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RISING TO THE SURFACE: THE EPA'S ADDITION OF
SUBSURFACE INTRUSION AS A COMPONENT
OF THE SUPERFUND HAZARD
RANKING SYSTEM

I. INTRODUCTION

The release of hazardous substances into the environment can pose a frightening threat to communities when left uncontrolled and unaddressed.¹ Through the Superfund Program, the United States Environmental Protection Agency (EPA) addresses domestic health and environmental threats that result from the release of hazardous substances.² More specifically, the EPA addresses these threats by taking preventative measures against new risks, reducing current risks, and by restoring communities that have been affected.³ By proactively addressing these dangers, the EPA preserves the public health of the nation and the environment.⁴ The EPA's efforts also generally enhance the nation's quality of life and even bring forth advances in science and technology.⁵

The EPA uses the Hazard Ranking System (HRS) to evaluate threat levels of sites based on the sites' potential release of hazardous substances into the environment.⁶ Citizens, state officials, tribes, and organizations all report potentially hazardous spills or

1. See *The Superfund Program: Protecting Healthy Communities, Advancing Environmental Protection*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/superfund/superfund-program-protecting-healthy-communities-advancing-environmental-protection> (last updated Oct. 11, 2017) (mentioning that risks are associated with release of hazardous substances).

2. See *id.* (summarizing how Superfund Program impacts environment and public health). The release of hazardous substances into the environment has been linked to a number of adverse health impacts such as congenital abnormalities in infants and elevated blood lead levels in children, which can lead to irreversible neurological issues. See *EPA Adds Sites to National Priorities List to Reduce Risk to Public Health and Environment*, U.S. ENVTL. PROT. AGENCY (Apr. 6, 2016), https://19january2017snapshot.epa.gov/newsreleases/epa-adds-sites-national-priorities-list-reduce-risk-public-health-and-environment_.html.

3. See *The Superfund Program: Protecting Healthy Communities, Advancing Environmental Protection*, *supra* note 1 (summarizing ways in which Superfund Program addresses threats of hazardous substances).

4. See *id.* (summarizing how Superfund Program positively impacts public health).

5. See *id.* (listing positive ways Superfund Program affects nation).

6. See *Introduction to the Hazard Ranking System (HRS)*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/superfund/introduction-hazard-ranking-system-hrs> (last updated Apr. 5, 2017) (giving overview of present Hazard Ranking System).

environmental violations to the EPA, which can prompt the EPA to evaluate a site.⁷ In carrying out the Superfund Program, the EPA evaluates these sites and addresses them when necessary to protect people who live or work near the sites and are at risk of exposure.⁸ Presently, in assessing sites through the HRS, the EPA evaluates the potential negative impact that sites have on air, groundwater, surface water, and soil.⁹ Based on a site's HRS ranking, it may be placed on the Superfund National Priorities List (NPL), which is a list of sites in the United States identified by the EPA as potentially threatening to the environment or public health.¹⁰ The sites are potentially dangerous due to existing or potential releases of hazardous substances.¹¹ The EPA evaluates sites on the NPL to determine whether the EPA should take action to address the potential hazard.¹² Where the EPA is unable to otherwise impose cleanup costs on a party legally responsible for the pollution, sites listed on the NPL can be eligible to receive federal funding for cleanup.¹³

While the EPA previously only evaluated sites based on air, groundwater, surface water, and soil under the HRS, the EPA recently finalized a rule to add an additional component to the rank-

7. See *Superfund Site Assessment Process*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/superfund/superfund-site-assessment-process> (last updated Dec. 7, 2017) (giving background on how EPA finds out about sites to evaluate).

8. See Mathy Stanislaus, *Superfund Acts to Protect Americans From Harmful Vapors*, THE EPA BLOG (Dec. 7, 2016), <https://blog.epa.gov/blog/2016/12/superfund-acts-to-protect-americans-from-harmful-vapors/> (explaining generally what Superfund program does). Furthermore, the Superfund Program is especially important, because “[a]pproximately 53 million people in the U.S. live within three miles of a Superfund site.” *Id.* (introducing purpose of Superfund Program).

9. See *Introduction to the Hazard Ranking System (HRS)*, *supra* note 6 (explaining different scoring pathways of HRS).

10. See *Basic NPL Information*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/superfund/basic-npl-information> (last updated June 16, 2017) (providing overview of NPL and HRS); see also *Superfund: National Priorities List (NPL)*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/superfund/superfund-national-priorities-list-npl> (last updated Jan. 18, 2018) (providing overview of NPL).

11. See *Superfund: National Priorities List (NPL)*, *supra* note 10 (providing general overview of NPL).

12. See *id.* (explaining primary purpose of NPL). Based on the NPL, the EPA ascertains whether remedial action is needed to protect human health and the environment from the release of hazardous substances. See *Basic NPL Information*, *supra* note 10.

