The Emerging Legal Problem of Naturally Occurring Asbestos and Washington State's Swift Creek Conundrum

Jean O. Melious[†]

Naturally occurring asbestos (NOA) is no different than asbestos found in buildings and products. Although human exposure to any asbestos is harmful, human exposure to NOA is particularly problematic because it occurs in varied locations, in varied forms, and in varied quantities. Unlike the laws applicable to asbestos in the occupational setting, the laws applicable to NOA are vague and often unhelpful. As a result, health professionals, regulators, and lawyers find it difficult to advise communities about risk and liability issues. This article examines these issues in the context of NOA in northwest Washington State. Specifically, a large landslide on Sumas Mountain in rural Whatcom County deposits more than 100,000 cubic yards of soil containing NOA and heavy metals into Swift Creek every year. Unfortunately, Swift Creek is part of an international river system that delivers NOA across farmlands, through small towns, and into Canada. This is a particularly intractable problem because asbestos-laden soil will continue to slide into Swift Creek for at least the next 400 years. As the river system continues to deposit NOA onto riverbanks, across farmland, and into yards and basement, possible health risks to humans will need to be addressed. Because the scale of this asbestos dilemma is particularly daunting, both in terms of the timeframe and of the affected geographical area, it highlights many of the difficulties of addressing NOA and its effects on communities. This article evaluates applica-

† Jean Melious is an associate professor at Huxley College of the Environment, Western Washington University, and a partner at Nossman LLP. She received a J.D. from Harvard Law School and an M.Phil. in Urban Design and Regional Planning from the University of Edinburgh. The author gratefully acknowledges the work of Douglas Naftz, who received his B.A. in Environmental Policy and B.S. in Cellular Biology from Western Washington University in 2009. To fulfill the requirements of the Honors Program, Mr. Naftz wrote his honors thesis on Swift Creek, and his research contributed substantially to this article. Thanks also to Stefan Freelan, Geographic Information Specialist at Western Washington University, who conducted the analysis supporting the discussion of the costs of acquiring property in the area affected by Swift Creek asbestos.

ble laws and discusses the difficulties of piecing together a solution to a problem that the legal system does not recognize. As agencies and residents continue to grapple with the enormous Swift Creek asbestos problem, hopefully those experiences will contribute to the development of a more rational policy to address the difficult legal and health issues raised by NOA.

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I. INTRODUCTION

[W]here we are right now is a seam between the authorities. And that's not an answer you want to hear, but to the extent I understand it, it's probably the reality.

> —Mike McCormick, Seattle District Commander, U.S. Army Corps of Engineers.[1]

1. Transcript of Swift Creek Meeting at Glen Echo Community Club 35 (Nov. 20, 2007) [hereinafter Nov. 2007 Transcript], *available at* http://yosemite.epa.gov/r10/CLEANUP.NSF/sites/sumasmtndocs/$FILE/Swift+Creek+Meeting+Transcript_Nov2007.pdf.

If there is a problem now, there must be a way to address it.

> —Clifford Villa, Assistant Regional Counsel, U.S. Environmental Protection Agency, Region 10.[2]

All asbestos occurs naturally, which makes the term "naturally occurring asbestos" (NOA) somewhat misleading. Nonetheless, the "natural" label is widely applied to asbestos minerals found in their natural state—in bedrock or soils.[3] Because NOA is "natural," it is difficult for many people to believe that exposure to asbestos in the environment could be harmful, despite the fact that asbestos used in manufactured products is known to harm health.[4]

The potential for human exposure to NOA is widespread throughout the United States.[5] According to the U.S. Geological Survey (USGS), asbestos-containing minerals have been documented in twenty-seven of fifty states,[6] including a number of areas where development is occurring rapidly. As a result, increased construction and land development will generate dust that contains NOA, leading to potential environmental health hazards from airborne asbestos.[7]

Asbestos has been regulated extensively in occupational settings because of the acute health hazards it creates in that context. Asbestos in the environment, however, exposes the many gaps in scientific knowledge about asbestos and its toxicity and adds some

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2. Minutes of the Whatcom Cnty. Council Special Surface Water Work Session 9 (July 18, 2006), *available at* http://www.co.whatcom.wa.us/council/2006/minutes/water_resources/sw0718.pdf.

3. Bradley S. Van Gosen, U.S. Geological Survey, Reported Historic Asbestos Prospects, and Natural Asbestos Occurrences in the Rocky Mountain States of the United States (Colorado, Idaho, Montana, New Mexico, and Wyoming) (2007), http://pubs.usgs.gov/of/2007/1182/pdf/Plate.pdf.

4. Jill J. Dyken & John S. Wheeler, *ATSDR's Experience with Community Exposure to 'Naturally Occurring Asbestos'*, 70 J. ENVTL. HEALTH 74 (2008).

5. Agency for Toxic Substances and Disease Registry, Dep't of Health and Human Servs., Naturally Occurring Asbestos Locations in the Contiguous USA and Alaska and the 100 Fastest Growing U.S. Counties (July 20, 2007), http://www.atsdr.cdc.gov/noa/docs/usamap.pdf.

6. Jeff Slivka, *Naturally Occurring Conditions Could Create Liability For Contractors, Insurers*, NAT'L UNDERWRITER PROP. & CAS. INS. (July 27, 2009), http://www.propertycasualty360.com/2009/07/27/naturally-occurring-conditions-could-create-liability-for-contractors-insurers; *see also Naturally Occurring Asbestos*, AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, DEP'T OF HEALTH AND HUMAN SERVS., http://www.atsdr.cdc.gov/NOA/where_is_asbestos_found.html (containing links to maps showing known deposits of NOA). In Washington State, "Swift Creek might be the most well known landslide to contain asbestos but since asbestos occurs throughout Washington State, many other landslides have the potential to contain asbestos." *Landslides Potentially Containing Asbestos*, SLIDING THOUGHT BLOG (July 9, 2009), http://slidingthought.wordpress.com/2009/07/09/landslides-potentially-containing-asbestos/; *see also Deep-Seated Landslides in Formations that Contain Asbestos*, SLIDING THOUGHT BLOG, http://slidingthought.files.wordpress.com/2009/07/asbestos-landslides2.jpg.

7. R.J. Lee et al., *Naturally Occurring Asbestos—A Recurring Public Policy Challenge*, 153 J. HAZARDOUS MATERIALS 1, 2 (2007).

epidemiological and ecological wrinkles of its own. The Agency for Toxic Substances and Disease Registry (ATSDR), a federal public health agency that addresses exposure to hazardous substances in the environment, summarized the problem of quantifying NOA exposure in communities as follows:

> Our knowledge of asbestos exposure and disease response comes almost entirely from studies of asbestos workers who experienced relatively high exposure to commercial-grade asbestos materials regularly over quantifiable periods of time, usually for many years. In contrast, NOA exposures occur to individuals of diverse ages and backgrounds and typically occur at lower levels and in an irregular or intermittent fashion.[8]

Health professionals and regulators find it difficult to advise communities about the risks posed by NOA, leaving residents uncertain about what risks they may face and what responses are appropriate. Lawyers similarly may find it difficult to provide clients or communities with clear advice about options and liabilities in this emerging legal field, which incorporates some aspects of asbestos law (even when it is not helpful in the environmental context) and excludes other aspects of the law (even when they would be helpful in the environmental context). Clients with asbestos-laden soils and communities that need to plan for growth in areas with asbestos face uncertain liabilities based on risks that are difficult to quantify.

This article examines these issues in the context of the environmental and potential health problems created by NOA from the crumbling serpentine face of Sumas Mountain in northwest Washington State. Because the scale of this asbestos dilemma is particularly daunting, both in terms of the timeframe and of the affected geographical area, it highlights many of the difficulties of addressing NOA and its effects on communities.

A large landslide on Sumas Mountain, believed to be the result of natural forces, deposits more than 100,000 cubic yards of soil containing chrysotile asbestos fibers and heavy metals into Swift Creek every year.[9] Asbestos-laden soils will slide into Swift Creek for at least the next 400–

8. Dyken & Wheeler, *supra* note 4.

9. PACIFIC SURVEYING AND ENGINEERING, INC., WHATCOM COUNTY DEP'T OF PUB. WORKS, SWIFT CREEK SEDIMENT MANAGEMENT PLAN PROPOSED DESIGN 1 (March 30, 2011) [hereinafter SEDIMENT MANAGEMENT PLAN], *available at* http://www.whatcomcounty.us/pds/plan/sepa/pdf/swift-creek-sediment-mgmt-plan-final-20110330.pdf.

600 years;[10] in the words of an engineering report, the landslide "represents a functionally unlimited sediment supply."[11]

To complicate matters, Swift Creek is part of an international river system that delivers asbestos from the landslide to Canada. Swift Creek starts at the toe of the landslide and flows west for about four miles to its confluence with the Sumas River. The Sumas River, in turn, meanders roughly fifteen miles through agricultural land and past the small towns of Nooksack and Sumas before reaching the Canadian border. Once in Canada, the river flows through the city of Abbotsford, British Columbia, before merging with the Fraser River ten miles north of the border.[12] As discussed below, the Canadian government and Canadian scientists have been actively involved in Swift Creek research. To date, however, Canada has not publicly advocated for a solution to the problem, despite evidence that American asbestos has affected Canadian rivers and farms.

When Swift Creek and the Sumas River flood, a fairly regular occurrence, receding floodwaters coat farmland with asbestos-laden soils and heavy metals. This can prevent crop growth. Until recently, sampling along Swift Creek had indicated that asbestos levels in sediments ranged from around one percent to as high as four percent. In May 2009, however, samples along areas of the Sumas River that flooded during the previous winter showed much higher concentrations. Almost all samples contained at least ten percent asbestos, and the percentage of asbestos in some samples reached twenty-seven percent. By comparison, the federal workplace standard for asbestos exposure is one percent, and federal health and environmental agencies state that there is no safe level of exposure to asbestos.

The existence of such high levels of asbestos along the Sumas River has caused concern among federal, state, and local agencies. Many of the people who live along Swift Creek and the Sumas River, in contrast, view the health risk as a figment of the environmental and health officials' imaginations. The nature of the risk that asbestos creates causes this crucial disconnect between the agencies and the people that they serve. People understand harm, especially harm to health, when they can see it and when there is a clear cause-and-effect relationship. What harm does NOA cause? In ten, twenty, or thirty years, some residents may

10. KERR WOOD LEIDAL ASSOCS., SWIFT CREEK BACKGROUND AND MANAGEMENT ALTERNATIVES: REPORT TO WHATCOM COUNTY FLOOD CONTROL ZONE DISTRICT 1-1 (2008).

11. *Id.* at i.

12. DIV. OF HEALTH ASSESSMENT AND CONSULTATION, U.S. DEP'T OF HEALTH AND HUMAN SERVS., HEALTH CONSULTATION: SWIFT CREEK SEDIMENT ASBESTOS, WHATCOM COUNTY, WASHINGTON 4 (2006) [hereinafter HEALTH CONSULTATION], *available at* http://www.atsdr.cdc.gov/hac/PHA/SwiftCreekSedimentAsbestos/SwiftCreekHC033006.pdf.

suffer from one of the lung diseases associated with asbestos. Perhaps, for any given individual, NOA exposure will result in no harm at all.

The *discovery* of asbestos in the soils, however, clearly has harmed some property owners in the area. Their property is suddenly worth much less, and they can do less with it. Although asbestos-laden sediments continue to clog Swift Creek, government agencies no longer allow the creek to be dredged. The immediate harms of flooding and of the legal uncertainty surrounding NOA appear, to some residents, to be far worse than the health risks.

As a result, residents often view the agencies charged with protecting them as the sources of their problems. As one citizen stated at a public meeting:

> I, and I'm speaking for myself but others may have the same sentiment, don't believe your fuzzy science. I'm living proof. I've been here since the '60s. I've played in it, worked in it, hauled it, ate it as a kid, and I have not suffered any ill health. And that's what people—see, they don't believe you and they don't like to be told what to do. I don't like to be told what to do with gravel on my own property. I need some fill. Now I can't even touch it and I'm too cheap to buy it, so what I've got here is a problem.[13]

Although some members of the public blame the Environmental Protection Agency (EPA) for creating the problem of asbestos, and many residents may wish that the agencies would just go away, neither the agencies nor the public will be able to close the Pandora's box of potentially dangerous contamination. Health and environmental agencies cannot say with certainty that exposure to asbestos at the levels found along Swift Creek and the Sumas River is safe, and as long as that is the case, the area remains under a cloud. Even if there is no immediate harm, the prospect of harm creates a problem. Out of fairness to the residents and property owners along Swift Creek and the Sumas River, the identification of a problem ought to lead to the timely development of a solution.

Unfortunately, existing law does not provide a clear solution. As discussed below, the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA),[14] often referred to as the Superfund law, could impose liability for exposure to asbestos resulting from human activities that artificially disrupt asbestos-laden soils. In Whatcom County, this could include creek dredging that has occurred

13. Nov. 2007 Transcript, *supra* note 1, at 59.

14. Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601–9675 (2010). See *infra* text accompanying notes 143–84, for a discussion of CERCLA and its applicability to NOA.

since the 1940s and the subsequent use of dredge spoils for unknown, but presumably widespread, purposes. However, Superfund liability raises several knotty problems.

The primary problem is that there is no dumper, no polluter, and no big company making money by externalizing the costs of its environmental harm. Although humans have dredged the creek and moved the soils, nature is the primary "responsible party." The only potentially liable parties are government agencies and private individuals who behaved rationally, even responsibly, in response to a natural threat. This raises the second problem with Superfund liability: there are very few entirely clean hands. A number of agencies, at various levels, have authorized or have been involved in actions that disturbed asbestos-bearing soils over the years. It would be difficult for any agency to attempt to impose liability on any other party without raising questions about its own role. Finally, the likely costs of liability are so high that no potentially liable party would be able to provide sufficient resources.

One hypothetical option would be to attack the problem at its source by building structures or channeling water to prevent the release of NOA from the landslide on Sumas Mountain. As discussed below, however, engineering solutions are expensive and may not even provide a permanent solution to the problem.

The United States Army Corps of Engineers (Corps) may have a role to play. The Corps has suggested that its ecosystem restoration authority could help address the Swift Creek watershed. Two immediate practical problems plague this authority: first, the Corps' cost-benefit requirements do not favor spending large sums of public money in sparsely populated areas; and second, a local partnership requirement would impose costs on cash-strapped local or state agencies.

A state-of-the-art proposal for a solution to Swift Creek might include land use planning to avoid increased exposure to asbestos-laden soils, the construction of a sediment trap to reduce short-term threats, and acquisition of the properties that are most significantly affected. Reflecting the unusual circumstances of the problem—the property is almost all in private ownership, and some riverbank homes are in small towns—the property within the hazard area could be subject to a long-term buyout program. The cost of such a program, while high, would be much lower than any other alternative.

There is no legal obligation for any agency to create or fund a buyout program, however, and no obvious funding source. Absent evidence of immediate harm, there is no constituent pressure; in fact, many constituents likely would oppose such a program. Under these circumstances, dedicating public funds to the purchase of property in a

sparsely populated area in response to a problem that is largely outside the focus of major media is unlikely.

Basic fairness calls for such a solution, however, because the status quo is not likely to be kind to property owners affected by NOA. Real estate laws require owners to disclose asbestos in *or on* property,[15] and buyers are likely unwilling to accept the risk of asbestos except at a discount. A buyout program could ensure that landowners were offered reasonable compensation, constituting both a prudent long-term fiscal policy for the public sector and the assurance of fair treatment of innocent landowners.

II. ASBESTOS RISKS AND INFORMATION GAPS

Looking around the room, I've been here longer than anybody here. I've walked on this dirt and I've drank water out of the wells and I think I'm the healthiest individual in the room.

> —Vernon Leibrant, Resident, Whatcom County, Washington.[16]

A. How Dangerous Is Naturally Occurring Asbestos?

The risk from NOA is difficult to quantify, difficult to communicate, and difficult for citizens to understand. Exemplifying this difficulty is a government publication on NOA, titled *Limiting Environmental Exposure to Asbestos in Areas with Naturally Occurring Asbestos*.[17] The fact sheet asks, "How could asbestos exposure make you sick?" and responds, "Important! Being exposed to asbestos does not mean you will develop health problems."[18] These apparently conflicting messages—that asbestos may make you sick, but then again, it may not—reflect the scientific uncertainty about asbestos and its effects, as well as the difficulty of predicting exposure to NOA.

1. Definition and Detection of Asbestos Fibers

Among the many factors that play into the uncertainties surrounding the health effects of NOA is the fact that the term "asbestos" does not clearly delineate the minerals of concern. Asbestos can be defined as follows:

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15. WASH. REV. CODE § 64.06.013 (2010).

16. Nov. 2007 Transcript, *supra* note 1, at 37.

17. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, U.S. DEP'T. OF HEALTH AND HUMAN SERVS., LIMITING ENVIRONMENTAL EXPOSURE TO ASBESTOS IN AREAS WITH NATURALLY OCCURRING ASBESTOS, http://www.atsdr.cdc.gov/noa/docs/Asbestos%20LimitExp_ENG_web.pdf.

