THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Environmental Conservation

DIVISION OF SPILL PREVENTION AND RESPONSE
Contaminated Sites Program

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September 12, 2023 *Issued electronically via e-mail*

Stephanie Plate
Marathon Petroleum Company
54741 Energy Way
Kenai, AK 99611

Re: Tesoro Alaska Refinery, ADEC Hazard ID# 312
September 6th EPA RCRA Inspection - DEC Comments

Ms. Plate:

On September 6, 2023, the Alaska Department of Environmental Conservation, Contaminated Sites Program (ADEC), accompanied the EPA on their RCRA inspection. ADEC has the following comments.

During our morning meeting, it was observed that there may be a hydraulic connection between groundwater and surface water at the wetlands east of the Spur Highway during times of high groundwater. We understand this to be the case as benzene has been periodically observed in wetland surface water during monitoring. Water under these circumstances would be regulated under 18 AAC 75 or 18.AAC 78. We have included Technical Memorandum 01 005 Updated: April 13, 2011, that provides guidance on the Regulatory Approach to Managing Contamination in Hydrologically Connected Groundwater and Surface Water.

We are requiring Marathon to develop a work plan to monitor surface water and sediment in the wetlands to determine if the surface water quality is in compliance with the Technical Memorandum that for total aromatic hydrocarbons (TAH) and total aqueous hydrocarbons (TAqH).

ADEC is requiring that Marathon assess the historical use of aqueous film-forming foam (AFFF) storage, firefighting, or fire training at the facility. Please determine if firefighting foams were used at the facility, and through assessment work if PFAS is present in soil or groundwater.

Please have your consultant submit a work plan to the DEC for review and approval by November 15, 2023. If there are any questions about this request for work plan, or any

other aspect of this project, please contact me at (907) 262-3412, or by e-mail at peter.campbell@alaska.gov
Sincerely,

Peter Campbell

Peter Campbell
Project Manager

Electronic Copies: Jan Palumbo, EPA
Rory O'Rourke, EPA

Attachments:
October 2, 2019, Technical Memorandum Action Levels for PFAS in Water and Guidance on Sampling Groundwater and Drinking Water
April 13, 2011, Regulatory Approach to Managing Contamination in Hydrologically Connected Groundwater and Surface Water

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF SPILL PREVENTION AND RESPONSE
CONTAMINATED SITES PROGRAM
and
DIVISION OF ENVIRONMENTAL HEALTH
DRINKING WATER PROGRAM
Date: August 20, 2018
UPDATED: October 2, 2019

Technical Memorandum

Action Levels for PFAS in Water and
Guidance on Sampling Groundwater and Drinking Water

Purpose

This document was prepared by the Alaska Department of Environmental Conservation (DEC or "department") to provide clear, consistent guidance on responding to Per- and Polyfluoroalkyl Substances (PFAS) in groundwater and surface water, and to establish health-based action levels for drinking water.

This Technical Memorandum replaces the August 20, 2018 (and April 9, 2019 amendment) Technical Memorandum. PFAS is an emerging issue and DEC policy is being updated to reflect new information. The science on PFAS is evolving and state policy may change in the future to take new toxicity information or federal policies into account.

Background and Basis for Guidance

To ensure public drinking water is safe for consumption, Alaska relies on and adopts the U.S. Environmental Protection Agency's (EPA's) drinking water maximum contaminant levels (MCLs), rather than establishing state specific MCLs.

The EPA has not yet established MCLs for PFAS. However, in 2009 the EPA published Provisional Health Advisory Levels of 0.4 µg/L perfluorooctanoic acid (PFOA) and 0.2 µg/L perfluorooctane sulfonate (PFOS), and recommended people not drink water containing higher levels of these compounds.

In 2012, EPA published the third Unregulated Contaminant Monitoring Rule (UCMR3) under the Safe Drinking Water Act (SDWA). The rule required a subset of public drinking water systems to monitor for thirty unregulated contaminants including six PFAS compounds [PFOS, PFOA, perfluorohexane sulfonate (PFHxS), perfluorononanoic acid (PFNA), perfluorohepatanoic acid (PFHpA) and perfluorobutane sulfonate (PFBS)] between 2013 and 2015. PFAS have since been found in many public and private water supplies across the country.

