White Paper on EPA's Proposed Changes to the Use Authorization for PCBs in Air Compressor Systems: A Natural Gas Transmission Perspective

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Contents

Foreword

On April 7, 2010, the Environmental Protection Agency (EPA) issued an Advance Notice of Proposed Rulemaking (ANPRM) entitled Polychlorinated Biphenyls (PCBs); Reassessment of Use Authorizations. In this ANPRM, the EPA proposes to reassess the existing PCB use authorizations under the Toxic Substances Control Act (TSCA), including the use authorization for PCBs in natural gas pipelines, air compressor systems and porous surfaces. As part of this reassessment, the EPA has proposed to revise and/or eliminate these use authorizations in a way that could significantly and dramatically impact natural gas pipeline operations. Natural gas pipelines have been subject to programs addressing PCBs for the past 30 years, starting with the EPA's Compliance Monitoring Program (CMP) in the early 1980s to the EPA's present comprehensive regulatory program, better known as the PCB Mega Rule.

The Interstate Natural Gas Association of America (INGAA) is a trade association representing virtually all interstate natural gas transmission companies operating in the United States. INGAA therefore has a direct interest in the EPA's ANPRM and accordingly has prepared comments in response. In support of these comments, INGAA has commissioned several independent experts to prepare "White Papers" providing key analysis of the complex issues raised by the EPA's ANPRM with respect to the presence of PCBs in the interstate natural gas pipeline system. These papers address pipelines and pipeline operations, the presence of residual PCBs in the pipeline system, the risks to health and the environment associated with PCB-impacted pipelines, the technical feasibility of removing increasingly diminished concentrations of PCBs and the anticipated economic impacts resulting from the EPA's proposals.

ENVIRON International Corporation (ENVIRON) was commissioned to analyze the effectiveness of the transmission industry's efforts to clean PCB-impacted air compressor systems and to examine risks to health and the environment associated with residual PCBs in these systems as they relate to natural gas pipeline operations. While commissioned by INGAA in support of its comments, this paper is an independent analysis, and its conclusions are based on the expertise of the author.[1]

[1] ENVIRON is an international environmental and health science consulting firm that specializes in the assessment and management of risks associated with chemicals in the environment, workplace and consumer products. The lead author for this white paper, Mr. Michael Scott is a Principal at ENVIRON and holds masters degrees in chemistry and public health engineering with over 30 years of environmental consulting experience. He has conducted numerous assignments involving the evaluation of PCB regulatory and contamination issues in a broad range of industries and environmental settings. In particular, he has worked extensively on PCB issues associated with the pipeline industry from the 1980s to the present time.

1. Introduction

Under the Advance Notice of Proposed Rule Making (ANPRM) published in the Federal Register on April 7, 2010 (FR, Volume 75, Number 66, pp. 17645 -17667), EPA has provided notice of its intent to reassess the use authorizations for PCBs and issue regulations for the phase-out of PCB use authorizations including certain interim deadlines from 2015 to 2025 based on equipment concentration and type. In particular, EPA is considering the termination or significant limitation of the duration of the current use authorization for PCBs in air compressor systems allowed under 40 CFR 761.30(s) of the 1998 PCB Disposal Amendments. Specifically, at p.17657 the ANPRM states:

> *"EPA has little information on the need to continue the use authorizations at 40 CFR 761.30(s) for air compressor systems….The 10 years that these authorizations have been in place should have allowed sufficient time to purge the PCBs from their systems. EPA is considering whether to terminate or significantly limit the duration of these authorizations."*

This white paper provides technical comments on the use authorization changes that EPA is considering with respect to air compressor systems, as referred to above. A summary of key points addressed in this paper includes, but is not limited, to the following:

- Air compressor systems are used at virtually all interstate natural gas transmission compression stations, but PCB-containing lubricants were used historically in only a sub-set of specific air compressors due to the lubricant's high flash point.
- PCB-contaminated air compressor systems have been remediated using EPA approved performance-based methods.
- Residual levels of PCBs will remain in the air compressor systems indefinitely.
- It is infeasible to remove all residual PCBs from air compressor systems without rebuilding or replacing the systems equipment at very considerable cost.
- PCB impacts associated with air compressor systems remain isolated at individual compressor station facilities, and do not migrate into the natural gas pipeline system.
- The levels of residual PCBs in air compressor systems do not present an unreasonable risk of injury to health or the environment.
- New EPA data regarding estimates of certain PCB exposure factors suggest that an acceptable PCB surface concentration could be well above the current EPA cleanup level for indoor, low-contact surfaces.