18. *Id.* at 2.

> [C]ertain minerals that have crystallized in a finely fibrous habit, in bundles of easily separable fibers and/or fibers which are composed of smaller diameter fibrils, and with a hair-like elongated shape resembling organic fibers, with exceptionally smooth faces and displaying unusual adamantine or silky luster.[19]

The term "asbestos" was defined by industry to refer to minerals that were commercially exploited.[20] Asbestos fibers historically have been classified into two main mineralogical groups: serpentine and amphibole. Chrysotile, by far the predominate form of asbestos present at Swift Creek, is the only type of serpentine fiber and accounted for ninety-five percent of commercial asbestos applications.[21]

Chrysotile asbestos has relatively long and flexible fibers, compared to the shorter, more brittle fibers of the amphibole variety.[22] Asbestos is narrowly defined by regulatory agencies, including EPA and the Occupational Safety and Health Administration (OSHA), as fibers that are at least five micrometers (µm) in length with an aspect ratio greater than or equal to 3:1.[23] This regulatory definition of asbestos appears to be based not on epidemiological or clinical health data, but on the physical detection limits of the technology that was used to identify asbestos at the time that the regulations were developed.[24] The majority

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19. Martin Harper, *10th Anniversary Critical Review: Naturally Occurring Asbestos*, 10 J. ENVTL. MONITORING 1394, 1394 (2008).

20. *Id.*

21. ROBERT VIRTA, U.S. GEOLOGICAL SURVEY, ASBESTOS: GEOLOGY, MINERALOGY, MINING AND USES (2002), *available at* http://pubs.usgs.gov/of/2002/of02-149/of02-149.pdf. There are five types of amphibole minerals, including actinolite, anthophyllite, grunerite (amosite is the asbestiform version), riebeckite (crocidolite is the asbestiform version), and tremolite. Harper, *supra* note 19, at 1394. Actinolite fibers have been found in some Swift Creek-related soil samples. JULIE WROBLE, U.S. ENVTL. PROTECTION AGENCY, ENVIRONMENTAL MONITORING FOR ASBESTOS: SUMAS MOUNTAIN ASBESTOS SITE SELECTED RESIDENTIAL PROPERTIES 3 (2011), *available at* http://www.epa.gov/region10/pdf/sites/sumasmountain/asbestos_monitoring_report_april2011.pdf. Other minerals, including talc and various lesser-known minerals that were not commercially exploited, may also have an asbestiform habit. Harper, *supra* note 19, at 1394–95. "Asbestiform" describes the shape assumed by crystals of minerals when they form as thin-hair-like fibers. Lee, *supra* note 7.

22. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, U.S. DEP'T. OF HEALTH AND HUMAN SERVS., TOXICOLOGICAL PROFILE FOR ASBESTOS 2 (2001) [hereinafter TOXICOLOGICAL PROFILE], *available at* http://www.atsdr.cdc.gov/toxprofiles/tp61.pdf.

23. HEALTH CONSULTATION, *supra* note 12, at 6.

24. "The limit of [one] percent asbestos by weight for ACM is a somewhat arbitrary level and was chosen because of technological constraints (i.e., polarized light microscopy (PLM) could not detect asbestos levels below this level)." ANTHONY PERRY, U.S. ENVTL. PROT. AGENCY, A DISCUSSION OF ASBESTOS DETECTION TECHNIQUES FOR AIR AND SOIL: REPORT PREPARED FOR OFFICE OF SUPERFUND REMEDIATION AND TECHNOLOGY INNOVATION (2004). The scientific bases of NOA regulations thus appear to be rather tenuous, and based largely on industrial standards that were formulated using outdated PLM technology. The instrument capability derives from Phase Contrast Microscopes (PCM), which are most commonly used to analyze asbestos samples originat-

of asbestos fibers identified at Swift Creek are shorter than five micrometers in length.[25] While such fibers do not meet the regulatory definition of asbestos, it has not been established that they do not have health impacts.[26] Because health and environmental agencies regulate asbestos based on outdated technological constraints, and because the of the limited knowledge of the effect of the shorter fibers prevalent at Swift Creek, existing regulatory standards do not adequately address the real risk of asbestos at the site.

2. Health Risks from Asbestos

Asbestos fibers are dangerous when inhaled because the fibers lodge in the lungs. They can remain there for a lifetime, damaging the lungs or lung lining. Although asbestos is associated with asbestosis (pneumoconiosis), a scarring of the lungs caused by exposure to relatively large asbestos concentrations in the workplace, lung cancer and mesothelioma are the major health concerns related to asbestos in the environment.[27] Mesothelioma is a cancer of the tissue that lines the lungs, stomach, heart, and other organs.[28] ATSDR, the federal agency that compiles such data, describes mesothelioma as a "relatively rare" cancer primarily associated with exposure to asbestos. Lung cancer, in contrast, is the leading cause of cancer-related death, accounting for about twenty-nine percent of all cancer deaths. Cigarette smoking is by far the most important risk factor for lung cancer, and cigarette smoking

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ing from industrial activity. *Id.* Transmission electron microscopy is more efficient. It can identify fibers at 30,000 times magnification, where an optical microscope can only identify fibers at 400 times magnification. OFFICE OF INSPECTOR GENERAL REPORT, EPA'S ACTIONS CONCERNING ASBESTOS-CONTAMINATED VERMICULITE IN LIBBY, MONTANA 2001-S-7 20 (2001), *available at* http://www.nycosh.org/workplace_hazards/epa-oig-montana.pdf. Electron microscopy is capable of resolving asbestos fibers smaller than five micrometers in length, but is considerably more expensive than PCM. ECOLOGY & ENV'T, INC., U.S. ENVTL. PROT. AGENCY, SUMMARY REPORT OF EPA ACTIVITIES, SWIFT CREEK ASBESTOS SITE, WHATCOM COUNTY, WASHINGTON 3-1 (2007) [hereinafter 2007 EPA SUMMARY REPORT], *available at* http://yosemite.epa.gov/r10/CLEANUP.NSF/sites/sumasmtndocs/$FILE/Final+Report.pdf. When electron microscopes are used to analyze asbestos samples, fibers are counted in Polarized Light Microscope Equivalents (PCME), and only those fibers meeting the strict regulatory definition are included in the final count. *Id.*

25. 2007 EPA SUMMARY REPORT, *supra* note 24, at 6-3.

26. ATSDR has observed:

> [A]nalyses of autopsied human lung tissue of asbestos-exposed and non-exposed patients often show greater numbers of short (< 5 µm) than long (> 5 µm) retained fibers, and short chrysotile fibers have been reported to be the most prevalent type of fibers found in parietal pleura tissue from asbestos-exposed autopsy cases.

TOXICOLOGICAL PROFILE, *supra* note 22, at F-23 (citations omitted).

27. Harper, *supra* note 19, at 1394.

28. *Mesothelioma*, NAT'L INSTITUTES OF HEALTH, http://www.nlm.nih.gov/medlineplus/mesothelioma.html (last visited Nov. 22, 2011).

combined with asbestos exposure greatly increases the likelihood of lung cancer.[29]

Diseases from asbestos exposure take a long time to develop. Signs or symptoms of asbestos-related disease usually do not appear for ten to twenty years,[30] and mesothelioma has a thirty- to fifty-year latency period.[31] When symptoms do appear, however, they may resemble the symptoms of other diseases. There is no effective treatment for asbestosis, which may lead to respiratory failure and death over twelve to twenty-four years. Mesothelioma is usually associated with an extremely poor prognosis.[32]

According to ATSDR, all types of asbestos cause cancer, but the amphibole type is considered the most toxic.[33] There is no conclusive epidemiological data that supports this statement, however, and EPA does not differentiate between fiber types when assessing risk of asbestos exposure.[34] The International Agency for Research on Cancer has concluded that all commercial asbestos fibers cause lung cancer and mesothelioma, and has found sufficient evidence that asbestos also causes laryngeal and ovarian cancers.[35] Likewise, the World Health Organization (WHO) has concluded that all forms of asbestos, including chrysotile, cause cancer. WHO notes that no threshold has been identified for the carcinogenic risk of chrysotile and recommends avoiding work likely to disturb asbestos fibers.[36] Australia, New Zealand, and all countries in the European Union have banned chrysotile.[37]

Uncertainties regarding asbestos risk, intertwined with politics, have precluded asbestos bans in the United States and Canada. Asbestos is an overtly political issue in Canada, where a large mine in Quebec produces chrysotile asbestos for export, and the federal government subsidizes the Chrysotile Institute, a Quebec-based advocacy group

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29. *Asbestos: Health Effects*, AGENCY FOR TOXIC SUBSTANCES & DISEASE REGISTRY (April 1, 2008), http://www.atsdr.cdc.gov/asbestos/asbestos/health_effects/.

30. *Id.*

31. *Mesothelioma*, *supra* note 28.

32. *Mesothelioma-Malignant*, NAT'L INSTITUTES OF HEALTH, http://www.nlm.nih.gov/medlineplus/ency/article/000115.htm (last visited Nov. 22, 2011).

33. TOXICOLOGICAL PROFILE, *supra* note 22, at 1.

34. Interview by Douglas Naftz with Julie Wroble, Toxicologist, U.S. Envtl. Prot. Agency (Mar. 2, 2009).

35. T.L. Ogeden, *Canadian Chrysotile Report Released—At Last*, ANNALS OCCUPATIONAL HYGIENE 1, 3 (2009).

36. WORLD HEALTH ORG., ELIMINATION OF ASBESTOS-RELATED DISEASES 2 (Sept. 2006), *available at* http://www.who.int/occupational_health/publications/asbestosrelateddiseases.pdf.

37. Mia Rabson, *Stop Paying to Promote Asbestos Use, Martin Urges*, WINNIPEG FREE PRESS, Nov. 6, 2011, http://www.winnipegfreepress.com/local/stop-paying-to-promote-asbestos-use-martin-urges-88532167.html.

established in 1984 to promote the use of chrysotile.[38] In 2007, Health Canada, the Canadian federal health department, convened an "expert panel" of scientists with varied views on the health risks of chrysotile exposure.[39] The panel's report, which contained cautious statements suggesting that several sources indicate that chrysotile probably causes lung cancer, was withheld from publication for over a year. This prompted the panel's British chair to observe, "[t]he unexplained long delay in publishing the Canadian report illustrates that chrysotile risk is still a political issue, but the table and other aspects of the report illustrate the wide measure of agreement that now exists on the science."[40] Canada has since led the effort to block the designation of asbestos as a hazardous substance under the Rotterdam Convention, an international treaty that imposes disclosure and trade requirements on listed substances.[41]

In the United States, EPA attempted to phase out and ban the manufacture, import, processing, and distribution of asbestos products in 1989,[42] but the Fifth Circuit overruled the attempted ban two years later in *Corrosion Proof Fittings v. EPA*.[43] The court recognized that "[a]n EPA-appointed panel reviewed over one hundred studies of asbestos and . . . concluded that asbestos is a potential carcinogen at all levels of exposure, regardless of the type of asbestos or the size of the fiber."[44] The court held, however, that EPA "presented insufficient evidence" to justify the ban,[45] reasoning that EPA had not sufficiently balanced asbestos' toxic effects on health and the environment against the benefits of asbestos, the availability of substitutes, and the economic consequences of the rule.[46] Characterizing EPA's proposed ban as the

38. *Id.*

39. HEALTH CANADA, CHRYSOTILE ASBESTOS CONSENSUS STATEMENT AND SUMMARY: CHRYSOTILE ASBESTOS EXPERT PANEL (Mar. 2008).

40. Ogeden, *supra* note 35.

41. Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, *opened for signature* Sept. 10, 1998, 2244 U.N.T.S 337; *see* Steve Rennie, *Harper Parties in Mining Town as Canada Keeps Asbestos off Hazardous List*, GLOBE AND MAIL, Jun. 24, 2011, http://www.theglobeandmail.com/news/politics/harper-parties-in-mining-town-as-canada-keeps-asbestos-off-hazardous-list/article2074399/.

42. Asbestos; Manufacture, Importation, Processing, and Distribution in Commerce Prohibitions, 54 Fed. Reg. 29,460, 29,468 (July 12, 1989) (to be codified at 40 C.F.R. pt. 763).

43. Corrosion Proof Fittings v. U.S. Envtl. Prot. Agency, 947 F.2d 1201, 1214–15 (5th Cir. 1991). Note that in their amicus briefs, Canada and Quebec opposed EPA's proposed ban; however, the court held that Canadian entities, including a Canadian mining company, did not have standing. *Id.* at 1208–09.

44. *Id.* at 1207.

45. *Id.* at 1214–15.

46. *Id.* at 1216; *see also id.* at 1223 ("EPA, in its zeal to ban any and all asbestos products, basically ignored the cost side of the TSCA equation.").

"death penalty alternative"[47] (referring to the "death" of asbestos under the ban), the court held that EPA had not sufficiently established that less burdensome alternatives would be insufficient. The first Bush Administration did not appeal the court's ruling, and manufacturers still use asbestos in consumer products in the United States, including brake pads and clutch linings.[48]

Although the last U.S. asbestos mine closed in 2002, the United States imported 2530 metric tons of asbestos in 2005, along with 90,000 metric tons of products that contain it.[49] Washington Senator Patty Murray introduced a bill to ban asbestos in 2002. The bill, Ban Asbestos in America Act, S. 742, 110th Cong. (2007), passed the Senate in 2007, but has not become law.[50]

3. Exposure to and Epidemiology of Naturally Occurring Asbestos

NOA is found in a number of areas in the United States and around the world. The USGS and ATSDR have documented NOA in more than half of the states, including much of the West Coast.[51]

Several of the areas investigated by ATSDR and EPA involve mining, which entails more intense occupational exposure than the Swift Creek asbestos situation. The infamous vermiculite mine in Libby, Montana, was so heavily contaminated with taconite asbestos that it caused asbestos-related disease affecting at least 1200 Libby residents.[52] Additionally, mines in Minnesota, New Jersey, and Alaska have also created health concerns.[53] A taconite mine at Silver Bay, Minnesota, released predominately short asbestos fibers in the air. Although these

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47. *Id.* at 1215.

48. *Mesothelioma and Asbestos Risk for Auto Mechanics*, SURVIVING MESOTHELIOMA: A PATIENT'S GUIDE (March 19, 2010), http://www.survivingmesothelioma.com/news/view.asp?ID=00111.

49. David Whitney, *Senate is Close to a Deal on a Bill to Ban the Use of Asbestos*, KNIGHT-RIDDER WASH. BUREAU (June 12, 2007), *available at* 2007 WLNR 10969779.

50. Senator Patty Murray, *Ban Asbestos in America*, http://murray.senate.gov/public/index.cfm/banasbestosinamerica (last visited Nov. 22, 2011). Senator Murray has observed: "As I've pushed my bill in Congress, one of the biggest hurdles has been the senators' and representatives' assumption that asbestos was banned long ago." Jennifer L. Leonardi, *It's Still Here! The Continuing Battle over Asbestos in America*, 16 VILL. ENVTL. L.J. 129, 130 (2005). Concerns over the scope and expense of asbestos lawsuits, as well as the economic and political strength of the asbestos lobby, have also contributed to the continued use of asbestos in the United States. *Id.* at 146.

51. *See, e.g.*, Van Gosen, *supra* note 3; Bradley S. Van Gosen, U.S. Geological Survey, Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Asbestos Occurrences in Oregon and Washington (2010), http://pubs.usgs.gov/of/2010/1041/downloads/Plate.pdf.

52. Bianca Forde, *Revisiting Asbestos-Contaminant Exposure, Regulation, and Reckoning: When Death is in the Air*, 35 B.C. ENVTL. AFF. L. REV. 289, 290 (2008). *See generally* ANDREW SCHNEIDER & DAVID MCCUMBER, AN AIR THAT KILLS: HOW THE ASBESTOS POISONING OF LIBBY, MONTANA UNCOVERED A NATIONAL SCANDAL (2008).

53. Harper, *supra* note 19, at 1401–03.

fibers, like many of the fibers detected at Swift Creek, were shorter than the five-micrometer standard in some asbestos regulations, some experts contend that these shorter fibers create a health risk that is as yet unrecognized by the antiquated asbestos regulatory scheme.[54] In Ambler, Alaska, the asbestos-containing tailings of a mine were used to create unpaved gravel roads,[55] similar to the use of dredged materials for numerous purposes in the Swift Creek area.

Most of the regulatory activity concerning NOA has focused on the El Dorado Hills area of California, about twenty miles east of Sacramento.[56] Asbestos there is sequestered in subsurface mineral deposits, where it can be released when disturbed by soil excavation, driving on dirt roads, or detonation of explosives to clear land.

NOA was first identified in El Dorado County in the 1980s along serpentine-rich dirt roads, which EPA subsequently paved to limit exposure.[57] In 1998 and 1999, officials discovered that asbestos concentrations in air samples taken near the Golden Sierra High School in El Dorado County exceeded state air quality limits for asbestos, posing a health risk.[58] These findings prompted the California Air Resources Board to increase sampling in the area, and culminated with activity-based sampling by EPA in October 2004.[59] The State of California and County of El Dorado responded by enacting regulations to reduce and mitigate activities likely to create airborne dust.