In 2016, EPA published lifetime health advisories (LHAs) under the SDWA for two PFAS, specifically PFOS and PFOA. These LHAs were created to assist state and local officials and drinking water system operators, in evaluating risks from these contaminants in drinking water, so they can take appropriate action to protect residents. **The EPA recommends people not drink**

water containing a total concentration of PFOS+PFOA above 0.07 µg/L (70 parts per trillion).

The EPA LHA levels assume an adult body weight of 80 kilograms and a daily drinking water intake rate of 4.32 liters for a nursing mother. In addition, each LHA level incorporates a relative source contribution (RSC) that assumes 20% of the exposure to PFOS and PFOA is from drinking contaminated water and the remaining 80% is from exposure from other sources (e.g. consuming contaminated food, contact with household products, and occupational exposure).

In November 2016, the department promulgated groundwater cleanup levels for two of the UCMR3 compounds -- PFOS and PFOA -- that incorporated the published EPA LHA reference dose (RfD).[1] Groundwater cleanup levels for contaminants regulated by the department are calculated using a risk-based approach that does not include an RSC factor.

In June 2018, the Agency for Toxic Substances and Disease Registry (ATSDR) issued a draft Toxicological Profile for Perfluoroalkyls for public review and comment, which has not yet been finalized.

On August 20, 2018 DEC issued a Technical Memorandum that established PFAS Action Levels for groundwater and surface water used as drinking water. A 0.07 µg/L action level was set for the sum of the following five (5) PFAS chemicals: perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), perfluorohexanesulfonic acid (PFHxS), and perfluoroheptanoic acid (PFHpA). A separate action level for the shorter-chain, perfluorobutane sulfonate (PFBS) was set at 2.0 µg/L.

On February 14, 2019 EPA published a PFAS Action Plan. This plan includes a commitment to propose a national drinking water regulatory determination for PFOA and PFOS for public comment in 2019 – this is a critical step under the Safe Drinking Water Act for EPA to determine whether it will establish MCLs. EPA also proposed to finalize toxicity assessments for five other PFAS.[2]

Action Levels

In order to align state actions to the recently announced EPA plans, DEC will use the EPA LHA (PFOS+PFOA above 0.07 µg/L) as the Action Level.

Guidance

Any new testing for PFAS will report the full suite of PFAS compounds analyzed by the appropriate EPA Method.

At a contaminated site where a release of PFAS has been documented, a responsible party shall develop a work plan to:

[1] See 18 AAC 75.345(b), Table C

[2] For more on the EPA's PFAS action plan, see: https://www.epa.gov/sites/production/files/2019-02/documents/pfas_action_plan_021319_508compliant_1.pdf

- characterize the nature and extent of contamination in groundwater including, if appropriate, surface water and pore water if contaminated groundwater is discharging to surface water, using approved analytical methods and PFOS and PFOA results, following the ITRC sampling guidance for PFAS[3]
- conduct a water well survey to identify wells that may be impacted; and
- sample potentially impacted drinking water supplies, both public and private, using approved analytical methods to determine the extent of impacts.

Where drinking water contamination is likely, water well surveys and drinking water sampling should be conducted as soon as feasible. Where drinking water sources or water supply wells are affected, the responsible party shall:

- provide an alternative drinking water source to all properties where drinking water has been impacted above the action levels described above;
- work with owners of all water supply wells containing PFAS concentrations above the action levels as soon as feasible to:
    - ensure all water pumped and discharged is treated to concentrations below the action levels;[4]
    - disconnect the wells (disconnect power, cap water line, and label) and take them out of use; or
    - permanently decommission the wells.

Regulatory Authority

18 AAC 75.325(d): "A responsible person shall investigate, contain, and perform a cleanup of a discharge or release of a hazardous substance…"

18 AAC 75.325(f)(1)(D): "A responsible person shall to the maximum extent practicable, …prevent, eliminate, or minimize potential adverse impacts to human health, safety, and welfare, and to the environment, onsite and offsite, from any hazardous substance remaining at the site."

18 AAC 75.990(17): Cleanup is defined to include "efforts to mitigate environmental damage or a threat to human health, safety, or welfare resulting from a hazardous substance, and includes . . . measures that are necessary to mitigate or avoid further threat to human health, safety, or welfare."

18 AAC 75.345(d): "Where the department determines that toxicity information is insufficient to establish a cleanup level for a hazardous substance or a pollutant that ensures protection of human health, safety, and welfare, and of the environment, the department may require a responsible person to provide an alternative source of drinking water for the affected parties or implement other

[3] ITRC 2018. Site Characterization Considerations, Sampling Precautions, and Laboratory Analytical Methods for Per- and Polyfluoroalkyl Substances (PFAS).