These points and additional relevant information are discussed in detail in this white paper.

2. Technical Comments

1. Air compressor systems are used widely throughout the natural gas pipeline industry at compressor stations to start reciprocating gas compressor drivers, to operate instrumentation and to provide utility air. PCBs were a component of some high flash point (*e.g.*, fire/explosion proof) lubricants used from the 1950s through the early 1970s in some air compressors used to assist starting reciprocating drivers that powered gas compressors at certain natural gas compressor stations along interstate pipeline systems. The lubricant used was typically Pydraul® AC which contained 56% Aroclor® 1254.[2] Air systems consist of the following components:

    a. Two or more air compressors, located in the station auxiliary building or compressor building;

    b. Steel piping from the air compressors to a set of steel air receiver tanks (ARTs);

    c. The ARTs themselves; and

    d. Steel piping from the ARTs to the gas compressor drivers.

    Air compressors are typically two stage units, sometimes with an intercooler between the upper and lower stages. The high flash point PCB-containing lubricating oils were used in some air compressors to prevent flashed oils from being present in the compressed air used to start reciprocating gas compressor drivers. In some cases, air dryers and filters were installed downstream of the air compressors in the buildings where the air compressors or compressor drivers were located.

    In addition to the starting air system, compressed air was also used at compressor stations for instruments and utility air (*e.g.*, pneumatic tools) at the compressor stations because it did not present the ignition hazard of electricity in buildings that may possibly contain a flammable atmosphere. The network of piping associated with these systems is extensive and complex and includes small diameter piping < 1-inch in diameter and tubing. There may be one or more sets of reciprocating engines housed in separate buildings at particular compressor stations, and correspondingly one or more air systems at a station.

    Associated with the piping, there are sometimes a series of drip bottles (or knock-out bottles) which collect water condensate generated by temperature and pressure changes in the system. These are generally located in the following positions relative to the main equipment: (1) downstream of the starting air compressor; and (2) downstream of the ARTs. In other instances, air system piping is configured such that localized low points are present in the piping runs, and valves are also located at these points to allow the removal of water condensate. Drain valves for water condensate removal are also located on the bottom of ARTs.

[2] PCBs were manufactured in the US by Monsanto under the Aroclor® trade name using a numeric designation that was typically based on the percentage of chlorine so that, for example, Aroclor® 1254 contained 54% chlorine.

It is important to note that PCBs associated with air compressor systems remain isolated within the compressor station facility, and do not migrate beyond the facility into the natural gas pipeline system.

2. The PCB-containing lubricant was formerly used in the crankcase of some air compressors (and also in the upper lubrication system of some types of units) and was supplied to the pistons and rods of the air compressors as a lubricant. In the normal operations of the air compressor, trace amounts of the lubricant can pass across the seals of the air compressor. These small amounts of lubricant are partly trapped in the air dryers, drip bottles and partly pass through to the ARTs. At the same time, water condensate is generated as a result of the compression of the air and subsequent cooling, resulting in a decreased capacity of the compressed air to hold water vapor which condenses out of the air stream. Small quantities of lubricant may be entrained in the air stream and consequently are also contained in the water condensate, either as droplets, or as an emulsion. The resulting condensate thus contains a mixture of water (predominantly) and small amounts of lubricant. Lubricant is added periodically to the crankcase and/or upper lubrication system reservoir to replace losses between routine lubricant exchanges. The manufacture and use of Pydraul AC as the air compressor lubricant at compressor stations was discontinued in the early 1970s and a non-PCB lubricant was used thereafter resulting in a gradual dilution of the PCBs present in the air system. Condensate continues to be generated in the air system and must be removed to prevent corrosion and buildup of scale within the system. PCB impacted mixtures of water and oil removed from the air system is collected and disposed of in accordance with applicable disposal regulations and discharge permits.