Outside the United States, studies and reports of inhabitants exposed to NOA indicate the possibility of health risks. Studies in South Africa and Western Australia, where commercial asbestos mining occurred, found that residents who were not involved in mining had elevated disease risks. As noted in an article reviewing these studies, however, "[i]n the mining regions, it is obviously more difficult to separate out the potential for exposure and disease from the simple presence of asbestos in the soils and rocks in the absence of mining

54. *Id.* at 1401.

55. *Id.* at 1402.

56. This area contains deposits of asbestos associated with ultramafic serpentine rock formations along the West Bear Mountains Fault, which runs north to south within El Dorado County. KAREN LADD, U.S. ENVTL. PROT. AGENCY, EL DORADO HILLS NATURALLY OCCURRING ASBESTOS MULTIMEDIA EXPOSURE ASSESSMENT: EL DORADO HILLS, CALIFORNIA 2-1 (2005).

57. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, HEALTH CONSULTATION PUBLIC COMMENT RELEASE FOR EVALUATION OF COMMUNITY-WIDE ASBESTOS EXPOSURES 3 (2010), *available at* http://www.edcoe.k12.ca.us/supts/whats_new/asbestos/documents/ATSDRHealthConsultation_EDH_32910.pdf.

58. DEP'T OF TOXIC SUBSTANCES CONTROL, REPORT ON SURFACE SOIL SAMPLING FOR NATURALLY OCCURRING ASBESTOS GARDEN VALLEY, CALIFORNIA 1 (2002), *available at* http://www.dtsc.ca.gov/SiteCleanup/Projects/upload/Garden-Valley_REP_Soil_10-02.pdf.

59. LADD, *supra* note 56, at 5-3.

activities."[60] Other reports from several regions of the world where mining never occurred, but where many different forms of asbestos were found, have shown elevated risks of disease.[61]

Health risks from NOA come from exposure, and the exposure pathway of greatest concern is inhalation. For exposure through inhalation to occur, asbestos must become airborne.[62] Swift Creek appears to be unique in the world as a delivery system for airborne asbestos. In other areas, including El Dorado Hills in California, asbestos fibers are not likely to be airborne until some human activity—building, farming, driving off-road vehicles that kick up dust—disturbs the soils. In contrast, the landslide on Sumas Mountain continually disturbs asbestos-containing soils, which are then distributed by the flooding of Swift Creek and the Sumas River. The flooding creates new layers of asbestos-laden soils that are not contained under vegetation, under soils, or within rocks. Floods deposit asbestos-laden soils in residents' yards and basements and in city storm drains. The intrusion of these asbestos-laden soils into people's living spaces creates possibilities of exposure unlike any other in the world, making it particularly difficult to estimate the risk from NOA in this region.

III. THE HISTORY OF NATURALLY OCCURRING ASBESTOS AT SWIFT CREEK

I've talked to the members of my staff, I've talked to the EPA, and this is one of the rare places in the United States that, yeah, there's asbestos occurring, naturally occurring in very many places around the country. But this is one of the very few places where water is impacting with the naturally occurring asbestos and then transporting it to various places.

> —Colonel Mike McCormick, U.S. Army Corps of Engineers.[63]

A. Geography and Geology

Swift Creek is located in the far northwestern corner of the United States. Canada borders Whatcom County to the north, the Pacific Ocean borders the county to the west, and the rugged Cascade Mountains

60. Harper, *supra* note 19, at 1396.

61. Countries reporting exposure to fibrous minerals, not all of which fall within the traditional definition of asbestos, include Turkey, Greece, Cyprus, Austria, Corsica, Afghanistan, Italy, New Caledonia, China, Japan, Bulgaria, and Finland. *Id.* For example, in Bulgaria, tobacco farmers whose soils contained mineral fibers showed pleural plaques. *Id.*

62. *Id.* at 1398.

63. Nov. 2007 Transcript, *supra* note 1, at 37.

dominate the eastern part of the county. Seattle is about ninety miles to the south; Vancouver, British Columbia, is about fifty miles to the north.

Moving water crisscrosses this predominately rural landscape. Swift Creek's headwaters are on Sumas Mountain, a forested ridge of serpentine rock that marks the transition between flat farmland and the Cascade Mountains. In the late 1930s, a landslide took place on Sumas Mountain[64]—not a single slide, but the start of an ongoing, massive, slow-moving shifting of soil and rocks. No artificial trigger has been associated with the Sumas Mountain landslide, and engineers assume that a natural event, seismic or hydrological, probably triggered the landslide.[65] Whatever the reason, the Swift Creek landslide has not been susceptible to the apportionment of blame.

The asbestos found in Swift Creek comes from the bedrock geology of the landslide. The serpentinite minerals on Sumas Mountain contain a significant proportion of asbestos. Asbestos fibers weather easily, breaking down into sediments that the landslide deposits in Swift Creek. Of the sediment load that reaches Swift Creek, engineers have estimated that forty-four percent of the particles are larger than sand.[66] These particles are transported along the bottom of the streambed as bedload, which probably poses little hazard to humans; as for other species, salmon have not been found in Swift Creek since the 1970s.[67]

The problem is that much of the sediment load consists of "fine sediments," and most of the fine sediments consist of chrysotile fibers.[68]

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64. The earliest aerial photographs showing landslide activity at Swift Creek were taken in 1940, and interpretation of the photographs indicates that landslide activity probably began in the late 1930s. KERR WOOD LEIDAL, *supra* note 10, at 4-2.

65. Landslides are usually triggered by single events, including earthquakes, hydrological events such as heavy rainfall or stream erosion, or an artificial trigger, such as excavation or blasting. *Id.* at 4-3. One theory is that a strong earthquake in 1872 may have created conditions favorable to the infiltration of water during particularly heavy rains from 1930 through 1932. *Id.*

66. *Id.* at 4-11. Efforts are ongoing to characterize the sediments and their transport. A recent study observed that fine sediments constituted a far smaller percentage of the bedload, but also noted difficulties in measurement:

> The erosion rate of the SCL was estimated to be 158 mm [per year], while the erosion rate of just the unvegetated toe, where most of the suspended sediment is presumed to originate, is approximately 1 m [per year]. The annual suspended sediment yield estimated to be approximately 910 t [per square kilometer, per year], is only about 5% of the bedload estimate. The suspended sediment yield is probably an underestimation because of the inability to sample during several of the large rain events and because of the inclusion of debris flow deposits in the bedload estimate.

Tovah M. Bayer & Scott Linneman, *The Nature and Transport of the Fine-Grained Component of Swift Creek Landslide, Northwest Washington*, 36 EARTH SURFACE PROCESSES AND LANDFORMS 624, 637 (2011).

67. *See infra*, text accompanying note 78.

68. Bayer & Linneman, *supra* note 66, at 624, 673 ("The chrysotile fibers . . . make up at least 50%, by volume, of the suspended load transported in Swift Creek . . . .") ("The fine-grained com-

Fine sediments travel in suspension in the water column. Swift Creek transports chrysotile fibers into the Sumas River, which bisects small towns en route to crossing the border into Canada, where it eventually merges into the Fraser River. It is becoming increasingly clear that asbestos fibers hitch a ride along this entire route.[69]

B. The 1950s Through the 1970s: Floods and the Discovery of Asbestos

The Sumas Mountain landslide quickly clogged Swift Creek with sediment. During the 1950s, Whatcom County conducted drainage studies on Swift Creek.[70] In the mid-1960s, the federal Soil Conservation Service, the predecessor to the Natural Resources Conservation Service, conducted several studies of Swift Creek sediments and the effects of sedimentation. It concluded that landslide stabilization was not feasible and recommended the construction of levees to keep Swift Creek within its banks.[71]

Swift Creek did not, however, stay in its banks, and the 1970s were Swift Creek's high water mark in more ways than one. Severe flooding focused attention on Swift Creek and its sediments. By the end of the 1970s, asbestos had been identified in both sediments and the water. Government agencies knew of the likely transport of asbestos to Canada through the river system, and the most comprehensive study of potential engineering approaches to the landslide conducted to date was completed. Almost everything that is known about Swift Creek was known in the 1970s, at least in broad outline.

A debris flow carrying 150,000 cubic yards of sediment clogged Swift Creek in 1971, flooding adjacent fields. In response, the Corps built levees, berms, and training dikes for most of the floodplain reach of Swift Creek.[72] In the first recorded episode of sediment removal, the Corps dredged Swift Creek.[73]

Dikes, levees, berms, and dredging did not, of course, affect the source of the sediment: the landslide on Sumas Mountain. The Corps

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ponent of the [Swift Creek Landslide] is predominantly chrysotile with minor amounts of lizardite, illite, chlorite and occasionally hydrotalcite.").

69. KERR WOOD LEIDAL, *supra* note 10, at 4-8 to -9. The Soil Conservation Service estimated that around 230,000 cubic yards of sediment had been deposited in the Sumas River from Swift Creek over the thirty-year period that preceded 1965, and proposed a location for a sedimentation basin to reduce the rate of sedimentation. CONVERSE DAVIS DIXON ASSOCS., INC., PHASE II SUBMITTAL, GEOLOGIC AND ENGINEERING ANALYSIS, SWIFT CREEK TRIBUTARIES, SUMAS RIVER WATERSHED, WHATCOM COUNTY, WASHINGTON 11 (Dec. 1975) (on file with author).

70. KERR WOOD LEIDAL, *supra* note 10, at 2-6.

71. *Id.* at 2-9.

72. CONVERSE DAVIS DIXON, *supra* note 69, at 12.

73. The Corps excavated 70,000 cubic yards of bedload from the Swift Creek channel. *Id.* at 6; KERR WOOD LEIDAL, *supra* note 10, at 2-9.

examined the landslide in 1971, evaluating engineering options and costs for the "remediation" of the landslide, but determined that the project was not economically justified.[74] No action was taken, and Swift Creek flooded severely again four years later. In 1975, a large flood left a twelve- to twenty-inch layer of sediments in agricultural fields.[75]

That same year, in response to large, destructive floods, the Soil Conservation Service hired a geotechnical consulting firm, Converse Davis Dixon Associates, to evaluate the feasibility of engineering solutions to the landslide project.[76] The firm's geotechnical report now provides a snapshot of Swift Creek at the midpoint of its chronology, approximately thirty-five years after the landslide began and approximately thirty-five years ago. The report described the landslide as "teardrop-shaped" and encompassing approximately 225 acres.[77] It observed that local residents had not reported salmon runs for "several years" in Swift Creek, consistent with the Washington Department of Fish and Wildlife's conclusion that salmon could not utilize Swift Creek "in its present state." It was possible, the consultants pointed out, that salmon in the Sumas River could also be affected by Swift Creek sediment. The report stated that a "much more broad-based study of sediment effects within the Sumas River" would be required to determine the significance of Swift Creek.[78]

Not long after the report was released, EPA, in its first recorded appearance in the Swift Creek saga, apparently came up with evidence of Swift Creek's impact on the Sumas River. In 1976, EPA reported abnormally high levels of asbestos fibers in the Sumas River. The Water Quality Division of Environment Canada became aware of these findings, prompting water quality sampling and further research in the late 1970s and early 1980s.[79]

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74. CONVERSE DAVIS DIXON, *supra* note 69, at 12. See *infra* text accompanying note 231, for a discussion of possible engineering solutions.

75. KERR WOOD LEIDAL, *supra* note 10, at 5-4; David L. Blake, Risk Analysis of Agricultural Exposure to Airborne Asbestos in Whatcom County, Washington State 10 (May 1990) (unpublished Master's thesis, Western Washington University) (on file with Western Washington University Library).

76. CONVERSE DAVIS DIXON, *supra* note 69, at 2.

77. *Id.* at 4 (observing that the landslide extended from an elevation of 1,000 feet up to an elevation of around 2,600 feet; the active portion was approximately 1,500 feet wide, 4,600 feet deep, and 150 to 300 feet thick).

78. *Id.* at 10.

79. KERR WOOD LEIDAL, *supra* note 10, at 5-3. Since the time that this report was prepared, laboratory tests have confirmed that chrysotile asbestos is hazardous to salmon. *See generally* Scott E. Belanger et al., *Effects of Chrysotile Asbestos on Coho Salmon and Green Sunfish: Evidence of Behavioral and Pathological Stress*, 39 ENVTL. RES. 74 (1986).

At about the same time, Washington State's environmental agency, the Department of Ecology (Ecology), correlated Swift Creek sediment with the presence of asbestos in Sumas River water samples.[80] Ecology took water samples at several points along Whatcom County rivers in November 1977. Both the samples from Swift Creek and from the Sumas River downstream of its confluence with Swift Creek contained asbestos. Samples from the Sumas River above Swift Creek, as well as samples from another creek unaffected by the Sumas Mountain landslide, did not contain asbestos.[81] In a concise summation of the Swift Creek situation, the memo concluded:

> It appears that the local farmers and those persons most affected by the slide debris and flooding will have to institute whatever action is to be taken. Whether or not any of this would have an impact on the asbestos fibre getting into the Sumas River is unknown. Assuming the siltation could be controlled by sedimentation basins, etc., possibly the amount of fibre would be decreased but probably not eliminated.[82]

C. The 1980s: Dredge, Haul, and Hope for the Best

Ecology's observation that "those persons most affected" by Swift Creek sediment would have to take care of the problem correctly predicted a regime of local dredging and local disposal of dredged sediments. Whatcom County began dredging the creek bed regularly around 1980. The county left dredged sediments on the creek banks, available as free fill to anyone who wanted to haul them away. Although there is no record of where all of the dredged material went, it was probably used in building sites and roadbeds throughout the county. This

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80. Memorandum from Darrel Anderson to Dick Cunningham, Wash. Dep't of Ecology, Sumas River, Swift Creek Drainage Asbestos Fibre Source Investigation (Feb. 11, 1977), *available at* http://www.ecy.wa.gov/pubs/77e00.pdf. A 1977 memorandum discussing the Converse Davis Dixon geotechnical report states:

> The presence of serpentinite [noted in the Converse Davis report] explains the source of asbestos fibres [sic] in the water. Although there are various forms of serpentinite, the basic structure shows fibreous [sic] structures and silky luster. This can be confirmed by water samples taken at the Sumas River water monitoring station by D.O.E, downstream from Sumas. Under the microscope the fibre [sic] structures can be seen on filter paper. Since its presence can only be identified by the filtering method one can only guess as to the amount of serpentinite entering the Sumas River drainage.

Id.

81. Samples were taken from Swift Creek, the Sumas River, and Breckinridge Creek. Breckinridge Creek, which is also a tributary of the Sumas River, is north of and roughly parallel to Swift Creek. The Sumas Mountain landslide does not affect it. Memorandum from Shirley Prescott to Dick Cunningham, Wash. Dep't of Ecology, Asbestos Fibre Source Sumas River 3 (1977), *available at* http://www.ecy.wa.gov/pubs/77e23.pdf.

82. *Id.*

approach to the dredged sediments was viewed simply as a win-win situation: local residents and industries received free fill material in return for clearing out piles of unwanted dredged sediments. Its legacy is ongoing uncertainty about the location of Swift Creek sediments, whether or not they are capable of becoming airborne, and the extent of exposure to the sediments.

Although agencies knew that asbestos was present in sediments, the record of the 1980s, to the extent that it has been pieced together, does not indicate any efforts to address the extent to which Swift Creek asbestos posed a health hazard. The dangers of asbestos in occupational settings were well known. When the presence of asbestos in Swift Creek sediments and Sumas River water was first established in the late 1970s, asbestos litigation relating to occupational exposure was in full swing. In 1982, when the Johns Manville Corporation filed for bankruptcy protection, it had been named in 17,000 asbestosis cases.[83] In the absence of acute health effects or of a regulatory regime that extended to asbestos found outside the occupational setting, however, agency concern over asbestos in Swift Creek and the Sumas River was slow to develop.

In the face of neglect, Swift Creek continued to create problems. Despite Whatcom County's dredging efforts, Swift Creek flooded severely in 1983 and again in 1984. These floods again deposited thick layers of asbestos-laden sediments on agricultural lands. Later in the 1980s, Dr. Hans Schreier, a researcher from Canada's University of British Columbia, published research demonstrating substantial asbestos fiber concentrations in the Sumas River during the 1983–84 hydrological cycle, showing that the Swift Creek landslide had influenced sediment and water quality in at least a 9.9-mile reach of the Sumas River.[84]

In several further studies, Dr. Schreier and associates attempted to analyze the presence of asbestos and related heavy metals in plants and animals in Whatcom County. Fish samples from the Sumas River in Washington and Canada showed elevated levels of nickel and manganese, trace metals associated with asbestos fibers.[85] The documented presence of asbestos contributed to the slowly accumulating

83. Patrick M. Hanlon & Anne Smetak, *Asbestos Changes*, 62 N.Y.U. ANN. SURV. AM. L. 525, 540–41 (2007).

84. KERR WOOD LEIDAL, *supra* note 10, at 5-5.

85. H. Schreier, T.G. Northcote & K. Hall, *Trace Metals in Fish Exposed to Asbestos Rich Sediments*, WATER, AIR, & SOIL POLLUTION 279, 290 (1987). A previous test had determined that, under laboratory conditions, chrysotile asbestos is hazardous to salmon. Belanger, *supra* note 79; *see also* James S. Webber & James R. Covey, *Asbestos in Water*, 21 CRITICAL REVS. ENVTL. CONTROL 331, 355–58 (1991) (reviewing studies evaluating the effect of asbestos on aquatic ecosystems, including the Schreier and Belanger articles referenced in this note).

body of information demonstrating that the river system was transporting and distributing landslide sediments over long distances.