13. See *EPA Adds Sites to National Priorities List to Reduce Risk to Public Health and Environment*, *supra* note 2 (explaining that NPL prioritizes both enforcement actions against responsible parties and EPA Superfund cleanup funding with goal of holding legally responsible parties accountable for cleanup costs). When able to identify the party responsible for the pollution, the EPA makes an effort to hold the party responsible for the cleanup costs based on the principle that the responsible party should bear the costs instead of the costs being passed onto taxpayers. *Id.*

ing system – subsurface intrusion.¹⁴ This addition enables the EPA to investigate sites based on subsurface intrusion contamination and evaluate those sites for placement on the NPL.¹⁵

Subsurface intrusion is the migration of hazardous substances in contaminated groundwater or soil into an overlying building as a gas, vapor, or liquid.¹⁶ Most commonly, subsurface intrusion occurs in the form of vapor intrusion.¹⁷ Accordingly, the phrase “subsurface intrusion” throughout this Comment primarily refers to vapor intrusion.¹⁸ Subsurface intrusion is dangerous because it can expose people to harmful levels of hazardous substances, especially in instances of prolonged exposure.¹⁹

Prior to adopting the subsurface intrusion rule, the EPA only evaluated sites incidentally affected by subsurface intrusion, where the site had some other form of exposure covered under the traditional pathways of the HRS.²⁰ The addition of subsurface intrusion as an HRS factor authorizes the EPA to directly consider human exposure to hazardous substances that enter buildings through the subsurface environment.²¹

Part II of this Comment summarizes the background of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the Superfund Program, and the EPA’s establishment of the HRS.²² Part II also gives a more in-depth explanation of the NPL, subsurface intrusion, and the events leading to the EPA’s addition of subsurface intrusion to the HRS.²³

14. See *HRS Subsurface Intrusion*, U.S. ENVTL. PROT. AGENCY, https://19january2017snapshot.epa.gov/superfund/hrs-subsurface-intrusion_.html (last updated Jan. 10, 2017) (explaining EPA’s proposed rulemaking to add consideration of subsurface intrusion to HRS).

15. See *id.* (giving overview of impact of adding subsurface intrusion as component of HRS).

16. See *id.* (defining subsurface intrusion).

17. See *id.* (discussing common forms of subsurface intrusion).

18. See *id.* (explaining that vapor intrusion is most common form of subsurface intrusion).

19. See *Vapor Intrusion*, WIS. DEP’T OF HEALTH SERVS., <https://www.dhs.wisconsin.gov/air/vi.htm> (last updated Nov. 6, 2017) (describing health concerns associated with subsurface intrusion).

20. See *Rationale for the Potential Addition of a Vapor Intrusion Component to U.S. EPA’s Hazard Ranking System*, U.S. ENVTL. PROT. AGENCY 1, <https://semspub.epa.gov/work/HQ/174042.pdf> (last visited July 30, 2017) (explaining that HRS evaluation of sites does not account for subsurface intrusion).

21. See *id.* (considering effect of addition of subsurface intrusion to HRS factors).

22. For a discussion of subsurface intrusion and EPA’s relationship with it, see *infra* notes 27-63 and accompanying text.

23. For a discussion of the events that led to updating the HRS to include subsurface intrusion, see *infra* notes 27-63 and accompanying text.

Next, in Part III, this Comment discusses the legal response to subsurface intrusion thus far.²⁴ Part IV discusses the EPA's rationale for adding subsurface intrusion to the HRS.²⁵ Finally, Part V considers the potential impact of the addition of subsurface intrusion to the HRS.²⁶

II. BACKGROUND

A. CERCLA, HRS, and NPL

In 1980, Congress enacted CERCLA in response to growing concern regarding releases of hazardous substances and their effect on the environment and public health.²⁷ CERCLA is commonly referred to as the Superfund Program and will be referred to as such throughout this Comment.²⁸ The Superfund requires the EPA to address sites that are threatened by hazardous substances.²⁹ When the EPA learns of a potentially threatening site, the EPA determines whether the site requires action by the EPA and whether a state agency or other program may clean up the site.³⁰ For sites that require clean up that cannot otherwise be addressed by a state agency or other program, the EPA further analyzes the site through the HRS and if appropriate, places the site on the NPL.³¹

When enacted, CERCLA required the EPA to develop criteria to evaluate and prioritize sites based on their potential threat levels, which prompted the EPA to create the HRS.³² The HRS "is a numerically based screening system that uses information from initial, limited investigations to assess the relative potential threat that sites pose to human health or the environment due to contaminant re-

24. For a discussion of the legal response to subsurface intrusion, see *infra* notes 64-126 and accompanying text.

25. For a discussion of the EPA's rationale for adding subsurface intrusion to the HRS, see *infra* notes 127-138 and accompanying text.

26. For a discussion of the potential impact of adding subsurface intrusion to the HRS, see *infra* notes 139-174 and accompanying text.

