AZCON/DULUTH SEAWAY PORT AUTHORITY SLIP DECISION SUMMARY
MINNESOTA POLLUTION CONTROL AGENCY
SITE REMEDIATION UNIT 2

Site Name:	Azcon/Duluth Seaway Port Authority Slip
Address:	630 Helberg Drive, Duluth Minnesota 55802
SR/AI Number:	SR0001012/AI19134
Project Manager:	Steven Schoff
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STATEMENT OF PURPOSE

This Decision Summary presents the selected remedial action for the Azcon/Duluth Seaway Port Authority (DSPA) Slip section of the St. Louis River Area of Concern (SLRAOC or St. Louis River AOC) and summarizes the facts and determinations made by the Minnesota Pollution Control Agency (MPCA) in approving the selected response actions. The response actions were designed to minimize or remove exposure to sediment contaminants that bioaccumulate in the food chain to levels that are protective of human health and the environment. MPCA is proposing to conduct limited dredging and removal of contaminated sediments above cleanup levels followed by capping and armoring, in order to minimize risks to human health and the environment and to be protective in the long term.

SITE BACKGROUND AND HISTORY

The Azcon/DSPA Slip (Slip) is an approximately 6.4 -acre active shipping slip located near the south end of Rice's Point on Superior Bay within the inner portion of the Duluth Superior Harbor, and within the boundaries of the SLRAOC. Historical releases of contaminants resulted in sediment contaminated with lead, arsenic, copper, nickel, zinc, polychlorinated dibenzo-p-dioxins/dibenzofurans (dioxins), and polycyclic aromatic hydrocarbons (PAHs).Due to these releases, the MPCA identified the Azcon/DSPA Slip as an area requiring remedial action to address contamination, a "Remedial Action Area", for the SLRAOC.

The Slip and surrounding area is highly industrialized, as it has been for over a century. Current slip tenants include a metals broker and processor on the northern side of the slip, and the Duluth Seaway Port Authority (DSPA), a public agency, on the southern side of the slip known as the Garfield C Dock.

SITE HISTORY

The Slip was shown on an 1895 topographic map and a pier is present to the north of the slip. The slip and piers have undergone several physical modifications since settlement of the area. Modern development of the harbor began after 1861. Construction of the Duluth Ship Canal was started in 1870, thereby providing a Duluth entry into the harbor from Lake Superior.

The Duluth-Superior Harbor, which connects to Lake Superior, has a long history of serving the manufacturing and shipping needs for the Duluth-Superior Region and has been home to significant historical heavy industry including paper mills, coal gasification plants, and steel processing. The Duluth-Superior port remains active in the transportation of iron ore, coal, limestone, and grain, and is the largest port on the Great Lakes in terms of shipping volume.

The U.S. Army Corps of Engineers Maritime Museum in Duluth retains several historical photos of the Slip and harbor development over time.

DESCRIPTION OF CONTAMINANTS

In 2010-2011, The United States Environmental Protection Agency (USEPA) and United States Army Corps of Engineers (USACE) conducted an extensive sediment characterization project in the St. Louis River AOC. MPCA used the AOC-wide sediment characterization data as a baseline for its planning level analysis of the assessment data, which determined areas of the SLRAOC in need of remediation, additional investigation, or restoration. The MPCA conducted an

investigation of sediment quality in the Slip as documented in the 2015 Remedial Investigation Report for the Slip. Based on this study, contaminated sediments are located in a 3.48-acre area, including the head of the Slip and along the north dock wall within the approximate 6.4-acre Slip. The Slip has been identified as a "Remedial Action Area" for the SLRAOC where remedial action to mitigate contaminated sediment is needed. Contaminants present include lead, copper, nickel, zinc, arsenic, dioxins, PCBs, and PAHs. The volume of contaminated sediments is estimated to be approximately 55,000 cubic yards. The Slip is a high priority for remedial action in the SLRAOC based on:

- Exceedance of the Midpoint Sediment Quality Target (SQT) for lead over a 3.48-acre area of the 6.4-acre Slip.
- Presence of bio-accumulating contaminants that contribute to fish advisories in the SLRAOC.
- Large area of bioactive zone sediments and benthic habitat impacted by contaminants.
- Presence of exposed contaminated sediments vulnerable to erosion and re-suspension from boat traffic in the Slip.
- High potential for continued development of this area for commercial use.

Contaminated sediment identified in the 3.48-acre area, which includes the head of the Slip and the north dock wall, and is considered to present a high likelihood of significant effects to benthic invertebrate communities.

