for Groundwater Remedy Selection

Module IV – Facility-Wide Corrective Action
MTHWP-14-01
2014 Draft Permit Modification December 5, 2019
BNSF Railway Company – Former Tie Treating Plant, Paradise, MT

Attachment IV.3
~~October 17,~~

**STATEMENT OF BASIS and FACT SHEET
BNSF RAILWAY
PARADISE TIE TREATING PLANT SITE
PARADISE, MONTANA**

**MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
March 22, 2006**

OPPORTUNITY FOR PUBLIC INVOLVEMENT

*DEQ Announces Proposed Decision for Control of Contaminated Groundwater at the
Paradise Tie Treating Plant*

SITE INFORMATION LOCATION:

Plains Public Library
108 West Railroad
Plains, MT 59859

Montana Department of Environmental Quality
1520 East Sixth Street
Helena, MT 59620

SEND COMMENTS TO:

Ann Kron
Montana Department of Environmental Quality
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DECISION SUMMARY

The Montana Department of Environmental Quality (MDEQ) has prepared this Statement of Basis (SB) to describe a proposed remedy for groundwater contamination at the BNSF Railway Company (BNSF) former tie treating plant in Paradise, Montana (Paradise Site). The SB identifies the proposed remedy for contaminated groundwater and explains the rationale for selection. In addition, the document briefly describes all other remedies considered during the remedy evaluation process. MDEQ proposes to select a remedy for groundwater contamination that will include source control via pump-and-treat technology, monitored natural attenuation supported by an Alternate Concentration Limit (ACL), and land use controls. Requirements for the selected remedy are included in the proposed modification of BNSF's hazardous waste permit.

MDEQ is soliciting public comment on the remedy and modified BNSF hazardous waste permit (MTHWP-01-02) during a public comment period, (March 22 through May 5, 2006). During the public comment period, any interested person may request a public hearing. A request for a public hearing must be in writing and must state the nature of the issues proposed to be raised in the hearing. If a hearing is held, the DEQ will provide notice of the public hearing date at least thirty days prior to the hearing.

MDEQ is issuing this SB as a part of its public participation requirements under the Montana Hazardous Waste Act (MHWA). In addition, this document includes the fact sheet requirements in 40 Code of Federal Regulations (CFR) 124.8 as incorporated by reference in the Administrative Rules of Montana (ARM), Title, 17, Chapter 53, Subchapters 1 through 14.

1.0 LOCATION AND CURRENT USE

The Paradise Site is located approximately three-quarters of a mile northwest of the town of Paradise and five miles south of the town of Plains. Paradise is the only population center within five miles. The site is south of Highway 200, on the northern bank of the Clark Fork River. BNSF and its predecessors owned the property between the river and the primary railroad tracks at the time of tie treating operations. The following areas of the site are currently regulated by a hazardous waste permit issued by MDEQ: an active Corrective Action Management Unit (CAMU) which includes a product recovery system and active land treatment unit (LTU), a closed surface impoundment, and a closed waste pile unit.

2.0 BACKGROUND

2.1 Operation

The Paradise Site tie treating plant operated from 1908 to 1982. Creosote was the only wood preservative known to have been used at the plant. Creosote is produced from coal tar and is a mixture of hundreds of compounds, primarily semi-volatile organic compounds. Polynuclear aromatic hydrocarbons (PAHs) are semi-volatile organic compounds that generally account for 85 percent (by weight) of creosote.

Railroad ties were treated with creosote at elevated pressures and temperatures in the treatment building. Wastewater from the plant was discharged through a buried pipe into a surface impoundment located southwest of the plant site. The impoundment is a former channel of the Clark Fork River and was used during plant operations as a settling basin for recovery and reuse of creosote.

Freshly treated ties were transported to the drip track area west of the treatment building. The drip track area consisted of two parallel rows of narrow-gauge tracks and was approximately 1,000 feet in length and 60 feet wide. Freshly treated ties were allowed to drip onto the underlying track and soils. The depress track, south of the drip track, was used to bring in locomotives and cars to remove the treated ties.

2.2 Hazardous Waste Permits

The State of Montana issued a hazardous waste permit to BNSF in 1988 to allow storage of hazardous waste in an on-site waste pile unit, and to allow treatment of contaminated soil in an on-site land treatment unit. In addition, the Environmental Protection Agency (EPA) issued BNSF a permit under the Hazardous and Solid Waste Amendments to RCRA which requires hazardous waste permitted facilities to conduct facility-wide corrective action. The EPA permit required that BNSF conduct remedial investigation and cleanup of contaminated areas throughout the facility. In 2000, MDEQ obtained oversight for facility-wide corrective action from EPA. Hazardous waste permits (both state and federal) are issued for a ten-year period and may be renewed at the end of that period. The BNSF hazardous waste permit was reissued by MDEQ in 2001 and includes requirements for the operation of a CAMU which consists of a product recovery system and the land treatment unit; continued maintenance of the closed surface impoundment and waste pile; and facility-wide corrective action. The permit also includes requirements to establish an Alternate

Concentration Limit (ACL), a groundwater mixing zone, and land use controls that restrict the use of groundwater.

2.3 Soil Contamination

In 1989, EPA identified 22 potentially contaminated areas which required some degree of investigation and remediation. The areas were designated as Solid Waste Management Units (SWMUs) or Areas of Concern (AOCs). SWMU/AOC closure was completed in 2002 with the excavation of the top 2 feet of SWMU/AOC surface soil containing hazardous constituents with concentrations exceeding an industrial risk-based standard. Excavated areas were backfilled with clean fill and seeded; excavated soil was placed on the LTU for treatment.

2.4 Groundwater Contamination

Subsurface Geology

Geologic studies of the site have defined three laterally continuous stratigraphic units beneath the site. The uppermost unit, Zone I, is a silty soil averaging four feet in thickness. Zone II, a well-graded sand and gravel layer varying between 15 to 60 feet thick, contains a water-table aquifer. Zone II is underlain by Zone III and is a clayey silt combined with fine silty sand. The top of Zone III is considered the base of the water-table aquifer. Groundwater is encountered between 15 and 25 feet below ground surface.

Characteristics of Creosote in the Subsurface

Creosote is a dense non-aqueous phase liquid (DNAPL); when creosote is released to subsurface soils it migrates downward and slightly outward. After reaching the water table, creosote will continue to migrate downward because it has a density slightly greater than water. Since most of the constituents in creosote are essentially insoluble, creosote usually remains as a separate liquid phase (free phase) when it is in contact with groundwater. Additionally, the rate of free phase creosote movement is many times slower than that of water.

The subsurface conditions at the Paradise site have been investigated through extensive groundwater monitoring and on-going corrective action soil characterizations. Monitoring has determined that groundwater has been impacted by creosote constituents in dissolved phase, residual phase, and free phase. BNSF installed alternate municipal water supply wells for the Town of Paradise in 1987. Figure 1 is a map of the dissolved phase and free phase PAH plumes

found in the subsurface at the Paradise Site.

Dissolved Phase PAH's

Groundwater data indicate that the dissolved PAH plume fluctuates throughout the year, but generally has not increased in size since the initiation of monitoring in 1986. The observed static extent of the PAH plume and the distribution of dissolved oxygen concentrations suggest that intrinsic biodegradation is occurring in the aquifer. Monitoring wells continue to be sampled at the Paradise Site to ensure dissolved phase PAHs are not increasing in concentrations or migrating off site.

Residual Creosote

As the creosote migrates downward in the subsurface some of it becomes trapped in the soil pore spaces as residual saturation. Creosote at residual saturation will not flow to a recovery well and cannot be removed from the soil pores by groundwater pumping. Residual creosote at the Paradise site is estimated at 1,050,000 gallons.

Free Phase Creosote

Extensive mapping of the top of Zone III formation indicates free phase creosote has collected in localized depressions on the top of this impermeable zone. Any additional movement of free phase on the top of Zone III will tend to be towards these depressions. In 1996, BNSF began removal of free-phase creosote from the groundwater in the former treatment area and the southeast portion of the surface impoundment. Free phase creosote at the Paradise Site is estimated at 94,000 gallons.

2.5 Impacts to the Clark Fork River

Groundwater monitoring and sediment sampling near the Clark Fork River have demonstrated that subsurface contamination does not appear to impact the river.

3.0 REMEDIATION TREATMENT TECHNOLOGY EVALUATION

In 1992, BNSF conducted a Surface Impoundment Corrective Measures Study (SICMS) which extensively evaluated groundwater treatment technologies that could address residual and free phase creosote at the Paradise Site. The SICMS recommended removal of recoverable free phase creosote via pump-and-treat and modification of the Groundwater Protection Standard (GWPS) to risk-based levels through an Alternate Concentration Limit (ACL). Pump-and-treat was installed in 1996 as an interim measure and BNSF submitted an ACL petition in 1992. The ACL petition went through several discussions and further research before being finalized, as explained in

section 5.0 of this document. Below is a brief description of each evaluated technology in the SICMS.

3.1 Flushing Technologies

Flushing technologies are used to enhance recovery of residual and free phase creosote in the subsurface. In hot water flushing, the oily waste is mobilized by controlled heating and is displaced to recovery wells by sweeping the oily waste accumulation with hot water. The chemically enhanced flushing methods use injection of a surfactant, alkali, or alcohol, followed by recovery of the contaminant and subsequent flushing of residual additive.

Flushing technologies, regardless of their level of aggressiveness, would leave residual creosote in place in the source zone as a continuing PAH source to groundwater. In addition, the more aggressive and innovative techniques raised the potential risk of increasing the concentration and transport of soluble-phase constituents. The SICMS concluded that hot-water flushing of creosote would require a containment system to ensure complete capture of all mobilized DNAPL and dissolved constituents.

