

Remediation of Drycleaning Sites in California

Towards a Program for the Remediation of
Current and Former Drycleaning Sites in California



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The Auger Group

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Executive Summary

The principal chemical used in drycleaning since the 1930s is perchloroethylene or *perc*. It has many negative effects on human health, most notably as a carcinogen recognized by the IARC, CalEPA and OEHHA, among others. Exposure to *perc* can also increase the risk of developing Parkinson's disease by nine times.

5% or more of public water supply wells in the State are already affected by *perc* contamination. This is a national issue since California is the breadbasket of America and *perc* shows up in a wide range of food products of both animal and non-animal origin. Most agricultural production in the state takes place in the Central Valley, where even 16 years ago more than a third of tested wells were found to contain *perc*.

Unquantified and unregulated releases continue in large number across the state.

Two yawning gaps urgently need to be closed: that between current remediation activity and the proven need, and the gap between cleanup costs and the ability of affected businesses' to meet those costs.

Concatenated *chemical-physical factors* and *rule-cost factors* leave many family businesses, the State and chemical manufacturers dangerously and unnecessarily exposed to legal and associated financial risks. Bankruptcy and litigation are in no-one's interest. Yet risks to public health and the environment must be avoided.

In the first instance, a preliminary sampling and monitoring program is needed to identify priority sites in need of remediation.

The status quo is as iniquitous to small business owners as the situation is avoidable, as socio-economically undesirable as legally precarious. Change depends on overcoming barriers, perceptual and substantive. A point that has been well proven in other states, the key issue is funding. Specifically the challenge is *to devise, develop or synthesize the most appropriate funding solutions to provide sufficient revenue to drive a proactive statewide cleanup program that balances the desired aggressive approach with realistic, context-driven limits.*

Proven successful funding sources include: i) a sales tax on drycleaning services, ii) a tax on perc use charged to drycleaners and distributors, iii) a licensing fee, iv) an interest-earning deposit account at the state treasury that receives revenue from other income streams, most significantly i), and v) partial diversion of existing sales tax from drycleaning.

The option v) is used by the State of Kansas to increase available funds. In California such a mechanism could foreseeably increase available funds from \$720 to \$977 million over a 20 year period - an increase of 36% (with revenue based on a 2.5% tax at the point of sale.)

It should be noted that the successful North Carolina program was driven by the private sector, underlining the win-win nature of state remediation programs. It is the interests of public and private sector stakeholders, including water supply companies and chemical manufacturers, to book a seat at the table, not least to address the risks of litigation associated with severe compromises in public health.

The work of a new program would fit well within the mandate and operations of the State Water Regional Control Board (SWRCB), and potentially other state agencies.

The California phase out of perc use in drycleaners provides a golden opportunity to mop up and roll back legacy contaminations as the incidence of new cases first declines then ceases.

The interests of the State, of business and property owners, chemical manufacturers, water supply companies, the environment and future generations are aligned. All parties can benefit socially, environmentally and financially from a statewide program to restore environmental integrity lost after half a century's use of this potent chemical.

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Introduction

Drycleaning got its name because solvents as opposed to water are used in the cleaning process. The principal chemical used for the cleaning itself, and known as 'drycleaning fluid', is perc, a halogenated solvent that has been in use since the 1930s. Perc is also known as tetrachloroethylene, tetrachloroethene, perchloroethylene, perchlorethene, perclene, perchlor, and PCE. Documented impurities of perc are: 1,1,1-trichloroethane, carbon tetrachloride, dichloromethane, trichloroethylene, water and other chlorinated solvents¹. PCE is often confused with trichloroethylene (TCE), a different chemical with similar uses; perc is also not to be confused with perchlorate, a chemical used in rocket fuel that like perc shows up in human breast milk.

There has been a transition underway for a number of years from perc to non-halogenated solvents and ecological alternatives, as reflected by events in this brief timeline:

- 1980** Perc use in the USA peaks, with dry cleaners as the main users.
- 1990** US EPA proposes national emission standards to limit PCE emissions from drycleaning plants.
- 1995** The first state drycleaning site remediation program begins, in Florida.
- 1998** The State Coalition for Remediation of Drycleaners is established, with US EPA Superfund support.
- 2001** California deems perc a toxic chemical.
- 2006** CARB votes to phase out perc use in drycleaning by 2023.