Contaminant Of Concern	Level 1 SQT	SQT Midpoint Cleanup Level	Level 2 SQT	Units	Number Sample Stations	Stations > Level 1 SQT	Stations > SQT Midpoint	Stations > Level 2 SQT	Maximum Conc. Detected
Total PAHs	1600	12,300	23,000	µg/kg	34	26	7	6	523,030
Lead	36	83	130	mg/kg	34	28	17	12	589
Zinc	120	290	460	mg/kg	30	22	4	2	640

µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

No fish tissue or other biological studies have been completed specifically for the Slip; however, there are Minnesota Department of Health (MDH) fish consumption advisories for mercury and PCBs for the water bodies that comprise the SLRAOC. Completing remedial actions that eliminate or significantly reduce the exposure of benthic organisms to legacy-contaminated sediments in the Slip will contribute to meeting the SLRAOC goals for this beneficial use indicator.

As identified in the St. Louis River Remedial Action Plan (RAP, 2016) and later verified in the Final Sediment RI Report Azcon Slip, dated November 2015, the Slip is contributing to the following beneficial use impairments to the SLRAOC:

1) Restrictions on dredging
2) Fish consumption advisory
3) Degradation of the benthos environment

As recommended by the RAP, areas that are contributing to river sediment impairments should be addressed through remedial activities. In addition, the St. Louis River, including the Duluth/Superior Harbor, is listed as impaired water on the Clean Water Act 303(d) list for bioaccumulative toxins. Toxins include mercury, PCBs, and pesticides (DDT, dioxin, etc.). According to the MPCA, it is recommended by many programs that biotoxins be reduced within the St. Louis River estuary and harbor. Removing or isolating the contaminated sediments from the surface water/sediment interface will help in the reduction of the impaired water resulting from bioaccumulative toxins in the SLRAOC.

<u>Risk to human health</u>
The Slip is within an active harbor surrounded by commercial properties. Exposure from contaminated sediments to the public is limited given the depth to sediments within the Slip. No public swimming or wading is permitted or practical, and the Slip does not serve as a public water supply. All information to date indicates that the proposed future use of

the Slip is consistent with the current use. The major contaminant, lead, is non-volatile and not emitted from the waters of the Slip; therefore, the only remaining pathway for human exposure to contamination from the Slip is fish consumption. The size and consistent deep water does not provide significant high quality fish habitat, however, fish consumption advisories are in effect for selected fish species in the SLRAOC due to elevated concentrations of PCBs and mercury found in fish tissue (MDH, 2000). There is a potential that contaminated sediments in the Slip are contributing bioaccumulative contaminants into the fish food chain and contributing to the overall impaired use in the SLRAOC. In summary, risk to human health from contaminated sediments in the Slip is low.

Ecological risks

The depth to which benthic and other higher trophic level organisms can penetrate sediment varies, but for water depths of greater than 2.5 meters at the nearby St. Louis River Interlake Duluth Tar Superfund Site, the maximum potential penetration depth was estimated to be 0.5 meters, with the majority of the activity within the upper 15 centimeters. Accounting for the root penetration of aquatic plants increases the depth of penetration of all flora and fauna up to a depth of 1.0 meter or greater. Where water depths are less than 2.5 meters, higher trophic level organisms have the potential to penetrate the sediment to a depth of 1.0 meter or greater. Root penetration by aquatic plants has the potential to increase the maximum depth that burrowing benthic organisms can penetrate to approximately 1.0 meter. Deeply rooted shallow water and emergent aquatic and terrestrial plant roots can penetrate and be exposed at 1.0 meter or greater. Since post remedy, water depths in the Slip will be greater than 2.5 meters the sediment interval of greatest relevance for ecological exposure is the top 0.5 meters. It should be noted that no recent investigation of the Slip has found the presence of aquatic plants growing in the sediment.

There are limited pathways by which ecological receptors might be exposed to contaminants in the sediments at the Slip. Direct environmental exposure pathways include direct contact with contaminated sediments or water by benthic invertebrates and fish, and ingestion of sediments by sediment dwelling organisms and fish, which feed on invertebrates living in sediment. Indirect exposure pathways include ingestion of invertebrates by fish or fish that have bioaccumulated sediment contaminants in their tissues.

The limited screening ecological risk assessment prepared for the detailed investigation was conducted by comparing the sediment chemistry results with the Level 1 and Level 2 SQTs (Crane et al, 2000). SQTs are contaminant values that represent a level of protection of sediment-dwelling organisms. Level 1 SQTs identify chemical concentrations, which will provide a high level of protection for designated water uses, specifically for aquatic life. By comparison, a lower level of protection for designated water uses will be provided by the Level 2 SQTs. Therefore, goals of the SQTs developed for the protection of sediment dwelling organisms are:

- Level 1 SQTs are intended to identify contaminant concentrations below which harmful effects on sediment dwelling organisms are unlikely to be observed.
- Level 2 SQTs are intended to identify contaminant concentrations above which harmful effects on sediment-dwelling organisms are likely to be frequently or always observed.