[4] Excavation dewatering and other discharges may be permitted on a case-by-case basis under an excavation dewatering permit, DEC work plan, or other DEC authorized permit, and may involve limited or controlled discharge locations and/or heightened monitoring requirements.

institutional controls under 18 AAC 75.375 until a cleanup level is established under (b)(2), (3), or (4) of this section."

18 AAC 75.345(c): "The department will set a more stringent cleanup level than the applicable level under (b) of this section, if the department determines that a more stringent cleanup level is necessary to ensure protection of human health, safety, or welfare, or of the environment, and based on actual onsite and actual or likely offsite uses of the groundwater that are likely to be affected by the hazardous substance. In making a determination under this subsection, the department may consider:

(2) the presence of sensitive subpopulations who respond biologically to lower levels of exposure to a hazardous substance…

(5) a health advisory value developed by EPA's Office of Water…"

18 AAC 80.005(a): "The purpose of this chapter is to protect public health and safety by establishing…

(2) contaminant monitoring requirements for drinking water provided by a public water system."

18 AAC 80.015(a): "A person may not

(1) cause pollution or contamination to enter a public water system; or

(2) create or maintain a condition that has a significant potential to cause or allow the pollution or contamination of a public water system."

The department may revise this memorandum as new information becomes available.

For more information or additional questions, please contact: John Halverson at (907) 269-7545.

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE
CONTAMINATED SITES PROGRAM

Regulatory Approach to Managing Contamination in Hydrologically Connected Groundwater and Surface Water

Technical Memorandum 01-005 **Updated: April 13, 2011**

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PURPOSE

This technical memo clarifies how groundwater cleanup criteria under 18 AAC 75 and water quality standards under 18 AAC 70 apply to the hydrologically connected groundwater and surface water (including the hyporheic zone) during the cleanup of contaminated sites (i.e., as regulated under 18 AAC 75 or 18 AAC 78 regulations). Hazardous substances may impact surface waters through overland flow from contaminated soils, or surface water or sediments from hydrologically connected, contaminated groundwater. The memo also emphasizes the coordination that is necessary between the Contaminated Sites and Water Quality Programs in these instances.

REGULATORY BACKGROUND

Groundwater cleanup criteria under 18 AAC 75 apply to groundwater and are used to derive the migration to groundwater cleanup criteria for soil. However, the Site Cleanup Rules recognize that oil and other hazardous substance cleanups must also meet the water quality standards for contaminated surface water and sediment. Key regulations are excerpted below.

18 AAC 75.345

(f) Groundwater that is closely connected hydrologically to nearby surface water may not cause a violation of the water quality standards in 18 AAC 70 for surface water or sediment. The department will, in consultation with local, state, and federal officials and the public, establish points of compliance with this subsection, taking into account the following factors:

(1) groundwater travel time and distance from sources of hazardous substances to surface water;

(2) the contribution of the groundwater to the chemical and physical quantity and quality of the surface water;

(3) organisms living in or dependent upon the groundwater to surface water ecosystems;

(4) climatic, tidal, or seasonal variations;
(5) feasibility of attaining applicable water quality standards to support the designated uses of the surface water;[1]
(6) presence of sediment contamination;
(7) if conducted for the site, the conclusions of a site-specific risk assessment conducted under the *Risk Assessment Procedures Manual*, adopted by reference in 18 AAC 75.340.
(g) If the groundwater point of compliance is established at or near a property boundary or if groundwater is closely connected hydrologically to a surface waterbody, the department will, if the department determines that sentinel monitoring is necessary to ensure protection of human health, safety, or welfare, or the environment, require a responsible person to develop sentinel monitoring wells that monitor for any hazardous substances likely to migrate to the applicable point of compliance at concentrations that exceed the cleanup levels.

Where groundwater at a site is determined to be hydrologically connected to surface water, it must meet the more stringent or more protective of either the Table C criteria in 18 AAC 75 or the Alaska Water Quality Standards under 18 AAC 70 in order to be protective for use as a drinking water source and to protect potential ecological receptors. In the regulations governing water quality there are two relevant provisions for contaminated sites.