D. The 1990s: Asbestos Concerns Develop

By 1990, agencies began to show increasing uneasiness about the presence of asbestos in Swift Creek sediments. The Port of Bellingham considered using Swift Creek sediments for fill, but reconsidered after the Northwest Washington Air Pollution Authority (now the Northwest Washington Clean Air Agency) advised the port that the sediments contained asbestos.[86] To evaluate the presence of asbestos in Swift Creek sediments, Whatcom County hired a consultant to collect and analyze soil samples from Swift Creek's streambed and bank. Eight samples contained asbestos in concentrations between one and three percent. The report summarized standards and advisories related to asbestos, noting that no standards apply to NOA, and recommended safe-handling procedures for using the sediments as fill.[87]

The following year, an employee of Northwest Air Pollution Authority attempted to determine "the maximum health risk posed by the [Swift Creek] deposits" by examining "what may be a worst-case human exposure scenario—a farmer cultivating an asbestos sediment-containing field."[88] The study focused on an eight-acre field characterized as "the only contaminated field still under cultivation"[89] after inundation by the 1975 flood. Asbestos-laden sediments therefore had been deposited fifteen years prior to the study.[90] The study concluded that there was no evidence that regulatory standards had been violated. It also concluded that the release of asbestos by wind erosion did not appear to pose a significant threat in the study area.[91] For more than fifteen years, this

86. KERR WOOD LEIDAL, *supra* note 10, at 5-6.

87. *Id.* at 5-7.

88. Blake, *supra* note 75, at 10.

89. *Id.* at 11.

90. Although the soil was poor because of the effects of the flood sediments, the farmer usually planted a crop of corn or seed grass in May or June. An unusually wet spring during the study year, 1990, delayed cultivation, and the farmer ultimately "agreed to disturb the study area in a typical manner (disc and tractor)" in September. As a result, conditions were dryer than they would have been in spring, likely resulting in increased dust levels that were viewed as a worst-case scenario. *Id.*

91. *Id.* at 44. Ambient air samples were collected from five air samplers, and sampling filter membrane cassettes were clipped to the farmer's collar in an effort to determine impacts within his breathing zone. *Id.* at 14. Chrysotile asbestos was identified in all samples collected from the sediment-laden field and in the sample from the breathing zone. The study concluded that neither the ambient samples nor the farmer's exposure met the Occupational Health and Safety Administration "action level," which required a time-weighted exposure of 0.2 fibers per cubic centimeter. *Id.* at 39. When identifying asbestos fibers, the study only counted fibers greater than 0.5 micrometers in length with an aspect ratio of at least five to one. *Id.* at 20, 42. As discussed further below, this is

study constituted the best—indeed, the only—scientific examination of the possible health risks of airborne asbestos from Swift Creek sediments.

Most efforts continued to focus on removing the stream-blocking sediments that continued to flow from the landslide.[92] Whatcom County hired a consulting firm to evaluate ways to reduce flooding by restricting the amount of sediment that would accumulate in Swift Creek. The County selected an option that would involve channel dredging, construction of sediment traps, and relocating the confluence of the North and South Forks of Swift Creek. It was estimated that the plan would cost $600,000 to $1.6 million to implement, depending on the marketability of the sediment as fill material.[93] Whatcom County started to implement the plan in 1998 by routinely dredging Swift Creek.[94] It is believed that most of the dredged sediment, estimated at 50,000 cubic yards, was used as fill for the approaches to a new bridge.[95]

In Canada, the federal environmental agency, Environment Canada, had been conducting a study of the Fraser River system, which includes the Sumas River as a tributary. In 1998, Environment Canada released a report showing that elevated levels of nickel, chromium, copper, and zinc had been found in the sediments of the Sumas River system. It noted that elevated levels of nickel and chromium, heavy metals often associated with asbestos deposits, "likely" came from the Sumas Mountain landslide.[96]

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still the regulatory standard, although there is no scientific consensus that shorter asbestos fibers are not potentially harmful to humans.

92. KERR WOOD LEIDAL, *supra* note 10, at 5-8 to -9. In 1995, Great Western Lumber, a private company affected by flooding, proposed to remove gravel from Swift Creek. An ad hoc committee of agency representatives found that samples from five plots were reported to contain only trace amounts of chrysotile asbestos, below the one percent threshold in occupational settings. The gravel removal apparently was allowed to proceed. On a broader scale, the Corps granted emergency authorization to Whatcom County to dredge Swift Creek with two conditions: Whatcom County should pursue a long-term management plan, and the sediment could not be removed from the site. Because it could no longer be removed, dredged sediment was added to berms along the side of the Creek. In 1997, Whatcom County again needed to dredge sediment, in part because the sediments that had been piled into berms along the side of Swift Creek were eroding back into the creek. The Corps agreed to approve off-site disposal of the sediment, provided that clearance could be obtained from the Whatcom County Health Department. After consulting with the Northwest Air Pollution Authority, the Health Department replied that the material could be used as fill because it contained less than one percent asbestos, and further stated that the asbestos-laden soil did not require a cover or warning signs while in transport. *Id.*

93. *Id.* at 1-2.

94. *Id.* at 2-8.

95. *Id.* at 3-1.

96. MINISTRY OF WATER, LAND, AND AIR PROT., SUMMARY OF SURFACE WATER QUALITY SAMPLING ON SUMAS RIVER AND TRIBUTARIES, ABBOTSFORD, BRITISH COLUMBIA 7–8 (2004), *available at* http://www.env.gov.bc.ca/epd/regions/lower_mainland/water_quality/reports/sumas_river/sumas_river.pdf.

E. 2000 to 2005: Inklings of a Regulatory Regime

During the first few years of the twenty-first century, sedimentation and flooding, not asbestos, remained the major concern relating to Swift Creek. In a 2001 Whatcom County Council committee meeting, for example, members of the County Council asked if Swift Creek was "the creek that has something in the sediment that makes it difficult to get rid of the sediment." Whatcom County's Public Works Director replied that "Swift Creek has a form of asbestos that is not the type that has caused lung problems, but it is still asbestos." He further noted that the county could not use all of the sediment for fill and that some of the dredged sediment was piling up. "The trick is to find a user for it at the time it is being excavated. Generally, no one is willing to use it if it costs to pile it and then move it again."[97] At least at the local level, Swift Creek continued to be viewed solely as a flood problem.

To reduce flooding, Whatcom County tried to obtain permits to build a sediment trap on Swift Creek but found that it was working in a new regulatory environment. The Washington Department of Fish and Wildlife objected to the sediment-trap permits on the grounds that the dredged, asbestos-laden sediments could reenter state surface waters.[98] Although the Corps tried to create a work-around to allow dredging while meeting the Washington Department of Fish and Wildlife's concerns, the sediment-trap project never went forward.[99] This action represented the start of a new era for Swift Creek with nonlocal agencies concerned about the impacts of dredging the creek.

F. 2005 to the Present: Federal Agencies Come to Swift Creek

EPA again became involved in Swift Creek in 2005. To reduce the constant risk of flooding, Whatcom County had applied to the Corps for a permit to allow dredging and bank stabilization. EPA responded to the Corps' public notice of the permit application by requesting that the Corps not issue a permit until public and environmental health concerns were addressed.[100]

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97. Minutes of the Whatcom Cnty. Council Pub. Works and Capital Projects Comm. 3 (Feb. 6, 2001), *available at* http://www.co.whatcom.wa.us/council/2001/minutes/Public_Works_for_February_6.doc.

98. 2007 EPA SUMMARY REPORT, *supra* note 24, at 2-3.

99. *Id.*

100. EPA recommended that a method to monitor and track the use of dredged materials should be developed, that there should be no minimum threshold for the requirement of permits for the removal of materials, that the stockpiled material should be secured from unauthorized removal, and that a public information project should be developed to inform potential users of the risks associated with NOA. *Id.* at 2-4.

In response, Whatcom County notified the Corps that the Washington State Department of Health would help the county assess the health risks associated with the Swift Creek dredged material. The county further pledged not to move dredged sediments away from the banks of Swift Creek until the health risks were determined. This cautionary approach was memorialized in the Corps' permit, which required Whatcom County to "securely store" all dredged sediments "at the project site on adjacent uplands" and prohibited the removal of the dredged sediments "for any use including as fill material."[101] Whatcom County could no longer pile sediments on the creek banks and allow residents and construction companies to haul the sediments away as free fill material. Instead, the sediments had to be stored on private property on the banks of Swift Creek.

With this permit in hand, Whatcom County launched the "Big Dig" in the summer of 2005. It dredged approximately 85,000 cubic yards from one reach of Swift Creek, stockpiling all of the material along the creek's banks. The stockpiled materials formed high levees which, it was believed at the time would be a temporary storage solution until a better solution could be developed. In an attempt to prevent further exposure, fences, gates, and warning signs were installed along several access points, although these measures have not stopped people from walking and even riding off-road recreational vehicles through creek sediments and on top of the levees.[102] "Securing" the sediments in large creek-side berms may have actually attracted recreational use, which has the potential to expose more residents to asbestos-laden dust. The agencies themselves were not sure how much risk the sediments posed, and throughout 2005 made further efforts to analyze the extent of asbestos in the soils and the risk of exposure to airborne asbestos.[103] Federal, state, and county health officials, including ATSDR, the Washington Department of Health, and the Whatcom County Health Department,

101. *Id.* at 2-4.

102. HEALTH CONSULTATION, *supra* note 12, at 5.

103. *Id.* at 8. The Whatcom County Health Department took sediment samples from Swift Creek in June 2005 and found that fine-grained sediments contained as much as forty-six percent chrysotile asbestos, as well as trace levels of amphibole fibers. *Id.* Western Washington University, in nearby Bellingham, Washington, conducted independent analysis of samples from Swift Creek's banks and streambed. The asbestos concentration was not noted, but chrysotile asbestos fibers were observed. *Id.* During dredging in August 2005, Whatcom County and the Washington State Department of Labor and Industries took personal air samples from workers' breathing zones for roughly three to five hours over the course of two days. Asbestos fibers were detected in twelve of the sixteen samples, but most samples had concentrations below analytical reporting levels, and all samples were below the permissible exposure limit. It was noted, however, that these results were influenced by the analytical method used, which was unable to detect the small asbestos fibers characteristic of Swift Creek sediments.

conducted a site visit in August 2005. They walked past a gate with signs prohibiting the removal of sediments and then climbed to the top of the levees that contained stockpiled sediments from the previous dredging. Dredging was still occurring at the time, and the health officials observed that "[n]umerous pieces of heavy equipment were removing sediment from the creek and placing it on the bank or moving it around on the levees,"[104] as a water tanker truck sprayed water on the levee soils to minimize dust. Researchers observed off-road recreational vehicle tracks running through Swift Creek sediments and photographed a child's big-wheel toy sitting adjacent to a levee.[105]

The resultant health consultation report, issued in March 2006, identified numerous potential airborne exposure pathways for asbestos, including windblown dust from piles, off-road recreational vehicles stirring up dust in Swift Creek or on levees, dust in yards where sediments were used as fill, tilling or working earth where sediments had been deposited, and dredging for flood control.[106] The report further observed, "downstream exposures to asbestos are possible if there is significant deposition along Sumas River." Although Dr. Schreier's publications from the 1980s were not cited, the health consultation report did note the possibility of impacts on the Sumas and Fraser Rivers in Canada.[107]

The health consultation report concluded that the health risk from asbestos was "indeterminate." In particular, it found that "[c]urrent knowledge of asbestos content and physical properties in Swift Creek sediments is insufficient for determining human health risks and appropriate end use of dredged sediments" and recommended that the asbestos in Swift Creek should be fully characterized.[108] The report's primary recommendation encouraged the agencies to develop a collaborative sampling plan so as to fully characterize of the asbestos in the sediments. With that recommendation in hand, Whatcom County's Health Department asked EPA to characterize the asbestos by defining the type and concentrations of asbestos.[109]

Starting in April of 2006, EPA performed four phases of investigation: site reconnaissance, integrated assessment, activity-based

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104. *Id.* at 6.

105. *Id.*

106. *Id.* at 13.

107. *Id.* at 12 ("[The Department of Health] has no information on whether Sumas River is used as a source of drinking water in British Columbia, or what the impacts are on Fraser River's water quality.")

108. *Id.* at 4.

109. 2007 EPA SUMMARY REPORT, *supra* note 24, at 2-5.

sampling and analysis, and risk evaluation.[110] During the site reconnaissance, conducted in April 2006, EPA collected sediment and water samples. Polarized light microscopy detected chrysotile asbestos in all eight samples. The concentration of asbestos ranged from trace amounts to approximately thirty percent.

The integrated assessment, conducted in May, was a site investigation that assessed the necessity for clean-up at the site.[111] EPA assessed soil and air filter samples from the levee of dredged material piles on the south side of Swift Creek. Asbestos levels in those soil samples ranged from trace amounts to 4.4%. Those soil samples also showed elevated levels of three heavy metals: chromium, nickel, and vanadium. The air samples included stationary samples and personal samples. Personal air sampling involves placing an air-sampling pump on a worker with the air inlet placed near the person's breathing zone.[112] While asbestos was found in all of the air samples, the average concentration for the personal samples was more than ten times greater than the average concentration of the stationary samples.[113]

Based on the integrated assessment, EPA concluded "the dredged material piles at the site were contaminated with asbestos and metals and that people working or traveling across the site are potentially exposed to these contaminants." EPA further concluded "asbestos could be migrating to off-site locations, including nearby residential areas."[114]

The third phase of EPA's investigation, activity-based sampling, was intended to simulate exposures to asbestos that could result from common activities at the site. EPA workers, dressed in moon suits with respirators containing filters designed to collect asbestos fibers, performed activities described as "loading/hauling, raking/spreading, and recreation (walking/jogging/biking)." All of the samples from the workers' air filters contained asbestos.[115]

Activity-based sampling was an important input into the final stage of EPA's 2006 investigation, the risk assessment. EPA concluded that for all evaluated activities the excess lifetime cancer risk from asbestos was greater than one in one million (1×10^{-6}), and the risk was greater than one in ten thousand (1×10^{-4}) for some activities.[116] These risk levels correspond to threshold determinations for further agency action.

110. *Id.* at 2-5, 4-1.

111. The assessment was "integrated" because it applied both criteria for a time-critical removal action and the criteria for listing on the National Priorities List. *Id.* at 5-1.

112. *Id.* at 6-1.

113. *Id.* at 5-1 to -2.

114. *Id.* at 5-2.

115. *Id.* at 6-3.

116. *Id.* at 7-2.

EPA noted that, under the Superfund program, a risk level below one in one million is considered *de minimis*, while a risk level greater than one in ten thousand may form the basis for a cleanup action.[117]

The risk assessment resulted in the conclusion that "[r]esidents living near the Swift Creek Asbestos Site should limit exposure to Swift Creek dredged materials," and that contact with off-site materials could also lead to indeterminate exposure risks.[118] EPA further recommended that "dredged materials no longer be removed from the site without personal protection and that it not be taken to other sites where further exposure is possible, as has been done in the past."[119] EPA concluded that a successful response to Swift Creek asbestos would have to be collaborative, involving many agencies

In response to this risk assessment, EPA used its removal authority under CERCLA to "reduce the potential for an uncontrolled release of asbestos from the dredged materials presently stockpiled along Swift Creek . . . ."[120] EPA used its removal authority in November of 2007 to re-grade the site and apply a dust suppressing "tackifier" compound to the dredged sediment piles in order to limit wind dispersal of asbestos fibers.

The Washington Department of Health and ATSDR also responded to the risk assessment by preparing a health consultation that focused on health statistics and public health issues.[121] The 2008 report reviewed existing health statistics, comparing the number of cancer cases identified in the community near Swift Creek with the number of cancer cases seen in two reference populations. The report concluded that "[i]n the area of interest, no mesothelioma cases were identified from 1992 to 2004. Lung and bronchus cancer rates were in the area of interest, were similar to Washington State rates, and were not significantly different from Whatcom County as a whole."[122] Although the small number of

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117. *Id.* at 7-1. The Washington State Department of Ecology generally uses a maximum level of risk of one in one million for residential exposures and one in one hundred thousand for industrial exposures. *Id.*

118. *Id.* at 8-1.

119. *Id.*

120. JAMES PETERSON, ECOLOGY & ENVTL., INC., SWIFT CREEK ASBESTOS SITE: TIME CRITICAL REMOVAL ACTION REPORT EVERSON, WASHINGTON 2-3 (2008), *available at* http://yosemite.epa.gov/r10/CLEANUP.NSF/sites/sumasmtndocs/$FILE/Swift+CK+Removal+Rpt+Final_Apr2008.pdf. See *infra* text accompanying note 151, for a discussion of the basis and extent of EPA's removal authority under CERCLA.