Based on a comparison of the available analytical data and SQT values, the contaminants detected in the Slip sediments exceeding the SQT values are considered a risk to the benthic community and the larger ecological environment, where they are found in the top meter of sediment.

SELECTION AND DESCRIPTION OF REMEDY

As the MPCA staff evaluated potential remediation options for the Slip, the following remedial action objectives (RAOs) were established that should be accomplished by the remediation project.

1) Minimize or remove exposure to sediment contaminants that bioaccumulate in the food chain and contribute to fish consumption advisories
2) Minimize or remove exposure of the benthic organisms to contaminated sediments above the preliminary sediment cleanup goals

3) Preserve water depth to enable the current use of the slip
4) Enhance deep-water aquatic habitat if conditions allow

A Focused Feasibility Study (FFS) was completed in 2016 to evaluate alternatives to remediate contaminated sediments that represent a risk to the aquatic community that were identified in the 2015 Remedial Investigation. Alternatives were identified and screened to determine if they meet the RAOs. Meetings with the landowners required a modification of the preferred Alternative. The following alternatives were evaluated in the FFS.

Alternative 1: No Action – The No Action Alternative does not include any treatment or engineering controls, institutional controls (ICs), or monitoring. There are no costs associated with the No Action Alternative. A No Action Alternative applied to the Site would not meet criteria for protection of human health and the environment, but is included as an alternative for comparison purposes.

Alternative 2: Monitoring and Institutional Controls – This alternative does not provide any immediate improvement to protectiveness but is included as a possible placeholder to be used as an interim response. An interim response may be required should funding sources be unavailable until a later date or be distributed based on a site prioritization. The monitoring and ICs alternative would consist of evaluating trends in sediment chemical concentrations, sediment toxicity, and contaminants of concern (COC) bioaccumulation within aquatic organisms (i.e., benthic organisms) over time. ICs appropriate for maintaining protectiveness of human and environmental health would be implemented, if applicable, until sufficient contaminant degradation, transformation, isolation, or other natural recovery processes reduce Site-related risks to acceptable levels; however, natural recovery of contaminated sediments is not anticipated within a reasonable time frame at the Site, or should an alternative remedy be implemented.

Alternative 3: Cap and Armor – This alternative would consist of constructing a cap over approximately 3.61 acres, the remedial footprint, where sediment concentrations exceed the cleanup levels (CULs) for COCs. Prior to cap construction, a limited amount of sediment "grading" to prevent excessive gradients and/or excessively shallow areas after cap construction. The cap would consist of approximately 12,000 cubic yards of sand or clean import. Armoring, using approximately 5,700 cubic yards of cobble, would be across the entire cap to prevent scouring due to prop wash, as the Site is actively used. Following cap construction, ICs would be implemented to protect the capped area.

Alternative 4: Consolidate, Cap, and Armor – This alternative would consist of moving a portion of the contaminated sediments exceeding the CUL in the remedial footprint, and consolidating them in the remaining 2.2-acre area at the head of the slip. The sediments being moved, approximately 19,110 cubic yards, are located along a 1.4-acre portion of the north dock wall. The consolidated sediments would be capped and armored with approximately 7,600 cubic yards of sand/clean import and 3,500 cubic yards of cobble, respectively. Following cap construction, ICs would be implemented to protect the capped area.

Alternative 5: 1-Meter Dredge, Cap, and Armor – This alternative would consist of dredging 1.0 meter (3.3 feet) of sediments exceeding the CUL in the remedial footprint and capping. The dredged sediments, approximately 19,000 cubic yards, would be transported by barge to a staging area, stabilized with amendment materials as needed, transported by roadway, and disposed of at an off-site landfill. The benefits of dredging 1.0 meter prior to cap placement would be to offset draft loss due to capping, maintaining current site use. The cap would be constructed from approximately 12,000 cubic yards of sand or clean import. Armoring, using approximately 5,700 cubic yards of cobble, would be completed across the entire cap to prevent scouring due to prop wash, as the Site is actively used. Following cap construction, ICs would be implemented to protect the capped area.

Alternative 6: Dredge with Thin-Layer Cover – This alternative would consist of complete removal of all sediments exceeding the CULs, approximately 55,000 cubic yards (65,000 cubic yards including over dredge). The dredged sediments would be transported by barge to a staging area, stabilized with amendment materials as needed, transported by roadway, and disposed of at an off-site landfill. Following sediment removal, a 0.15-meter (0.5-feet) thin-layer sand cover (2,900 cubic yards) would be placed to reduce surface concentration of dredge residuals through mixing

of the upper sediment layer. ICs and a long-term monitoring program would not be implemented following completion of remedy construction if complete removal of contaminated sediments is achieved.