In 2008 the State of California began a 15-year phase out of perc, the first of its kind in the nation. The existence of this program is in uncomfortable contrast to the fact that California does not yet have a statewide program for remediation of current and former drycleaning sites affected by perc contamination of soils and groundwater. Such programs exist in 13 other states, with the earliest dating back to the mid-1990s. The reasons for a remediation program are very similar to those for the phase out.

Health effects of perc

People who are directly exposed to perc on a daily basis suffer from nausea, vertigo, headaches, fatigue, irritability and dizziness. Perc is a nervous system depressant that enters the body through respiratory or dermal exposure, dissolving body fats and leading to skin irritation. Studies from the Parkinson's Institute in Sunnyvale, California, have found that exposure to perc multiplies the risk of developing Parkinson's disease six fold². The California Office of Environmental Health Hazard Assessment (OEHHA) lists PCE as a carcinogen³. Perc is linked to multiple cancer types, reproductive disorders and infertility, brain and nervous system defects, as well as impaired liver and kidney function. Anyone who comes into contact with perc is at risk.

¹ *Tetrachloroethylene, Summary Risk Assessment Report, Part I* – Environment, European Commission, Special Publication I.05.104, 2005

² *Industrial solvent linked to increased risk of Parkinson's disease*, Los Angeles Times, Feb 7 2010, accessed May 6 2011: http://latimesblogs.latimes.com/booster_shots/2010/02/industrial-solvents-sharply-increase-risk-of-parkinsons-disease.html

³ Accessed May 21 2011: http://www.oehha.ca.gov/prop65/prop65_list/files/P65single052011.pdf

The toxicity of perc and its effects on human health become more obvious when you consider that every medium, vessel or container with which perc comes in contact must thereafter be treated as hazardous waste – with the exception of the clothes we wear. The highly pervasive, potent and recalcitrant nature of perc is relevant not just to the outer environment but to the sensitive tissues and organs of the human body - even when perc is present in very low concentrations in drinking water and other forms of public supply water such as irrigation.

Complexity and cost of remediation

Other chemicals used by dry cleaners that have entered soils and groundwater include glycol ethers, naphtha, silicon-based solvents, hydrocarbons, 'mahogany' or petroleum sulfonates, sodium sulfosuccinates, sodium alkylarenesulfonates, amine alkylarenesulfonates, fatty acid esters of sorbitan, etc., ethoxylated alkanolamides, ethoxylated phenols, and ethoxylated phosphate esters⁴; flame retardants, stain repellants, oxidizing bleaches, reducing bleaches, and plasticizers.

Highly complex and unpredictable chemical cocktails in soils, groundwater and drinking water supplies cannot all be tested for, much less understood, or even fully quantified. These chemicals also mix and react with other natural and anthropogenic substances in soils, groundwater, public supply water and ecosystems.

Complexity and cost of decontamination at a particular site is in general a function of time since release(s) occurred. As time goes on, soil contamination leads to groundwater contamination, with individual plumes commingling over broad areas, creating more and more complex contamination/decontamination environments and scenarios.

Perc in natural systems and water supplies

Perc enters the soil and thus groundwater and water supplies in three ways: airborne perc precipitates from the air in rain; perc leaks onsite and migrates downwards; and, perc-bearing liquids are disposed of in drains and waste pipes - many of which are unsealed or cracked. Perc is resilient and difficult to contain, seeping into the ground until it reaches rock or clay, which may be 40 feet or more below the surface. In some cases plumes spread over the course of decades, and have been known to spanned areas of up to 19 miles⁵. Once it has entered groundwater, perc and its breakdown products are difficult to remove.

Perc leads to contamination of public water supplies because it travels through soil relatively easily. Cleaning up perc from groundwater is three to ten times more expensive than cleaning it up from soils.

⁴ *Encyclopedia of Chemical Technology*, Kirk-Othmer, 1965, New York: John Wiley & Sons, Inc. Vol. 7.