At 18 AAC 70.050, groundwater is protected for Class (1) (A) uses (freshwater water supply):

18 AAC 70.050
CLASSIFICATION OF STATE WATERS.
(a) Except as specified in 18 AAC 70.230 (e), state water is protected for the following use classes:
(1) fresh waters - Classes (1)(A) - (1)(C);
(2) groundwaters - Class (1)(A); and
(3) marine waters - Classes (2)(A) - (2)(D).

However, according to 18 AAC 70.005, the water quality standards (WQS) do not apply to approved groundwater cleanup actions; however they continue to apply to contaminated surface water and sediment.[2]

18 AAC 70.005
NONAPPLICABILITY OF GROUNDWATER PROVISIONS.
(a) Except as provided in (b) of this section, the provisions of this chapter that are applicable to groundwater do not apply to a response, a cleanup, or a corrective action approved by
(1) the department under 18 AAC 60.440, 18 AAC 60.080, 18 AAC 75, or 18 AAC 78, except as this chapter is specifically made applicable by 18 AAC 60, 18 AAC 75, or 18 AAC 78; or
(2) the United States Environmental Protection Agency (EPA) under 42 U.S.C. 9601 - 9675 (Comprehensive Environmental Response, Compensation, and Liability Act of 1980) or 42 U.S.C. 6901 - 6992k (Solid Waste Disposal Act, as amended by the Resource Conservation Recovery

[1] Before a designated use can eliminated (feasibility determination) a use attainability study must be conducted to show the use is not achievable.

[2] Since the regulation is designed to protect the designated use of aquatic life, the standard applies only as deep as aquatic life reside. Salmon eggs and aquatic invertebrates are not generally found deeper than 40 cm.

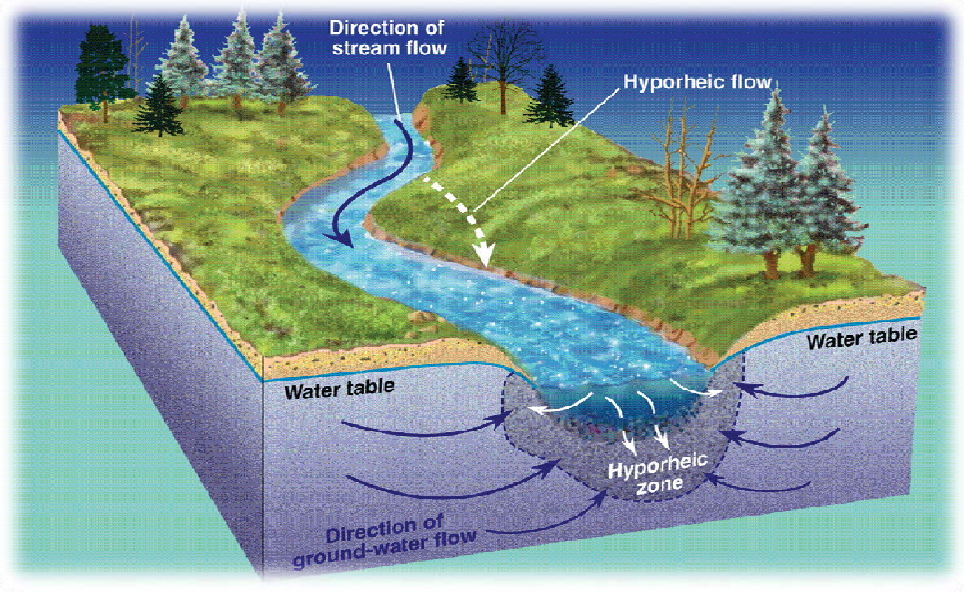
Act), if the response, cleanup, or corrective action meets, at a minimum, the site cleanup rules at18 AAC 75.325 – 18 AAC.75.390.
(b) This section does not affect the application of this chapter to contaminated surface water and sediment.

18 AAC 70.020.11 (c)
WATER QUALITY STANDARDS FOR DESIGNATED USES
There may be no concentrations of toxic substances in water or in **shoreline or bottom sediments** (emphasis added)**,** that, singly or in combination, cause, or reasonably can be expected to cause, adverse effects on aquatic life or produce undesirable or nuisance aquatic life, except as authorized by this chapter.

DETERMINING WHICH STANDARDS APPLY

Given this regulatory setting, choosing the applicable standards may not be clear-cut. At the most basic level, groundwater cleanup levels under 18 AAC 75.345 (Table C) apply to groundwater at a contaminated site that is not in contact with surface water. Whereas, 18 AAC 70 Water Quality Standards apply if the water appears at the surface. The hyporheic zone, however, includes both groundwater and surface water. Therefore, which regulatory criteria apply in this transition area?