121. WASH. DEP'T OF HEALTH, EVALUATION OF HEALTH STATISTICS AND PUBLIC HEALTH DATA GAPS RELATED TO EXPOSURE TO NATURALLY OCCURRING ASBESTOS FROM SWIFT CREEK (Feb. 22, 2008) [hereinafter PUBLIC HEALTH EVALUATION], *available at* http://www.doh.wa.gov/ehp/oehas/pubs/swiftcreekasbestos08.pdf (prepared under a cooperative agreement with ATSDR).

122. *Id.* at 10.

cases resulted in "wide confidence intervals around calculated values," the lack of an observed increase in the number of cancer cases led to a recommendation not to conduct further epidemiological analyses.[123]

The health consultation report also focused on data gaps. Observing that EPA's sampling and analysis had provided "much-needed information," the report noted that, "[u]nfortunately, it is difficult to extrapolate results of activity based sampling to other scenarios, including indoor exposure. Consequently, it is difficult to determine what public health actions are appropriate without a more complete picture of potential exposures."[124] Because of these data gaps, the report concluded that Swift Creek asbestos presents an "indeterminate" public health hazard.[125]

In addition, the health consultation report notes that data gaps exist in areas relating to both occupational and non-occupational exposure. Occupational exposure could occur from a number of activities and locations: future creek dredging; stream restoration efforts (which were halted once asbestos was identified); road repairs where Swift Creek sediments had been used as fill or bed material; and at Great Western Lumber, a local sawmill that may have used Swift Creek sediment in its lumber yard.[126]

Non-occupational exposure primarily originates from dust blown into or tracked into homes. This exposure is not limited to homes near Swift Creek; as the health consultation report notes, people have used Swift Creek sediments as fill throughout Whatcom County:

> The full extent to which asbestos-containing sediments have been used off-site is uncertain, and will likely never be completely known, but an estimated 2 million cubic yards were moved off-site. Anecdotal information suggests that Swift Creek sediments have been used as fill for a variety of private (e.g., driveways, parking lots, log yards, and horse arenas) and public projects (e.g., transportation projects). A potential pathway of significant concern is the in home exposure pathway. If asbestos containing fill was used at or near residential properties, there is potential that asbestos may have been tracked into the home over time. Since people spend the majority of time indoors, this potentially presents a frequent and prolonged exposure pathway.[127]

123. *Id.* at 24.
124. *Id.* at 11.
125. *Id.* at 13.
126. *Id.* at 11–12.
127. *Id.* at 11.

Flooding and the possible dispersion of asbestos sediments beyond Swift Creek also presented an uncertainty, or data gap, with regard to downstream exposure. The health consultation report observed that because Swift Creek flows into the Sumas River, flooding of the Sumas River could also deposit asbestos into the floodplain, homes, and basements of the Sumas River basin.[128]

That uncertainty did not last long. Nature soon provided scientists with the opportunity to fill this "data gap" when heavy winter rains caused the Sumas River to flood in the first days of 2009. EPA's subsequent sampling in May 2009 yielded sobering results. Chrysotile asbestos and some actinolite asbestos were detected in upland soil and bank sediment samples collected from Swift Creek and from the Sumas River downstream from Swift Creek. Chrysotile asbestos was detected in surface water samples. The concentrations detected were much higher than those detected in earlier sampling efforts, which focused on dredged sediments. Concentrations as high as 27% in upland soil samples and up to 22.75% in bank sediment samples collected along the Sumas River downstream from Swift Creek. Surface water samples detected up to 879 million asbestos fibers per liter in the Sumas River downstream from Swift Creek.[129] Disturbingly, the level of asbestos in the soils did not appear to diminish significantly as the Sumas River flowed north to the Canadian borders. Sampling indicated that upland soils at a site just south of the border contained 26.75% asbestos.[130]

In response to the potential, but still "indeterminate," risk of exposure to asbestos created by the flood conditions, EPA proposed a number of measures that property owners along the Sumas River should take. These measures included removing shoes before entering a house, dusting with a wet cloth rather than a feather duster or dry cloth, and keeping out of areas where asbestos may be present. Additionally, EPA provided specific advice for pets: "If they do get dirty, bathe the pet (brushing can release fibers into the air)."[131]

For farmers, homeowners, and businesses to take such inconvenient precautionary measures, they would need to believe both that asbestos in the soils created a health risk and that taking off their shoes and washing their pets would have a material effect on the health risks that they face.

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128. *Id.*

129. OFFICE OF ENVTL. ASSESSMENT, U.S. ENVTL. PROT. AGENCY, REGION 10, SOIL, SEDIMENT AND SURFACE WATER SAMPLING, SUMAS MOUNTAIN NATURALLY-OCCURRING ASBESTOS SITE, WHATCOM COUNTY, WASHINGTON 7 (Oct. 13, 2009), *available at* http://yosemite.epa.gov/R10/CLEANUP.NSF/6ea33b02338c3a5e882567ca005d382f/8b0d044466ea186b882572a6006cc71b/$FILE/20091013_finalreport.pdf.

130. *Id.* at 16.

131. *Id.* at 8.

Because of the uncertainty surrounding asbestos from Swift Creek, many local people doubt those propositions.

G. Risks from Sumas Mountain/Swift Creek Asbestos

To date, health agencies have concluded that (1) a "public health hazard" exists for people conducting activities regularly on dredge piles; (2) an "unacceptable cancer risk" of greater than one in ten thousand, or one excess cancer in ten thousand exposed people, results from some activities; (3) risk factors may be "underestimated" because exposures may occur at other locations, such as indoor environments of residences near Swift Creek; (4) there is no evidence of elevated rates of asbestos related disease such as mesothelioma and lung cancer in the community near Swift Creek compared to Whatcom County or Washington State as a whole; and, (5) nonetheless, an "indeterminate public health hazard" exists for people who may be exposed to Swift Creek asbestos off-site, such as indoor locations or areas where dredged material was used as fill.[132]

While the agencies' caution and lack of certainty are defensible from a legal and scientific perspective, it is very difficult for the general public to understand the ramifications of such vague and seemingly conflicting conclusions. Nor is it apparent to citizens why the agencies that "caused" the problem by proclaiming that the area is risky can neither solve the problems created by Swift Creek asbestos nor explain clearly what needs to be done to solve the problem.

In November 2007, multiple agencies hosted a public information session to discuss EPA's risk assessment with local citizens. Representatives from nine federal, state, and local agencies, including ATSDR, EPA, the Corps, the Washington State Departments of Ecology, Health, and Natural Resources, the Northwest Clear Air Agency, and Whatcom County Departments of Public Works and Health met in a community center near Swift Creek. The Administrator of EPA Region 10 participated, as did the Seattle District commander for the Corps.

The first speaker, the owner of a lumber company who had periodically dredged the areas of Swift Creek that ran through his property, questioned the significance of the risk assessment:

> [O]ne [value] that ended up outside of the range of reasonable risk was the child play and that was two hours a day for a full year, 350 days a year for 10 years. I mean, that's just not a—I mean, that doesn't seem realistic to me and that one, like I said, was again was from a maximum value, not a mean value. So it just seems like

132. HEALTH CONSULTATION, *supra* note 12, at 13.

> we're taking—the information we're basing these decisions on are really from an extreme and I just can't get my head around this, how we can make these decisions that are affecting this community based on—it seems like kind of iffy numbers . . . .[133]

EPA personnel responded that the analysis was inherently uncertain, but that they were concerned about potential health effects. The following exchange epitomizes the difficulties of the Swift Creek situation, where agencies cannot state clearly that the situation is dangerous but also cannot assure the public that the situation is safe

> MS. LORI COHEN: Can I just add to that? The one other thing I did want to say is you are asking for like kind of a bright line as to what's safe or not safe and I don't think we quite addressed that. There really is no bright line. Asbestos is a human carcinogen and there's no amount that's truly safe and so you do have to make these sort of assessments and evaluations to judge what kind of exposures you might be—what kind of exposures might be there and what the potential increased risk of cancer is to an individual. So I don't think we could ever say there is an absolute bright line of what is safe.
>
> MR. TOM WESTERGREEN: You still have to make a decision. You can say that about everything in life, that there's risk in everything you do, and that's what the frustration here is, Lori, is coming up with that level . . . .[134]

The absence of a bright line permeates the range of regulatory responses available to NOA in general, and to Swift Creek in particular. "Business as usual" is not possible because of the risk, but the risk is not so clearly elevated that significant resources are available for a response.

IV. "A SEAM BETWEEN THE AUTHORITIES": REGULATORY AUTHORITY

MR. CHUCK GELWICKS: I want to know who is going to take responsibility when it's a foot thick on our land. That's what I want to know.

MR. MIKE MCCORMICK: If we are called for the flood fight we will work with you on that, on the flood fight, but the impact to the land and everything else, I think that's really what you're getting to, the detrimental impacts to your farmland.

MR. CHUCK GELWICKS: Yes.

MR. MIKE MCCORMICK: That's what you're talking about?

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133. Nov. 2007 Transcript, *supra* note 1, at 9–10.

134. *Id.* at 13–14.

MR. CHUCK GELWICKS: Everybody's, yes.

MR. MIKE MCCORMICK: I think that's beyond my authority.

MR. CHUCK GELWICKS: Well, whose authority would it be?

MR. MIKE MCCORMICK: I don't know, sir.

—Swift Creek Meeting at Glen Echo Community Club.[135]

The regulation of asbestos can best be described as erratic. It is a hazardous waste for purposes of some laws but not for others. Commercial asbestos is extensively regulated at the federal level, but this authority does not always apply to NOA. Federal, state, and local governments all have some type of authority that they may be able to use to address NOA, but the extent to which agencies *must* act to address NOA concerns is less clear. As the Corps District Commander observed at a public meeting in 2007, "where we are right now is a seam between the authorities. And that's not an answer you want to hear, but to the extent I understand it, it's probably the reality."[136] Although a seam between the authorities is an uncomfortable location, it does dictate cooperation and may lead to creativity. Whether any or all of these authorities will be able to address NOA at Swift Creek, or whether NOA will turn out to be a problem without a regulatory solution, is the subject of Part V. First, however, the following sections describe existing regulatory authority.

A. Hazardous Waste Regulation

1. CERCLA: Release, Liability, and Removal

Asbestos is classified as a hazardous substance under CERCLA.[137] CERCLA focuses primarily on liability and contains only one regulatory

135. *Id.* at 62–63.

136. *Id.* at 35 (quoting Mike McCormick, Seattle District Commander, U.S. Army Corps of Engineers).

137. 42 U.S.C. § 9601(14)(E) (2006) (referencing hazardous air pollutants listed under 42 U.S.C. § 7412(b)); 40 C.F.R. § 302.4 (2011) (asbestos on list of hazardous substances); *see also* United States v. W.R. Grace & Co., 280 F. Supp. 2d 1149, 1153 (2003) (where parties stipulated that asbestos is a hazardous substance under CERCLA). In the context of a discussion of CERCLA liability, EPA representatives told local governments in Whatcom County that asbestos is "not a hazardous waste." *See* Minutes of the Whatcom Cnty. Council Special Surface Water Work Session, *supra* note 2, at 3 ("So far, asbestos is not designated as a hazardous waste. . . . For now, they are just saying that this is not a hazardous waste."). While asbestos is not defined as a hazardous *waste* under CERCLA, its designation as a hazardous *substance* makes asbestos subject to CERCLA's reporting and liability requirements. *See infra*, text accompanying notes 138–41. The speaker at the Whatcom County Council Special Surface Water Work Session may have been thinking about the

provision, which requires any person in charge of a facility to report any release of hazardous substances from the facility.[138] "Facility" includes "any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located,"[139] and "release" means "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment."[140] The reporting requirement for asbestos is triggered upon release of one pound of friable asbestos.[141]

CERCLA's reporting requirements technically are broad enough to require reporting by landowners ("in charge" of a "facility") when sufficient asbestos is "released" (removed by floods or wind) from a pile of dredged materials in which asbestos has been disposed of[142] or stored. It could theoretically require Whatcom County or other agency employees to report releases when dredging or otherwise moving asbestos-laden soils. This would, of course, require continuous monitoring and measurement.

In addition to the reporting requirements, CERCLA establishes liability for owners and operators of facilities, as well as arrangers (any person who arranged for disposal or transport) and transporters of hazardous substances.[143] Liability accrues for the release of a hazardous substance[144] and can extend to the costs of any removal or remedial actions taken by the federal or state government, any other necessary response costs, and damages to natural resources.[145]

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fact that asbestos is not regulated as a hazardous waste under the Resource Conservation and Recovery Act (RCRA).

138. 42 U.S.C. § 9603(a) (2010).

139. *Id.* § 9601(9).

140. *Id.* § 9601(12).

141. 40 C.F.R. § 302.4 (2011); Memorandum from Michael S. Alushin & Glenn L. Unterberger, U.S. Envtl. Prot. Agency, to Regional Counsels, Regions I–X, Inclusion of CERCLA Section 103(a) Counts in Asbestos NESHAP Cases (1990), *available at* http://www.epa.gov/compliance/resources/policies/civil/caa/stationary/inclu-asbes-rpt.pdf ("Even though CERCLA regulations do not define the term 'friable asbestos,' the reportable quantity should not be interpreted to include one pound of 'any material containing more than 1 percent asbestos by weight that hand pressure can crumble . . . .' 40 C.F.R. § 61.141 (definition of friable asbestos under Clean Air Act).").

142. Under the Solid Waste Disposal Act, "disposal" encompasses any "discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such [waste] or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters." 42 U.S.C. § 6903(3). This definition from the Solid Waste Disposal Act is applied to CERCLA through 42 U.S.C. § 9601(29).

143. 42 U.S.C. § 9607(a) (2010).

144. *Id.*

145. *Id.* § 9607(a)(4)(d).

These definitions require human action: asbestos must be disposed of or transported, or its disposal or transport must be arranged.[146] Asbestos that merely washes up along the banks of a river system likely would not fall within this definition,[147] but asbestos that has been dredged, hauled, or stored on the bank of a stream probably would qualify if it were released into the environment.

For decades, Whatcom County residents, companies, and government agencies have transported asbestos-laden sediments and used those sediments for purposes that have not been documented but that likely include the construction of roads, parking lots, and trails. It has been estimated that two million cubic yards of sediment have been dredged and removed from Swift Creek.[148] Beginning in the late 1940s, the Corps was responsible for dredging Swift Creek as a flood control measure. Later, the Whatcom County Public Works River and Flood Division assumed the responsibility of dredging and maintaining Swift Creek.[149] Further, private property owners, in the interest of preventing flooding, allowed the storage of sediments on their land. In theory, any of these potentially responsible parties could be liable under Superfund.

To date, this expansive web of potential Superfund liability has made the entire issue of liability recede into the background. In a situation in which almost every entity lives in a glass house, the decision to throw a stone is fraught with difficulty. When EPA discussed liability with the Whatcom County Council, EPA warned the council that "there is liability associated with Superfund" and that it could affect private property owners. The concluding message, however, was that "Superfund isn't interested unless there is a specific risk."[150]

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146. "Transport" means "the movement of a hazardous substance by any mode." *Id.* § 9601(26).

147. A recent federal district court case could cause uncertainty about this conclusion, to the extent that any asbestos transported by the river could be shown to have originated on the dredge piles. The court found that the Washington Department of Transportation was liable under CERCLA as an "arranger" because it designed a storm water drainage system that deposited roadway contaminants in the environment. United States v. Wash. Dep't of Transp., 716 F. Supp. 2d 1009, 1015 (W.D. Wash. 2010). If a reviewing court found that the criteria of the case were met—that an entity designed, constructed and operated the dredge piles, that their sole function was related to the collection and disposal of hazardous runoff, that the arranger knew that the system contained hazardous substances, and that there was an actual release of a hazardous substance—it is possible that arranger liability could apply.

148. PUBLIC HEALTH EVALUATION, *supra* note 121, at 11.

149. HEALTH CONSULTATION, *supra* note 12, at 5.

150. Minutes of the Whatcom Cnty. Council Pub. Works and Capital Projects Comm., *supra* note 97, at 7. CERCLA establishes an "act of God" defense, which applies when a release of a hazardous substance "and the damages resulting therefrom were caused solely by" an act of God. 42 U.S.C. § 9607(b) (2010). An act of God is defined as "an unanticipated grave natural disaster or other natural phenomenon of an exceptional, inevitable, and irresistible character, the effects of which could not have been prevented or avoided by the exercise of due care or foresight." *Id.* §

Neither the liability provisions of CERCLA nor the release-reporting obligation appear likely to result in the kind of long-term solution to the Swift Creek asbestos problem sought by agencies and residents. CERCLA also provides EPA with more promising tools by granting it authority under two distinct cleanup classifications: removal actions and remedial actions. EPA is authorized to initiate removal or remedial actions at sites where the release or substantial threat of release of a pollutant may pose an imminent and substantial danger to public health and welfare.[151] Removal or remedial activities are not authorized in response to a release, or threat of release, of "a naturally occurring substance in its unaltered form, or altered solely through naturally occurring processes or phenomena, from a location where it is naturally found."[152] This limitation should not apply to Swift Creek asbestos that has been dredged or moved, because it is not in a location "where it is naturally found."