Flushing calculations and simulations found that flushing technologies did not provide any quicker recovery of creosote than biodegradation. Creosote removal through biodegradation is estimated to take 300 years.

3.2 In Situ Bioremediation and Aquifer Aeration

In situ bioremediation is a process for enhancing the growth and activity of aerobic bacteria by controlled introduction and transport of an oxygen source and water-soluble nutrients. Aquifer aeration is similar to in situ bioremediation except that it does not involve the addition of nutrients.

Based on the limited data available for wood preserving sites, the effectiveness of in situ bioremediation and aquifer aeration is difficult to predict. While enhanced in situ bioremediation would be effective in reducing the boundaries of the dissolved phase contaminant plume, it would not remove or reduce the source of contamination. Enhanced in situ bioremediation would only be effective during system operation. If the system was turned off, the plume would return to its steady state condition. Due to the time required to biodegrade residual creosote in the subsurface,

long-term operation (>300 years) would be required to maintain reduction of the dissolved phase plume.

3.3 Containment Technologies

Physical containment technologies evaluated included a slurry wall, grout curtain, and sheet piling. These physical containment technologies most likely would require the use of another engineered process, such as recovery wells, to prevent groundwater mounding inside the area enclosed by the barrier. The hydraulic containment technologies evaluated were groundwater recovery and injection wells, and an interceptor trench/french drain system. Hydraulic containment is designed only to prevent further migration of contaminated groundwater with minimal removal of contamination from the source zone.

In general, the SICMS determined that containment technologies were ineffective in reliably containing migration of PAHs, were of excessively large size, and/or were considered unnecessary. Physical containment barriers could not be effectively anchored to the underlying less permeable silt. The uneven surface of the top of the Zone III silt layer and the limited permeability would still potentially allow some dissolved PAHs and/or DNAPL to migrate beneath the barrier. Sheet piles and grout curtains would not be constructable in the cobble-rich gravelly subsurface materials.

Groundwater pumping for containment would be impractical due to the excessively high groundwater volumes that would be produced. Groundwater modeling results indicate that under average groundwater flow conditions the volume of water that must be pumped would be at least 1,008,000 gallons per day.

Based on the above determinations, containment technologies were considered technically impractical.

3.4 Source Removal

Source removal would involve either product recovery operations in the form of pump and treat to remove recoverable creosote, or excavation of source materials from the aquifer.

Pump and Treat

Free phase creosote removal through pump-and-treat is a proven technology that has been

implemented at many wood treating sites. Due to the capillary forces in the subsurface and the nature of creosote, the recoverable fraction of the source is estimated to be less than 6% of the total mass of creosote in the subsurface. Resultantly, free phase creosote removal will not have a significant impact on groundwater quality or lessen the estimated 300 years remediation time frame for natural attenuation. However, product recovery ranked high in overall performance and implementability and was retained as part of the proposed groundwater corrective action. A network of product recovery wells have been operating in the surface impoundment since 1996. In the former treatment area, a reciprocating pump was installed in 1996 for removal of free phase product.

Excavation

Removal of source materials would require excavation to depths of 45 to 50 feet below ground surface, the majority of which is below the water table. Site characteristics (groundwater flow direction, velocity, size of material and contaminant characteristics) would determine the method and equipment used for excavation. Groundwater control during excavation would require containment of the excavation areas and dewatering prior to excavation. The SICMS evaluated the use of sheet piles for containment of excavation areas in the surface impoundment and this technology would be applicable to the areas of excavation in the SWMUs. Production wells would be required to dewater the excavated area and the high water yields would require a large water treatment system. On-site thermal treatment of the excavated material would be required due to the high concentration of hazardous constituents. For these reasons excavation was considered technically impractical and was not carried further in the evaluation.

3.5 Summary Of Technology Evaluation

The SICMS concluded that natural attenuation coupled with product recovery was the most viable approach for groundwater remediation at the Paradise site. Based on the evaluations of time frames, the SICMS also determined that approaches using in situ treatment methods did not guarantee groundwater would be treated any faster than by naturally occurring processes.

Restoration of the site groundwater to drinking water quality cannot be accomplished within a reasonable time frame because residual creosote present in the subsurface cannot be entirely removed. Therefore, groundwater restoration is technically infeasible.

4.0 GROUNDWATER REMEDIATION TIME FRAMES AND RECOVERABLE CREOSOTE

Remediation time frames are controlled by three basic considerations: free DNAPL recovery, flushing of residual DNAPL, and biodegradation. When biodegradation was taken into account for all evaluated technologies, the remediation time frames were about 300 years for all potential groundwater corrective action alternatives. This highlights the conclusion that a combination of free phase creosote DNAPL recovery and natural attenuation will achieve the groundwater remediation goals in about the same time frame as any other combination of technologies.

The rate of free DNAPL recovery is controlled by two considerations: the volume of recoverable free DNAPL and the rate of recovery. The contribution of the recoverable DNAPL to the total creosote mass in the subsurface is quite small (2 to 6 percent). The estimated maximum volumes of recoverable creosote at the Paradise Site are 8,500 gallons from the surface impoundment area (out of an estimated 494,000 gallons), and 38,500 gallons from the former treatment area (out of an estimated 650,000 gallons). Actual recoverable volumes may be significantly less due to undulations in the Zone III surface, truncation of the creosote pools, technological/engineering limitations, and the highly viscous nature of the creosote. Therefore, no significant decrease in total remediation time is achieved by removing the recoverable DNAPL in a short time period.

5.0 ALTERNATE CONCENTRATION LIMIT

Alternate Concentration Limits (ACLs) are risk-based groundwater levels that are created when it is impracticable or impossible to achieve the existing groundwater protection standards.

Specifically, ACLs are contaminant concentrations that, based on a site specific risk assessment, have been determined to not pose a substantial hazard to human health or environmental receptors (given exposure pathways and other factors). At the Paradise Site, given the nature of creosote, it is technically impractical to achieve the existing groundwater protection standards..

In 1992 BNSF submitted an Alternate Concentration Limit (ACL) Variance Petition to request an ACL using risk-based levels. Based on comments from the MDEQ and EPA, BNSF conducted a human health risk assessment as part of a 1996 supplemental ACL petition. The risk assessment developed allowable exposure concentrations (AECs) for PAHs in groundwater using a residential ingestion exposure scenario. In the 2001 permit reissuance, MDEQ required BNSF to complete the

ACL petition for MDEQ approval. BNSF provided a supplemental ACL petition, which was finalized in 2004.

A network of monitoring wells was then selected to evaluate PAH concentrations in the groundwater with respect to the site-specific AECs. Point of Exposure (POE) monitoring wells were proposed along the boundary of the Site. The POE monitoring wells are the point in which the established AECs cannot be exceeded. Groundwater samples will be taken from the POE wells semi-annually and analyzed to ensure PAH concentrations do not exceed the established AECs. Point of compliance (POC) wells were proposed in locations inside the Paradise Site that have had detectable levels of PAHs and low levels of dissolved oxygen, indicating they are all within the zone where biodegradation is occurring. Groundwater samples will be taken from the POC wells annually and analyzed to ensure PAH concentrations are not showing a statistically significant increase in concentrations. Locations of the POE and POC wells are presented in Figure 2. In addition, the Montana Department of Natural Resources has delineated a controlled groundwater use area to ensure that withdrawals of groundwater do not alter the distribution of dissolved PAHs.

The MDEQ has modified BNSF's permit to include requirements for the ACL. MDEQ is also soliciting public comment at this time for the proposed permit modification language.

6.0 LAND USE CONTROLS

In the proposed permit modification, MDEQ specifies requirements for establishing land use controls to further ensure prevention of potential future exposure to contamination. Required land use controls include compliance with the DNRC Controlled Groundwater Use Area designation, deed restrictions, restrictive covenants, an actual notice to any potential successors of the title in the property, engineering controls, notice to government authority prior to any land transaction, and annual land use control notification to MDEQ.

7.0 PUBLIC PARTICIPATION

In the past, MDEQ and EPA have informed the public of the corrective action activities at the Paradise Site through a variety of outreach activities, including fact sheets and public meetings. The Agencies also have periodically briefed a local citizens group, the Paradise Creosote Monitoring Committee (PCMC), on the status of the corrective action.

MDEQ is seeking input from the community on the selected groundwater remedy described in this SB. MDEQ has set a public comment period from March 22, 2006 through May 5, 2006 to encourage public participation in the remedy selection process. During the public comment period, any interested person may request a public hearing. A request for a public hearing must be in writing and must state the nature of the issues proposed to be raised in the hearing. The MDEQ will provide notice of the public hearing date at least thirty days prior to the hearing.

DEQ will prepare a Response to Comments after reviewing oral and written comments. DEQ will then finalize this Statement of Basis and include both documents in the public record for the site. DEQ will announce the availability of the final Statement of Basis, Final Permit Modification Language, and Response to Comments to the local newspaper and to those on the site mailing list.

The selected remedy will be carried out under BNSF's hazardous waste permit once the permit modification is effective.

**Attachment V.4
RCRA Facility Investigation (RFI)
Scope of Work**

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RCRA Facility Investigation Scope of Work

1.0. Purpose

The purpose of the RCRA Facility Investigation (RFI) is to characterize contamination at the facility and evaluate potential risks of that contamination to human health and the environment. Components of the characterization include describing the environmental setting; defining contamination sources (source characterization), determining the degree, and extent of any release of hazardous constituents (contamination characterization); identifying actual or potential receptors; and determining associated risks to human health and the environment. The RFI Work Plan must be developed based on Condition III.E. and should include the framework provided in this Attachment.

