



SCHOOL OF PUBLIC HEALTH
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Health Impact Assessment
Proposed Cleanup Plan for the
Lower Duwamish Waterway Superfund Site

Technical Report

September, 2013

(Final version)

Assessment and Recommendations

Institutional controls and health

Technical report

This technical report supports our HIA *Final Report*, published in September, 2013. This report is nearly identical to the Institutional Controls (ICs) and Health chapter in our *Final Report*. The major difference is addition of references for cited material.

Note, there was no version of this technical report accompanying our *Public Comment HIA Report*, which was submitted to EPA on June 13, 2013.

We made substantial changes in the text of this IC and Health technical report (and the IC and Health chapter in the *Final Report*), compared to the IC and Health chapter in the June 13 *Public Comment HIA Report*. However, there were no substantial changes to the recommendations..

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Institutional controls and health

The assessment of affected Tribes and subsistence fishers identified some important health issues related to institutional controls (ICs). We also identified broader concerns about ICs that could affect health and cost. This chapter offers information and recommendations beyond those provided in the subsistence fisher and Tribal chapters.

Institutional controls

The models of future river sediment and fish and shellfish tissue concentrations predict that the Plan's health-protective goals will not be fully achieved.[1] Resident fish and shellfish will probably still be unsafe for human consumption and higher than Puget Sound background levels, even after the 17-year period of active cleanup and monitored recovery. Therefore, the Plan is critically dependent on ICs to protect human health during and after cleanup of the river. The ICs are projected to last at least 40 years and could persist in perpetuity.

ICs are typically designed to work by limiting land or resource use or by providing information that helps modify or guide human behavior at a site. They are generally divided into four categories: proprietary controls, governmental controls, enforcement and permit tools with IC components, and informational devices. [2]

The Plan states that ICs for the Lower Duwamish Waterway (LDW) will use proprietary controls (controls on land use) and informational devices "including fish and shellfish consumption advisories to reduce human exposure from ingestion of contaminated resident seafood. EPA will rely on the existing [Washington state] fish and shellfish consumption advisories...and may implement additional advisories or other measure to provide additional protectiveness. Outreach and education programs will also be used to enhance seafood consumption advisories." [3]

There is little additional detail in the Plan. However, the Plan does acknowledge that: ICs are "difficult to monitor;" advisories are "not enforceable" and "have historically had limited effectiveness according to published studies and in EPA's experience;" and ICs raise concern about "the

burden placed on Tribes exercising their treaty rights and on other people who fish in the LDW." [4]

State and local guidelines and advisories exist for many water bodies in Washington state, including the lower Duwamish River. Existing signs along the Duwamish River attempt to inform fishers of these advisories in a variety of languages but have limited effectiveness. For example, the photo above shows people "fishing for perch" across from a yellow advisory sign on the lower Duwamish River. In addition, advisory signs are reportedly not present at some common fishing areas. Both informal and formal surveys have documented that fishers ignore the signs for many reasons.[5,6]

EPA guidance for institutional controls

The EPA is not required to identify exact ICs at the time of a proposed plan or remedy decision, especially if flexibility is appropriate.[2,7] However, EPA guidance indicates that site managers should ultimately "understand the strengths, weaknesses, and costs for planning, implementing, maintaining, and enforcing ICs;" "evaluate ICs as rigorously as any other response alternative;" "provide adequate opportunities for public participation...and opportunities for comment, such as the Proposed Plan;" and typically include "a preliminary IC evaluation...as part of site investigation efforts...for example, during an RI/FS [Remedial Investigation and Feasibility Study]." [2]

With respect to evaluating ICs as rigorously as other remedial alternatives, it is noteworthy that EPA wrote hundreds of pages in the Feasibility Study considering the merits of various other remedial alternatives, while ICs only covered 7 pages in the Feasibility Study and 3 pages in the 82-page "Detailed Cost Estimates" Appendix.[8] This and summary statements in the *Proposed Plan* are the only official information about ICs made available to the public during the public comment period for the Plan.