27. See *Superfund: CERCLA Overview*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/superfund/superfund-cercla-overview> (last updated July 24, 2017) (describing reasons for establishment of CERCLA). CERCLA was amended in 1986 by the Superfund Amendments and Reauthorization Act. *Id.*

28. See *The Superfund Cleanup Program*, U.S. ENVTL. PROT. AGENCY 1, <https://www.epa.gov/sites/production/files/documents/thesuperfundcleanupprogram.pdf> (last visited Jan. 19, 2017) (describing Superfund Cleanup Program).

29. See *id.* at 2 (explaining how Superfund works).

30. See *id.* (explaining process for initial EPA evaluation of sites).

31. See *id.* (explaining when further EPA evaluation via HRS becomes necessary).

32. *Overview of the Present Hazard Ranking System*, U.S. ENVTL. PROT. AGENCY 1, <https://semspub.epa.gov/work/HQ/174041.pdf> (last visited Jan. 19, 2017) (explaining history behind the development of the HRS).

leases.”³³ Following the preliminary assessment, the EPA places sites on the NPL as warranted.³⁴ Most sites that the EPA assesses do not meet the criteria to be placed on the NPL.³⁵ The ultimate HRS score is a number between 0 and 100, which represents a site’s relative risk among other sites listed on the NPL.³⁶ Sites scoring 28.5 or higher on the HRS are eligible for placement on the NPL.³⁷ The HRS develops the score based on “an evaluation of up to four pathways: ground water migration, soil exposure, surface water migration, and air migration.”³⁸ Scoring for each of the pathways is based on a number of factors related to likelihood of release or exposure, waste characteristics, and targets that are potentially exposed to the release.³⁹

The HRS is the main tool used by the EPA to determine which sites should be placed on the NPL.⁴⁰ The EPA uses the list to priori-

33. *See id.* (describing HRS and initial investigation). The EPA’s initial investigation of a site to determine a HRS score may include a “[p]re-CERCLA screening assessment; [] a preliminary assessment; and [] a site inspection or expanded site inspection.” *See* Addition of a Subsurface Intrusion Component to the Hazard Ranking System, 82 Fed. Reg. 2760, 2762 (Jan. 9, 2017) (to be codified at 40 C.F.R. pt. 300). The Pre-CERCLA screening assesses whether a release of hazardous substances has occurred or potentially will and if the site is eligible and in need of further attention under the Superfund or another cleanup program. *See id.* Next, the preliminary assessment involves the EPA evaluating readily available information to distinguish sites that pose little or no threat to the environment or public health from sites that warrant further investigation in the form of a site inspection. *See id.*

34. *See Superfund Site Assessment Process, supra* note 7 (describing process of scoring via HRS and placement on NPL).

35. *See id.* (describing process of scoring via HRS and placement on NPL).

36. *See* Addition of a Subsurface Intrusion Component to the Hazard Ranking System, 82 Fed. Reg. 2760, at 2762 (clarifying that HRS score reflects relative threat among sites as opposed to site-specific risk).

37. *See Superfund Site Assessment Process, supra* note 7 (explaining qualifications for listing on NPL).

38. *See Overview of the Present Hazard Ranking System, supra* note 32, at 2 (explaining pathways of HRS). The pathways employed in the HRS are the different ways through which hazardous substances can affect the environment and public health. *Id.* Now, the soil exposure pathway includes subsurface intrusion. *See generally* Addition of a Subsurface Intrusion Component to the Hazard Ranking System, 82 Fed. Reg. 2760, at 2766 (explaining HRS structure with subsurface intrusion component).

39. *See Overview of the Present Hazard Ranking System, supra* note 32, at 2 (explaining how HRS works). An example of a factor relating to likelihood of release or exposure is the “likelihood that a site has released or has the potential to release hazardous substances into the environment.” *Id.* Examples of waste characteristic factors are “inherent toxicity, mobility of the substances[,] and the quantity of the hazardous substances that has been released.” *Id.* An example of a target factor is an evaluation of “people or sensitive environments actually or potentially exposed to the release.” *Id.*

40. *See id.* at 1 (explaining that HRS is primary tool used by EPA in placing sites on the NPL).

tize sites that warrant further investigation to determine whether the EPA should take action to clean up the site.⁴¹ Importantly, the NPL is simply a mechanism for focusing the EPA's attention on threatening sites, but the NPL does not assign liability for the substance release to any party or property owner.⁴²

When, based on a site's HRS score, the EPA believes a site may belong on the NPL, it must propose the site for placement on the list and initiate a sixty-day comment period during which the public can comment on the proposed listing.⁴³ Depending on the submitted comments, the site is then either placed on the NPL, *not* placed on the NPL, or proposed for placement again at a later date.⁴⁴ Once a site is placed on the NPL, so long as the placement is not challenged in court, it is then eligible for further EPA investigation under the Superfund program.⁴⁵