Respondent should establish preliminary facility-specific objectives for corrective action. Objectives should be based on public health and environmental criteria, information expected to be gathered during the RFI, EPA guidance, and the requirements of any applicable federal and state statutes.

The RFI investigations should result in data of adequate technical content and quality to support the development and evaluation of the corrective measures alternative(s) during the Corrective Measures Study, or to determine no further action is necessary.

2.0. Components

2.1. *Environmental Setting*

Information to supplement and/or verify existing information on the environmental setting at the facility should be collected. The following should be characterized as they relate to identified sources, pathways and areas of releases of hazardous constituents from the solid waste management units (SWMUs) and areas of concern (AOCs).

2.1.1. Hydrogeology

The hydrogeologic conditions at the facility should be evaluated. This evaluation should provide the following information:

2.1.1.1. A description of the regional and facility specific geologic and hydrogeologic characteristics affecting groundwater flow beneath the facility, including:

- Regional and facility specific stratigraphy; description of strata including strike and dip, identification of stratigraphic contacts;
- Structural geology; description of local and regional structural features (e.g., folding, faulting, tilting, jointing, etc.);
- Depositional history;
- Regional and facility specific groundwater flow patterns;
- Identification, characterization, and quantification of recharge and discharge areas;

- Characterization of seasonal and temporal variations in the groundwater flow regime; and
 - A map drawn at an appropriate scale to show the location of SWMUs and AOCs in Attachment III.1.
- 2.1.1.2. An analysis of any topographic features that might influence the groundwater flow system.
- 2.1.1.3. Based on field data, tests, and cores, a representative and accurate classification and description of all hydrogeologic units which may be part of the migration pathways at the facility (i.e., the aquifers and any intervening saturated and unsaturated units), including:
- Hydraulic conductivity and porosity (total and effective);
 - Lithology, grain size, sorting, degree of cementation;
 - An interpretation of hydraulic interconnections between saturated zones; and
 - The attenuation capacity and mechanisms of the natural earth materials (e.g., ion exchange capacity, organic carbon content, mineral content, etc.).
- 2.1.1.4. Based on field studies and cores, structural geology and hydrogeological cross sections showing the extent (depth, thickness, and lateral extent) of hydrogeologic units which may be part of the migration pathways identifying:
- Sand and gravel deposits in unconsolidated deposits;
 - Zones of fracturing or channeling in consolidated or unconsolidated deposits;
 - Zones of higher permeability or lower permeability that might direct and restrict the flow of contaminants;
 - The uppermost aquifer: geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs; and
 - Water bearing zones above the first confining layer that may serve as a pathway for contaminant migration including perched zones of saturation.
- 2.1.1.5. Based on data obtained from groundwater monitoring wells and piezometers installed upgradient and downgradient from the potential contaminant sources, a representative description of water level or fluid pressure monitoring including:
- Water level contour and/or potentiometric maps;
 - Hydrologic cross sections showing vertical gradients and thickness of immiscibles and/or other known contaminants;
 - The flow system, including the vertical and horizontal components of flow; and
 - Any temporal changes in hydraulic gradients, for example, due to seasonal influences.
- 2.1.1.6. A description of manmade influences that may affect the hydrogeology of the site, including Interim Measure units or structures, identifying:

- Active and inactive local water supply and production wells with an approximate schedule of pumping; and
- Manmade hydraulic structures (pipelines, french drains, ditches, unlined ponds, septic tanks, NPDES outfalls, retention areas, etc.).

2.1.1.7. A description of the local geology and potential contaminant migration pathways. These should be determined by an appropriate number of borings and boring spacing. Borings should be located so that reasonably accurate cross-sections can be constructed.

2.1.2. Soils

Soil and rock units above the water table in the vicinity of contaminant release(s) should be characterized. Such characterization must include, but not be limited to, the following activities and information, as appropriate:

- SCS soil classification;
- Surface soil distribution;
- Soil profile, including ASTM classification of soils;
- Transects of soil stratigraphy;
- Hydraulic conductivity (saturated and unsaturated);
- Relative permeability;
- Bulk density;
- Porosity;
- Soil sorption capacity;
- Cation exchange capacity (CEC);
- Soil organic content;
- Soil pH;
- Particle size distribution;
- Depth of water table;
- Moisture content;
- Effect of stratification on unsaturated flow;
- Infiltration;
- Evapo-transpiration;
- Storage capacity;
- Vertical flow rate;
- Mineral content; and
- Redox potential (Eh).

2.1.3. Surface Water and Sediment

Surface water bodies in the vicinity of the facility should be characterized. Such characterization should include, but not be limited to, the following activities and information:

- 2.1.3.1. Description of the temporal and permanent surface water bodies including:
- For impoundments: location, elevation, surface area, depth, volume, freeboard,

and construction and purpose;

- For streams, ditches, and channels: location, elevation, flow, velocity, depth, width, seasonal fluctuations, flooding tendencies (i.e., 100 year event), discharge point(s), and general contents;
- For lakes and estuaries: location, elevation, surface area, inflow, outflow, depth, temperature stratification, and volume;
- Drainage patterns; and
- Evapo-transpiration rate.

2.1.3.2. Description of the chemistry of the natural surface water and sediments. This includes determining the pH, total dissolved solids, total suspended solids, biochemical oxygen demand, alkalinity, conductivity, dissolved oxygen profiles, nutrients, chemical oxygen demand, total organic carbon, specific contaminant concentrations, etc.

2.1.3.3. Description of sediment characteristics including:

- Deposition area;
- Thickness profile; and
- Physical and chemical parameters (e.g., grain size, density, organic carbon content, ion exchange capacity, pH, etc.)

2.1.4. Air

Information characterizing the climate in the vicinity of the facility should be provided in the RFI Report. Such information should include, but not be limited to:

2.1.4.1. A description of the following parameters:

- Annual and monthly rainfall averages;
- Monthly temperature averages and extremes;
- Wind speed and direction;
- Relative humidity/dew point;
- Atmospheric pressure;
- Evaporation data;
- Development of inversions; and
- Climate extremes that have been known to occur in the vicinity of the facility, including frequency of occurrence.

2.1.4.2. A description of topographic and man-made features which affect air flow and emission patterns, including:

- Ridges, hills or mountain areas;
- Canyons or valleys;
- Surface water bodies (e.g. rivers, lakes, bays, etc.);

- Wind breaks and forests; and
- Buildings.

2.2. *Source Characterization*

To the degree possible without undue safety risks, analytical data should be collected to completely characterize the wastes and the areas where wastes have been placed, collected, or removed. The characterization should include type, quantity, physical form, disposition (containment or nature of deposits), and facility characteristics affecting release (e.g., facility security, and engineering barriers). Procedures used in making the following determinations should be documented. The source characterization should include quantification of the following specific characteristics, at each source area:

2.2.1. Unit/Disposal Area Characteristics

- Location of unit/disposal area;
- Type of unit/disposal area;
- Design features;
- Operating practices (past and present);
- Period of operation;
- Age of unit/disposal area;
- General physical conditions; and
- Method used to close the unit/disposal area.

2.2.2. Waste Characteristics

2.2.2.1. Type of wastes placed in the unit;

- Hazardous classification (e.g., flammable, reactive, corrosive, oxidizing or reducing agent);
- Quantity; and
- Chemical composition.

2.2.2.2. Physical and chemical characteristics such as:

- Physical form (solid, liquid, gas);
- Physical description (e.g., powder, oily sludge);
- Temperature;
- pH;
- General chemical class (e.g., acid, base, solvent);
- Molecular weight;
- Density;
- Boiling point;
- Viscosity;
- Solubility in water;
- Cohesiveness of the waste;
- Vapor pressure; and
- Flashpoint.

2.2.3. Migration and Dispersal Characteristics of the Waste

Procedures used in making the following determinations should be documented.

- Sorption capacity;
- Biodegradability, bioconcentration, biotransformation;
- Photodegradation rates;
- Hydrolysis rates; and
- Chemical transformations.

2.3. *Characterization of Releases of Hazardous Constituents*

Analytical data should be collected on groundwater, soils, surface water, sediment, subsurface gas, and air contamination in the vicinity of the facility in accordance with the Sampling and Analysis Plan. These data should be sufficient to define the extent, origin, direction, and rate of movement of contamination. Data should include time and location of sampling, media sampled, concentrations found, conditions during sampling, and the identity of the individuals performing the sampling and analysis.

The following types of contamination at the facility should be addressed:

2.3.1. Groundwater Contamination

A groundwater investigation to characterize any plumes of contamination at the facility should be conducted. Procedures used in making all determinations (e.g., well design, well construction, geophysics, modeling, etc.) should be documented.

The groundwater investigation should provide at a minimum the following information:

- A description of the horizontal and vertical extent of any plume(s) of hazardous constituents originating from or within the facility;
- The horizontal and vertical direction of contaminant movement;
- The velocity of contaminant movement;
- The horizontal and vertical concentration profiles of hazardous constituents in the plume(s);
- An evaluation of factors influencing the plume movement;
- An extrapolation of future contaminant movement; and
- All available monitoring data including sampling locations.

2.3.2. Soil Contamination

An investigation to characterize the contamination of the soil and rock units above the saturated zone in the vicinity of any contaminant release should be conducted.

Procedures used in making the following determinations should be documented. The investigation should include the following information:

- A description of the vertical and horizontal extent of contamination;
- A description of appropriate contaminant and soil chemical properties within the contaminant source area and plume. This should include contaminant solubility, speciation, adsorption, leachability, exchange capacity, biodegradability, hydrolysis, photolysis, oxidation and other factors that might affect contaminant migration and transformation;
- Specific contaminant concentrations;
- The velocity and direction of contaminant movement; and
- An extrapolation of future contaminant movement.