The FFS included a comparative analysis to identify and compare advantages and disadvantages of each of the alternatives. This evaluation was done using the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) remedy selection criteria in general accordance with United States Environmental Protection Agency (EPA) guidelines for feasibility studies (EPA, 1990) which divides criteria into three groups.

1. **Threshold Criteria**, which relate to federal statutory requirements that each alternative must satisfy in order to be eligible for selection and including:
    - Overall protection of human health and the environment in both short and long term
    - Compliance with applicable or relevant and appropriate requirements (ARARs) under federal, state, or local environmental laws and regulations
2. **Primary Balancing Criteria**, which are the technical criteria upon which the detailed analysis is based on, including:
    - Long-term effectiveness and permanence
    - Reduction of toxicity, mobility, or volume through treatment
    - Short-term effectiveness
    - Implementability
    - Costs
3. **Modifying Criteria based on state agency and community acceptance.**

THRESHOLD CRITERIA

Only those alternatives that would meet the threshold criteria of providing overall protection of human health and the environment were carried forward with the comparative analysis. Alternative 1 is not protective of human health or the environment, but was carried forward as it is required for analysis under the NCP. Alternative 2 does not meet threshold criteria; however, it is included as a possible placeholder to be used as an interim response. An interim response may be required should funding source be unavailable until a later date or be distributed based on site prioritization. Alternatives 3, 4, 5, and 6 would adequately protect human health and the environment from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site. Alternatives 3 through 6 would eliminate, reduce, or control exposure to contaminated sediment; however, contaminated sediment would remain in place under Alternatives 3, 4, and 5 requiring monitoring to ensure long-term effectiveness. Alternative 6 would provide the highest level of protection, since contaminated sediments would be removed from the aquatic environment.

BALANCING CRITERIA

Long-term effectiveness and permanence

Alternative 1 is not effective in the long-term or permanent. Alternatives 2, 3, 4, 5, and 6 are effective in the long term. However, contaminated sediment would remain in place under Alternatives 2, 3, 4, and 5, requiring long-term O&M and ICs to ensure long-term effectiveness, therefore, they are not as permanent. Disposal of sediment at an off-site landfill would be equally effective in the long term. Since all contaminated sediments would be removed, Alternative 6 would provide the most permanence, even though contaminants would not be permanently destroyed but moved to a landfill or controlled environment.

In summary, Alternative 6 will provide a high achievement of this criterion by removing all of the contaminated sediment in the aquatic environment above the CULs. Alternatives 3 and 4 will provide a moderate achievement of this criterion. Alternatives 3 and 4 isolate contaminated sediments through capping. Alternative 5 will provide a moderate to high achievement as approximately 1 meter of contaminated sediment in the aquatic environment above the CUL will be removed. Alternative 2 provides a low achievement of these criteria. No physical barriers or contaminated sediment removal occur in this alternative.

Reduction of toxicity, mobility, or volume through treatment

Treatment of contaminant sediments to reduce toxicity, mobility, or volume is not a major component of any of the evaluated alternatives. However, with contaminant concentrations at sediment core locations BW14AZC-018, 020, and 021, the addition of a solidification agent to dredged sediment is proposed as a means to bind excess free water. Addition of the solidification agent would indirectly reduce the toxicity and mobility of sediment disposed of at an off-site landfill. Therefore, removal of contaminants from the aquatic environment and treatment of the sediments would provide a reduction in toxicity and mobility of contaminants. Removal and treatment of the contaminants would be considered permanent.

Alternatives 1 through 4 would not provide a reduction in the toxicity, mobility, or volume through treatment. Alternatives 3 and 4 would cap the contaminated sediment in place, reducing the mobility of the sediment. In summary, Alternative 6 will provide the highest achievement of this criterion by removing all of the contaminated sediment in the aquatic environment above the CULs. Alternative 5 would be the next highest with partial removal of contaminated sediment. Some contaminated sediment would remain in place underneath a 0.95-meter cap. Alternatives 3 and 4 will provide a moderate achievement of this criterion, since contaminated sediment would remain in the aquatic environment underneath a 0.95-meter cap. Alternatives 1 and 2 provide the lowest achievement of this criterion as no reduction in toxicity, mobility, or volume is provided.