3. To address the PCB-impacted contamination in the air compressor systems, the interstate pipeline transmission industry invested significant resources in cleaning impacted air systems during the late 1980s and early-to-mid 1990s if the presence of PCBs > 50 ppm was indicated by their detection in the air compressor lubricant or the oil fraction of the condensate. Cleaning consisted of draining the crankcase and replacing the lubricant with a non-PCB lubricant, and decontaminating the piping and ARTs typically by solvent washing or in some cases replacing the piping. Based on experience and industry knowledge, the direct costs incurred for the cleaning of air compressors and the decontamination of ARTs and air piping by permitted methods (see below) were in the tens of millions of dollars.

4. Prior to the June 1998 PCB Disposal Amendments (*i.e.*, the Mega-Rule), the options for decontamination of air systems were specified as disposal in a landfill or incinerator permitted in accordance with the provisions of 40 CFR 761.61, or the use of an alternate technology permitted by EPA under an Alternate Disposal Permit as per the provisions of 40 CFR 761.60(e). The first of these Alternate Disposal Permits was issued to Quadrex in February 1988 for a three year period and required that, after a triple washing procedure specified in the permit, the concentration of PCBs in the 4^{th} volume of rinsate could not exceed 4ppm as a surrogate for cleaning to specified surface levels (EPA 1988). The Quadrex permit was extended on multiple occasions and similar permits were issued to others including Rucker Environmental in 1994 and Burlington Environmental. The general approach approved in these permits was codified in EPA's August 1992 "Final PCB Air Compressor System Piping and Tanks Cleanup Guidance" (EPA 1992) which stated that

"*Air compressors and air compressor systems that are decontaminated at or below levels specified in an alternate disposal approval issued under 40 CFR 761.60(e) are unregulated as non-PCB equipment*."

5. Similar procedures were specified in the 1998 PCB Disposal Amendments which authorized use of PCBs in air compressor systems at concentrations <50ppm or use at concentrations >50ppm provided the following conditions were met:

    a. All free-flowing liquids are removed from the crankcase and the crankcase is refilled with non-PCB liquid;

    b. Other air compressor system components contaminated with PCBs >50ppm are disposed of in a TSCA permitted landfill or incinerator, or decontaminated in accordance with 761.79 which in turn specified:

        i. disconnecting or bypassing the air compressors and dryers from the piping and airlines, and decontaminating the air compressors and air dryers separately by triple flushing the internal surfaces with a volume of solvent containing <50ppm PCBs equal to 10% of the equipment's internal volume

        ii. double rinsing the piping and airlines under turbulent flow conditions using a volume of solvent containing <2ppm PCBs equal to 10 times the volume of the piping/airlines; and

    c. Air compressor piping with a nominal inside diameter of <2-inches is decontaminated by continuous flushing for 4 hours at a flow rate of not less than 300 gallons per hour.

6. To clean PCB-impacted air compressor systems, the pipeline industry has either used the methods specified in the Alternate Disposal Permits, pipeline-specific EPA-approved methods, or the methods specified in the 1998 PCB Disposal Amendments. These approaches are performance-based with no requirement for post-cleaning testing of the air system components themselves because of limited access to the internal parts of the systems. For example, the Quadrex permit specified a surrogate test of 4 ppm PCBs in the final rinsate. This level was designed to be equivalent to a surface concentration of 100 $\mu g/100cm^2$ on the interior surface of the equipment being decontaminated. As stated in the initial approval of the Quadrex cleaning technology (EPA 1988), "*there is no way to accomplish such representative wipe sampling without destroying, at the very least, sections of the articles by cutting windows to access to wipe representative sampling locations.*" Thus, by design these EPA-approved cleaning methods allowed a certain residual amount of PCBs to be present in the air systems.