2.3.3. Surface Water and Sediment Contamination

A surface water investigation to characterize contamination in surface water bodies resulting from releases of hazardous constituents at the facility should be conducted. The investigation should include, at a minimum, the following information:

- A description of the horizontal and vertical extent of any plume(s) originating from the facility, and the extent of contamination in underlying sediments;
- The horizontal and vertical direction of contaminant movement;
- Contaminant velocity;
- An evaluation of the physical, biological and chemical factors influencing contaminant movement;
- An extrapolation of future contaminant movement; and
- A description of the chemistry of the contaminated surface waters and sediments. This includes determining the pH, total dissolved solids, and contaminant concentrations, at a minimum. Analytical methods used to obtain the data should be specified.

2.3.4. Air Contamination

An investigation to characterize particulate and gaseous releases of hazardous constituents into the atmosphere should be conducted. Procedures used in making the following determinations should be documented. This investigation should provide the following information, if appropriate:

- A description of the horizontal and vertical direction and velocity of contaminant movement;

- The rate and amount of the releases; and
- The chemical and physical composition of the contaminant(s) released, including horizontal and vertical concentration profiles.

2.3.5. Subsurface Gas Contamination

An investigation to characterize subsurface gases emitted from buried hazardous wastes and constituents in the subsurface should be conducted. The investigation should include, but not be limited to, the following information:

- Horizontal and vertical concentration profiles of the subsurface gases being emitted;
- The chemical composition of the gases being emitted; and
- The rate, amount and density of the gases being emitted.

2.4. *Potential Receptors*

Data describing the human populations and environmental systems that are susceptible to contaminant exposure from the facility should be collected. Chemical analysis of biological samples and/or data on observable effects in ecosystems should also be obtained as appropriate. The following characteristics should be identified:

2.4.1. Current local uses and planned future uses of groundwater:

- Type of use (e.g., drinking water source: municipal or residential, agricultural, domestic/non-potable, and industrial);
- Location of groundwater users, to include withdrawal and discharge wells, within one mile of the affected area; and
- The aquifer or hydrogeologic unit used and/or affected by the current and planned future local uses.

2.4.2. Current local uses and planned future uses of surface waters directly affected by the facility:

- Domestic and municipal (e.g., potable and lawn/gardening watering);
- Recreational (e.g. swimming, fishing);
- Agricultural;
- Industrial; and
- Environmental (e.g., fish and wildlife propagation).

2.4.3. Human use of or access to the facility and adjacent lands, including but not limited to:

- Recreation;
- Hunting;

- Residential;
- Commercial;
- Relationship between population locations and prevailing wind direction; and
- The potential impact on human health including demography, groundwater and surface water use and land use.

2.4.4. A general description of the biota in surface water bodies on, adjacent to, or affected by, the facility.

2.4.5. A general description of the ecology within the area adjacent to the facility.

2.4.6. A general demographic profile of the people who use or have access to the facility and adjacent land, including, but not limited to; age, sex, and sensitive subgroups.

2.4.7. A description of any known or documented endangered or threatened species near the facility.

2.5. *Investigation Analysis*

An analysis and summary of all facility investigations and their results should be prepared. This task should be adequate to ensure that the investigation data are sufficient in quality (e.g., quality assurance procedures have been followed) and quantity to describe the nature and extent of contamination, potential threat to human health and/or the environment, and to support a Corrective Measures Study. The Investigation Analysis should include:

2.5.1. Data Analysis

All facility investigation data should be analyzed and evaluated. A summary should be developed detailing the type and extent of contamination at the facility, including sources and migration pathways. The summary should describe the extent of contamination (qualitative/quantitative) in relation to background levels indicative for the area.

2.5.2. Baseline Risk Assessment

A baseline risk assessment should be developed, incorporating the elements listed in the "Outline for Baseline Risk Assessment" contained in Attachment C of this Order.

2.6. *Laboratory and Bench-Scale Studies*

Laboratory and/or bench scale studies should be conducted, if necessary, to determine the applicability of a corrective measure technology or technologies to facility conditions. Respondent should analyze the technologies, based on literature review, vendor contracts, and past experience to determine the testing requirements.

If such studies are to be implemented, a testing plan should be developed identifying the type(s) and goal(s) of the study(ies), the level of effort needed, and the procedures to be used for data management and interpretation.

Upon completion of the testing, testing results should be evaluated to assess the technology or technologies with respect to site-specific questions identified in the test plan. A report summarizing the testing program and its results, both positive and negative should be prepared for submission to the Department.

3.0. Description of Current Conditions

The Current Conditions Report provides background information pertinent to the facility. The Current Conditions Report may be submitted with the RFI Work Plan or in a separate document. The data gathered during any previous investigations or inspections and other relevant data should be included, along with a discussion of the quality of the data.

3.1. *Nature and Extent of Contamination*

Respondent's report should describe the existing information on the nature and extent of contamination with regard to the units and areas of concern which are the subject of the RFI Work Plan.

3.1.1. Respondent's report should summarize all possible source areas of contamination. For each area, Respondent should identify the following, to the extent that information is available:

- Location of unit/area (which must be depicted on a facility map);
- Quantities of solid and hazardous wastes;
- Hazardous waste or constituents, to the extent known; and
- Identification of areas where additional information is necessary.

3.1.2. The Current Conditions Report should provide an assessment and description of the existing degree and extent of contamination. The assessment should include:

- Available monitoring data and qualitative information on locations and levels of contamination at the facility;
- All potential migration pathways including information on geology, pedology, hydrogeology, physiography, hydrology, water quality, meteorology, and air quality; and
- The potential impact(s) on human health and the environment, including demography, groundwater and surface water use, and land use.

4.0. RFI Work Plan

The RFI work plan must meet the requirements of this Order and should include elements outlined in this Attachment. The work plan should also include preliminary interim and final objectives for the facility and for the RFI. Other pertinent EPA guidance may be used in work plan development.

4.1. *Project Management Plan*

The Project Management Plan should include a discussion of the technical approach, schedules, budget, and personnel. The Project Management Plan should also include a description of qualifications of personnel performing or directing the RFI, including contractor personnel. This plan should also document the overall management approach to the RCRA Facility Investigation. Objectives for the RFI should be developed

4.2. *Sampling and Analysis and Quality Assurance Plans (SAP/QAP)*

All sampling and analysis should be conducted in accordance with the SAP/QAP. All sampling locations should be documented in a log and identified on a detailed site map.

The SAP/QAP should document all monitoring procedures including, but not limited to, the sampling and analytical procedures to be performed during the investigation to characterize the environmental setting, source, and releases of hazardous constituents, so as to ensure that all information and data are valid and properly documented. The sampling strategy and procedures should be in accordance with the *Characterization of Hazardous Waste Sites, a Methods Manual: Volume II, Available Sampling Methods*, EPA-600/4-84-076; *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)*, (third edition, 1986 and most recent updates); or other EPA approved methods. In accordance with Module III, Respondent should include in the RFI work plan justifications for deviations from these references.

The SAP/QAP should include the following:

4.2.1. Data Collection Strategy

4.2.1.1. A description of the intended uses for the data and the necessary level of precision and accuracy for these uses;

4.2.1.2. A description of the methods and procedures to be used to assess the precision, accuracy and completeness of the data;

4.2.1.3. A description of the rationale used to assure that the data accurately and precisely represent characteristics of a population, parameter variations at a sampling point, a process condition or an environmental condition. Examples of factors which should be considered and addressed include:

- Environmental conditions at the time of sampling;
- Number of sampling points;
- Representativeness of selected media; and
- Representativeness of selected analytical parameters.

4.2.1.4. A description of the measures to be taken to assure that the following data sets are comparable:

- RFI data generated by Respondent;
- RFI data generated by an outside laboratory or consultant versus data generated by Respondent; and
- Data generated by separate consultants or laboratories.

4.2.1.5. Details relating to the schedule and information to be provided in quality assurance reports, including:

- Periodic assessment of measurement data accuracy, precision, and completeness;
- Results of performance audits;
- Results of system audits;
- Significant quality assurance problems and recommended solutions; and
- Resolutions of previously stated problems.

4.2.2. Sampling Strategy

The sampling strategy should incorporate the following:

- Selecting appropriate sampling locations, depths etc.;
- Providing a statistically significant number of sampling sites;
- Obtaining all necessary ancillary data;
- Determining conditions under which sampling should be conducted;
- Determining which media are to be sampled (e.g., groundwater, air, soil, sediment, subsurface gas);
- Determining which parameters are to be measured and where and documenting the rationale for parameter selection;
- Selecting the frequency of sampling and length of sampling period;
- Selecting the types of samples (e.g., composites vs. grabs) and number of samples to be collected; and
- Preventing contamination of the sampling equipment and cross contamination between sampling points.

4.2.3. Sampling Procedures

4.2.3.1. Documenting sampling operations and procedures, including:

- Procedures for preparation of reagents or supplies which become an integral part

- of the sample (e.g., filters, preservatives, and absorbing reagents);
- Procedures and forms for recording the exact location and specific considerations associated with sample acquisition;
- Specific sample preservation methods;
- Calibration of field instruments;
- Collection of replicate samples;
- Submission of field-based blanks, where appropriate;
- Potential interferences present at the facility;
- Construction materials and techniques associated with monitoring wells and piezometers;
- Field equipment listing and sampling containers;
- Sampling order; and
- Decontamination procedures.

4.2.3.2. Selecting appropriate sample containers;

4.2.3.3. Sample preservation; and

4.2.3.4. Chain-of-custody, including:

- Standardized field tracking reporting forms to establish sample custody in the field prior to shipment; and
- Pre-prepared sample labels containing all information necessary for sample tracking.