Not all polluted sites in the United States are eligible for placement on the NPL.⁴⁶ For instance, sites housing federal facilities are automatically submitted to the preliminary assessment phase discussed above, during which the EPA produces a HRS score for the site.⁴⁷ Non-federal sites, however, must undergo a pre-screening process to determine whether preliminary assessment is appropriate.⁴⁸ If the EPA determines the assessment is appropriate, non-federal sites will then undergo an assessment.⁴⁹ Following the EPA's assessment and assignment of a HRS score, when appropriate, the EPA refers sites to a cleanup program.⁵⁰ There are numerous cleanup programs to which the EPA can refer a site, only one of those being the NPL.⁵¹ Accordingly, the EPA may take steps to list eligible sites on the NPL, but otherwise may refer a site to another

41. *See id.* (providing general overview of NPL).

42. *See* Addition of a Subsurface Intrusion Component to the Hazard Ranking System, 82 Fed. Reg. at 2765 (clarifying purpose of NPL).

43. *See id.* (explaining public's involvement in NPL site listing).

44. *See id.* (explaining steps of NPL site listing).

45. *See id.* (explaining how sites ultimately are eligible for EPA evaluation).

46. *See Superfund Site Assessment Process, supra* note 7 (explaining NPL listing process).

47. *See id.* (explaining which sites automatically pass to the preliminary assessment phase).

48. *See id.* (discussing site assessment).

49. *See id.* (discussing site assessment).

50. *See id.* (discussing how sites move on to be eligible for cleanup).

51. *See Superfund Site Assessment Process, supra* note 7 (describing that sites can be addressed through various cleanup programs).

program such as a state or federal cleanup program or the Superfund Alternative Approach.⁵²

B. Significance of Subsurface Intrusion

Sites with subsurface contamination that migrates above ground into an overlying building via subsurface intrusion can pose a significant threat to the environment and to the building's occupants.⁵³ Safety concerns related to buildup of hazardous vapors from subsurface intrusion include fire hazards or explosions, as well as health concerns.⁵⁴ Health concerns related to subsurface intrusion vary widely, depending on the types of substances and the extent of the exposure.⁵⁵ Some chemicals can cause eye irritation, respiratory irritation, headaches, or nausea, all of which are short-term issues that should dissipate once exposure is over.⁵⁶ Long-term exposure to low-level chemicals can create more serious threats of chronic disease or cancer.⁵⁷

C. EPA's Focus on Subsurface Intrusion

Subsurface intrusion has been on the EPA's radar since the early 2000s, as discussed in more detail in Part III of this Comment.⁵⁸ Importantly, the Government Accountability Office (GAO) published a report in 2010, which concluded that if the EPA did not assess sites with vapor intrusion, sites with harmful levels of

52. See *Superfund Alternative Approach*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/enforcement/superfund-alternative-approach> (last updated Oct. 10, 2017) (listing different mechanism through which sites are addressed). The EPA uses the Superfund Alternative Approach for sites that do not qualify for federal funding, and instead, where funding is alternatively provided by potentially responsible parties. See *Understanding the Superfund Alternative Approach*, U.S. ENVTL. PROT. AGENCY 1 (Apr. 2008), <https://www.epa.gov/sites/production/files/documents/saa-fact.pdf>.

53. See *Rationale for the Potential Addition of a Vapor Intrusion Component to U.S. EPA's Hazard Ranking System*, *supra* note 20 (summarizing threat posed by subsurface intrusion).

54. See *id.* (giving general overview of threats posed by subsurface intrusion).

55. See *What You Should Know About Vapor Intrusion*, U.S. ENVTL. PROT. AGENCY 1, <https://www.epa.gov/sites/production/files/2015-08/documents/what-you-should-know-about-vapor-intrusion.pdf> (last visited Jan. 19, 2017) (explaining various health concerns related to vapor intrusion).

56. See *id.* (giving example of temporary symptoms that can result from exposure to vapors).

57. See *id.* (giving example of serious health concerns that can result from long-term exposure to vapors).

58. For a discussion of the legal response to subsurface intrusion, see *infra* notes 64-126 and accompanying text.

hazardous substances would remain unaddressed.⁵⁹ In coming to this conclusion, the GAO recommended that the EPA decide upon how to consider vapor intrusion when selecting sites for the NPL and how that decision would affect the number of sites listed.⁶⁰ The EPA, following the GAO's recommendation, conducted outreach activities to disseminate information to the public about the possible addition of subsurface intrusion to the HRS.⁶¹ The EPA invited and considered public feedback when determining whether to modify the HRS, and ultimately, signed a proposed rulemaking regarding the addition of subsurface intrusion in February 2016.⁶² The EPA signed the final rulemaking in December 2016, and the rule was published in the Federal Register on January 9, 2017.⁶³

III. LEGAL RESPONSE TO SUBSURFACE INTRUSION

A. Timeline

In the early 2000s, the EPA and Congress began taking a series of actions regarding subsurface intrusion, specifically vapor intrusion, prompting the EPA to ultimately add a subsurface intrusion element to the HRS.⁶⁴ In 2002, the EPA's Office of Solid Waste and Emergency Response published a draft guidance about the EPA's understanding of vapor intrusion.⁶⁵ The purpose of this draft guidance was to serve as a policy recommendation regarding whether the vapor intrusion pathway creates an unacceptable level of health

59. See *HRS Subsurface Intrusion*, *supra* note 14 (giving background information of events leading to addition of subsurface intrusion to HRS).