⁵ South Carolina Post and Courier, Oct 18 2010, accessed May 21 2011:
<http://www.postandcourier.com/news/2010/oct/18/a-fresh-wrinkle/>

California Context

Affected sites in California

In 2003, the Santa Clara Valley Water District presented AB698, the California PCE (Tetrachloroethylene) Environmental Cost Recovery Act, which would have seen dry cleaner facilities paying registration fees and a per gallon fee on perc use to offset remediation costs. AB698 would also have established the necessary protocols for site prioritization⁶.

Of the approximately 36,000 current drycleaning facilities in the United States, an estimated 75% have become contaminated with perc⁷. Applying this metric for the 5,000 operational drycleaning sites in California, there may be around 3,750 current drycleaning sites in the state that are contaminated with perc and in need of remediation.

In addition there are a large number of former and abandoned sites where contamination has taken place. An estimated 90% of sites have seen perc leakages⁸.

Because most drycleaning facilities fall within urban limits, drycleaning solvent contamination affects a high number of public supply wells and risks spreading to many other wellfields⁹. The maximum contaminant level (MCL) for perc in drinking water is 5 parts per billion.

Perc is extremely pervasive and recalcitrant, concentrating in ecosystems and food chains. Even small amounts of perc in the water are toxic to aquatic animals, which store the chemical in their fatty tissues¹⁰. Some of these animals are human food sources. Perc shows up in: dairy products, meats, oils and fats, beverages, fruits and vegetables, fresh bread, fish, shellfish and marine mammals - as well as rainwater, sea water, rivers, groundwater, commercial deionized charcoal-filtered water¹¹.

More than 900 water production wells, or 5% of California state supply wells, have detectable concentrations of perc¹². More than a regional concern, this is an issue of national significance for the state that is the breadbasket of America.

⁶ Status of the California Dry Cleaner Remediation Fund, accessed May 1 2011:

<http://www.coreenvironmental.org/drycleanerfund.php>

⁷ *Conducting Contamination Assessment Work at Drycleaning Sites*, State Coalition for Remediation of Drycleaners, accessed May 21 2001: <http://www.drycleancoalition.org/pubs.cfm>

⁸ *Status of the California Dry Cleaner Remediation Fund*, CORE, accessed May 6 2011:

<http://www.coreenvironmental.org/drycleanerfund.php>

⁹ *New on the State Coalition for Remediation of Drycleaners Website*, SCRD 2010 Newsletter, accessed May 21 2010: www.drycleancoalition.org/download/news1210.pdf

¹⁰ *Garment and Textile Care Program: Frequently Asked Questions About Drycleaning*, Design for the Environment, US EPA, June 1998, accessed April 21 2011:

www.epa.gov/dfe/pubs/garment/ctsa/factsheet/ctsafaq.pdf

¹¹ *11th Report on Carcinogens*, National Toxicology Program, 2005, accessed April 12 2011: ntp-server.niehs.nih.gov/ntp/roc/eleventh/profiles/s169tetr.pdf

¹² *Status of the California Dry Cleaner Remediation Fund*, CORE, accessed May 6 2011:

<http://www.coreenvironmental.org/drycleanerfund.php>

Most of California's agricultural production occurs in the Central Valley, where even 16 years ago a study found that over a third of tested wells contained perc¹³, and where contamination has been a major issue for many years, because groundwater is used extensively and high capacity well pumps pull contamination into the wells from great distances, and across the various aquifers and depths¹⁴.

Legal and Financial Exposure

There are a number of concatenated factors that leave a large proportion of drycleaning businesses, the State and chemical manufacturers unnecessarily exposed to legal and financial risks. These factors can be classified as *chemical-physical factors* and *rule-cost based factors*.

The combination of these sets of factors makes a strong case for improving the status quo. It is important to note that the chemical manufacturing industry and potentially the State of California are also legally exposed, as illustrated by events in recent years in regard to the City of Modesto, which has successfully sued perc manufacturing companies for cleanup costs.

Chemical-physical factors

Many chemical-physical factors have already been mentioned. In addition, perc is extremely pervasive and recalcitrant, able to penetrate even a sealed concrete floor or pvc piping. At most sites where contamination has taken place, multiple releases have occurred over many years. Each of these would represent a significant problem as an isolated incident. In the past there were no guidelines prohibiting disposal of perc into drains and municipal sewage systems; and even if the drains, pipes and conduits that make up these systems were perfect - without cracks, breaches, compromised connections and uneven surfaces - perc can easily penetrate sealed surfaces.