4.2.4. Field Measurements

4.2.4.1. Determining which parameters are to be measured and where;

4.2.4.2. Selecting the frequency of field measurements and duration of field measurement period;

4.2.4.3. Providing a statistically significant number of field measurements;

4.2.4.4. Determining conditions under which field measurements should be conducted;

4.2.4.5. Determining which media are to be addressed by appropriate field measurements (e.g., groundwater, air, soil, sediment, etc.);

4.2.4.6. Documenting field measurement operations and procedures, including:

- Procedures and forms for recording raw data and the exact location, time, and facility-specific considerations associated with the data acquisition;
- Calibration of field instruments;
- Collection of replicate measurements;
- Submission of field-based blanks, where appropriate;
- Potential interferences present at the facility;
- Construction materials and techniques associated with monitoring wells and

- piezometers used to collect field data;
- Field equipment listing;
- Order in which field measurements will be made; and
- Decontamination procedures.

4.2.5. Sample Analysis

Sample analyses should be conducted in accordance with the most recent edition of *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)* (third edition, 1986 and most recent updates); *Standard Methods for the Examination of Water and Wastewater*, (twenty-first edition, 2005); or an equivalent method approved by the Department. The sample analysis section of the Sampling and Analysis Plan should specify the following:

4.2.5.1. Chain-of-custody procedures, including:

- Identification of the responsible party at the laboratory who is authorized to sign for incoming field samples, obtain documents of shipment, and verify the data entered onto the sample custody records;
- Use of a laboratory sample custody log consisting of serially numbered standard lab-tracking report sheets; and
- Specification of laboratory sample custody procedures for sample handling, storage, and dispersment for analysis.

4.2.5.2. Sample storage, procedures, and storage times;

4.2.5.3. Sample preparation methods;

4.2.5.4. Analytical procedures, including:

- Scope and application of the procedure;
- Sample matrix;
- Potential interferences;
- Precision and accuracy of the methodology; and
- Method detection limits.

4.2.5.5. Calibration procedures and frequency;

4.2.5.6. Data reduction, validation and reporting;

4.2.5.7. Internal quality control checks, laboratory performance and systems audits and frequency, including:

- Method blank(s);
- Laboratory control sample(s);
- Calibration check sample(s);
- Replicate sample(s);
- Matrix-spiked sample(s);

- "Blind" quality control sample(s);
- Control charts;
- Surrogate samples;
- Zero and span gases; and
- Reagent quality control checks.

4.2.5.8. Preventive maintenance procedures and schedules;

4.2.5.9. Corrective action (for laboratory problems); and

4.2.5.10. Turnaround time.

4.2.6. Groundwater Investigations

4.2.6.1. Monitoring system design

- Downgradient wells should be located to satisfy regulatory requirements for release detection and no migration of hazardous constituents beyond the site boundary. The horizontal placement of these wells should be such that they intercept potential pathways for contaminant migration. Wells should be monitored at each depth necessary to ensure immediate detection of a release.
- Upgradient or background wells should be installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer that represent the quality of uncontaminated water that has not been affected by leakage from a SWMU or AOC. A sufficient number of wells should be installed to allow for stratified comparisons of water quality and to account for spatial variability in groundwater quality.

4.2.6.2. Monitoring well drilling methods

- Drilling should be performed in a manner that minimizes the disturbance and maintains the natural properties of the subsurface materials;
- Contamination and/or cross-contamination of groundwater and aquifer materials should be avoided;
- The drilling method should allow for the collection of representative samples of rock, unconsolidated materials, and soil;
- The drilling method should allow the owner/operator to determine when the appropriate location for the screened interval has been encountered;
- The drilling method should allow sufficient annular space around the well casing and screen to place the filter pack and annular sealants; and
- The drilling method should allow for the collection of representative groundwater samples. Drilling muds should be used only when minimal impact to the surrounding formation and groundwater can be ensured.

4.2.6.3. Monitoring well design and construction

- The most suitable material for a particular well at a particular site will depend on the characteristics of the site hydrogeology. The following factors should be taken into consideration: depth to the water-bearing zone, geochemistry of the soil and rock over the entire interval in which the well is to be cased, and the chemistry of the groundwater at the site. In addition, the screens and casing of all groundwater wells should be: 1) inert in the water being tested and 2) chemically resistant to any contaminants that are present in the aquifer(s) being monitored.
- The appropriate length of well screens varies from site to site; however, Respondent should provide justification for any screen which cuts across hydraulically separated geologic units. Well screens must be factory slotted or the equivalent. Field slotting is not permitted under any conditions.
- All wells should have a bottom sump to allow sediments that may enter the well to settle without silting in the well and preventing proper flow of fluids.
- The annular space between the borehole wall and the screen or slotted casing should be filled to minimize passage of formation materials into the well.
- A filter pack should be used when the natural formation is: 1) poorly sorted; 2) a uniform fine sand, silt, or clay; 3) very thin-bedded; 4) poorly cemented sandstone; or 5) highly fractured or characterized by relatively large solution channels. Filter pack material should be chemically inert and may not be constructed from fabric.

4.2.6.4. Annular sealant

- The well annulus must be properly sealed. Sealant materials should be chemically compatible with the highest anticipated concentration of chemical constituents that may be expected in the groundwater.
- When the screened interval is within the saturated zone, a minimum of two feet of sealing material should be placed immediately over the protective sand layer overlying the filter pack.
- The precise volume of filter pack material and sealant required should be calculated before placement; the actual volumes used should be determined during well construction. Any discrepancies between the calculated volumes and the actual volumes should be detailed and documented.

4.2.6.5. Surface completion

- A monitoring well surface seal should be installed on top of the annular sealant and extend vertically up the well annulus between the well casing and the borehole to the land surface.

- A protective casing should be installed around the well casing to prevent damage or unauthorized entry.
- A suitable cap should be placed on the well to prevent tampering or the entry of any foreign materials. A lock should be installed on the cap to provide security. Lubricants may not be applied to the lock.

4.2.6.6. Documentation of well design

Respondent should keep a record of the following information for each well:

- A well construction log;
- Date of construction;
- Drilling method and drilling fluid used;
- Well location (± 0.5 ft);
- Bore hole and well casing diameter;
- Well depth (± 0.1 ft);
- Drilling and lithologic logs;
- Casing materials;
- Screen materials and design;
- Casing and screen joint types;
- Screen slot size/length;
- Filter pack material/size, grain analysis;
- Filter pack volume calculations;
- Filter pack placement method;
- Sealant materials (% bentonite);
- Sealant placement method;
- Sealant volume (lbs/gallon of cement);
- Surface seal design/construction;
- Well development procedure;
- Type of protective well cap;
- Ground surface elevation (± 0.01 ft);
- Surveyor's pin elevation (± 0.01 ft) on concrete apron;
- Top of monitoring well casing elevation (± 0.01 ft);
- Top of protective steel casing elevation (± 0.01 ft); and
- Detailed drawing of well (include dimensions).

4.2.7. Water Level Elevation Determination

The following procedures should be followed when determining water level elevations:

- Field measurements should include depth to standing water and total depth of the well to the bottom of the intake screen.
- Prior to measurement, water levels in piezometers and wells should be allowed to stabilize for a minimum of 24 hours after well construction and development or well purging.

- Water level measurements from boreholes, piezometers, or monitoring wells used to define the water table or a single potentiometric surface should be collected within less than 24 hours.

4.2.8. Well Purging

The following procedures should be followed when purging wells:

- The purging method should ensure that all stagnant water is replaced by fresh formation water upon completion of the procedure.
- If the purged water is contaminated or if its chemistry is unknown, the water should be stored in appropriate containers until analytical results are available, at which time proper arrangements for disposal or treatment should be made.
- When purging a medium- to high-yielding well, the well should not be pumped dry if recharge causes the formation water to cascade vigorously down the sides of the screen.
- When purging a low yielding well, under no circumstances should the well be allowed to recover fully before sampling is started.

4.2.9. Sample Collection

- Monitoring well sampling should always progress from the well expected to be least contaminated to the well expected to be most contaminated. Samples to be analyzed for the most volatile constituents should be collected and containerized first.
- Equipment that minimizes agitation and reduces or eliminates contact with the atmosphere during sample transfer should be used.
- The following equipment or materials are not acceptable: neoprene fittings, PVC bailers, tygon tubing, silicon rubber bladders, neoprene impellers, polyethylene, and viton.

4.2.10. Bailers

The following precautions should be taken when using bailers:

- Bailers used in sampling groundwater from monitoring wells should be constructed of either fluorocarbon resin or stainless steel. Disposable single-use inert polyethylene bailers may also be used. The cable used to raise and lower the bailer should also be an inert material or coated with an inert material.
- Bailers should never be dropped into a well and should be removed in a manner that causes as little agitation as possible.

4.2.11. Sample Preservation

- Chemical preservatives should be added to the samples in the field.

- A temperature history of the samples should be maintained. Upon receipt of a shipment, the laboratory should record the temperatures on the chain of custody record;
- The laboratory should record the date/time sampled, the date/time received, the date/time extracted, and the date/time analyzed for all samples received.
- Samples should not be filtered in the field or transferred from one sample container to another unless approved by the Department.
- No headspace should exist in the containers of samples containing volatile organics.

4.2.12. Borehole Location and Sampling Strategy

- Borings should be located so that reasonably accurate cross-sections can be constructed.
- Borehole samples should be collected with a shelby tube, split barrel sampler, rock corer, or other appropriate device and should be described in the field by a professional experienced in geology. Concise drilling logs and field records should be kept.
- Samples should be collected from all borings at intervals equal to 10% of the total depth of the borehole and should be collected wherever contamination is suspected.
- Borings in which permanent wells are not installed and wells being abandoned should be sealed with material at least an order of magnitude less permeable than the surrounding soil.