Defining the Hyporheic Zone



The hyporheic zone is a region beneath and lateral to a stream bed, lake, wetland, or estuarine area where there is mixing of shallow groundwater and surface flow. Fluctuation may occur daily (e.g. tidal events) to seasonally (e.g. peak surface water discharge or peak groundwater movement). Hyporheic flow paths can also be lateral or vertical moving in a downstream direction and are driven primarily by topographic features and changes in substrate permeability. Fluvial processes also wield a strong control on the hyporheic zone at many levels; e.g. spatial scales, annual, seasonal and storm event timescales.[3]

[3] Barnes, Dave and Horacio Toniolo. June 2006. Literature review of the hyporheic zone: prepared for the Alaska Department of Environmental Conservation. University of Alaska Fairbanks, Department of Civil and Environmental Engineering, Water and Environmental Research Center. 15pp.

The flow dynamics and behavior in the hyporheic zone are important for surface water/groundwater interactions, as well as fish spawning and other processes. The hyporheic zone is an important location for hydrologic, biogeochemical, and biological processes. This biological ecotone provides an ideal habitat for hyporheic fauna and aquatic organisms (hyporheos). The exchange of water in the hyporheic zone also helps regulate stream water temperatures which are important to nutrient cycling and microbial activity, and is important for spawning anadromous fish which utilize the hyporheic zone during egg development.

The hyporheic zone is characterized by the presence of both water and sediment. Pore water, the water filling the spaces between grains of sediment in the hyporheic zone, has two origins: surface water (which some researchers define as anywhere from 10% to 90%), and groundwater. Because both surface water and groundwater are regulated under different authorities, the CSP project manager must be able to distinguish between the applicable regulations and defined collection methods.

Establishing the Physical Point of Compliance

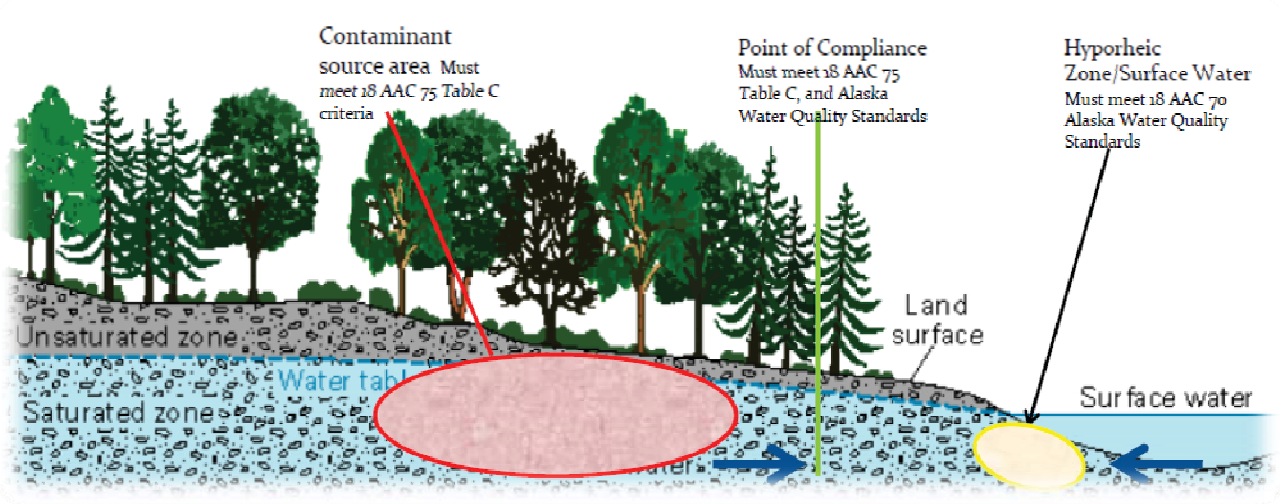
The cleanup level point of compliance is normally placed downgradient of the leading edge of a contaminant plume for the purposes of meeting Table C cleanup levels **and** to ensure the protection of surface water (see 18 AAC 75.345(f) above). In practical terms, the point of compliance should be established at a distance that is protective of a potentially impacted surface water body, where site-specific water quality parameters, or modeling, indicate the presence of a hydrologic groundwater/surface water connection (the hyporheic zone). The selected point of compliance is unlikely to reflect the transition between groundwater and surface water perfectly because the hyporheic zone represents a continuum of conditions that are very difficult to predict or measure with 100 percent confidence. However, the point of compliance must be reasonable and must pass the test of regulatory defensibility. For example, in most cases it would be unreasonable to apply surface water quality standards at a point of compliance located a mile upgradient from a salmon stream because it is unlikely the hyporheic zone reaches that far. Similarly, surface water quality standards should extend beyond the water column in a waterbody to be protective of organisms (macroinvertebrates and fish eggs) living in the stream bed and sediments.