In fact very many breaches have occurred, and continue to occur. No-one knows exactly how many; there is little way of quantifying how responsibly perc is being disposed of. However it is reasonable to assume that very many unregulated releases occur every day across the state. Given the often poor state of drainage systems – and sometimes sewage systems –, the low contaminant threshold of perc, the unregulated and unquantified nature of perc releases, and supplementary risks including perc precipitating from the air in rain, time is of the essence in addressing this issue.

Rule-cost based factors

Under federal Superfund/CERCLA rules there are two major, linked, causes for concern for drycleaning businesses and owners of properties where drycleaning has occurred in the past: i) joint and several liability, and ii) the charging, under federal rules, of three

¹³ *A Comparative Analysis of PCE Dry Cleaning and an Alternative Wet Cleaning Process*, Blackler, C., R. Denbow, W. Levine, and K. Nemsick, 1995, National Pollution Prevention Center for Higher Education, Ann Arbor, MI.

¹⁴ *What Drives An Environmental Cleanup?*, Enviroforensics, accessed May 6 2011: <http://enviroforensics.com/what-drives-an-environmental-cleanup/#more-1083>

times the cleanup costs to the deemed Primary Responsible Party (PRP). (The PRP may or may not then be able to recover monies from other Responsible Parties.)

California and Superfund Rules

Although California is the first state to introduce a phase out of perc in drycleaning facilities, the State does not yet have a program for cleaning up this known carcinogen. It should also be noted that perc is more toxic and recalcitrant than hydrocarbons, for which a remediation program activity already exists. These anomalies, while not representing substantive legal basis for culpability, make it very hard to justify the status quo. Contaminant levels at certain sites within California are likely to qualify these sites as CERCLA/Superfund sites, with all the associated complications and expense - see below.

The private sector in California is also legally and financially overexposed under a Business As Usual scenario, as shown by legal action over recent decades by the city of Modesto against various drycleaning solvent manufacturers. As a measure of the possibility of true leadership by the industry elsewhere, it should be noted that the successful North Carolina program was created by the drycleaning industry within the state, which lobbied intensely for passage of the needed legislation.)

In June 2003 an article appeared in *Carolina Clean* magazine by T. Richard Kane titled *The Monster in the Closet: Superfund Liability for Dry-Cleaners*¹⁵. (Indented paragraphs below are from that article, and may not have appeared contiguously in the original.)

There are five main factors that Kane identifies to consider in regard to the legal urgency of the situation in states such as California:

- Under federal rules, a facility is defined as “any site or area where hazardous substance has been deposited, stored, disposed of or placed, or otherwise come to be located”
- Joint and several liability means any one of a number of parties could be liable, including the purchaser of land that was contaminated prior to purchase
- Perc is a CERCLA “hazardous substance.”
- A “release” is defined as including “any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injection, escaping, leaching, dumping, or disposing into the environment” **and** the courts maintain that the presence of perc in the soil, surface water or groundwater under or around a drycleaning site, regardless of quantity or concentration, is evidence of a CERCLA “release.”

These last two points taken together mean that *the presence of perc in soil or groundwater is enough to trigger federally-mandated cleanup of the site according to joint and several liability* – followed by recovery of 300% of cleanup costs.

¹⁵ *The Monster in the Closet: Superfund Liability for Dry-Cleaners*, Carolina Clean magazine, June 2003, available at: <http://www.poynerspruill.com/publications/Pages/TheMonsterintheCloset.aspx>

Federal liability under Superfund/CERCLA is high not just because of the number of readily identifiable drycleaning sites:

Federal courts have consistently held that a dry-cleaning operation under which perc contamination has "come to be located" constitutes a Superfund "facility."

Congress enacted CERCLA for two primary purposes. The first purpose is to provide the federal government with a means to help control the spread of hazardous substances from waste "disposal" sites. Second, CERCLA assigns the ultimate costs of cleaning up such disposal sites to the parties responsible for the contamination. Although this is referred to as the "polluter pays" principle, in practice the responsible party assigned the costs through CERCLA may not be a polluter at all, but may be merely the owner or operator of the contaminated property.