4.3. *Data Management Plan*

A Data Management Plan should be developed to document and track the RFI data and results. This plan should identify and set up data documentation materials and procedures, project file requirements, and progress reporting procedures and documents. The plan should also describe the format for presenting the raw data and conclusions of the investigation.

4.3.1. Data Record

The data record should include the following:

- Unique sample or field measurement code;
- Sampling or field measurement location and sample or measurement type;
- Sampling or field measurement raw data;
- Laboratory analysis ID number;
- Property or component measures; and
- Result of analysis (e.g. concentration).

4.3.2. Tabular Displays

The following data should be presented in tabular displays:

- Unsorted (raw) data;
- Results for each medium, or for each constituent monitored;
- Data reduction for statistical analysis, as appropriate;
- Sorting of data by potential stratification factors (e.g., location, soil layer, topography); and
- Summary data.

4.3.3. Graphical Displays

The following data should be included in the Data Management Plan and may be presented in graphical formats (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transits, three dimensional graphs, etc.):

- Sampling location and sampling grid;
- Boundaries of sampling locations and areas where more data are required;
- Geographical extent of contamination;
- Contamination levels, averages and maxima;
- Sampling locations and levels of contamination at each;
- Changes in concentration in relation to distances from the source, time, depth or other parameters; and
- Features affecting inter-media or intramedia transport and potential receptors.

4.4. *Health and Safety Plan*

4.4.1. Respondent should prepare a Health and Safety Plan which includes the following:

- A facility description including the locations of roads, water supply, electricity, and telephone service;
- The known hazards and an evaluation of the risks associated with those hazards;
- Key personnel and alternates responsible for site safety, response operations, and the protection of public health;
- A description of the work area;
- Levels of protection to be worn by personnel;
- Procedures to control site access;
- Decontamination procedures for personnel and equipment;
- Site emergency procedures;
- Emergency medical care for injuries and toxicological problems;
- Requirements for an environmental surveillance program;
- Routine and special training required for responders; and
- Procedures for protecting workers from weather-related problems.

- 4.4.2. The Health and Safety Plan should be consistent with:
- NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);
 - EPA Order 1440.1 - Respiratory Protection;
 - EPA Order 1440.3 - Health and Safety Requirements for Employees Engaged in Field Activities;
 - Facility Contingency Plan;
 - EPA Standard Operating Safety Guide (1984);
 - OSHA regulations, particularly in 29 CFR 1910 and 1926;
 - State and local regulations; and
 - Other EPA guidance as provided.

** Note – the Department will not approve or disapprove Respondent's Health and Safety Plan.

- 4.5. *Community Relations Plan*
A plan for the dissemination of information to the public, regarding investigation activities and results, should be prepared

Attachment V.5
Scope of Work
Baseline Risk Assessment

1.0. Introduction

- Statement of the problem
- Site-specific objectives of the risk assessment
- Risk Assessment Report Organization

1.1. *Site Background*

- Site description
- Map of site
- Site History
- Current land use
- Regulatory Background
- Significant site reference points
- Description of SWMUs, AOCs, and other units considered in the risk assessment
- General sampling locations and media sampled
- Description of any interim corrective or stabilization measures

1.2. *Scope of Risk Assessment*

- Complexity of assessment
- Synopsis of study design

2.0. Site Characterization

2.1. *Summary of the Remedial Investigation Results*

- Soil/sediment/waste Investigation
- Surface Water Investigation
- Ground Water Investigation

3.0. Data Usability

3.1. *Site-Specific Data Collection Considerations*

- Identification of potential human exposure
- Identification of potential environmental exposure
- Groundwater, soils, and air modeling parameters
- Sampling locations and media sampled
- Sampling methods for each medium
- QA/QC methods for sample collection and analysis

3.2. *Study Areas for Which Media-Specific Samples Were Collected*

- Collection strategies for sampling in each area studied
- Evaluation of data collected
- Comparison of chemical concentrations with background samples
- Uncertainties in data

4.0. **Human Health Baseline Risk Assessment**

4.1. *Selection/Description of Chemicals of Potential Concern*

- Summary of applicable Data Usability in Section 2.0
- Comparison of maximum soil, groundwater, surface water, and sediment concentrations to screening and background levels
- Comparison of detection limits to screening or background levels
- Potential daughter products
- Final selection of human health COPCs

4.2. *Identify Receptors of Concern/Potentially Exposed Populations*

- Typical on- and off-site receptor types
- Relative locations and descriptions of populations with respect to site
- Current land uses adjacent to site
- Populations of concern which might be or are being affected by site contaminants

4.3. *Characterization of Exposure Setting*

- Climate
- Vegetation
- Soil types
- Surface water hydrology
- Ground water hydrology

4.3.1. Identification of Exposure Pathways

- Contaminant sources- primary and secondary
- Media receiving contamination on- and off-site
- Fate and transport of contaminants in media
- Exposure points and exposure routes
- Integration of sources, releases, fate and transport mechanisms, exposure points, and exposure routes into complete exposure pathways
- Summary of exposure pathways to be quantified
- Current and potential future receptors
- Conceptual site model

4.4. *Risk Analysis*

4.4.1. Exposure Assessment

4.4.1.1. Quantification of Exposure

- Exposure Point Concentrations
- Chemical intake estimates for individual exposure pathways

4.4.1.2. Summary of Exposure Assessment

4.4.2. Toxicity Assessment

4.4.2.1. Toxicity Information for Non-carcinogenic Effects

- Appropriate exposure periods for toxicity values
- Latest Reference Dose (RfD) for all chemicals

- Reference Concentration (RfC) for all chemicals
 - One- and ten-day health advisories for shorter term oral exposures
 - Overall database and the critical study on which the toxicity value is based
 - Effects that may appear at doses higher than those required to elicit critical effect
 - Consideration of absorption efficiency
- 4.4.2.2. Toxicity Information for Carcinogenic Effects
- Exposure averaged over lifetime
 - Latest slope factors for all carcinogens
 - Weight-of-evidence classification for all carcinogens
 - Concentrations above which the dose-response curve is no longer linear
- 4.4.2.3. Chemicals for Which No EPA Toxicity Values Are Available
- Qualitative evaluation
 - Documentation/justification of any new toxicity values
- 4.4.2.4. Uncertainties Related To Toxicity Information
- Quality of individual studies
 - Completeness of overall database
 - Uncertainty Factors
 - Modifying Factors
- 4.4.2.5. Summary of Toxicity Information

4.5. *Risk Characterization*

4.5.1. Current Land-Use Conditions

- Carcinogenic risk of individual substances
- Chronic hazard quotient calculation for individual substances
- Subchronic hazard quotient calculation for individual substances
- Shorter-term hazard quotient calculation for individual substances
- Carcinogenic risk for multiple substances
- Chronic hazard index for multiple substances
- Subchronic hazard index for multiple substances
- Shorter-term hazard index calculation for multiple substances
- Segregation of hazard indices
- Justification for combining risks across pathways
- Non-carcinogenic hazard index (multiple pathways)
- Carcinogenic risk (multiple pathways)

4.5.2. Future Land-Use Conditions

- Carcinogenic risk of individual substances
- Chronic hazard quotient calculation for individual substances
- Subchronic hazard quotient calculation for individual substances
- Shorter-term hazard quotient calculation for individual substances

- Carcinogenic risk for multiple substances
- Chronic hazard index for multiple substances
- Subchronic hazard index for multiple substances
- Shorter-term hazard index calculation for multiple substances
- Segregation of hazard indices
- Justification for combining risks across pathways
- Non-carcinogenic hazard index (multiple pathways)
- Carcinogenic risk (multiple pathways)

4.5.3. Uncertainties

- Site-specific uncertainty factors
- Definition of physical setting
- Model applicability and assumptions
- Parameter values for fate/transport and exposure calculations
- Summary of toxicity assessment uncertainty
- Identification of potential health effects
- Derivation of toxicity value
- Potential for synergistic or antagonistic interactions
- Uncertainty in evaluating less-than-lifetime exposures

4.5.4. Summary Discussion and Tabulation of Risk Characterization

- Key site-related contaminants and exposure pathways
- Types of health risks of concern
- Level of confidence in the quantitative information used to estimate risk
- Presentation of qualitative information on toxicity
- Confidence in the key exposure estimates for key exposure pathways
- Magnitude of the carcinogenic and non-carcinogenic risk estimates
- Major factors driving risk
- Major factors contributing to uncertainty
- Exposure human population characteristics
- Comparison with site-specific health studies

4.6. *Human Health Risk Assessment References*

5.0. **Ecological Risk Assessment**

5.1. *Problem Formulation*

5.1.1. Selection of Ecological COPCs (Screening Level ERA)

- Summary of Applicable Data Usability in Section 2.0
- Comparison of maximum soil, groundwater, surface water and sediment concentrations to screening or background levels
- Comparison of detection limits to screening levels
- Inclusion of bioaccumulative chemicals
- Final selection of ecological COPCs

5.2. *Ecological Setting*

- Climate
- Vegetation
- Soil types
- Surface water hydrology
- Ground water hydrology
- Detailed habitat descriptions
- List of species observed or expected to occur
- Discussion of special status species

5.2.1. Conceptual Site Model

- Environmental setting
- Ecological COPCs
- Contaminant sources
- Media receiving contamination on-and off-site
- Fate and transport of contaminants in media
- Potential exposure pathways
- Current and potential future receptors
- Conceptual model diagrams

5.2.2. Assessment Endpoints

- Description of management goals
- Identification of assessment endpoints linked to management goals