The important consideration when establishing the point of compliance within the lateral constraints of the hyporheic zone is that groundwater **may** be a current or reasonably expected future source of drinking water, **and** the hydrological connection to nearby surface water **may** dictate the need for aquatic life protection. On the other hand, if groundwater is determined not to be a current or potential future drinking water source (i.e. water with high salinity), only surface water quality standards would be applicable.

The point of compliance where overlapping regulatory authorities apply must be reasonable and defensible.

Applying the Applicable Criteria

Once a reasonable and defensible point of compliance has been established, the next challenge for the CSP project manager is to consider both the groundwater cleanup levels and the surface water quality standards to ensure protection of human health and the environment and to achieve a defensible cleanup decision. It is at the point of compliance - the transition between groundwater and surface water – that both sets of numeric criteria need to be scrutinized.



As an example, each individual component of BTEX has a groundwater cleanup level under 18 AAC 75 Table C but are summed for Total Aromatic Hydrocarbons (TAH) under the 18 AAC 70. As a result, there may be cases where the concentration of each BTEX contaminant in pore water is below its groundwater cleanup level but the sum of all the components exceed the Total Aqueous Hydrocarbons (TAH) standard of 10 µg/L established by 18 AAC 70. For example, benzene may be detected in a pore water sample at 8.0 µg/L while concentrations of toluene, ethylbenzene and xylene concentrations in the same sample are non-detect. In this case, the total BTEX is less than the TAH criterion of 10µg/L, but benzene exceeds the Table C criterion of 5.0 µg/L. Thus the Table C value would apply.

The applicable criteria at the point of compliance are the more stringent of either the Table C levels or surface water quality standards.

It is important to note that while surface water quality standards are the starting point, numeric criteria for specific compounds may not be available under 18 AAC 70. The presence of sensitive aquatic receptors, and the type(s) of contaminants present, should be evaluated in these situations to determine if a site-specific ecological cleanup level is appropriate. If not, the Table C groundwater cleanup level may be the appropriate default.

Risk Assessments

A risk assessment may be used to develop cleanup levels where no criteria exist in either 18 AAC 75 or 18 AAC 70, or where certain receptors are present that require a more protective value than what is available. Regardless, a risk assessment cannot be used to develop groundwater or surface water cleanup levels less stringent than either the Table C values under 18 AAC 75 or the WQS under 18 AAC 70. The WQS are the first regulatory action level for surface water and cannot be waived by cleanup project managers.

A risk assessment may also be helpful in prioritizing the level of action and resources applied to clean-up. Also, because water quality regulations do not adopt any specific numeric criteria for sediments[4], an ecological risk assessment may be useful and appropriate for determining cleanup levels for sediments under the WQS.

Site-specific ecological levels and/or an ecological risk assessment may also be appropriate.

Contaminated Sites and Water Division Coordination

Contaminated Sites staff must involve the Water Quality Program staff in the Nonpoint Source Program at sites where data indicates that surface water or sediments are impacted by contamination. Staff in the Non-Point Source program will use the data to make a determination as to whether the surface water body should be listed as threatened or impaired. Additionally, proposed remedial action to address the contamination will be taken into account as Water Quality staff determine the appropriate category to assign to the waterbody. Water Quality Standards staff should also be consulted if there are questions regarding applicable surface water quality criteria.

Typically, CSP staff will be the lead in these cross-program coordination efforts. Water Quality staff will monitor the response action to ensure sure water quality standards are reached. Water Quality staff may take on a more prominent role if they are actively managing a waterbody - such as permitting, overseeing grant-funded projects, or developing Total Maximum Daily Loads (TMDLs).

[4] For guidance on screening levels and setting criteria for sediment, refer to the Tech Memo, "Sediment Quality Guidelines" dated March 2004, and the companion document, "Sediment Quality Guideline Options for the State of Alaska" (Cormack 2001). Both are available at the CSP internet website under Guidance & Forms.