The party that is to be sued must fall within one of four classes of responsible persons: either (a) a current owner or operator of the facility where the release of hazardous substances has occurred, (b) a past facility owner or operator at the time the release occurred, (c) the party that arranged for disposal or treatment of the hazardous substance at the facility, and (d) the party that transported the hazardous substance to the facility, if it selected the facility. In the context of retail drycleaning operations, category (a), (b) and (c) are the most likely applicable categories.

A party seeking to recover costs under CERCLA must establish four elements: (1) that the contaminated area is a "facility," (2) where a "release" of a "hazardous substance" occurred or threatens to occur, (3) that such "release" or "threatened release" has caused the suing party to incur "response costs" that are "consistent with the National Contingency Plan," and (4) the party that is to be sued falls within one of four classes of persons subject to CERCLA liability.

CERCLA is a "strict liability" statute. That means that if the four CERCLA elements are satisfied as to a PRP, even if that PRP did not cause or even know about the contamination, then that PRP is liable for cleaning it up. For example, the party that owned the facility when perc or another hazardous substance was spilled there will always face liability, regardless of its blamelessness. Superfund liability is "joint and several." For example, assume that for five years a dry cleaner operated at a site where nine other dry cleaners, all of whom are now out of business, had operated beforehand. Even if all ten dry cleaners spilled an equal amount of perc, the tenth dry cleaner is liable for the cost of cleaning up all the contamination. The motivation to recover such cleanup costs is clear - Superfund cleanups are notoriously expensive, routinely costing in excess of \$1 million.

Finally, parties cannot contract away their Superfund liability. In other words, if the government attempts to hold a landlord liable for drycleaning solvent contamination, the landlord cannot escape liability because its tenant/dry cleaner agreed to accept all Superfund liability in the lease. Landlords, can, however, allocate the ultimate financial burden of a CERCLA cleanup in a lease. Accordingly, landlords generally include indemnity provisions in their commercial leases that require dry cleaners to reimburse them for any costs they incur as a result of the dry cleaner's operations.

In the above context, consider the growing reluctance of landlords to rent to drycleaning businesses that use perc. Also consider that:

The mere fact that a drycleaning business is operating as a corporation does not necessarily protect the owners, directors and shareholders of the corporation from individual CERCLA liability. Such owners, directors and shareholders have been held personally liable for Superfund cleanup costs where they participated in the day-to-day management of the dry-cleaning operation or made decisions about the disposal of spent perc.

For dry cleaners in other States, Superfund liability really is a monster ready to pounce on those involved with perc-contaminated sites. While certainly no guarantee against Superfund liability, DSCA (Dry-Cleaning Solvent Cleanup Act) is the chair propped against the door to the closet containing this monster in North Carolina.

In California there is no chair propped against the door.

Programs and Funding Mechanisms Deployed in Other States

Findings from the State Coalition for Remediation of Drycleaners

In 1998, with support from the US EPA Office of Superfund Remediation and Technology Innovation, the State Coalition for Remediation of Drycleaners (SCRD) was established, to facilitate knowledge sharing among different states through case studies, and to advance remedial technologies. The SCRD has since grown to include administrative functions and support to states. California is not a member but one of seven 'represented' states at the SCRD.

Any California program can benefit from a review of lessons learnt in the 13 states with existing remediation programs for drycleaning sites. The key issue for any and all such programs is funding. This will also be the case in California. The network of drycleaning operatives simply does not represent a large enough pool to fund the remediation of the thousands of sites in need of cleanup.

For any program to be successful, from a long-term perspective, appropriations must not exceed revenue, and a sufficient number of sites must be remediated in accordance with aggressive targets. In order for these targets to be realistic in turn requires that funding mechanisms are both robust and realistic.

The key finding from an exhaustive survey¹⁶ of funding mechanisms – one echoed by all experts in state drycleaning remediation programs – is that *the majority of funding must come from a sales tax charged on drycleaning at point of sale*. A survey of tax values in existing programs suggests that a value of up to 2.5% is acceptable and workable – no program seems to have attempted a higher value.