Short term risks

There are no short-term risks associated with Alternatives 1 and 2 as no actions would be implemented at the Site. The rest of the alternatives would have some short-term risks during implementation of the remedy. Alternatives 3, 4, 5, and 6 require varying amounts of dredging and/or capping that may impact short-term effectiveness. The potential short-term risks increase as the volume of contaminated sediment to be dredged increases due to additional coordination and due to the uncertainty of the slip wall stability. The potential short-term risks to the community and workers with Alternatives 3, 4, 5, and 6 are associated with increase boat/barge traffic, safety, noise, and related impacts due to working in the Duluth Harbor and other publicly accessible locations. For contaminant, concentrations at sediment core locations BW14AZC-018, 020, and 021 there are also potential short-term risks to workers from dust created from stabilization agents that are stockpiled and mixed. Truck transportation of dredged sediments to an off-site landfill would also have an increase in the short-term risks to the community and workers.

Short-term adverse effects to aquatic habitat and biota would be similar among Alternatives 3, 4, 5, and 6, and would include displacement of fish and smothering of benthic organisms; however, Alternative 3 would likely present less adverse effects since no dredging will take place only capping. Benthic organisms would be expected to be re-established for all alternatives within several growing seasons. Short-term adverse effects to surface water may also occur during dredging and capping/habitat restoration activities. Surface water control structures have shown that they are reliable in minimizing these short-term adverse effects.

Short-term risks with dock wall stability during dredging operations for Alternatives 4, 5, and 6 are also a concern and increase significantly with the total dredging option.

The time frame estimates do not include additional construction time that would be required at the staging area including: construction of a gravel staging pad, stabilization, and off-site transportation to a landfill (BW14AZC-018, 020, and 021).

Overall, Alternatives 1 and 2 will have the highest achievement of the short-term effectiveness criterion followed by Alternative 3. Alternatives 4, 5, and 6 will have low achievement of this short-term effectiveness criterion due to an increase in short-term risks from construction truck traffic to an off-site landfill.

Implementability

There are no implementability concerns associated with Alternative 1. There are few implementability concerns associated with Alternative 2; limiting ICs are required and may be difficult to implement. Dredging, capping,

restoration, surface water control structures, as well as monitoring and O&M that would be required under Alternatives 3, 4, 5, and 6 are all technically feasible and implementable from an engineering perspective. These technologies have been implemented successfully at other sediment sites and could be readily implemented at the Site. Services and materials are available for implementing each component of the remedy.

Dredging contaminated sediment with significant debris may pose additional, but not insurmountable, difficulties (Alternatives 4, 5, and 6). Vertical extent of contamination is unknown at this time; extent of contamination may increase the difficulty to implement (Alternatives 4, 5, and 6). Vertical extent of contamination should be defined prior to implementation of an alternative. In addition, there are concerns with the stability of the dock walls during dredging activities (Alternatives 4, 5, and 6). Dock wall inspection should be conducted prior to implementing an alternative; this cost estimate is not included for Alternatives 4, 5, and 6. There would be a higher risk to the stability of the dock walls, therefore, a greater degree of difficulty to implement, under a total removal scenario (Alternative 6). Weather could significantly impact productivity, particularly if done in the early spring or late fall. High winds in the late fall produce large waves that could impact productivity. Barge traffic would be postponed in the spring until ice breaking in the harbor is completed. Winter or freezing conditions in the fall could also impact productivity. Alternative 6 has the longest estimated time to complete and, therefore, would be the most impacted by weather.

Monitoring can be completed to evaluate the effectiveness of the remedy. Monitoring the effectiveness of the remedy could be more challenging, as dredging will be conducted under water; however, specialized equipment is available. Dock wall inspection, equipment staging and surface water controls would also be necessary to accommodate Alternatives 3, 4, 5, and 6.

Implementability also includes administrative feasibility of the remedy. As with most sediment remediation activities, multiple state and federal agencies and other stakeholders input is required, providing a lower achievement of administrative feasibility of implementing a remedy. Additional time will be required to obtain any necessary approvals and permits from other agencies. The sediment removed from core locations BW14AZC-018, 020, and 021 will require more coordination with other regulatory agencies than Alternatives 3 and 4, as no off-site disposal will be required. Permits for dredging and capping, however, would be required for Alternatives 3, 4, 5, and 6.

In summary, Alternative 1 has no actions to be implemented, so will provide the greatest achievement of the implementability criterion. Alternative 2 has minimal actions implemented so will be the second most implementable. Alternative 3 is third easiest to implement since it requires no dredging. Alternatives 4 and 5 will provide a moderate achievement of the implementability criterion, as less dredging and shorter schedule are anticipated. In contrast, Alternative 6 will have higher potential for interaction with debris within contaminated sediment, increased dredge depths, and dock wall issues.