7. EPA is now considering the termination or significant limitation of the duration of the authorization for use of PCBs in air compressor systems. In practice, for the reasons stated above, the manner of the EPA-approved cleaning will leave some residual PCBs in the air compressor systems. EPA also assumes that since the PCB Disposal Amendments were promulgated in 1998, the PCBs would be purged from the system. This is an incorrect assumption for the following reasons:

- First, incomplete mixing occurs in the lubrication systems so that the reduction in concentration will be slower than a completely mixed model would predict. In particular, the high viscosity of the oil as well as the lack of any active mixing or agitation in the system makes any assumption of complete mixing questionable. The lack of complete mixing creates "dead zones" within the lubrication system that do not rapidly flush with the PCB-free lubricant. In addition, the interior of ARTs can become pitted due to corrosion which can serve to trap PCB containing lubricant. The end result is the creation of small long-term PCB "reservoirs" within the lubrication system.
- Second, there is the potential for adsorption of PCB-containing oil onto the surface of internal parts that cannot be easily cleaned using conventional methods. Short of a complete tear-down, cleaning and rebuilding of each compressor and the associated piping and small diameter tubing, there is the potential for a persistent, low-level release of PCBs to result in measurable oil-fraction PCB concentrations. Given the low release/desorption rate that may occur, a detectable PCB concentration condition will likely persist for an extended timeframe.
- Finally, the presence of even minimally porous materials (seals, gaskets, etc.) will serve as yet another source of low-level but persistent PCBs. These materials will affect the PCB concentration of the lubricant in a manner similar to the above-mentioned adsorption process until replaced.

EPA also appears to think that, regardless of whether the equipment functions well, industry will replace the air compressor equipment within 30 years of the time of its installation – this is not the case – with proper maintenance, air compressors, and especially air compressor system tanks and piping, can last indefinitely, similar to other pipeline system components.

While the timing of the phase-out is unclear in the ANPRM, EPA refers to 2025 as a timetable by which to "*eliminate all use of any PCB contaminated equipment (>= 50 ppm), which is still authorized for use.*" By 2025, while PCBs in the air systems will be further reduced by the continued addition of non-PCB containing lubricant to the air compressors – particularly in the air compressors themselves – PCBs may still remain present in the air systems at measurable levels for the reasons stated above.

8. The continued use of air compressor systems at PCB concentrations <50ppm or with performance-based cleaning for systems with PCB concentrations >50ppm was considered protective of human health and the environment by EPA in promulgating the PCB Disposal Amendments in 1998.[3] Similarly, it will continue to be protective if the use authorization is continued, which can be demonstrated by consideration of the plausible exposures for compressor station workers under a continued use scenario. Such a scenario could reasonably involve a spill or incidental release of condensate from the air system to the concrete floor of a building and dermal contact as the exposure pathway. This was the type

[3] The preamble to the 1998 PCB Disposal Amendments states: "As with natural gas pipelines, EPA believes that allowing continued use of air compressor systems while the PCBs are being removed does not pose an unreasonable risk, so long as the PCBs are contained in the system, are regularly removed in the condensate, and when removed, are stored and disposed of in accordance with these regulations."

of exposure scenario modeled in support of the development of cleanup levels in EPA's 1987 Spill Policy (incorporated in Subpart G of the 1998 PCB Disposal Amendments). The modeling of this scenario resulted in a cleanup level of 10 µg/100cm^2 for indoor, low contact non-impervious surfaces,[4] as set out in a draft EPA memo (the "Hammerstrom memo") entitled Cleanup of Contaminated Spills Located Indoors (EPA 1986).