EPA policy does not require a complete IC plan as part of a proposed cleanup plan.[7] However, for the LDW Site, the Remedial Investigation could have collected evidence on Institutional Controls essential for eventual decision-making. It has been known throughout the 11+ years between the Superfund listing and the *Proposed Plan* that:

consumption of resident seafood poses a high risk to human health; some people catch and eat resident seafood; and fishing is not deterred by existing advisories and multilingual posted signs. Yet, even after the Feasibility Study indicated that ICs would be essential in almost any conceivable cleanup plan, there were no substantial efforts until recently to count or characterize *who* fishes in the river or to evaluate the seeming ineffectiveness of existing ICs. It is noteworthy that the EPA *EJ Analysis* recommended measures to mitigate adverse disproportionate impacts of residual contamination and ICs, including possible “offsets” such as fish trading, sustainable aquaculture, or alternative transportation for fishers.[9] However, the EPA assigned *EJ Analysis* findings and recommendations to the status of “modifying criteria,” which means they will not be considered until after public comment.

With this void of information about ICs—and in spite of noting that cleanup “alternatives that rely less on institutional controls are more readily implementable”—EPA selected a favored cleanup alternative for which ICs are essential to achieve health-protective goals.[1] Some of this information void could and should have been filled.

EPA practices related to institutional controls

The relative inattention to ICs in the *Proposed Plan* for the lower Duwamish River is not unusual for EPA.

The U.S. Government Accountability Office (GAO) reviewed the extent to which ICs are used at hazardous waste sites and whether controls are properly implemented, monitored, and enforced.[10] The GAO report (2005) reviewed 268 sites and found a general trend where ICs have been increasingly relied upon, with contaminants being left in place rather than being removed completely, even though the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) explicitly prefers permanent removal and treatment compared to more temporary measures. The report also found that remedy decision documents commonly lacked information about: implementation including timing of ICs, responsibility for monitoring of effectiveness, and enforcement responsibility. The GAO recommended that EPA review its IC recommendations,

methodologies, and guidance documents in order to ensure that ICs are effective during the time they are needed and that appropriate contingencies are in place for the long term. EPA generally agreed with GAO’s recommendations.

Costs of institutional controls

The estimated cost of ICs for the lower Duwamish River seems relatively low. This raises concerns that the true cost of cleanup is being underestimated or that the eventual IC plan could be substantially constrained by being designed to fit that IC cost estimate.

ICs were estimated to cost approximately \$15 million over a 50-year period for seafood consumption advisories, public outreach, and education, which is about 5% of the total \$305 million projected for the cleanup. The average annual cost of ICs, \$300,000 per year, is relatively low compared to the example described in the EPA *EJ Analysis*, the Palos Verdes Shelf Superfund site. The Record of Decision (2009) for that site estimated IC costs of \$1.43 million per year.[11] At this rate, a 50-year period of similar ICs for the lower Duwamish River would cost about \$72 million. Even this estimate is most likely conservative because of the additional need to consider infringement of Tribal Treaty rights.

Furthermore, this only accounts for direct costs and does not consider costs of adverse human health effects. For example, it has been suggested that cost estimates should include the costs of degrading Tribal seafood, which can subsequently lead to poorer health. In the 2007 *U.S. v. Washington “Culverts”* case, the District Court held that “implicitly incorporated in the treaties’ fishing clause is the right to have the fishery habitat protected from man-made despoliation.” [12] It is outside of the scope of this HIA to calculate health costs; however, they could be substantial.

Institutional controls are a public health intervention

ICs are an integral and essential component of the *Proposed Plan*. They are essential because the other proposed cleanup actions will not be sufficient to achieve a stated goal of remediation, to “reduce to protective levels the human health risks associated with consumption of contaminated Lower

Duwamish Waterway resident fish and shellfish by adults and children with the highest potential exposure.”[1] If the ICs fail, then the overall remediation will fail to achieve the stated goal.

For *any* proposed public health intervention, it is best evidence-based practice to assess beforehand (and afterward) whether the intervention is likely to be effective, whether it might have unfavorable or unintended consequences, whether there might be better or more cost-effective strategies, and whether and how it will be feasible to monitor if the intervention achieves its goals after it is implemented. [13-15] This is particularly true for behavioral interventions where unfavorable or inequitable consequences could occur.