5.2.3. Analysis Plan

- Risk hypotheses or questions
- Identification of measures (including measures of effect, measures of exposure, and measures of ecosystem and receptor characteristics)
- Brief description of site-specific biota surveys or toxicity tests that were conducted (complete study reports should be included as attachments)
- Selection of representative receptors (for wildlife, typically one avian and one mammalian species from each of the feeding guilds that are expected to be most highly exposed)
- Specify data quality objectives
- Outline weight-of-evidence framework

5.2.4. Risk Analysis

5.2.4.1. Exposure Assessment

- Exposure concentrations
- Exposure parameters
- Methods for estimating tissue concentrations (measured or modeled)
- Uptake factors (if applicable)

- Ingested dose, hazard quotient, and other relevant equations

5.2.4.2. Effects Assessment

- Toxicity reference values (TRVs) for abiotic media to protect community-level receptors such as plants, terrestrial invertebrates, benthic invertebrates and aquatic life
- Dose-based TRVs for wildlife
- Critical body residue TRVs (if applicable)
- Dietary TRVs for fish and/or wildlife (if applicable)

5.2.5. Risk Characterization

- Description of hazard quotient calculation methods
- Discussion of risks for each line of evidence
- Spatial analysis of risks for receptor with limited mobility (e.g. plants, invertebrates)
- Background comparison for inorganic compounds
- Weight-of-evidence analysis

5.2.6. Uncertainty Analysis

- Discussion of qualitative magnitude and direction of each uncertainty (uncertainty tendency to underestimate or overestimate risks)
- Conceptual model
- Exposure model applicability and assumptions
- Exposure concentrations
- Exposure parameters
- Toxicity values
- Potential for synergistic or antagonistic interactions

5.2.7. Ecological Risk Assessment Conclusions

5.3. *Ecological Risk Assessment References*

6.0. **Summary**

7.0. **Conclusions**

**Attachment V.6
Corrective Measures Study (CMS)
Scope of Work**

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Corrective Measures Study (CMS) Scope of Work

1.0. The Corrective Measures Study (CMS)

The CMS is used to help determine which corrective measure is most appropriate for the facility. Sections 1.0 and 3.0 discuss the evaluation process for developing and recommending corrective measures alternatives. Section 4.0 and Section 5.0 outline contents of the CMS Work Plan and Report.

2.0. Evaluation of the Corrective Measure Alternatives

2.1. *Corrective Action Objectives*

Corrective action objectives for the facility should be established. These objectives should be based on public health and environmental criteria, information gathered during the RFI, EPA guidance, and the requirements of any applicable federal and state statutes. The objectives should include the facility-specific purpose for the corrective action, identifying actual and/or potential exposure pathways to be addressed. Objectives established during the RFI should be used in developing objectives for the CMS.

2.2. *Screening of Corrective Measures Technologies*

The CMS should include a preliminary assessment of technologies which may be applicable at the facility. Corrective measures technologies should be screened to eliminate those that may prove infeasible to implement, rely on technologies unlikely to perform satisfactorily or reliably, or do not achieve the corrective measure objectives within a reasonable time period. The screening process should focus on elimination of technologies which have severe limitations for a given set of waste and site-specific conditions. The screening step may also eliminate technologies based on inherent technology limitations. Reasons for excluding any technology should be documented. Site, waste, and technology characteristics used to screen inapplicable technologies are described in more detail below:

2.2.1. Site Characteristics

Site data should be reviewed to identify conditions that may limit or promote the use of certain technologies. Technologies that are clearly precluded by site characteristics may be eliminated from further consideration.

2.2.2. Waste Characteristics

A review of waste characteristics, including remediation waste, should be conducted. Identification of waste characteristics that limit the effectiveness or feasibility of technologies is an important part of the screening process. Waste characteristics particularly affect the feasibility of in-situ methods, direct treatment methods, and land disposal (on/off-site). Technologies clearly limited by site waste characteristics may be eliminated from consideration.

2.2.3. Technology Limitations

During the screening process, the level of technology development, performance

record, and inherent construction, operation, and maintenance problems should be identified for each technology considered. Technologies that are unreliable, perform poorly, or not fully demonstrated may be eliminated.

2.3. *Evaluation and Development of the Corrective Measure Alternatives*

Corrective measure alternatives should be developed based on the corrective action objectives and an analysis of the corrective measure technologies that pass the initial screening process. The corrective action alternatives developed in the CMS should represent a workable number of options that adequately address all site problems and corrective action objectives. Each alternative may consist of an individual technology or a combination of technologies. Technology descriptions and information used to support Respondent's evaluation of the alternative corrective measures should be included in the CMS Report. Reasons for excluding any technology should also be documented. The evaluation of alternatives should be based on technical, environmental, human health and institutional concerns. A cost estimate should be developed for each corrective measure alternative.

2.3.1. Technical/Environmental/Human Health/Institutional

Respondent should evaluate each alternative from a technical, environmental, human health and institutional standpoint, following the guidelines presented below.

2.3.1.1. Technical

Each corrective measure alternative should be evaluated based on performance, reliability, implementability and safety.

2.3.1.1.1. Performance should be evaluated based on the effectiveness and useful life of the corrective measure:

- Effectiveness should be evaluated in terms of the ability to perform intended functions, such as containment, diversion, removal, destruction, or treatment. The effectiveness of each corrective measure should be determined either through design specifications or by performance evaluation. Any specific waste or site characteristics which could potentially impede effectiveness should be considered. The evaluation should also consider the effectiveness of combinations of technologies.
- Useful life is defined as the length of time the level of desired effectiveness can be maintained. Most corrective measure technologies, with the exception of destruction, deteriorate with time. Often, deterioration can be slowed through proper system operation and maintenance, but the technology eventually may require replacement. Each corrective measure should be evaluated in terms of the projected service lives of its component technologies. Resource availability in the future life of each technology, as well as appropriateness of each technology, should be considered in estimating the useful life of the project.

2.3.1.1.2. The reliability of each corrective measure should be evaluated based on its operation

and maintenance requirements and its demonstrated reliability:

- Operation and maintenance requirements include the frequency and complexity of necessary operation and maintenance. Technologies requiring frequent or complex operation and maintenance activities should be regarded as less reliable than technologies requiring little or straightforward operation and maintenance. The availability of labor and materials to meet these requirements should also be considered.
- Demonstrated and expected reliability is a way of measuring the risk and effect of failure. Respondent should evaluate whether the technologies have been used effectively under analogous conditions, whether the combination of technologies have been used together effectively, whether failure of any one technology has an immediate impact on receptors, and whether the corrective measure has the flexibility to deal with uncontrollable changes at the site.

2.3.1.1.3. The implementability of each corrective measure should be evaluated, including the relative ease of installation (constructability) and the time required to achieve a given level of response:

- Constructability is determined by conditions both internal and external to the facility and includes such items as location of underground utilities, depth to water table, heterogeneity of subsurface materials, and location of the facility (i.e., remote location vs. a congested urban area). Respondent should evaluate what measures can be taken to facilitate construction under these conditions. External factors which affect implementation include the need for special permits or agreements, equipment availability, and the location of suitable off-site treatment or disposal facilities.
- Components of time should be addressed: 1) the time it takes to implement a corrective measure and 2) the time it takes to see beneficial results. Beneficial results are defined as the reduction of contaminants to some acceptable, pre-established level.
- Respondent should evaluate each corrective measure alternative with regard to safety. This evaluation should include threats to the safety of nearby communities and environments as well as those to workers during implementation. Factors to consider are fire, explosion, and exposure to hazardous substances.

2.3.1.2. Environmental

An environmental assessment should be performed for each alternative. The environmental assessment should focus on the facility conditions and pathways of contamination actually addressed by each alternative. The environmental assessment for each alternative should include, at a minimum, an evaluation of the short- and long-term beneficial and adverse effects of the response alternative, any adverse

effects on environmentally sensitive areas, and an analysis of measures to mitigate adverse effects.

2.3.1.3. Human Health

Each alternative should be assessed in terms of the extent to which it mitigates short- and long-term potential exposure to any residual contamination and protects human health both during and after implementation of the corrective measure. The assessment should describe the concentrations and characteristics of the contaminants on-site, potential exposure routes, and the potentially affected population. Each alternative should be evaluated to determine the level of exposure to contaminants and the reduction over time. For management of mitigation measures, the relative reduction of impact should be determined by comparing residual levels of each alternative with existing criteria, standards, or guidelines acceptable to the Department.

2.3.1.4. Institutional Needs and Controls

The relevant institutional needs for each alternative should be assessed. Specifically, those needs include the effects of federal, state and local environmental and public health standards, regulations, guidance, advisories, ordinances, or community relations on the design, operation, and timing of each alternative.

2.3.2. Cost Estimate

An estimate of the cost of each corrective measure alternative (and for each phase or segment of the alternative) should be developed. The cost estimate should include both capital, and operation and maintenance costs.

2.3.2.1. Capital Costs

Capital costs consist of direct (construction) and indirect (non-construction and overhead) costs.

2.3.2.1.1. Direct capital costs include:

- Construction costs: Costs of materials, labor (including fringe benefits and worker's compensation), and equipment required to install the corrective measure;
- Equipment costs: Costs of treatment, containment, disposal and/or service equipment necessary to implement the action. These materials remain until the corrective action is complete;
- Land and site-development costs: Expenses associated with purchase of land and development of existing property; and
- Buildings and services costs: Costs of process and non-process buildings, utility connections, purchased services, and disposal costs.

2.3.2.1.2. Indirect capital costs include:

- Engineering expenses: Costs of administration, design, construction supervision, drafting, and testing of corrective measure alternatives;
- Legal fees and license or Order costs: Administrative and technical costs necessary to obtain licenses and permits for installation and operation;
- Start-up and shakedown costs: Costs incurred during corrective measure start-up; and
- Contingency allowances: Funds to cover costs resulting from unforeseen circumstances, such as adverse weather conditions, strike, and inadequate facility characterization.