Cost effectiveness

Cost estimates developed for each alternative are included in the remedy descriptions of the FFS. The cost estimates include capital costs (including both direct and indirect costs), annual O&M costs, and net present value of capital and O&M costs. Several factors that could greatly affect cost could not be reasonably estimated during this FFS and are not included in the estimated costs. These factors, which should be evaluated during final design, include:

- Dock Wall Repair: The risks of damage to and stability of dock walls described within this report increases as dredging volume increases. The vertical area of dock wall to be exposed during dredging for Alternative 6 is significantly larger compared to Alternatives 4 and 5. The costs for repair of significant damage to larger areas of dock wall could be significant. Additional measures to ensure dock wall stability during construction should be considered during the design phase. These measures, however, could add both time and cost to the remedial actions.
- Sediment traps or other means of limiting incoming sediment to maintain appropriate water depth may be required; this need will be further evaluated in the design phase of this project. If sediment traps are implemented, long-term maintenance of these traps such as sediment removal will be required. Costs for installation and/or maintaining these sediment traps are not included.

- While this FFS assumes that Former Hallet Dock #7 will be used as a staging area for costs associated with preparing Former Hallet Dock #7 for staging use and renting it are not included in this estimate and could significantly impact the final cost.
- Additional costs for habitat enhancement materials are dependent on final design and are not included.

In summary, based on the cost estimates to date, Alternative 1 provides the most cost-effective option, followed by Alternatives 2, 3, 4, 5, and 6, respectively. Alternative 3 provides the most cost-effective option that includes addressing contaminated sediments at the Site. Alternative 6 will provide the lowest achievement of the cost criterion.

MODIFYING CRITERIA

The modifying criteria, which includes state agency and community support and acceptance, were evaluated during the public notice period in July and August 2017 and at a public open house meeting held on July 20, 2017. The MPCA received written comments in regards to the proposed clean up following the meeting. The MPCA has actively engaged the Slip landowners in face-to-face meetings throughout 2017-2019.

GREEN SUSTAINABLE REMEDIATION CRITERIA

Greenhouse Gas Emissions

Alternative 1 would not produce GHG emissions. GHG emissions production from Alternative 2 would be limited to equipment mobilized for periodic sampling. Alternatives 3, 4, 5, and 6 would result in GHG emissions from the mobilization, operation, and demobilization of all fuel-powered construction equipment required to dredge, consolidate, and/or install the cap/cover.

Alternatives 4, 5, and 6 would also produce emissions during dredging activities. Alternatives 5 and 6 will produce more due to emissions associated with sediment disposal such as transport sediment by water to the handling area and during transport by land to the disposal facility; however, Alternative 5 would produce less GHG emissions than alternative 6 because the amount of dredging is considerably less with Alternative 5. Reduction of emissions can be accomplished by using equipment that is compliant with the latest USEPA non-road engine standards and retrofitting older equipment with appropriate filters.

Toxic Chemical Usage and Disposal

Portland cement is the stabilization agent used for sediment from core locations BW14AZC-018, 020, and 021. There are no other toxic chemical usage and disposal considerations associated with these alternatives.

Energy Consumption

Alternative 1 would not consume fossil fuels. Alternative 2 would consume minimal fossil fuels for periodic sampling events. Alternative 3 would result in the consumption of fossil fuels for the mobilization, operation, and demobilization of all diesel-powered construction equipment associated with the installation of the cap material, considerably less than alternatives 4, 5, and 6. Alternatives 4, 5, and 6 would result in the consumption of fossil fuels for the mobilization, operation, and demobilization of all diesel-powered construction equipment associated with the dredging and the installation of the cap/cover material. Alternatives 5 and 6 will have additional fossil fuel consumption due to hauling and disposal of contaminated sediment. Because the amount of sediment removed in Alternative 5 is considerably less than in Alternative 6, the energy consumption for sediment dredging and hauling would be less than Alternative 6.

Use of Alternative Fuels

Alternative 1 would not require the use of alternative fuels. Biodiesel blended fuels (B10 or B20) could be used as a supplemental fuel source for all diesel powered construction equipment associated with Alternatives 2 through 6.

Water Consumption

Alternative 1 would not require the consumption of water. There are few water consumption considerations associated with Alternatives 2 through 6. Alternative 2 would consume the least amount of water required to decontaminate personnel and sampling equipment. A minimal quantity of water would be required to decontaminate personnel and

equipment during sediment dredging and/or capping activities with Alternatives 3 through 6. Water treatment associated with dredging is not considered water consumption.