There is some reasonable doubt about IC effectiveness, as evidenced in EPA’s statements in the Plan about ICs being difficult to monitor and advisories being non-enforceable and having limited effectiveness. The EPA *Ej Analysis* made an important effort to characterize the evidence base related to ICs. However, as noted earlier, EPA designated findings of that analysis as “modifying criteria,” to be considered later in selecting the final remedy. Otherwise, there is no substantial evidence base in the RI/FS or *Proposed Plan* to support or refute the likely effectiveness of the proposed ICs. Yet, this is the evidence base that the public had to rely upon, at this last official opportunity for public comment before the final remedy is selected.

Reliance on ICs to remediate a compromised aquatic system inherently raises environmental justice concerns, when ICs expect vulnerable populations to change fishing or fish consumption behaviors, even though these may be deeply rooted in cultural traditions and may be important to subsistence or family and community cohesion.[16,17] The Tribal and subsistence fisher chapters in this HIA report identify a number of ways in which the proposed ICs could adversely impact health, in a manner that would disproportionately affect these populations. Furthermore, although there is limited information to characterize their baseline health status, the available information indicates that the Tribal populations and probably a sizable number of subsistence fishers and families have existing socioeconomic and health disparities.

Clearly, further EPA evaluation of ICs is warranted, as summarized above for any substantial public health intervention. A meaningful evaluation would assess ICs relative to the cumulative burden of chemical and non-chemical threats to health and differential vulnerabilities in these populations. This would characterize the potential compounding health risk of ICs, rather than their risk in isolation. This also could identify population-appropriate ways to mitigate those risks. The EPA has established frameworks for cumulative risk assessment and integrated environmental decision making but has not established agency-wide guidelines for either approach. [18,19] Nonetheless, the concepts are sufficiently well entrenched and resources are available to support applying these concepts in this complicated exposure situation. [20-25]

RECOMMENDATIONS

Directed to EPA

EPA is stuck between the need to resolve a technological problem (residual contamination due to incomplete cleanup), for which ICs are required, and a health problem (risks to vulnerable populations), for which there should be no ICs. In order to better protect human health, EPA should enact measures to protect vulnerable populations as long as ICs are in effect.

1. EPA should follow its own institutional control guidance recommendations:

- Characterize the strengths, weaknesses, and costs for planning, implementing, maintaining, and enforcing ICs
- Evaluate ICs as rigorously as any other response alternative
- Develop procedures to coordinate with implementing entities early and often throughout the cleanup process.

2. EPA should evaluate the true health impact of institutional controls to vulnerable populations. Options to consider are:

- Conduct cumulative health assessments to accurately account for multiple physical and chemical stressors that affect Tribes and subsistence fishers that make them more vulnerable to contamination. These cumulative

risks would illustrate health impacts higher than traditional risk assessments predict.

- Determine a realistic cost estimate of IC programs so that potentially responsible parties understand their future and long-term costs relative to the cost of more cleanup now.

3. EPA should develop a robust Institutional Control Implementation and Assurance Plan (ICIAP) to protect *all* vulnerable populations who consume seafood from the Duwamish River to be funded by Potentially Responsible Parties as long as ICs are in effect.

In acknowledging that ICs will have to be used until residual contamination levels decrease, they should be as temporary as possible. The remedy decision document should refer to the ICIAP with information about implementation, including timing of ICs, responsibility of monitoring effectiveness over time, and responsibility of all parties.

Directed to EPA, City of Seattle, King County, and Port of Seattle

4. An IC Task Force should be established and include a leader from each affected community.

Current and prospective future fishers on the Duwamish River are highly diverse in terms of race, ethnicity, nationality and language. Based on what was learned in HIA focus groups and key informant interviews, there are at least 15 communities for outreach including but not limited to: the three affected tribes, urban American Indians and Alaska Natives; food bank clients; homeless communities; Asian Americans and Pacific Islanders, and several second generation low income populations.

5. The IC Task Force should incorporate a community based participatory approach to engage and empower affected populations so that they can participate meaningfully in all stages of any prospective interventions, from initial intervention and planning through implementation and follow-up monitoring for success.

The preceding Tribal and Fisher chapters provide information about community based participatory approaches. As mentioned earlier, the methods used by Burger and colleagues (2013) provide an excellent model for community engagement.[26] The EPA's *Environmental Justice Collaborative Problem-Solving Model* (2008) is another valuable resource.[27]

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