60. See *id.* (giving background information of events leading to addition of subsurface intrusion to HRS).

61. See *id.* (explaining EPA's public outreach activities prior to adding subsurface intrusion to HRS). Specifically, the EPA "facilitate[ed] public listening sessions, provid[ed] public information documents and establish[ed] a website with more information regarding this rulemaking." *Id.* The public comment period, during which the EPA collected comments regarding the proposed rulemaking, lasted from January 31, 2011, until April 16, 2011. *Id.*

62. See *id.* (detailing EPA's consideration of public feedback regarding addition and laying out timeline leading to publication of rule in Federal Register).

63. See *id.* (laying out timeline leading to publication of rule in Federal Register).

64. For a discussion of the timeline of the EPA's response to subsurface intrusion, see *infra* notes 65-90 and accompanying text.

65. *Evaluating the Vapor Intrusion into Indoor Air*, U.S. ENVTL. PROT. AGENCY, EPA 530-F-02-052, 2 (Nov. 2002), <https://archive.epa.gov/epawaste/hazard/web/pdf/f02052.pdf> (giving overview of EPA's publication of draft guidance). Guidance documents are published by federal agencies to define industry standards or aid in the interpretation of laws. See Final Bulletin for Agency Good Guidance Practices, 72 Fed. Reg. 3432, 3434 (Jan. 25, 2007).

risk.⁶⁶ The EPA recommended that the information in this draft guidance be used at sites on the NPL under the Superfund.⁶⁷ The draft guidance remained in place for over a decade, until 2015 when the EPA released its final guide called the Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Sub-surface Vapor Sources to Indoor Air (VI Technical Guide).⁶⁸

The next significant event related to subsurface intrusion concerns occurred in 2002 when Congress passed the Small Business Liability Relief and Brownfields Revitalization Act (Brownfields Act) to amend CERCLA.⁶⁹ This amendment provided funds for site clean-up and state response programs, and clarified Superfund liability protections.⁷⁰ Specifically, the Brownfields Act clarified the requirements for establishing the innocent landowner defense under the Superfund program.⁷¹ The innocent landowner defense is available to parties subject to Superfund liability who purchased contaminated property without knowledge of the contamination.⁷² To establish this defense, parties must show they undertook all appropriate inquiries (AAI) prior to ownership.⁷³ Under the Brownfields Act, AAI includes taking reasonable steps to minimize exposure from past releases, discontinue ongoing releases, and prevent any future releases of hazardous substances.⁷⁴ This clarification, particularly the requirement to limit human exposure,

66. See *Evaluating the Vapor Intrusion into Indoor Air*, *supra* note 65, at 2 (explaining EPA's goal in publishing draft guidance).

67. See *id.* (directing draft guidance to be used at sites on NPL).

68. See Nadine Weinberg, *USEPA Releases Vapor Intrusion Technical Guidance*, EHS JOURNAL (July 7, 2015), <http://ehsjournal.org/http://ehsjournal.org/nadine-weinberg/usepa-releases-vapor-intrusion-technical-guidance/2015/> (announcing release of Vapor Intrusion Technical Guidance).

69. See *Brownfield Laws and Regulations*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/brownfields/brownfields-laws-and-regulations> (last updated Jan. 19, 2018) (detailing history of Brownfields laws and regulations).

70. See *id.* (listing effects of Brownfields Act).

71. See Gary E. Marchant, *Indoor Air Quality, Risk and Uncertainty: The "New" Risks of Vapor Intrusion*, 46 ARIZ. ST. L.J. 565, 568 (2014) (overviewing legal response to vapor intrusion and mapping out key events in timeline).

72. See *Innocent Landowners*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/enforcement/innocent-landowners> (last updated Nov. 28, 2016) (defining innocent landowner defense).