Surveyed funding mechanisms come in a variety of forms. Most programs draw from a

¹⁶ http://www.drycleancoalition.org/download/SCRD_AP_Topics-All_Final_Nov2010.pdf. Detailed discussion of funding mechanisms can also be found at this SCR D website: <http://www.drycleancoalition.org/docs/components/default.cfm?page=2>

number of common funding elements, including:

- A registration fee for drycleaning businesses
- A tax on cleaning solvents, paid by drycleaning businesses and chemical distributors
- Diversion of sales tax
- A surcharge to dry cleaners on gross receipts; or a sales tax
- Deductibles from cleanup costs paid by the business owner, landowner or municipality

One important conclusion from SCRD surveying is that the program should not rely heavily on taxing perc or other chemicals, because as the usage of a taxed chemical declines, so does revenue. It is a better idea to **tax services than solvents** used. This is because i) the number of facilities may decrease, ii) the choice of solvents will continue to change, and iii) many sites are in need of remediation that are no longer used for drycleaning operations - and therefore not providing revenue to a fund.

In terms of risk and portfolio management strategies, the most robust solution may be development of a 'revenue river' that **incorporates revenue streams from multiple sources** – perhaps both public and private sector. Among the most successful innovations in other states is one from the State of Kansas, where 9% of net fund income¹⁷ originates from an interest-earning account held at the state treasury, into which primary revenue streams flow. In the context of a California program, such a mechanism could greatly increase funds available for remediation with, for example, 10% of fund revenues being withheld from appropriations for a period of ten years, during which time they would earn compound interest.

An example calculation is given below to illustrate this tried-and-tested method to increase fund revenue and achieve a more aggressive rate of remediation across the state than would otherwise be possible.

It is also feasible to put in place a mechanism to **collect fees from property owners of eligible sites where drycleaning is no longer conducted**.

Experience in other state suggests that **taxes on specific solvents** used may not be enough to cover even staffing costs for a fund; but this revenue stream should certainly be incorporated, as should **finances for late payments**. The State of Oregon uses heavy fines for late payment to generate revenue but this also secures high rates of payment.

Grants are not a viable source of income for day-to-day activities of the fund, i.e., cleanup. However, grant money could potentially be used within activities, for example to convene a meeting, canvas opinion or begin an initiative.

¹⁷ Accessed Apr 11, 2011: http://www.drycleancoalition.org/download/SCRD_AP_Topics-All_Final_Nov2010.pdf, p.3

Increasing fund value through a deposit account

In the State of North Carolina a 2.4% sales tax on drycleaning services regularly brings in close to \$1 million a month into the drycleaning remediation fund¹⁸, based on the 1650 drycleaning businesses in the state. Assuming that the population in California spends the same amount of money, on a per capita basis, on drycleaning as North Carolinians, then a 2.5% sales tax on services purchased from California's 5,000 drycleaning businesses would yield over \$3 million each month for a statewide fund—approximately \$36 million per year.

Under a scenario where this money is simply spent on remediation, after 10 years \$360 million will have been made available and allocated to appropriations. (Fund income will go up with inflation and the cost of living, but so will remediation costs, to some extent balancing each other out.)

Alternatively, if 10% of monthly and annual revenue is withheld into a 9% APR account at the state treasury for ten years prior to disbursement, the total amount available upon term will be \$384 million. Then again, if 20% of revenue is withheld for 10 years into such an account, the total available after 10 years will be \$407 million, compared to \$360 million without the deposit account. Lastly, if 20% of revenue is banked for 20 years, the total available upon term will be \$977 million, compared to \$720 million without use of the deposit account.

Figure 1: Net increases in fund revenue using a 9% APR deposit account – with estimated income based on annual state drycleaning sales tax revenue of \$36m before withholding and interest.

All \$ values in millions	Revenue withheld			Fund Total		
	0%	10%	20%	0%	10%	20%
after						
10 yrs	\$0	\$36	\$72	\$360	$\$324+60=$ \$384	$\$288+119=$ \$407
			<i>increase</i>		6.5%	13%
20 yrs	\$0	\$72	\$144	\$720	$648+200=$ \$848	$576+401=$ \$977
			<i>Increase</i>		18%	36%

For the sake of arriving at conservative figures for net available revenue after interest, the above calculations only include estimated revenue from a 2.5% state drycleaning sales tax, and do not include revenue from other sources such as licensing and distributor fees, fines, the public sector and the private sector.