EPA's removal authority over NOA that has been altered or transported by human activities is supported by a number of federal district court cases. In cases involving Libby, Montana vermiculite mine that exposed workers and residents to high levels of asbestos, the responsible party strenuously contested EPA's removal activities on the grounds that the asbestos was a naturally occurring substance. The federal district court considered the fact that rain washed material from the mine into a nearby river, and concluded that "[a]ny asbestos that washed off disturbed areas at the Mine Site to the Kootenai River was not in its 'unaltered form, or altered solely by naturally occurring processes or phenomena.' "[153]

In a similar case, a mining company contended that arsenic, a naturally occurring element found around a mine, was exempt from regulation under CERCLA. The court held, however, that "the arsenic is not found in its unaltered form because mining, an unnatural process, has

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9607(b)(1). Under the act of God defense, a potentially responsible party would likely contend that the Swift Creek landslide constitutes an unanticipated natural disaster, however slow-moving and permanent it may be. The potentially responsible party would further need to establish that the damages resulting from the natural disaster were caused *solely* by the natural disaster. The agencies that conducted that dredging might be able to contend that the damage could not have been prevented or avoided by the exercise of due care and that their actions constituted due care and foresight to prevent greater damage. However, this approach might not be available to the private parties who transported or received sediment, unless they could convincingly argue that no due care or foresight could have prevented damage because the nature of the materials were unknown. In light of the strict liability nature of CERCLA, this would be a departure from the law's current interpretation.

151. *Id.* § 9604(b).

152. *Id.* § 9604(a)(3)(A).

153. United States v. W.R. Grace & Co., 280 F. Supp. 2d 1149, 1155 (2003); *see also id.* at 1148.

altered its location."[154] In another mining case, a court found that acid mine drainage was not a naturally occurring release, even though it consisted of naturally occurring substances, because "mining constitutes an artificial alteration rather than a naturally occurring process or phenomenon."[155] A court has also summarily rejected the application of the exception to "naturally occurring" metals in soil, noting that the metals were located in fill material brought onto the site from another location. The court held that they were not in the location where they would be "naturally found."[156] These cases, which view the movement of soils as sufficient alteration to avoid the exclusion, support EPA's response authority over sediments that have been exposed through dredging or relocated to sites in which they did not naturally occur.

EPA's response authority over sediments distributed through flooding is a more open question. CERCLA would only exempt NOA "in its unaltered form . . . from a location where it is naturally found" from EPA's response authority. NOA is not "naturally found" in basements or municipal storm drains, where it appears after flooding. Although a natural process delivered the asbestos, the portion the CERCLA statute that refers to natural processes addresses the alteration of asbestos not its transportation or location ("altered solely through naturally occurring processes or phenomena"). Thus, if EPA chose to exercise its response authority over flood-distributed asbestos, the exceptions in CERCLA should not prevent it from doing so.[157]

If it is accepted that EPA has response authority over at least some of the asbestos from Swift Creek sediments, the next question is the scope and nature of the actions that it is authorized to take. CERCLA defines a remedial action as permanent, whereas removal actions are defined as actions consistent with future remedial actions or actions that are taken under emergency authority. Remedial actions can only be initiated once a site has been listed on the National Priorities List (NPL), which is an inventory of hazardous waste sites that meet specific criteria based on their individual Hazard Ranking System (HRS) scores. Swift Creek has not been listed on the NPL, and it is not known whether the asbestos contamination present at Swift Creek would generate a HRS score sufficient to list the site on the NPL.[158] The uncertain health threat

154. Monarch Greenback v. Monticello Ins. Co., 118 F. Supp. 2d 1068, 1080 (D. Idaho 1999).
155. United States v. Iron Mountain Mines, 812 F. Supp. 1528, 1548 (1992).
156. Containerport Grp. v. Am. Fin. Grp., 128 F. Supp. 2d 470, 482 n.16 (2001).
157. 42 U.S.C. § 9604(a)(3)(A) (2010).
158. A site can be listed on the NPL if it meets one of the following three criteria:
(1) The release scores sufficiently high pursuant to the Hazard Ranking System . . . .
(2) A state . . . has designated a release as its highest priority. States may make only one such designation; or

posed by NOA makes a risk determination difficult, and local politicians and EPA officials do not appear interested in pursuing an NPL listing.[159] Further, personnel involved in the Swift Creek issue may have believed, incorrectly, that CERCLA's liability provisions would not apply if Swift Creek was not included on the NPL.[160]

Unlike remedial actions, removal actions can occur on sites not scored using the HRS or listed on the NPL.[161] Although CERCLA does not define "removal action," the statute does define "remove" and "removal":

> The terms "remove" or "removal" means the cleanup or removal of released hazardous substances from the environment, such actions as may be necessary taken in the event of the threat of release of hazardous substances into the environment, such actions as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal of removed material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release. The term includes, in addition, without being limited to, security fencing or other measures to limit access, provision of alternative water supplies, [and] temporary evacuation and housing of threatened individuals not otherwise provided for.[162]

The National Contingency Plan (NCP), which consists of the regulations that govern the selection and implementation of removal and remedial actions,[163] states that removal actions must "be terminated after $2 million has been obligated for the action or 12 months have elapsed from the date removal activities begin on site."[164]

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(3) The release satisfies all of the following criteria:

(i) The Agency for Toxic Substances and Disease Registry has issued a health advisory that recommends dissociation of individuals from the release;

(ii) EPA determines that the release poses a significant threat to public health; and

(iii) EPA anticipates that it will be more cost-effective to use its remedial authority than to use removal authority to respond to the release.

40 C.F.R. § 300.425(c) (2010).

159. Interview by Douglas Naftz with Luke Loeffler, Congressional Aide, Representative Rick Larsen (Feb. 2009).

160. *Id.*

161. 40 C.F.R. § 300.425(b)(1) (2010).

162. 42 U.S.C. § 9601(23) (2010).

163. The full title of the NCP is the "National Oil and Hazardous Substance Pollution Contingency Plan." *Id.* § 9605(a). The NCP is located at 40 C.F.R. § 300. For the government to recover costs, its removal and remedial activities must be "not inconsistent with" the NCP. 42 U.S.C. § 9607(a)(4)(A). For private parties to recover costs, their activities must be "consistent" with the NCP. *Id.* § 9607(a)(4)(B).

164. 40 C.F.R. 300.415(b)(5) (2010).

In November 2007, EPA approved a Time Critical Removal Action (TCRA) at Swift Creek. EPA intended the removal action to "reduce the potential for an uncontrolled release of asbestos" through the application of a dust suppressant, or tackifier, to the sediment piles. EPA also re-graded the stockpiles in an effort to prevent erosion.[165] It appears, however, that these stopgap measures may not have worked as intended. Premature failure of the tackifier has been observed along the sediment piles, and erosion of the sediment pilings continues, especially during periods of high creek flow.[166] These stopgap measures alone may not adequately protect public health and welfare of the surrounding community.

The NCP arguably only requires EPA to abate, minimize, stabilize, or mitigate the threat to public health that resulted in the removal action.[167] The goal of EPA's removal authority, however, is to prevent "imminent and substantial danger to public health and welfare."[168] This language implies that the removal action should ensure that this "substantial danger" no longer exists. Although EPA certainly intended its actions to minimize asbestos exposure pathways, many such exposure pathways remain. Recent observations suggest that the 2007 removal action did not adequately address the exposure pathways originally targeted in the removal action. It appears likely that the public health risk that led to the removal action will simply recur—as many times as EPA's short-term measures fail or wear out.

The twelve-month limit on removal activities, if measured from the November 2007 action, has expired. An emergency exemption would nonetheless allow future removal action to occur. The emergency exemption is authorized when "[t]here is an immediate risk to public health or welfare of the United States or the environment; continued response actions are immediately required to prevent, limit, or mitigate an emergency; and such assistance will not otherwise be provided on a timely basis."[169] This exemption was applied to EPA's removal activities in Libby, Montana. Although Swift Creek does not involve the dramatic public health risk present in Libby, it does present a large-scale, long-term asbestos problem in a populated area, "not a remote, abandoned

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165. JAMES PETERSEN, ECOLOGY& ENV'T, INC., SWIFT CREEK ASBESTOS SITE TIME-CRITICAL REMOVAL ACTION REPORT, EVERSON, WASHINGTON 2-3, 3-2 (2008), *available at* http://yosemite.epa.gov/r10/CLEANUP.NSF/sites/sumasmtndocs/$FILE/Swift+CK+Removal+Rpt+Final_Apr2008.pdf.

166. Interview by Douglas Naftz with Luke Loeffler, *supra* note 159.

167. 40 C.F.R. § 300.415(b)(3).

168. *Id.* § 307.22(e)(2) (2011).

169. *Id.* § 300.415(b)(5)(i).

mine"[170] as the Ninth Circuit emphasized when it upheld EPA's activities in Libby. Furthermore, as in Libby, "assistance from other government agencies [is] not anticipated on a timely basis."[171]

The Ninth Circuit has noted that "[t]he term 'emergency' is not defined in CERCLA or the National Contingency Plan, and EPA has interpreted it to include a range of time-sensitive threats."[172] Although the term "emergency" has never been used by EPA with regard to the situation at Swift Creek, the request for the 2007 removal action at Swift Creek stated that "[a]ctual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this action memorandum, may present an imminent and substantial endangerment to public health, or welfare or the environment."[173] This description is consistent with an emergency.

The selection of a time-critical removal action by EPA in 2007 may support the determination of an emergency at Swift Creek when flooding occurs. With a projected 400 to 600 years of sediment release from the Sumas Mountain landslide,[174] Swift Creek likely will continue to deposit hazardous asbestos-containing sediment downstream into the foreseeable future. Now that dredging no longer occurs regularly, sediments accumulate in the streambed, increasing the risk of floods. Increased flood risk can only add to the time-sensitivity requirement of a future removal action; EPA's 2009 testing established that flooding spreads the hazardous sediment over a large area and effectively multiplies the existing asbestos exposure pathways.[175]

Removal actions have been described as "time-sensitive responses to public health threats for which EPA is granted considerable leeway in structuring the cleanup."[176] The Ninth Circuit found that EPA's cleanup in Libby, which took place over the course of years, "was a removal action that was exempt from the temporal and monetary cap."[177] This

170. United States v. W.R. Grace & Co., 429 F.3d 1224, 1226 (9th Cir. 2005).

171. *Id.* at 1231.

172. *Id.* at 1248 n.25.

173. JEFFRY RODIN, U.S. ENVTL. PROT. AGENCY, FIRST ACTION MEMORANDUM: REQUEST FOR APPROVAL OF A TIME-CRITICAL REMOVAL ACTION AT THE SWIFT CREEK ASBESTOS SITE, EVERSON, WHATCOM COUNTY, WASHINGTON 7 (2007).

174. 2007 EPA SUMMARY REPORT, *supra* note 24, at 2-2.

175. EPA supported its decision to conduct a removal action in Libby on the grounds that "the asbestos . . . posed an immediate threat to the local population; a cleanup beyond the cap was required to prevent, limit, or mitigate an emergency because of the size of the cleanup and the short construction season; and assistance from other government agencies was not anticipated on a timely basis." *W.R. Grace & Co*., 429 F.3d at 1231. Although the public health effects are nowhere near as immediate or egregious in the Swift Creek area as in Libby, the rationales regarding the size of the cleanup and the absence of assistance from other government agencies apply to Swift Creek.

176. *Id.* at 1228.

177. *Id.* at 1227.

type of long-term removal action is justified at Swift Creek because the previous dredge-and-deposit strategy of sediment management is no longer viable or even necessarily legal, to the extent dredged creek sediments would constitute a hazardous substance under CERCLA. Furthermore, consultants to EPA have estimated that the annual removal and transport of 100,000 cubic yards of Swift Creek sediment to a repository within ten miles of the creek (if such a place existed) would cost between $1.5 and $1.9 million per year over a period of five years.[178] The odds that any public agency will be able to commit this level of funding to the Swift Creek problem, year after year, decade after decade, are very long.

A continuation of status quo approaches at the site clearly would cost too much and would not address asbestos exposure pathways originating from the creek sediment. Further, it would not stop the physical movement of sediment from the landslide into the creek. Therefore, the situation at Swift Creek warrants a long-term, multi-stage removal action.

2. State Hazardous Substances Regulation

State law also has a role to play in addressing the Swift Creek problem. Washington State's Model Toxics Control Act (MTCA)[179] was "heavily patterned" after CERCLA.[180] All hazardous substances listed in CERCLA are also listed as hazardous substances under the MTCA.[181] The MTCA seeks to "raise sufficient funds to clean up all hazardous waste sites and to prevent the creation of future hazards due to improper disposal of toxic wastes into the state's land and waters."[182] To this end, the MTCA holds parties accountable for "irresponsible use and disposal of hazardous substances"[183] and requires the identification, investigation, and cleanup of contaminated properties that are, or may be, a threat to human health or the environment.[184]

MTCA resembles CERCLA in that "potentially liable [parties]" can be ordered to "provide the remedial action" for release of a hazardous substance.[185] Additionally, the MTCA applies joint and several liability

178. 2007 EPA SUMMARY REPORT, *supra* note 24, at 3-8.

179. WASH. REV. CODE § 70.105 (2011).

180. Taliesen Corp. v. Razore Land Co., 144 P.3d 1185, 1197 (Wash. Ct. App. 2006); Pacificorp Envtl. Remediation Co. v. Wash. State Dep't of Transp., 259 P.3d 1115, 1128 (Wash. Ct. App. 2011).

181. WASH. ADMIN. CODE § 173-340-200 (2003).

182. WASH. REV. CODE § 70.105D.010(2).

183. *Id.*

184. *Id.* § 70.105D.030.

185. *Id.* § 70.105D.050(1).

to "remedial action costs and . . . natural resource damages resulting from the releases or threatened releases of hazardous substances."[186] Past and present owners and operators of facilities, arrangers, transporters, and sellers can all be held liable under the MTCA.[187]

For agencies and parties that have moved NOA-containing materials, liability issues under the MTCA are potentially as threatening as CERCLA liability. State courts have upheld a broader interpretation of MTCA arranger liability, for example, concluding that intent to dispose of a hazardous substance is not required.[188]

While the MTCA imposes the specter of liability, it also provides the prospect of assistance with cleanup. It authorizes the state Department of Ecology to conduct remedial actions "to remedy releases or threatened releases of hazardous substances."[189] Ecology's hazardous waste cleanup, prevention, and management activities are funded by both a hazardous substances tax imposed on substances including chemicals, fertilizers, and petroleum products, as well as recovered costs from remedial actions.[190] Washington also uses these revenues to maintain a state toxics control account for the broad purpose of "[w]ater and environmental health protection and monitoring programs."[191] Funds from the pollution tax are also deposited into a local toxics control account, for distribution to local governments, with remedial actions designated as the highest priority.[192]

The Washington State Legislature must appropriate all toxics control account funds,[193] and, as noted below, the legislature has directed some funding to Swift Creek to assist with short-term stabilization measures and the search for longer-term approach to the problem. The

186. *Id.* § 70.105D.040(2).

187. *Id.* § 70.105D.040(1)(a)–(e).

188. Pacificorp Envtl. Remediation Co. v. Wash. State Dep't of Transp., 259 P.3d 1115, 1132 (Wash. Ct. App. 2011) ("The United States Supreme Court's interpretation of CERCLA does not trump our state courts' interpretation of Washington's comparable Act.") (citing Seattle City Light v. Wash. State Dep't of Transp., 989 P.2d 1164, 1170 (Wash. Ct. App.1999) and Modern Sewer Corp. v. Nelson Distrib., Inc.,109 P.3d 11, 13–14 (Wash. Ct. App. 2005), *review denied*, 122 P.3d 186 (Wash. 2005)).

189. WASH. REV. CODE § 70.105D.030(1)(b).

190. WASH. DEP'T OF ECOLOGY, HOUSE BILL 1761: MODEL TOXICS CONTROL ACCOUNTS TEN-YEAR FINANCING PLAN 15 (Dec. 2008), *available at* http://www.ecy.wa.gov/pubs/0801044.pdf. State agencies that receive funds for hazardous waste cleanup, prevention, and management activities include the Department of Health, Department of Agriculture, Department of Natural Resources, Washington State Patrol, Washington State Department of Transportation, and the Puget Sound Partnership, as well as the Department of Ecology. *Id.*

191. WASH. REV. CODE § 70.105D.070(2)(viii).

192. *Id.* § 70.105D.070(3)(a).

193. *Id.* § 70.105D.070(4).

legislature has neither appropriated funds for remedial action under the MTCA nor provided funding from the hazardous substance tax.