73. See *id.* (stating when a landowner may be eligible to establish innocent landowner defense). The landowner must also comply with all pre- and post-purchase requirements. See *id.*

74. Marchant, *supra* note 71, at 568 (explaining effect of Brownfields amendment as it relates to progressive action against vapor intrusion).

implied a need to protect the public from exposure to vapor intrusion.⁷⁵

A little over a decade later, the EPA took further administrative strides to establish standard practices for addressing vapor intrusion.⁷⁶ In 2013, the EPA adopted the American Society for Testing and Materials Standard Practice (ASTM E1527-13) for Phase I Environmental Assessments as a method for establishing AAI.⁷⁷ The ASTM E1527-13 requires an assessment of vapor intrusion.⁷⁸ Previous versions of Phase I Assessments, which have always satisfied the AAI rule, did not require an assessment of vapor intrusion.⁷⁹ This adopted standard shows further focus by the EPA on the need to address concerns of vapor intrusion.⁸⁰

At last, more than a decade after releasing its draft guidance on vapor intrusion, in 2015, the EPA released its final guidance, titled Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air (VI Technical Guide).⁸¹ The public long awaited the release of this guide because the draft guidance previously released in 2002 had proven to be inadequate in informing the public on the growing concerns of vapor intrusion.⁸² The EPA's goal in releasing this final guidance was to establish standard procedures and recommended

75. *Id.* (emphasizing significance of Brownfields amendment in vapor intrusion timeline).

76. *See id.* at 569 (illustrating timeline of EPA's actions related to vapor intrusion).

77. *Id.* (discussing EPA's adoption of ASTM E1527-13 as method of satisfying AAI). The American Society for Testing and Materials (ASTM) is a non-profit organization that develops voluntary consensus standards for products and systems and produce technical documents explaining the standards. *See Frequently Asked Questions*, ASTM INT'L, <https://www.astm.org/FAQ/#what> (last visited June 2, 2017). Members of the ASTM who produce these standards are users, consumers, government officials, and academics from around the world. *Id.*

78. Marchant, *supra* note 71, at 569 (explaining effect of EPA's adoption of ASTM E1527-13 as method of satisfying AAI).

79. *Id.* (clarifying that previous EPA standards that satisfied AAI rule did not require assessment of vapor intrusion).

80. *See id.* (summarizing that EPA's adoption of this standard shows focus on threat of vapor intrusion with assessment of vapor intrusion being necessary now to establish AAI).

81. *See generally* Weinberg, *supra* note 68 (announcing release of EPA's vapor intrusion guidance documents).

82. *See generally* Martin Schmidt, *US EPA Releases Final Vapor Intrusion Guidance*, COX-COLVIN & ASSOCIATES, INC. (June 2015), <https://www.coxcolvin.com/us-epa-releases-final-vapor-intrusion-guidance/> (discussing release of VI Technical Guide). The 2002 draft guidance was inadequate in that it did not keep up with the evolving nature of the field and was never finalized, leaving states to determine their own conflicting guidelines. *See id.*

practices for assessing vapor intrusion.⁸³ While the guidance provides a standard approach for vapor intrusion assessment, the EPA acknowledges that vapor intrusion instances can vary greatly.⁸⁴ Accordingly, the guide serves more as a framework than as a prescriptive, step-by-step method.⁸⁵ The guidance details the different vapor intrusion pathways, proper investigative processes, risk assessment measures following investigation, mitigation techniques, and community involvement.⁸⁶ Because the 2002 version was neither adequate nor finalized, states had either developed inconsistent guidance on vapor intrusion or none at all.⁸⁷ Now, with the heavily revised and improved VI Technical Guide, states can reassess and revise their own guidance or, states without a guidance can simply adopt the guide.⁸⁸

The EPA's inclusion of subsurface intrusion in the HRS evinces the agency's commitment to addressing the issue.⁸⁹ Although, over the years, many states have incorporated subsurface intrusion into environmental due diligence processes, its inclusion within the HRS makes clear that it is now a point of focus for the EPA and the country.⁹⁰

B. The Rule

The final rule, titled "Addition of a Subsurface Intrusion Component to the Hazard Ranking System," was published in the Federal Register on January 9, 2017 containing extensive background of the considerations leading to the rule's creation and the con-

83. See Weinberg, *supra* note 68 (explaining purpose of VI Technical Guide).

84. See *id.* (clarifying that VI Technical Guide was designed to accommodate different situations).

85. See *id.* (clarifying that VI Technical Guide is merely framework to be applied and adapted to various circumstances).

86. See *generally id.* (detailing contents of VI Technical Guide).

87. See Schmidt, *supra* note 82 (noting disparity among states prior to release of VI Technical Guide).

88. See David R. Gillay, Elizabeth B. Davis, Tammy L. Helminski, Michael H. Elam & Paul M. Drucker, *Vapor Shroud Has Fallen: EPA Releases Final Vapor Intrusion Guidance*, LEXOLOGY (July 17, 2015), <http://www.lexology.com/library/detail.aspx?g=7628838b-949d-4482-b6fa-1bcbb91a835b> (discussing VI Technical Guide's interplay with state guidance).

89. See Dietrich Hoefner, *Environmental Due Diligence—EPA Adds Subsurface Intrusion to Superfund Hazard Ranking System*, ENERGY & NAT. RESOURCES BLOG (Dec. 13, 2016), <https://blog.lrrc.com/energy/2016/12/13/due-diligence-buying-former-dry-cleaning-property-epa-adds-subsurface-intrusion-superfund-hazard-ranking-system/> (concluding impact of addition).