The Hammerstrom memo included preliminary risk calculations for PCB exposures in residential and occupational settings via the inhalation and dermal exposure pathways, and concluded the volatilization pathway was not significant.[5] The Hammerstrom memo calculations were updated in Versar's "Assessment of Risks Associated with Proposed PCB Use Authorizations" prepared for EPA in October 1997 (Versar 1997) in support of the proposed rulemaking. This assessment was subsequently revised in March 1999 (Versar 1999), and the updated inhalation and dermal risks were estimated at $2.5x10^{-8}$ and $3x10^{-6}$, respectively. The risks associated with the dermal exposure pathway fall well within the risk range of 10^{-4} to 10^{-6} typically considered acceptable by EPA, and the inhalation risks would be considered *de minimis*. It is also important to recognize that as part of routine health and safety procedures, workers conducting maintenance at compressor stations wear personal protective equipment (PPE). Hence, actual exposure to PCB-contaminated surfaces in a compressor station would be substantially less than theoretically estimated.

Because many of the exposure assumptions used in the Hammerstrom memo, particularly those related to surface to skin transfer rates and absorption rates, are now outdated, the current science would support a higher cleanup level for low-contact, non-impervious solid surfaces at compressor stations such as concrete[6] and painted metal. 40 CFR 761.120(c) explicitly provides EPA the flexibility to allow less stringent or alternative cleanup requirements on a site-specific basis "*if the responsible party demonstrates that cleanup to the numerical decontamination levels is clearly unwarranted because of risk-mitigating factors, that compliance with the procedural requirements or numerical standards in the policy is impracticable at a particular site, or that site-specific characteristics make the costs of cleanup prohibitive.*" Additional information on risk-mitigating factors, available since EPA developed the Spill Policy cleanup levels, is presented in Attachment A and provides the basis for an increased cleanup level for low-contact surfaces in compressor station buildings from the current level of 10 µg/100cm^2 to 500µg/100cm^2.

9. Replacement of air systems could result in disruption of pipeline operations and impose an unreasonable cost burden. Disruption of compressor station operations could be significant; removal of air compressors could result in out of service times from a few days for a small station to a few weeks for a large station with multiple air systems. Costs for replacement could easily be as much as $5 million per station, depending upon the size of the

4 Note that EPA has essentially codified in the PCB Disposal Amendments an equivalency between a PCB-contaminated liquid at 50 ppm and a surface having a surface concentration of 10 µg/100cm^2.

5 Using conservative and now outdated assumptions, the evaluation demonstrated that that inhalation exposure of workers in occupational settings due to releases of PCBs resulting in surface concentrations as high as 100 µg/100cm^2 did not likely represent a scenario that would result in significant inhalation exposures (i.e., cancer risk levels < $4x10^{-8}$), whereas risks associated with the dermal exposure pathway were estimated at $1x10^{-4}$.

6 Some concrete porous surfaces were painted before and or during the time when PCB lubricants were used.

compressor station and complexity of the associated air compressor system(s). The total cost industry-wide could be in the hundreds of millions of dollars.

3. Conclusions

In conclusion, notwithstanding the industry's cleaning of the compressed air systems in compliance with EPA's regulatory requirements, residual PCBs remain in the compressed air systems and will likely remain so until 2025 and beyond. It is infeasible to remove them completely without rebuilding or replacing the equipment at very considerable cost. Furthermore, under ongoing management practices, these residual PCB levels do not result in any unreasonable risk of injury to health or the environment. It is therefore imperative that EPA maintain the current use authorizations for air compressor systems to allow continued operation of the pipeline system without service disruption and incurring unreasonable costs. This is particularly important for air compressor system tanks and piping since they can last indefinitely, similar to other pipeline system components.

Attachment A

Evaluation of Alternative Risk-based Cleanup Levels for Low Contact Industrial Surfaces

Introduction

Under the Spill Policy at Subpart G of the 1998 PCB Disposal Amendments, the cleanup levels for "new spills," i.e. after May 1987 to surfaces in restricted access locations (i.e. industrial settings) consist of 10 µg/100cm^2 for high contact surfaces such as manned equipment or control panels, and 10 µg/100cm^2, or 100 µg/100cm^2 with encapsulation for low-contact, indoor non-impervious surfaces such as concrete floors. These levels are risk-based and deemed to protect human health. In addition, 40 CFR 761.120(c) explicitly provides EPA the flexibility to allow less stringent or alternative cleanup requirements on a site-specific basis "*if the responsible party demonstrates that cleanup to the numerical decontamination levels is clearly unwarranted because of risk-mitigating factors, that compliance with the procedural requirements or numerical standards in the policy is impracticable at a particular site, or that site-specific characteristics make the costs of cleanup prohibitive.*"