B. The Army Corps of Engineers and Ecosystem Restoration

The possibility of a Corps ecosystem restoration[194] project has been discussed as a way to address the Swift Creek problem. Ecosystem restoration projects "utilize engineering and other technical solutions to water and related land resources problems, with emphasis on improving degraded ecosystem function and structure."[195] The Corps focuses on "restoration opportunities that are associated with wetlands, riparian[,] and other floodplain and aquatic systems."[196] Ecosystem restoration projects are intended to address "ecological resources, and not . . . [the cleanup] of hazardous and toxic wastes . . . ." Under the Corps' policies, cleanup presumably would be one of the "components of ecosystem restoration problems or opportunities [that] are better addressed by other agencies through their missions and programs."[197] Projects that "consist primarily of land acquisition are not appropriate as Civil Works ecosystem restoration investments."[198]

At the 2007 public meeting, the Corps' Seattle Division commander, Mike McCormick, discussed the possibility of ecosystem restoration, including the uncertainties that surround the Corps' jurisdiction:[199]

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194. *See* U.S. ARMY CORPS OF ENG'RS, WATER RESOURCES POLICIES AND AUTHORITIES: CIVIL WORKS ECOSYSTEM RESTORATION POLICY 2 (Sept. 30, 1999), *available at* http://140.194.76.129/publications/eng-regs/er1165-2-501/entire.pdf. ("Ecosystem Restoration is one of the primary missions of the Civil Works program. The purpose of Civil Works ecosystem restoration activities is to restore significant ecosystem function, structure, and dynamic processes that have been degraded. Ecosystem restoration efforts involve a comprehensive examination of the problems contributing to the system degradation, and the development of alternative means for their solution. The intent of restoration is to partially or fully reestablish the attributes of a naturalistic, functioning, and self-regulating system.").

195. *Id.* at 3.

196. *Id.*

197. *Id.*

198. *Id.*

199. The Corps derives its authority to engage in ecosystem restoration projects from a number of sources:

> a. Study authorities through which the Corps can examine ecosystem restoration needs and opportunities include: 1) congressionally authorized studies pursued under General Investigations (i.e., new start reconnaissance and feasibility studies for single-purpose ecosystem restoration or multiple purpose projects which include ecosystem restoration as a purpose); 2) General Reevaluation Reports and reformulation opportunities in conjunction with significant Post-Authorization Change Reports; 3) Section 216, Review of Completed Projects (River and Harbor and Flood Control Act of 1970); 4) major rehabilitation of existing projects; and 5) Section 22, Planning Assistance to States (Water Resources Development Act (WRDA) 1974, as amended).

> I have authority to do the ecosystem restoration. Is this an ecosystem restoration project? Don't know. One of the requirements of course is that I have a local sponsor in addition to having a federal. I'm the federal sponsor, but I need to have a local sponsor whether that's the state, DNR, or whether that's a local agency, the county. It requires that. If there is—that's an authority. I don't know if this qualifies for ecosystem restoration, but even if it did I'd still need a local sponsor.[200]

The requirements for local sponsors vary, depending on the source of authority for the ecosystem restoration project. Local sponsors must provide from twenty-five to forty percent of the project cost, depending on the circumstances; the extent to which in-kind contributions can be used to meet the local share varies.[201] The process is competitive, as Commander McCormick described:

> How we get a local sponsor is we get a letter from a local sponsor saying they're willing to contribute a certain percentage depending on the type of study that we're going after or what portion of the process we're in. And it differs, but essentially somewhere around 35, 40 percent is provided by the local sponsor and then the federal government, then we go in and we certainly talk to the congressional delegation and then the congressional delegation funds us for the federal portion, the federal share, and it is across the entire country where this 4.8 billion dollars worth of civil works appropriation money gets chopped up into various programs. And if this thing makes the cut, there is a federal chunk of money put into it. If the member of the Senate or a member of the House has enough pull to actually get the federal money applied, that takes care of the federal portion, but the local portion has to be provided by something that's not federal. . . . Someone has to write a letter saying we're willing to contribute 30, 40 percent of whatever this

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> b. Authorities through which the Corps can participate in the study, design, and implementation of ecosystem restoration and protection projects include: 1) Section 1135, Project Modifications for Improvement of the Environment (Water Resources Development Act (WRDA) of 1986, as amended); 2) Section 206, Aquatic Ecosystem Restoration (WRDA 1996); 3) Section 204 Beneficial Uses of Dredged Material (WRDA 1992, as amended); and, 4) dredging of contaminated sediments under Section 312 of WRDA 1990, as amended.
>
> c. Additional opportunities for ecosystem restoration and protection may also be pursued through existing project authorities for the management of operating projects; e.g., through water control changes or as part of natural resources management.

Id. at 2.

200. Nov. 2007 Transcript, *supra* note 1, at 36.

201. The Corps' ecosystem restoration policy spells out these obligations, which depend on whether the project is congressionally authorized or if it falls under various provisions of the Water Resources Development Act of 1986. *See* U.S. ARMY CORPS OF ENG'RS, *supra* note 194, at 4.

> study and then later on at the end of the day, at the end of the study if there is an answer to the problem, then it gets authorized. At the end there's a chief's report by the chief of engineers, he signs off on, it gets authorized by congress, and then appropriations get applied for construction.[202]

Ecosystem restoration efforts are grounded in a benefit-cost analysis "involv[ing] a comprehensive examination of the problems contributing to the system degradation, and the development of alternative means for their solution."[203] This assessment considers monetary and non-monetary benefits, and follows "[t]he general guidance in the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (P&G)."[204] The P&G is "intended to ensure proper and consistent planning by Federal agencies in the formulation and evaluation of water and related land resources implementation studies."[205] Under those guidelines, the Corps must analyze "all reasonable alternatives," including "[a] plan that reasonably maximizes net national economic development benefits."[206]

National economic development (NED) is defined as "the net value of the national output of goods and services, expressed in monetary units."[207] The importance of NED in this assessment emphasizes the benefit-cost nature of the Corps' ecosystem restoration process. Although the P&G provide that the assessment should include "[o]ther plans which reduce net NED benefits in order to further address other Federal, State, local, and international concerns,"[208] and the Corps' ecosystem restoration policy guidance states that "measures do not need to exhibit net national economic development . . . benefits and should be viewed on the basis of non-monetary outputs compatible with the P&G selection criteria,"[209] competition for limited resources is stiff, and the benefit-cost calculus is a significant factor. In general, the benefit-cost analysis process is problematic because "knowledge of the costs,

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202. Nov. 2007 Transcript, *supra* note 1, at 53–54.

203. U.S. ARMY CORPS OF ENG'RS, *supra* note 194, at 2.

204. *Id.* at 5.

205. U.S. WATER RES. COUNCIL, ECONOMIC AND ENVIRONMENTAL PRINCIPLES AND GUIDELINES FOR WATER AND RELATED LAND RESOURCES IMPLEMENTATION STUDIES, at iv (Mar. 10, 1983), a*vailable at* ftp://ftp-fc.sc.egov.usda.gov/Economics/priceindexes/Data/PrinciplesAndGuidelinesLocalSite.pdf (indicating that the P&G applies to Corps (Civil Works), Bureau of Reclamation, Tennessee Valley Authority, and Soil Conservation Service water resources project plans).

206. *Id.*

207. *Id.*

208. *Id.*

209. U.S. ARMY CORPS OF ENG'RS, *supra* note 194, at 5.

benefits, impacts, and interactions is rarely precise." [210] These problems are magnified in the case of Swift Creek, where costs are extremely high and benefits are extremely difficult to quantify in the light of the uncertainties surrounding exposure to NOA and its health effects.

Representatives of Washington's congressional delegation are not optimistic that the Corps will identify any viable alternatives that meet its benefit-cost standards.[211] If it were calculated that several human lives would be saved from asbestos-related deaths through an ecosystem restoration project, a "savings" that might be calculated at around $7 million per death,[212] and that property damage from flooding would be averted, it is nevertheless unlikely that these "benefits" would outweigh the project costs for mitigation, which have been roughly estimated at more than $100 million.[213] Under this calculus, it is difficult to see how assisting a sparsely-populated area would make the cost-benefit cut.

The availability of the required local contributions presents an equally significant barrier. Between 1998 and 2007, Whatcom County spent approximately $1.4 million on Swift Creek management activities, averaging approximately $140,000 per year.[214] In 2009, the Washington State Legislature allocated $1 million for the cleanup of Swift Creek.[215] The required contribution of between twenty-five and forty percent of the restoration costs, if applied to the ballpark figure of $100 million contemplates a required local expenditure of $25 to $40 million. Compared to the few million dollars currently spent locally, this level of expenditure would represent an enormous escalation of funding for the Swift Creek asbestos problem.

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210. IGOR LINKOV ET AL., COMPARATIVE RISK ASSESSMENT AND ENVIRONMENTAL DECISION MAKING 15 (2004).

211. Interview by Douglas Naftz with Luke Loeffler, *supra* note 159.

212. David Fahrenthold, *Cosmic Markdown: EPA Says Life Is Worth Less*, WASH. POST, July 19, 2008, http://www.washingtonpost.com/wp-dyn/content/article/2008/07/18/AR2008071803235.html (emphasizing that according to new EPA estimates, the value of a 'statistical human life' is $7.22 million).

213. This figure comes from a newspaper quote from an interview with a Whatcom County geologist. No agency calculations of the cost of mitigation appear to be publicly available. *See* Sam Taylor, *State May Help Dredge Swift Creek*, BELLINGHAM WASH. HERALD, Mar. 26, 2008, *available at* http://www.redorbit.com/news/science/1312445/state_may_help_dredge_swift_creek/.

214. KERR WOOD LEIDAL, *supra* note 10, at 3-8.

215. WHATCOM CNTY. COUNCIL, AGREEMENT NO. 201003023, INTERAGENCY AGREEMENT BETWEEN THE STATE OF WASHINGTON DEPARTMENT OF ECOLOGY AND WHATCOM COUNTY FLOOD CONTROL ZONE DISTRICT 1 (Jan. 19, 2010), *available at* http://www.co.whatcom.wa.us/council/agreements/2010/201003023.pdf.

C. County and City Authority

At the local level, Whatcom County and the small cities affected by Swift Creek and the Sumas River have land use planning and zoning authority that could minimize human exposure to NOA by reducing population densities in the vicinity of the NOA. Perhaps reflecting their constituents' skepticism about the degree of harm posed by asbestos-laden soils, however, local governments appear reluctant to restrict land uses in areas affected by NOA. For example, only months after EPA found high levels of asbestos in floodplain sediments, the county council designated land in the Sumas River floodplain for urban-density growth.[216] This decision was not made inadvertently; the local governments received testimony regarding the presence of asbestos-laden soils in this area and requests that the affected area be omitted from the urban growth boundaries.[217] This decision demonstrates both the difficulty of coordinating the activities of different levels of government and the problems that local government officials face in weighing property rights against long-term risk.

Washington State law also requires local governments, including Whatcom County, to designate geologically hazardous areas using the "best available science."[218] Regulations define "geologically hazardous areas" as "areas susceptible to erosion, sliding, earthquake, *or other geological events. They pose a threat to the health and safety of citizens* when incompatible commercial, residential, or industrial development is sited in areas of significant hazard."[219] The regulations further state that, "[w]hen technology cannot reduce risks to acceptable levels, building in geologically hazardous areas is best avoided."[220]

Whatcom County's current Comprehensive Plan only designates the Swift Creek alluvial fan, an area of approximately 495 acres,[221] as a

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216. WHATCOM CNTY. COUNCIL, WHATCOM COUNTY COUNCIL ACTION TAKEN (Nov. 24, 2009), *available at* http://www.co.whatcom.wa.us/council/meetings/council/actiontaken/pastactiontaken/2009/at1124.pdf (referencing approval of an "[o]rdinance amending Whatcom County Code Title 20, the Official Whatcom County Zoning map, and the Whatcom County Comprehensive Plan and maps"); *see also* WHATCOM CNTY. COUNCIL, WHATCOM COUNTY COUNCIL AGENDA BILL 451, 843 (Nov. 17, 2009), *available at* http://www.co.whatcom.wa.us/council/meetings/council/packet/archived/2009/packet1124.pdf (including text of ordinance including the affected area and a map of the affected area).

217. Whatcom County did add a policy related to asbestos: "This area will be kept in reserve status until the County has determined that development will not expose future residents and employees to unacceptable risk from naturally occurring asbestos." *Id.* at 545.

218. WASH. REV. CODE § 36.70A.172 (2011).

219. WASH. ADMIN. CODE § 365-190-080(4)(a) (2010) (emphasis added).

220. *Id.*

221. KERR WOOD LEIDAL, *supra* note 10, at 2-4.

geologically hazardous area.[222] Based on EPA's sampling results from the 2009 flood, which showed highly elevated levels of asbestos in sediments along the Sumas River, the best available science seems to indicate that the geologically hazardous area designation should be extended to include other affected areas.[223] Concerns about property values would make such a designation politically unpopular, however, and Whatcom County has not indicated any interest in using comprehensive planning to address the problem.

V. THE RANGE OF SOLUTIONS

[Q]uick and efficient cleanup of hazardous material eliminates risks to people and the environment and minimizes the stigma contamination can bring to properties and communities.

> —EPA, The Emergency Response and Removal Program.[224]

And with it being such a health risk, you would think that that would play into it because this is a national health risk is what I'm hearing today. So why are our hands tied and the money tied up? I don't understand that. If it's such a health concern, why isn't there the money for this county not to be this big of a risk? And if you can't answer that, it's like where do we go next? What are we going to do?

> —Tammy Rawls, Resident, Whatcom County.[225]

I'm here for a solution. I'm not here to find out how bad this stuff is or how good this stuff is or what we can or can't do with this. I want a solution instead of all these things. It's redundant to bring them up again, but we can't get one agency here to come up with a solution. Nobody has.

> —Edward Bosscher, Resident, Whatcom County.[226]

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222. WHATCOM CNTY. COUNCIL, WHATCOM COUNTY COMPREHENSIVE PLAN, at Map 27 (June 2008), *available at* http://www.co.whatcom.wa.us/pds/planning/comp_plan/pdf/20110101-chapter-11.pdf (showing the Swift Creek alluvial fan designated as an "Alluvial Fan Hazard Area").

223. *Id.* at 11-11. This would be consistent with Whatcom County Comprehensive Plan Goal 11-D:

> Minimize potential loss of life, damage to property, the expenditure of public funds and degradation of natural systems resulting from development in hazardous areas such as floodplains, landslide-prone areas, . . . potentially dangerous alluvial fans and other known natural hazards by advocating the use of land acquisition, open space taxation, conservation easements, growth planning, and other options to discourage development in such areas.

224. United States v. W.R. Grace & Co., 429 F.3d 1224, 1248 (9th Cir. 2005).

225. Nov. 2007 Transcript*, supra* note 1, at 54.

226. *Id.* at 34–35.

From the perspective of many residents affected by Swift Creek asbestos, government agencies arrived on the scene, proclaimed that NOA is a health hazard, and then moved on without solving the problem. From the perspective of agency officials, the scope and nature of the Swift Creek problem demands a response, but the lack of clear legal authority and the paucity of available resources stymie efforts to address the long-term needs of the region. Furthermore, as discussed, no single agency has the authority to tackle every aspect of the Swift Creek problem. As one Whatcom County representative stated, "it's like a Hydra, the heads are moving."[227]

Under these circumstances, federal, state and local approaches to the problem will have to be coordinated in order to approach the asbestos problem from a number of angles and to extend the reach of scarce resources. In a 2009 press release, EPA recognized the need for simultaneous application of a variety of solutions. Noting that "[e]ngineering options—including building a structure that would control sediment near the landslide—are being considered," the agency explained that "[t]he situation may also call for changes to local land use planning."[228]

The most popular approach probably is the engineered solution, which would be intended to prevent asbestos-laden soils from entering Swift Creek or from being distributed through flooding. Residents naturally hope that the problem can be controlled at its source in a way that does not depreciate property values or require the residents to change their lifestyles. One engineering alternative involves the construction of a large debris stabilization basin in the alluvial fan of Swift Creek. In 1971, the Corps selected this approach as the most feasible of three potential alternatives; but the concept failed to survive the requisite cost-benefit analysis.[229] Subsequent studies have continued to propose ways to contain sediment, either as a long-term or short-term approach to the problem.

To date, the most thorough geotechnical study of the Swift Creek region remains the 1976 Soil Conservation Service study. The purpose of this study was to "make a preliminary evaluation of the feasibility of retarding the landslide movement via a landslide control structure or other means and for determining the size, type and location of a potential

227. *Id.* at 57 (quoting Jon Hutchings, Assistant Dir. of Pub. Works, Whatcom Cnty.).

228. U.S. ENVTL. PROT. AGENCY, NATURALLY-OCCURRING ASBESTOS FOUND IN SUMAS RIVER DOWNSTREAM OF SWIFT CREEK (July 20, 2009), *available at* http://yosemite.epa.gov/opa/admpress.nsf/0/0F93B0BF4981377C852575F9007AE5FE.