2.3.2.2. Operation and Maintenance Costs

Operation and maintenance costs are post-construction costs necessary to ensure continued effectiveness of a corrective measure. Respondent should consider the following operation and maintenance cost components:

- Operating labor costs: Wages, salaries, training, overhead, and fringe benefits associated with the labor needed for post-construction operations;
- Maintenance materials and labor cost: Costs for labor, parts, and other resources required for routine maintenance of facilities and equipment;
- Auxiliary materials and energy: Costs of such items as chemicals and electricity for treatment plant operations, water and sewer service, and fuel;
- Purchased service: Sampling costs, laboratory fees, and professional fees for which the need can be predicted;
- Disposal and treatment costs: Costs of transporting, treating, and disposing of waste materials, such as treatment plant residues, generated during operations;
- Administrative costs: Costs associated with administration of corrective measure operation and maintenance not included under other categories;
- Insurance, taxes, and licensing costs: Costs of such items as liability and sudden accident insurance; real estate taxes on purchased land or right-of-way; licensing fees for certain technologies; and hazardous waste regulatory fees and reporting costs;
- Maintenance reserve and contingency funds: Annual payments into escrow funds to cover (1) costs of anticipated replacement or rebuilding of equipment and (2) any large unanticipated operation and maintenance costs; and

- Other costs: items that do not fit any of the above categories.

2.3.3. Use of the Corrective Action Management Unit (CAMU)

As a part of any corrective measures alternative, Respondent may propose designation of one or more remediation units under the provisions of 40 CFR 264, Subpart S. These units would include CAMUs, temporary units, and/or staging piles. Final designation of subpart S units are made by the Department.

3.0. **Recommending Corrective Measure(s)**

Once the evaluation process is complete, Respondent should justify and recommend a corrective measure alternative using technical, human health, and environmental criteria. This recommendation should include summary tables which allow the alternative or alternatives to be understood easily. Tradeoffs among health risks, environmental effects, and other pertinent factors should be highlighted.

3.1. *Technical Criteria*

3.1.1. Performance - corrective measure(s) which are most effective at performing their intended functions and maintaining the performance over extended periods of time are preferred;

3.1.2. Reliability - corrective measure(s) which do not require frequent or complex operation and maintenance activities and that have proven effective with wastes, and under facility conditions similar to those anticipated are preferred;

3.1.3. Implementability - corrective measure(s) which can be constructed and operated to reduce levels of contamination to attain or exceed applicable standards in the shortest period of time are preferred; and

3.1.4. Safety - corrective measure(s) which pose the least threat to the safety of nearby residents, environments and workers during implementation are preferred.

3.2. *Human Health Criteria*

The corrective measure(s) must comply with existing EPA and State of Montana criteria, standards, and/or guidelines for the protection of human health. Corrective measures providing the minimum level of exposure to contaminants and the maximum reduction in exposure with time are preferred.

3.3. *Environmental Criteria*

The corrective measure(s) posing the least adverse impact (or greatest improvement) on the environment over the shortest period of time are preferred.

4.0. **CMS Work Plan**

The CMS Work Plan must meet the requirements of Module III and should include the elements outlined in this Attachment. Other pertinent EPA guidance may be used in work plan development. The work plan should present facility-specific objectives for remediation and the methods Respondent will use to develop and evaluate

appropriate corrective measure alternatives. The work plan should also present criteria to be used in determining which alternative best meets the objectives.

4.1. *Contents of the CMS Work Plan*

The CMS Work Plan should include:

- Corrective action objectives for the facility;
- Specific problems or areas to be addressed;
- A description of the general approach to investigating and evaluating potential remedies;
- A description of the specific remedies and/or technologies to be studied;
- A description of how each potential corrective measure(s) and/or technology will be evaluated, including identification of data gaps, implementation of pilot tests or bench studies, etc.; and
- A schedule for completion for all tasks included in the CMS Work Plan.

5.0. **CMS Report**

A Corrective Measures Study Report should be prepared which presents the results of the Corrective Measures Study and includes a recommendation for a corrective measures alternative.

5.1. *Report Content*

The Report should, at a minimum, include:

5.1.1. Site Description

A description of the facility, including a site topographic map. The description should include the current situation at the facility and the known nature and extent of the contamination as documented by the RFI Report, as well as any previous response activities and/or interim measures that have or are being implemented;

5.1.2. RFI Summary

A summary of the RFI and its impact on the selected corrective measure(s), including the following information:

- Field studies (ground water, surface water, soil, air);
- Summary of human health and ecological risk assessments, if performed; and
- Laboratory studies (bench scale, pilot scale).

5.1.3. Corrective Measures Alternatives

The discussion of the corrective measures alternative should include the following:

- Description of the corrective measure(s), the results of the evaluation, and rationale for selection. Each corrective measure evaluated should be described,

including those that did not pass the initial screening;

- Performance expectations, including media cleanup levels, points of compliance and remediation timeframes;
- Preliminary design criteria and rationale;
- General operation and maintenance requirements; and
- Long-term monitoring requirements.

5.1.4. Design and Implementation Precautions:

- Special technical problems;
- Additional engineering data required;
- Permits and regulatory requirements;
- Access, easements, right-of-way, and other institutional controls;
- Health and safety requirements; and
- Community relations activities.

5.1.5. Cost Estimates:

- Capital cost estimate;
- Operation and maintenance cost estimate.

5.1.6. Schedules

- Project schedule (design, construction, and operation).

Attachment V.7
Scope of Work
Interim Measures (IM) and Corrective Measures Implementation (CMI) Outline

- 1.0 **Engineer Design**
 - Treatment Systems
 - Containment Systems
 - Cover Systems
 - Monitoring Networks
 - Security

- 2.0 **Operation And Maintenance**
 - Treatment Systems
 - Containment Systems
 - Cover Systems
 - Monitoring Networks

- 3.0 **Monitoring And Performance Monitoring**
 - Location
 - Frequency
 - Sampling and Analysis

- 4.0 **Waste Management**
 - On-Site Management
 - Sampling and Analysis
 - Disposition

- 5.0 **Health And Safety Plan**
 - Same Requirements As Section 4.4 of Attachment V.4

- 6.0 **Schedule**
 - Construction
 - Operation
 - Monitoring/Performance Monitoring
 - Closure/Completion

- 7.0 **Remediation Goals**
 - Description of Media Goals
 - Time Frames for Achieving Goals

- 8.0 **Reporting**
 - Types of Reports
 - Reporting

9.0 **Public Participation**

- Major Changes to the Selected Corrective Measure(s)
- At Completion of Corrective Measure(s)

10.0 **Demonstration Of Financial Assurance And Cost Estimates**

- Cost Estimate for Corrective Measures Implementation
- Cost Estimate for Maintenance of Corrective Measures after Implementation

**Attachment V.8
Compliance Schedule**

Activity & Permit Condition(S)	Due Date
Compliance Reporting	
1. Notification of compliance or noncompliance with compliance schedules - Condition I.J.12.e.	Within 14 calendar days of due date
2. Notification of noncompliance - Condition I.J.12.f.	Oral notification within 24 hours; written notification within 5 calendar days
Newly Identified SWMUs/AOCs, and Newly Discovered Releases at Previously Identified SWMUs and AOCs	
3. Notification of newly identified SWMUs/AOCs or hazardous constituents - Condition V.D.1.	Within 15 calendar days of discovery
4. Submittal of SWMU/AOC Assessment Report - Condition V.D.2.	Within 60 calendar days of notification (See 2.)
5. Notification of newly discovered releases at previously identified SWMUs and AOCs - Condition V.E.1.	Within 15 calendar days of discovery
RCRA Facility Investigation	
6. Submittal of RFI Work Plan(s) for SWMUs and AOCs and Description of Current Conditions Report - Conditions V.A.5.a., V.D.3., V.E.2., V.G.1.a., and Attachment V.4	Within the timeframe specified by the Department.
6.a. Submittal of RFI Progress Reports - Condition V.G.4.	In accordance with the approved RFI Work Plan
6.b. Submittal of Draft RFI Report - Condition V.G.5.a.i.	In accordance with the approved RFI Work Plan
6.c. Submittal of Final RFI Report - Condition V.G.5.a.ii.	Within 45 calendar days after receipt of Department comments on RFI Report
Interim Measures	
7. Submittal of IM Work Plan - Condition V.H.1.a.	Within the timeframe specified by the Department.
7.a. Submittal of IM Progress Reports - Condition V.H.5.	In accordance with the approved IM Work Plan
7.b. Submittal of IM Final Report - Condition V.H.6.	Within 45 calendar days of completion of IM or inclusion into Corrective Measures Implementation

Activity & Permit Condition(S)	Due Date
Corrective Measures Study	
8. Submittal of CMS Plan - Condition V.I.1.a.	Within the timeframe specified by the Department.
9. Submittal of Draft CMS Report - Condition V.I.4.a.i.	In accordance with the approved CMS Plan
10. Submittal of Final CMS Report - Condition V.I.4.a.ii.	Within 45 calendar days after receipt of Department comments on draft CMS Report
Corrective Measures Implementation	
11. Submittal of CMI Work Plan - Condition V.K.1.a.	Within 90 days of following permit modification to incorporate the remedy.
12. Submittal of CMI Progress Reports - Condition V.K.5.	In accordance with the approved CMI Work Plan
13. Submittal of Fiver-Year Review Report – Condition V.K.6.	By April 1, 2020 and fiver years following that date, until permit reissuance, termination, or another enforceable mechanism is issued.
14. Submittal of Corrective Measures Completion Certification Report - Condition V.L.3.	Within 45 calendar days of completion of Corrective Measures