The purpose of this document is to present new exposure information contained in relevant guidance issued since the time that the Spill Policy cleanup guidelines were promulgated in 1987, and based on this new information to propose an alternative risk-based cleanup level for new spills to low-contact surfaces at compressor stations.

Use of Alternative Exposure Parameters

In developing surface cleanup levels for the Spill Policy in 1986, EPA evaluated the potential for exposure to PCBs released during indoor spills, in both residential and occupational settings. Without modifying the exposure scenarios or methodology used in that evaluation, the analysis presented in this document indicates that more recent EPA estimates of certain exposure factors would result in an acceptable surface concentration well above the current cleanup level for indoor, low-contact surfaces.

Specifically, the Agency's analysis of potential occupational exposure to PCBs on low contact surfaces, such as floors, walls and ceilings was based on certain assumptions (including the transfer rate from the surface to the skin and absorption through the skin), which should be revised to reflect recent EPA and other guidance. Part of this original analysis was documented in an EPA internal memo ("the Hammerstrom memo"), which provides background information on how EPA established a surface cleanup level of 10 µg/100 cm^2 (EPA 1986). In that memo, EPA presented a table which showed that a PCB surface concentration of 100 µg/100 cm^2, a transfer rate for PCBs of approximately 1%, and an absorption rate of 100% was equivalent to a 10^{-6} risk level. Similarly, if the transfer rate was approximately 10% and absorption remained at 100%, a surface concentration of 10 µg/100 cm^2 would be equivalent to the same risk level. Thus, it appears that a transfer rate of approximately 10%, an absorption rate of 100%, and a risk level of approximately 10^{-6} were used as a basis for the 10 µg/100 cm^2 cleanup level adopted in the Spill Policy.

At the time EPA developed these risk-based cleanup levels, it used a cancer slope factor (CSF) of 4.0 (mg/kg-day)$^{-1}$, a worker body weight of 50 kilograms (110 pounds), absorption of 100% of PCBs that contact the skin, a transfer rate of approximately 10% and a target risk level of approximately 10^{-6}. These parameters are defined as the baseline conditions, or base case, for comparison to more current information, and are summarized in Table 1.

Table 1 Summary of Baseline Conditions for Current Regulatory Low-Contact Surface Cleanup Level	
Spill Policy Basis for 10 µg/100 cm^2	
Cancer Slope Factor (CSF)	4.0 (mg/kg-day)$^{-1}$
Body Weight	50 kg
Absorption Rate	100%
Transfer Rate	10%
Risk Level	1.3 x 10^{-6}

New Information Relevant to Cleanup Levels

Since 1986, EPA has decreased the CSF for PCBs to a range from 0.07 (mg/kg/day)$^{-1}$ to 2.0 (mg/kg/day)$^{-1}$ using a tiered approach that takes into account relative risk and persistence, and published risk assessment guidance that specifies the use of a body weight of 70 kilograms (154 pounds) for an adult (EPA 1989). While the net effect of these changes would result in a slight increase in the cleanup level, they are neglected here as of lesser importance; rather, we focus on the changes to transfer rate and absorption rate as being of more significance. Each of these items and the relevant basis is discussed in the paragraphs below.