Waste Generation

Alternatives 1 and 4 would not generate waste. Material removed from core locations BW14AZC-018, 020, and 021 would generate waste that includes the dredged contaminated sediments. Alternative 6 would generate significantly more waste than Alternative 5 because all the contaminated sediment would be removed from the Site and disposed of.

COMPARATIVE ANALYSIS SUMMARY

The comparative analysis of alternatives narrative discussion and quantitation table did not clearly identify a superior alternative to address the contamination at the Site. Alternatives 3, 4, 5, and 6 were all protective of human health and the environment. No significant difference in the balancing criteria score was found between these alternatives other than cost. Alternative 1 was not protective and will not be selected or considered further. Alternative 2 was protective although achieved relatively few ARARs.

The modifying criteria, state/support agency acceptance, and community acceptance were assessed formally after the public comment period. Stakeholder and community input provided valuable insight as for MPCA in the selection of a preferred alternative. The MPCA held a public meeting and invited resource managers, current slip users, the public and local units of government prior to the public comment period. Current slip user input was carefully considered and help frame the remedial alternative selection.

Based on the information provided in the FFS report and on input provided by adjacent property owners, comments from the public meeting and other stakeholders, the MPCA staff has selected **Alternative 5: 1-Meter Dredge, Cap, and Armor** as the preferred option for remediation of contaminated sediment in the Slip. Dredging will be limited to the Azcon beaching area to remove the most heavily impacted sediments, and maintain the current slope after capping. Dredge depth and volumes will be determined in the USACE Remedial Design. Some of the primary reasons for selecting Alternative 5 as the preferred option are summarized below.

- Alternative 5 is protective of human health and the environment, and, with adequate long-term maintenance, it provides the same level of protection and long-term effectiveness as Alternatives 3, 4 and 6. Alternative 5 will require long term monitoring and maintenance of remaining contaminated sediment and the protective cap.
- Alternative 5 reduces the risk of compromising the stability of the adjacent dock walls that might be associated with the deeper dredging required for both Alternatives 4 and 6. because the dredge area is significantly smaller.
- Alternative 5 maintains the existing beach slope for current and future uses of the Slip.
- Primary stakeholders, including adjacent property owners, support Alternative 5, which will not adversely affect the current or planned future uses of the Slip.

DETAILED DESCRIPTION OF SELECTED REMEDIAL ALTERNATIVE 5: 1-Meter Dredge, Cap, and Armor

Since development of the FFS, the Azcon/Duluth Seaway Port Authority Slip remedial Alternative 5 has been further evaluated by a Federal Value Engineering team and project stakeholders. Based on feedback from these groups, some design details of the selected alternative have been modified from those presented in the FFS.

The selected Remedial Alternative 5 will consist of the limited dredging of sediments with COC concentrations exceeding CULs at the head of the slip in the Azcon ship beaching area and equal approximately 1,025 cubic yards. The dredged sediments will be transported by barge to a staging area, stabilized with amendment materials as needed, transported by roadway, and disposed of at an off-site landfill. Also, possible limited consolidation of the dredged beach area sediments will be explored by the USACE design team to a deep area of the slip with capping. This would eliminate disposal costs. Once dredging is complete, the area would be capped. The objective of capping sediments at the Site is to limit exposure of aquatic organisms to contaminated sediments, and thereby limit transfer of chemical contaminants to higher trophic organisms. The purpose of including dredging in the alternative is to allow adequate space for capping while maintaining current water depth and slopes. The cap design should be congruent with current and/or planned use

of the Site. It should be noted that the cap would be constructed in areas of the Site currently suitable and/or used for mooring vessels; therefore, armoring will be completed across the entire cap.

Following cap construction, ICs will be implemented and LTM will commence. The major IC and LTM components of the 1-Meter Dredge, Cap, and Armor Alternative 5 are described in the following sections.

Long-Term Monitoring

LTM will commence after remedy implementation and will include collection of Site data to ensure that cap integrity is maintained as long as COCs remain in sediments above the CUL; ensure that ICs continue to be enforced as long as COCs remain in sediments above the CUL.

Institutional controls

ICs will be necessary to maintain the cap integrity because contaminated sediments will remain in-place with this alternative. ICs may include, boat depths, boat use that may erode cap materials, and large craft anchoring.

Cost

The costs associated with each alternative are presented as Class 4 (+50/-30) estimates and are appropriate for remedial design alternative evaluations only. The estimated total present value cost for the modified Alternative 5 is $3,300,000.

PUBLIC COMMENTS AND RESPONSES

On July 20, 2017, the MPCA held an open house for public review and comment on the Slip's six cleanup alternatives. The MPCA published a request for comments on July 5, 2017, and accepted public comments through August 4, 2017. The MPCA reviewed each comment letter received, and categorized and summarized the significant comments, criticisms, and new relevant information in aggregate along with the MPCA staff's response to those comments. The summarized comments and responses are provided in the table presented on the following pages.