90. See *id.* (emphasizing EPA's focus on vapor intrusion as a concern).

tents of the rule itself.⁹¹ Most relevant to this Comment are the portions of the rule dealing with the addition's impacts on HRS score ranking and site investigations.⁹²

Importantly, the rule explains how the HRS now functions with the addition of subsurface intrusion.⁹³ Logistically speaking, the subsurface intrusion component is incorporated into the pre-existing soil exposure pathway within the original HRS structure.⁹⁴ Because soil contamination can ultimately lead to subsurface intrusion and are therefore related, it is appropriate that both types of contamination are now evaluated together within the same pathway.⁹⁵ Soil contamination and subsurface intrusion are evaluated separately, with their risk levels then being combined to reflect their cumulative risk within the entire HRS site score.⁹⁶

The rule details how the investigation differs now that it includes a subsurface intrusion element.⁹⁷ More specifically, the rule instructs those investigating sites with suspected subsurface intrusion to direct attention towards two situations in which subsurface intrusion is most likely to occur.⁹⁸ The first situation is where someone has previously observed and documented the site's exposure to subsurface intrusion.⁹⁹ The second situation is where subsurface contamination below occupied buildings has been documented, but indoor air samples have either not yet reflected contamination, or have not been tested.¹⁰⁰

91. *See generally* Addition of a Subsurface Intrusion Component to the Hazard Ranking System, 82 Fed. Reg. 2760, 2760 (Jan. 9, 2017) (to be codified at 40 C.F.R. pt. 300) (outlining basis for rule adding subsurface intrusion to HRS).

92. For a discussion of the portions of the rule most relevant to this Comment, see *infra* notes 93-100 and accompanying text.

93. *See* Addition of a Subsurface Intrusion Component to the Hazard Ranking System, 82 Fed. Reg. at 2766 (explaining updated HRS structure with subsurface intrusion).

94. *See id.* (detailing newly revised HRS structure). This revised pathway has been renamed as the "Soil Exposure and Subsurface Intrusion" pathway. *See id.*

95. *See id.* (explaining precisely how HRS scoring works now with addition of subsurface intrusion).

96. *See id.* at 2767 (elaborating on reasoning behind considering soil contamination and subsurface intrusion in tandem).

97. *See id.* at 2768 (explaining how EPA's investigation process has changed in light of subsurface intrusion addition).

98. *See generally* Addition of a Subsurface Intrusion Component to the Hazard Ranking System, 82 Fed. Reg. at 2768 (explaining types of areas prone to exposure from subsurface intrusion).

99. *See id.* (explaining that subsurface intrusion is likely to occur again where it has been previously observed).

100. *See id.* (explaining types of areas prone to exposure from subsurface intrusion).

C. Liability under CERCLA

Under the Superfund Program, parties can be held liable for the presence of hazardous materials at sites.¹⁰¹ Sites listed on the NPL are often subject to further EPA investigation to determine liability for the cause of contamination.¹⁰²

Under CERCLA, a party responsible for the presence of hazardous wastes may be found liable if hazardous substances are released, or potentially will be released, and expenses are incurred, or will be incurred, as a result.¹⁰³ In the event that a party is found liable, the party may be responsible for cleanup costs, health assessment costs for those affected, damage to natural resources, and injunctive relief in the form of site cleanup if the site presents substantial endangerment.¹⁰⁴

There are four categories of parties who may be liable under the Superfund.¹⁰⁵ First, current owners or operators of a facility where hazardous waste is present may be liable.¹⁰⁶ Second, past owners or operators of a facility may be liable if hazardous wastes disposed of during their ownership or operation caused contamination.¹⁰⁷ Third, parties that “arranged for the disposal or transport of” hazardous waste, leading to contamination, may be liable.¹⁰⁸ Fourth, parties who did not necessarily arrange for the disposal, but merely transported waste and selected a site to bring the waste to, may be liable.¹⁰⁹ The extent to which a party may be liable for the existence of hazardous substances at a site depends on the consideration of a few factors.¹¹⁰ Upon consideration of the those factors,

101. *See Superfund Liability*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/enforcement/superfund-liability> (last updated Jan. 24, 2017) (explaining liability imposed by Superfund).

102. *See* Hoefner, *supra* note 89 (mentioning liability and CERCLA enforcement).

103. *See Superfund Liability*, *supra* note 101 (listing elements of Superfund liability). Superfund liability also requires that hazardous wastes be present at the facility and that the defendant ultimately be a liable party. *Id.*

104. *See id.* (listing repercussions of Superfund liability).

105. *See id.* (listing types of Superfund liable parties). *See also* 42 U.S.C. § 9607(a) (2015) (listing potentially responsible parties under Superfund).

106. *See Superfund Liability*, *supra* note 101 (describing types of potentially responsible parties).

107. *See id.* (describing past owners as type of potentially responsible party).