- **Transfer rate.** Although EPA used a transfer rate of 10%, a transfer rate of 1% was considered by EPA in the 1986 Hammerstrom memo. That memo concludes by suggesting that for low contact surfaces a transfer rate of less than 1% may be appropriate (EPA 1986). Certainly, a transfer rate for a non-impervious or porous surface as high as 10% would seem improbable, since the mere act of touching a surface repeatedly should significantly reduce surface concentrations. For example, touching a surface ten times would reduce the surface concentration by approximately 65%. This would suggest that the transfer rates for such surfaces are much less than 10% and be supportive of the 1% value suggested in the Hammerstrom memo.
- **Absorption rate.** Since 1986, additional information and guidance also has become available on absorption factors. A review of the literature suggests that, instead of 100%, the actual absorption factor for PCBs on skin ranges between approximately 0.6% and 60% depending on the receptor, the amount applied to the skin, and the medium in which the PCBs are applied. For example, in the Agency for Toxic Substances and Disease Registry's (ATSDR) Toxicological Profile for Selected PCBs (ATSDR 1997 and updated 2000), a series of studies are referenced where 14.6% to 56% absorption was observed when PCBs were applied to the skin of various animals in various solvent carrier solutions. The carrier solutions used in these studies included a benzene/hexane mixture, mineral oil, and trichlorobenzene. The absorption rate observed for mineral oil, which would be most comparable to the lubricating oil used at compressor stations, was approximately 20% for both Aroclor® 1242 and 1254. This scenario, however, provides much greater opportunity for absorption than actually would be the case at the compressor stations, where contacting a solid floor surface would be more similar to contacting soil. Routine maintenance activities and safety procedures at gas compressor stations are such that free phase oil is unlikely to be the medium that would be contacted routinely on the floors of the buildings. In EPA guidance for conducting dermal exposure assessments (EPA 2004), a dermal absorption fraction was estimated at 14% for Aroclor® 1254 and 1242 (and other PCBs). However, to be conservative, we have adopted the 20% absorption factor based on the mineral oil based data.

Acceptable Risk Levels

The selection of an appropriate risk level both for triggering the need for clean-up and for establishing a clean-up goal once the need for clean-up has been established is widely agreed to be a matter of policy rather than of scientific analysis. Over the last several years, EPA has clarified its position regarding risk management policy in various memoranda and guidance documents. With respect to clean-up levels, once the need for clean-up is triggered, EPA guidance establishes a range of 10^{-6} to 10^{-4} as a basis for establishing acceptable clean-up levels, with 10^{-6} as a "point of departure." In evaluating cleanup goal options within this risk range, it is typical for the risk manager to take into account site-specific factors, such as cost-effectiveness and technological feasibility as well as the characteristics of the site, including the size and nature of the population exposed, and the future land use. In the case of compressor stations which are classified by EPA as low occupancy (an estimated average time in the building of 6.7 hours per week) and, which have a very small population exposed, arguably there is a strong basis for selecting an acceptable risk level other than lowest end of the risk range (10^{-6}).[7] Also, we note that in defining preliminary remediation goals for soils in residential areas, the concentration established in EPA's Guidance on Remedial Actions for Superfund Sites with PCB Contamination (EPA 1990) is equivalent to a risk level of 10^{-5}. However, as a further conservative measure, we have adopted the 10^{-6} risk level for purposes of the proposed alternative cleanup level.

Analysis of the Impact of New Information on Cleanup Levels

Review of new exposure parameter information since the time of the Spill Policy indicates that it would be more appropriate to use a transfer factor of 1% rather than 10%, and an absorption factor of 20% rather than 100%. Adopting these revised exposure factors and using an acceptable risk level of 10^{-6} results in a 50-fold increase in the cleanup level for 10 µg/100cm^2 to 500µg/100cm^2. These changes are based on conservative assumptions and do not take into account the changes in CSF and body weight used in more current EPA guidance since the time of the Spill Policy that would further increase the cleanup level. In conclusion, we believe that the proposed cleanup level of 500 µg/100 cm^2 for low contact, indoor surfaces at gas compressor stations appropriately takes into account the most current EPA policy and guidance, and is protective of human health. Finally, we note that as a practical matter, at compressor stations, workers wear PPE when performing maintenance duties. This practice reduces exposure to any PCBs located on surfaces.

[7] In practice, with increasing automation and modernization of compressor stations, the time a worker routinely spends an individual building at a compressor stations will tend to be less than the low occupancy level.

Attachment B

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