Summary of Public Comments and MPCA Responses
Comment: Would prefer that MPCA follow a clean-up course to remove all contamination from the Slip and cover it with clean material as seen in Alternative 6. Alternatives 3, 4, and 5 do provide protection against pollutants, but do not remove the contaminants from the estuary. (via e-mail)
Response: The MPCA appreciates your comments in regards to the proposed cleanup of the Slip. However, Alternative 5 is a more cost effective cleanup, which is protective of human health and the environment.
Comment: All material in the Slip that exceeds MPCA Industrial SRVs should be removed and properly disposed off-Site.
Response: MPCA Industrial SRVs address land-based clean ups where there is a higher potential for human exposure; the MPCA addresses underwater clean-ups in a different manner due to the limited potential for human exposure to contaminated sediments.
Comment: Should a capping option be pursued, the DSPA position is that no shallowing or capping occur in the outer 1200 ft. of the dock.
Response: The MPCA intends to design Clean-up Alternative 5 to avoid shallowing or capping in this area if at all possible.
Comment: The agreed maintenance depth of the slip is 26 ft. below low water datum (LWD).
Response: The MPCA is aware of the April 4, 1902 agreement. Current Bathometry indicates that current landowners are not following this agreement and the MPCA will not dredge to depths indicated in the document.
Comment: DSPA desires that the dredged sediment from Alternative 4 be used to slope up to its submerged Wakefield sheeting and over it if possible to stabilize the wall and fill in behind if sufficient material is available. Rip rap will be used to armor the placed dredge material. The DSPA will then likely build up the rip-rap barrier to the level of the present dock and replace the fill behind it under a separate project funded by the Authority.
Response: USACE engineers indicate that this is not a viable option due to slopes that will not hold the dredged sediment. The MPCA Selected Alternative is Alternative 5
Comment: Should capping and armor option occur, it will be necessary to maintain the current slip depth for optimal slip use including the current approximate 500' of gradual slope from the beach and the approximate outer 1,200' at a 26' depth below low water datum.
Response: The MPCA will attempt to maintain current slope near the beach area but this is dependent on the final USACE design and removal of the skid rails. If the skid rails are not removed by Azcon before construction begins, the area in question will be capped and the current slope will not be maintained.
Comment: The skid rails on the west end of the slip will need to stay in place or if necessary removed and replaced.
Response: The MPCA is aware of the skid rails and has indicated in previous conversations with you that MPCA is not willing or able to remove or replace the rails or other underwater structures. If Azcon wishes to maintain the current slope, it will need to remove the skid rails prior to the start of remedial action. Alternatively, if the rails are not removed, the area will be capped and no dredging will be possible and the current slope will not be maintained.

Comment: Our beach location must be kept in the original area as we have a winch on shore that has specific cable length for pulling vessel/barges hard aground.
Response: The MPCA understands the request to maintain the beach area in the same location so to not undermine the winch capability. The MPCA will attempt to maintain the beach slope and winch areas in the final design. If Azcon does not remove rails and underwater structures, these areas will need to be capped and a beach slope will not be able to be maintained.

Comment: MPCA staff have explained that the proposed clean-up alternatives will be based on current use and state of the dock wall. Recognizing the age and unknown state of our dock wall, we would like to review cleanup plans before formal dredging starts. The formal decision document should state that all work on our slip will be completed to our satisfaction.
Response: If the dock walls will not support dredging, the MPCA will modify the cleanup design to ensure that the walls are not in jeopardy due to the cleanup. The MPCA will not maintain or repair the walls in order to implement a dredging cleanup plan. It is the MPCA's intention to work with Slip tenants to achieve a mutually beneficial outcome of the cleanup. However, the MPCA will not guarantee or imply that it will achieve such satisfaction.
Comment: If any material in the Slip exceeds MPCA Industrial SRV's it should be removed and properly disposed of off-site.
Response: MPCA Industrial SRVs apply to land based cleanups based upon human exposures, not underwater clean-ups. Human exposure to contaminated sediments at the Slip is unlikely.

MPCA site decision

The selected response actions are consistent with the Minnesota Environmental Response and Liability Act, Minn. Stat. §§ 115B.01 to .18, and are not inconsistent with the Federal Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9601 et seq and the National Contingency Plan, 40 C.F.R Part 300. I have determined the selected response actions are protective of public health, welfare, and the environment.

Kathryn J. Sather

Kathryn J. Sather
Division Director
Remediation Division

10/11/2019

Date