¹⁸ John Powers, North Carolina Dry-Cleaning Solvent Cleanup Act Program, personal communication.

In other words, use of such an account, by withholding a portion of fund revenue from immediate disbursement, could for example increase the rate of remediation by around 36%.

In the course of program design, in order to determine optimum values for the variables within this equation, a simply algorithm calculation tool could be used to determine the best scenario of factors, which will include net and gross fund income, costs associated with remediation of priority sites, desired rate of site remediation, and practical limits on this rate - including contractor and equipment availability, climate and weather conditions.

Summary, Conclusions and Recommendations

General findings

An estimated 5% of public supply wells in California are already affected by perc contamination. The public health risk is very considerable and merits an urgent yet considered response. When perc and other drycleaning-associated contamination is left untreated, cleanup costs and public health risks spiral. The status quo on a statewide basis is unsustainable and in need of methodical rationalization geared toward aggressive action in protection of public health and the preservation of environmental integrity for future generations.

The environment must be protected and the State must address risks to the public health seriously. The statewide phase out of perc in drycleaning will underline in the public's imagination the arguments for a remediation program. As the statewide phase out of perc proceeds a unique opportunity also exists to mop up receding legacy depositions of perc, to prevent the contamination degrading into untreatable and persistent non point source pollution problems covering large swathes of area, with contaminants migrating into water supplies and ecosystems.

Complexity and cost of decontamination is in general a function of time since release occurred. Costs for perc remediation in groundwater are three to ten times higher than those for soil remediation alone.

There are two yawning gaps to be closed: that between current remediation activity and the proven need – to not only curtail perc use but clean up the effects of previous use – and the gap between cleanup costs and the ability of affected businesses' to meet those costs.

There are close to 4,000 drycleaning sites in California in need of remediation. The number of former and abandoned (brownfield) drycleaning sites remains to be unquantified. Many contaminated sites are no longer in use as dry cleaners. On the other hand, environmental contamination will not go away on its own. Assistance is needed well beyond what business owners can fund from their own pockets, in order to make remediation viable on a scale that will better protect the health of the public and the natural environment.

A statewide sampling program should be implemented as soon as possible. Sites should be classified according to priority, and then remediated in order. Such a two - or three - tier approach would allow work to begin sooner than otherwise possible and could quicken the passage of necessary legislation. Not all answers have to be resolved before work begins.

A new program also provides a valuable opportunity to reduce costs and make money go further by standardizing operating procedures across the state.

Funding recommendations

As in other states the key issue is funding. Specifically the challenge is *to devise, develop and/or synthesize the most appropriate funding solution that will provide sufficient revenue to drive a proactive statewide cleanup program that balances a desired aggressive approach with realistic, context-driven/determined limits.*

A California program is able to draw on ample experience from drycleaning site remediation programs in place in other states. Multiple stream funding with a focus on a drycleaning sales tax is the most viable approach. Appropriations budgets may be drawn from a variety of sources, which should all be explored, including but not limited to:

- Tax at point of sale
- Tax to businesses on solvents, chemicals and cleaning substances (including chemical distributors)
- Diversion of sales tax
- Annual registration fee
- Superfund
- Chemical manufacturing industry
- Other state public sources
- Federal funds including USDA
- High interest account housed within the state treasury, into which other funding streams would flow

By way of reference, the State's Underground Storage Tank Cleanup Fund (USTCF) benefited from major economic drivers and corporate actors. Solvent manufacturers should be at the table and could provide an important source of fund revenue; it is in the interests of these parties to mitigate their legal exposure.

Inclusion and the stakeholder process

Since change is in everyone's long-term interests, an effective program represents a win-win scenario. Consideration of this point should yield the understanding that bringing stakeholders into the process of program development and implementation is a matter of education rather than persuasion. This point underlines the value of conducting the process in an inclusive manner. It is valuable to note that the successful North Carolina program was driven by the private sector, which successfully sought to mitigate risk and take environmental responsibility ahead of worst-case scenario events. This benefited not only business owners but all sectors and stakeholders.