229. KERR WOOD LEIDAL, *supra* note 10, at 2-10 to -12.

sediment debris basin(s) located on the Swift Creek floodplain."[230] This report identified a range of alternative solutions.[231]

As outlined in the study's purpose statement, two possibilities were evaluated in detail: a landslide control structure and sedimentation basins. The landslide control structure "would contain the debris at the source by means of an earth buttress constructed at the face of the landslide above the Swift Creek 'narrows.' "[232] This buttress would be 1075 feet in length and would require excavating fourteen million cubic yards of landslide material and the re-use of thirteen million cubic yards as fill.[233] Even in 1976, without accounting for the costs of worker protection while excavating asbestos-laden sediments or the costs of the disposal of the sediments, this engineering alternative was recognized to be too expensive to pursue any further.[234]

In light of the high costs of constructing a landslide control structure, sedimentation basins emerged as the favored engineering approach. Sediment basins are constructed to "reduce the volume of sediment transported, reduce the incidence of overbank flooding and the related flood plain sediment deposition."[235] Potential sites for two basins were identified.[236] Excavated on-site soils from the sedimentation basins were proposed as the source of materials to build embankments and dikes. These materials consist of alluvial fan and flood channel deposits,[237] now known to contain asbestos.

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230. CONVERSE DAVIS DIXON ASSOCS., INC., FINAL GEOTECHNICAL REPORT: SWIFT CREEK TRIBUTARIES, SUMAS RIVER WATERSHED, WHATCOM COUNTY, WASHINGTON PT. II, at 2 (Jan. 15, 1976) (on file with author) (referenced in text as the "1976 Geotechnical Report").

231. *Id.* at 14–16. Two of these alternatives, "slide stabilization" and "drainage diversions from slide[-]area," were considered clearly infeasible. Slide stabilization would involve "internal drainage of the ground water within and beneath the slide mass" by some means or "soil solidification or grouting to solidify and strengthen the slide material." *Id.* The report noted that sufficient information about subsurface conditions and the cause of the movement was not available and that in any event, "no case is known where such methods have been successfully applied to a landslide of this magnitude." *Id.* at 14–15. "Drainage diversion," related to the fact that stream flows on both sides of the slide-area, as well as runoff on the slide-area itself, results in erosion of the slide-area and transport of slide materials to the floodplain. "Diversion of the streams or runoff into these streams from the upstream watershed by conduits, channels, dams and pumping, etc., was considered impossible from a sound engineering aspect and economics." *Id.* at 15. Steep topography and site conditions prevent an inter-basin transfer, while the crushing forces of the shifting of geologic formations would destroy collection and diversion structures.

232. *Id.* at 27.

233. *Id.* at 28.

234. *Id.* at 29.

235. *Id.* at 31.

236. *Id.* at 32.

237. *Id.* at 35. The report predicted embankments of thirty-five and twenty-five feet for Basin A and Basin B, respectively, would result in a trap efficiency of from seventy-five to ninety percent.

The report estimated that the total project cost would be $3.6 million, with annual operation and maintenance costs of $568,000.[238] Adjusting for inflation, the project cost today would be approximately $15 million, with an annual operating cost of $2.4 million.[239] Of course, costs have changed over time. Even if some processes can be done more efficiently and some materials may be relatively cheaper, the fact that the 1975 estimate did not include worker protection for handling hazardous asbestos-laden material is a countervailing factor. To help put these costs in perspective, EPA's costs in 2007 for spraying dust suppressant, stockpile grading, and bank armoring were approximately $250,000.[240] Additionally, EPA estimated that the cost of removing 100,000 cubic yards of sediment per year for five years, and transporting it to a repository within ten miles—if such a place existed—would be between $1.5 and $1.9 million.[241]

The involved agencies have acknowledged that this type of large-scale engineering solution is not economically feasible. In 2009, EPA, Ecology, and Whatcom County entered into a Joint Agency Agreement based on the premise that "[t]he agencies have concluded that engineered facilities to stop the erosion and deposition of Sumas Mountain sediments near their source are prohibitively costly and require resources far beyond those available to State and Local governments, and that Federal programs do not presently allow for spending of this magnitude."[242] The engineered solution currently under consideration is far more modest than the solution proposed in 1975. The Washington State Legislature allocated $1 million from the local toxics control account in 2009 "solely to clean up naturally occurring asbestos from Swift Creek."[243] Whatcom County and Ecology agreed to use the funds primarily for the management and improvement of the existing sediment piles on the side of Swift Creek, designated as "levees," and for the design and construction of new levees and retention facilities. The parties also agreed to use the funds for floodplain easement, land acquisition, and geotechnical investigation of long-term solutions.[244]

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238. *Id.* at Appendix A.

239. *Inflation Calculator*, DOLLARTIMES, http://www.dollartimes.com/calculators/inflation.htm (input "3,600,000" into "$" box; then choose "1975" in the following drop-box; then choose "2010" in the drop-box under "Convert to $"; then follow "Calculate" hyperlink).

240. KERR WOOD LEIDAL, *supra* note 10, at 3-8.

241. *Id.*

242. WHATCOM CNTY. COUNCIL, WASH. STATE DEP'T OF ECOLOGY, U.S. ENVTL. PROT. AGENCY, JOINT AGENCY AGREEMENT: NATURALLY OCCURRING ASBESTOS ORIGINATING FROM THE SUMAS MOUNTAIN LANDSLIDE IN WASHINGTON STATE 1 (Aug. 31, 2009).

243. WHATCOM CNTY. COUNCIL, AGREEMENT NO. 201003023, *supra* note 215.

244. *Id.* at 6.

Whatcom County has since acquired property intended for the disposal of asbestos-containing sediment[245]—apparently skirting, or having received reassurances about, liability issues. It has also approved a sediment management plan for the construction of levees and excavated sediment basins with berms. Specifically, Whatcom County proposed the construction of two large basins on a seventy-acre site located in the existing Swift Creek alluvial fan. The basins would have a storage capacity of approximately two million cubic yards of sediment.[246] Containment levees would be "offset from the banks of Swift Creek channel," in order to contain larger debris flows and sediment from flooding events.[247]

The estimated cost for basin design, permitting, and construction is $4.6 million, with $2.5 million estimated for levee design and construction. The repair and maintenance costs are estimated at $250,000 per year.[248] While these costs greatly exceed any funding that has been dedicated to, or identified for, Swift Creek to date, it should further be noted that these engineering features are not viewed as permanent solutions. Landslide stabilization, optimistically priced at $150,000 to $4 million, is identified as a long-term goal.[249]

Based on the current situation, it appears that the agencies are not anticipating that a Corps-sponsored ecosystem restoration will rescue Swift Creek. The Corps would be the logical lead agency for an engineered solution. Not only is the Corps experienced in large-scale engineering projects, but its ecosystem restoration authority is focused on water systems. In contrast to EPA, which has CERCLA authority more clearly authorized to address NOA handled by humans, the Corps' ecosystem restoration authority is intended to avoid hazardous waste issues and to work to improve natural systems. An engineering approach led by the Corps could address the source of the Swift Creek asbestos problem. Realistically, however, both the feasibility and the cost make a large-scale engineering solution unlikely.

Reflecting the dearth of solutions, EPA tends to emphasize small-scale, local policies. On its Swift Creek website, EPA notes:

> [I]n El Dorado County, California, for example, local land-use permits require geologic study and documentation of construction and waste management practices. In Fairfax County, Virginia, a

245. Sam Taylor, *Whatcom Officials OK Buying Lot for Asbestos Sediment from Swift Creek Area*, THE BELLINGHAM HERALD, Sept. 29, 2010.

246. SEDIMENT MANAGEMENT PLAN, *supra* note 9, at 11.

247. *Id.* at 12.

248. *Id.* at 6.

249. *Id.*

> plan must be approved before construction occurs. In the future, local or state level changes, similar to this, will likely be needed in areas affected by asbestos carried downstream from Sumas Mountain landslide.[250]

In conjunction with the local governments' planning and zoning authority, these local controls might help to reduce risk. El Dorado and Fairfax County are unlike the Swift Creek area, however, because the asbestos in those locations is in the ground and the rocks. It is not transported, by a river delivery system, and there is no landslide providing a continuous source of asbestos-laden sediments.

Rather than trying to stop the asbestos from moving, or engaging in low-level mitigation measures that may or may not reduce risk and harm, the agencies need to determine whether the Swift Creek geologically hazardous area is simply incompatible with human settlement. Given the unique temporal and geographic scope of NOA distribution in the Swift Creek area, the most protective and inexpensive option might be simply to purchase affected properties.

A land-purchase solution would likely put EPA in the lead, based on its response authority under CERCLA. This would be an innovative approach. Although permanent relocation of residents at a CERCLA cleanup site is not unprecedented, such relocation has not occurred during a removal action at a site that is neither listed nor pending listing on the NPL. Based on the broad statutory deference offered to EPA through the inclusive language of CERCLA, however, permanent relocation is certainly not outside the realm of policy options at EPA's disposal when carrying out a complex removal action.[251]

The definition of a remedial action under CERCLA provides insight into the types of situations that might warrant relocation:

> [T]he costs of permanent relocation of residents and businesses and community facilities where the President determines that, alone or in combination with other measures, such relocation is more cost-effective than and environmentally preferable to the transportation, storage, treatment, destruction, or secure disposition offsite of

250. *Frequently Asked Questions about Sumas Mountain Asbestos, Swift Creek and Sumas River*, U.S. ENVTL. PROT. AGENCY (Aug. 26, 2009), http://yosemite.epa.gov/r10/cleanup.nsf/sites/sumasmtnfaq.

251. The lists of example removal actions outlined under CERCLA in 42 U.S.C. § 9601(23), and in the NCP under 40 C.F.R. § 300.415(e) are not exhaustive, and act as a "general rule" for what removal actions might include. Given the broad statutory deference offered to EPA, it is likely that even property acquisition, which normally occurs in remedial actions, could be utilized under a complex removal action.

> hazardous substances, or may otherwise be necessary to protect the public health or welfare . . . .[252]

Using this definition as a guide, a rough estimate can be prepared of the cost of relocating property owners affected by Swift Creek NOA. The assessed value of all properties within a quarter-mile buffer zone around the creek can be calculated by using data from Whatcom County and Geographic Information Systems software. Based on total assessed property values from 2007,[253] the seventy-one properties within a quarter-mile buffer zone of Swift Creek are worth approximately $7,673,790. In contrast, the cost of dredging, transportation, and disposal of hazardous sediment from Swift Creek over a period of 400 years or more can be roughly estimated at two million dollars per year.[254] Permanent relocation of homeowners near Swift Creek is therefore a viable policy alternative. A dredge-and-deposit strategy of sediment management exceeds permanent relocation costs after only four years. Thus, as a means of eliminating asbestos exposure pathways over a long period of time, permanent relocation would be the most cost-effective method.

Additionally, permanent relocation addresses another important exposure pathway—indoor exposure to asbestos from Swift Creek.[255] Although EPA has identified indoor air exposure as a risk factor, indoor exposure has not been quantified or incorporated into EPA's risk calculations. It is possible that harmful asbestos-containing sediment from Swift Creek has accumulated in homes, where residents inhale it for longer durations than would occur during outdoor exposure. Indoor exposure may also result from the local transport and use of Swift Creek sediments as fill material. Thus, as indicated by EPA and the Washington Department of Health, it is possible that NOA exists in driveways and other residential areas near sites where the fill was

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252. 42 U.S.C. § 9601(24) (2010).

253. Total assessed value includes value of built structures, land, and any resource value that may exist on the site.

254. KERR WOOD LEIDAL, *supra* note 10, at 3-8. This cost estimation incorporated several important assumptions, including the ability to remove and export 20,000 cubic yards of hazardous dredged sediment per year to a disposal site within ten miles. Under these conditions, it was estimated that over a five-year period, 100,000 cubic yards of hazardous sediment (the estimated volume of stockpiled sediment currently residing at the site) could be removed and disposed off site for between $1.5 and $1.9 million per year, with transportation costs accounting for between twenty and thirty percent of the total cost.

255. According to the Washington Department of Health, "[r]isk estimates may in fact be underestimated because exposures may occur at other locations such as indoor environments of residences near Swift Creek." PUBLIC HEALTH EVALUATION, *supra* note 121, at 13. Additionally, properties downstream (including those on the Sumas River) are "areas where questions remain about non-occupational exposure." *Id.* at 11.

used.[256] Compared to the dredge-and-deposit solution, which only mitigates exposure within the immediate vicinity of the creek, permanent relocation could eliminate exposure within homes as well as exposure from sediments in and surrounding the creek.

Property owners may resist permanent relocation. On the other hand, they may recognize that relocation provides proactive mitigation of decreasing property values caused by the presence and stigma of NOA. Washington law requires the disclosure of asbestos in or on a residential property when it is sold.[257] The free market may well provide a more draconian solution than the proposed purchase of properties affected by NOA. The depreciation process has been aptly described as follows:

> One issue that may come and be disclosed by the seller is the presence of or concerns about environmental contamination on the property. Once this topic is introduced, the buyer-seller conversation is altered away from positive attributes of the property to a potentially deal-killing topic while the potential buyer assesses their taste for environmental risk. In many cases, the potential buyer will walk away from a contaminated property, especially if the property is not uniquely excellent and if there are some uncontaminated substitutes for it. Hence, this substitution effect acts to depress demand for the property, driving down the sales price.[258]

Free market proponents might argue that the market should control the price of properties affected by NOA. After all, properties with quicksand or fault lines are worth less than other properties, and NOA is equally a result of natural forces. Looking at the situation from the property owners' perspective, however, the situation is more equivalent to an innocent landowner affected by a Superfund site. Landowners affected by Swift Creek NOA did nothing wrong, and they are exposed to health risks that the government has determined to be unacceptable.

Superfund law, however, revolves around the liability of a responsible party. As a result, it not only fails to provide a clear path forward in many situations involving NOA, but it can actually chill agency action, with the unintended consequence of exposing citizens to

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256. *Id.* at 11; *see also* HEALTH CONSULTATION, *supra* note 12, at 2-2.

257. WASH. REV. CODE § 64.06.020 (2011). Required "environmental" disclosures include the following: "Are there any substances, materials, or products in or on the property that may be environmental concerns, such as asbestos, formaldehyde, radon gas, lead-based paint, fuel or chemical storage tanks, or contaminated soil or water?" The seller may check "Yes," "No," or "Don't know." If "Yes" is checked, the seller must explain the answer. Although buyers may waive disclosure, the "environmental" disclosures must be provided if the answer would be "Yes." WASH. REV. CODE § 64.06.010(7).

258. ROBERT A. SIMONS, WHEN BAD THINGS HAPPEN TO GOOD PROPERTY 37 (2006).

greater risks.[259] Nonetheless, if agencies are willing to interpret it aggressively to protect public health, existing law can lead to a solution for exposure to naturally occurring asbestos. The unspoken issue is whether our society will view this problem as a communal issue, requiring an investment of societal resources, or if individuals will be left to bear the brunt of the problem.

As a slow-moving emergency that confronts a relatively small and conflicted constituency, the pressure for leadership on NOA is muted. Thus, the problem is likely to sort itself out through market-choice mechanisms. Property values will provide a rough reflection of the risk of asbestos exposure. Those who cannot afford to live anywhere else, or who discount the risk, will remain in areas with NOA.

If Swift Creek is a guide, citizens will have great difficulty making individual risk assessments in the face of the complexity of the health effects of asbestos, with its long latency period and uncertainties about exposure. No matter their generalized view of the role of government, affected residents will tend to assume that the government will protect their health from identified hazards. As an anonymous commentator wrote on the local newspaper's web site:

> Well, well, well . . . Until you have it all over YOUR property, your driveways/roads after flooding, and all over the inside of your home, . . . you have no idea how much it impacts your life, your property value, your future and your ability to sell your property when you are no longer able to run a farm and no one will buy it because it is contaminated with the stuff . . . .
>
> We would be more than happy to let the county buy our property at the "before" contamination value, and let nature take it's course. No people living here—no health concerns. I'd rather not be that guinea pig for you all. Thanks![260]

Unfortunately for the anonymous commentator, the harsher calculus of cost-benefit analysis, rather than the assumed social contract of government protection, is likely to determine the outcome of the Swift Creek NOA problem. New laws specific to the context of NOA, as well as additional scientific understanding of asbestos would, of course, help to protect citizens in all areas affected by NOA. Further research regarding the health impacts of short asbestos fibers, as well as additional work on indoor and outdoor exposure to NOA, would help citizens and regulators to understand the risks of NOA. Federal or state

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259. *See supra* Part IV.A.1.

260. Doghouse333, Comment to *Whatcom Officials OK Buying Lot for Asbestos Sediment from Swift Creek Area*, THE BELLINGHAM HERALD, Sept. 30, 2010.

laws requiring NOA to be addressed as a geological hazard would provide local governments with a template, and would help local governments to implement rational land use controls that balance their constituents' immediate concerns about property rights and property values.

If and when NOA rises to a level of priority that pushes the government to act, these are all actions that would help to eliminate the "seam between the authorities" in which the players in the Swift Creek drama find themselves. In the meantime, the real estate market will continue to apply its rough justice, while agencies, scientists, and residents continue to scramble to balance long-term concerns against short-term economic realities. These efforts, and the work of communities around the country, are the laboratories of experimentation that will lead to a more rational, less ad hoc approach to the difficult legal and health issues raised by naturally occurring asbestos.