A large percentage of drycleaning operations in California is operated by Korean family businesses. Therefore, as for successful programs in other states, communications should be presented in both Korean and English. Areas of the state where other ethnic groups represent a large proportion of drycleaning businesses should be printed in the relevant language. Members of different drycleaning associations and their chapters should be included as close to the center of the program development and implementation process as possible. The Korean Dry Cleaners Association of California must be an integral part of program development if it is to succeed.

Although a more inclusive process may take more time, it is time well spent. Disagreements are more often perceptual and cultural than substantive. Success is often determined as much by the nature of the processes of consultancy, outreach and program development as by the inherent subject matter under discussion.

The right balance should be sought such that the program development process is sufficiently inclusive yet not unwieldy. A streamlined yet inclusive, robust and well-rounded approach should be sought. The final result would be an equitably funded program with high stakeholder buy-in, and incorporating an efficient triage system that rapidly prioritizes sites most in need of remediation.

State agencies' jurisdictions and mandates

The work of a resulting new program would fit well within the mandate of the State Water Regional Control Board (SWRCB), and potentially also other state agencies. It would also mesh well with existing areas of focus of the broader SWRCB Cleanup Program.

CalEPA, State Water Boards and the Department of Toxic Substances Control (DTSC) have jurisdiction to address perc contamination with cleanup operations. The primary goals of the State Water Board are *to preserve, enhance and restore the quality of California's water resources*, goals that would be met by a new drycleaning site remediation program. Such a fund would also fit well within SWRCB's Site Cleanup Program. Under the current program: *brownfields* are cleaned up in order to eliminate pollution and contamination problems, *Department of Defense* sites are cleaned up in order to remediate water quality issues at military facilities, and the *Bay Protection and Toxic Cleanup Program* (BTCP) exists because of the effects of contamination on invertebrates and those species that feed on them, including aquatic species consumed by humans. Cleanup of drycleaning sites fulfills all of the above criteria.

Administration of the new program could potentially involve collaboration with another state agency in addition to the SWRCB. State and federal law have granted both the Water Boards and DTSC the authority to require cleanup of any site in California where a waste or toxic substance has been released. DTSC conducts and oversees remediation of sites with some level of toxic contamination in order to protect public health and the environment. The new program could in theory be officially administered by DTSC, as has occurred for other programs that are actually implemented by another agency. SRWCB Department of Financial Assistance should also be involved, in order to maximize the reach of any new program.

The next step

An inclusively selected working group comprising representatives of all affected sectors and contributing voices should be convened to begin robust discussions on the format of a California drycleaning site remediation program. The working group should comprise experts and representatives from academic, engineering, industry, environmental and policy fields, with consultation possibly also provided by the SCRDP, and with proponents of AB698 invited to attend. It is also important that water supply companies are present, since these parties treat and purvey water the quality of which is affected by drycleaning operations and decontamination of affected sites.

The working group could identify and quantify the problem in detail, identifying best project design elements and a menu of options to address the challenge; as well as designing a path to full program implementation. Areas for discussion would include a statewide sampling program, site prioritization, and revenue streams.

Sessions could be attended by state agency representatives, including, but not limited to from among the following: SWRCB (various departments and Programs including Water Quality, Brownfield Program, USTCF, and Department of Financial Assistance), CalEPA, Department of Toxic Substances Control, and the Department of Mines and Reclamation.

Closing

Inevitable logic points towards the need for a statewide remediation program of perc contamination at current and former drycleaning sites. Averted risks and associated benefits are biochemical, environmental, health, financial, socioeconomic and legal in nature. The interests of the State are aligned with those of business and property owners, the drycleaning industry in general, water supply companies, the environment and future generations.

All parties can benefit socially, environmentally and financially from a program to restore a portion of the integrity that lost as a result of decades of use of this potent if useful chemical. In addition, the statewide phase out of perc use in drycleaners represents a unique opportunity to mop up legacy toxins before public health and financial costs spiral due to contaminated sites - while helping small businesses out of a crisis greater than their making, and reducing the legal exposure of both State and Industry.

California's economic and political significance mean that an aggressive lead on this matter is likely to have significant knock on effects at the national and international level.