108. *See id.* (describing people who arrange waste removal as a type of potentially responsible party).

109. *See id.* (describing people who transport waste as a type of potentially responsible party).

110. *See Unique Parties and Superfund Liability*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/enforcement/unique-parties-and-superfund-liability> (last updated Jan. 24, 2017) (listing factors affecting liability).

discussed below, the EPA will designate a liable party as one of four different types of “unique parties.”¹¹¹ First, a party who only contributes a small amount of waste is considered a *de minimis* party.¹¹² The EPA is likely to settle with a *de minimis* party early on to be able to divert attention towards parties who have contributed larger amounts of waste.¹¹³ Second, parties whose waste contribution poses only a limited hazard are referred to as *de micromis* parties.¹¹⁴ Generally, the EPA’s policy is that *de micromis* parties are not required to finance cleanup efforts because their actions have a limited effect on the environment.¹¹⁵ The third category of unique parties includes municipalities, generators and transporters of municipal waste, owners of property above contaminated groundwater, and residential homeowners, all of which the EPA typically takes no or minimal action against.¹¹⁶ Fourth, the EPA generally permits parties who are unable to pay for the total amount of their cleanup costs to enter into special payment arrangements, or, sometimes, the EPA reduces the amount of their total payment.¹¹⁷

There are a number of defenses to Superfund liability as well as exemptions.¹¹⁸ The defenses a party may raise are that the release of hazardous materials was caused by an act of God, act of war, or an act or omission by a third party.¹¹⁹ There are numerous exemptions to Superfund liability, including one for cleanup contractors who perform cleanup activities at Superfund sites, so long as they do not engage in negligence or intentional misconduct.¹²⁰ Landowners can be exempt from Superfund liability as discussed

111. *See Superfund Liability*, *supra* note 101 (listing factors that make parties unique).

112. *See Unique Parties and Superfund Liability*, *supra* note 110 (describing one category of potentially responsible parties).

113. *See id.* (discussing *de minimis* parties).

114. *See id.* (describing *de micromis* parties).

115. *See id.* (explaining why *de micromis* parties are not required to finance cleanup).

116. *See id.* (discussing subset of parties that is usually not held responsible).

117. *See Unique Parties and Superfund Liability*, *supra* note 110 (discussing parties who cannot afford to pay for cleanup).

118. *Defenses and Exemptions to Superfund Liability*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/enforcement/defenses-and-exemptions-superfund-liability> (last updated June 15, 2017) (overviewing defenses and exemptions).

119. *See id.* (listing defenses to Superfund liability). A potentially responsible party can only raise the third party defense if the potentially responsible party had no contractual relationship with the third party. *See id.*

120. *See id.* (discussing exemptions to Superfund liability).

above with regard to the innocent landowner defense.¹²¹ State and local governments, so long as they did not engage in gross negligence or intentional misconduct, are not liable for costs stemming from emergency clean-up of hazardous substances.¹²² State and local governments are not liable for hazardous substances at a Superfund site or other contaminated property that was acquired involuntarily, unless the state or local government caused the contamination.¹²³

The NPL guides the EPA in determining what enforcement efforts are appropriate in a given situation.¹²⁴ When the EPA determines a party is liable, it can require the responsible party to pay for, or even conduct, the site cleanup.¹²⁵ If a party fails to comply with the EPA's cleanup requirements or engage in negotiations, the EPA may issue an enforcement order against that party.¹²⁶

IV. RATIONALE FOR ADDING A SUBSURFACE INTRUSION COMPONENT TO THE HRS

To understand the EPA's rationale for adding subsurface intrusion to the HRS, one should consider the purpose and goals of the EPA generally.¹²⁷ The EPA's overall goal is to protect the health of U.S. citizens as well as the environment.¹²⁸ More specifically, the EPA seeks to ensure that citizens are protected from health and environmental risks in their homes, places of work, and places where they otherwise spend time.¹²⁹ One of the primary mechanisms through which the EPA pursues these goals is the Superfund

121. *See id.* (explaining landowner exemption for Superfund liability). For a discussion of the innocent landowner defense, see *supra* notes 71-73 and accompanying text.

122. *See id.* (discussing exemptions to Superfund liability).

123. *See Defenses and Exemptions to Superfund Liability*, *supra* note 118 (discussing state and local governments' exemption from Superfund liability when they did not cause contamination).

124. *See* Sudhir Lay, *Understanding the Basics of CERCLA*, AM. BAR ASS'N YOUNG LAWYERS DIV. (2010), <http://files.levvelabs.com/a2873d08b168bf352f8f3e64f43a8e20/resources/uploads/articles/UnderstandingtheBasicsofCERCLA.pdf> (explaining that NPL identifies what remedial actions are appropriate).

125. *See id.* (summarizing objective of CERCLA).

126. *See id.* (summarizing actions EPA may take in response to discovering hazardous substance releases). *See also* 42 U.S.C. § 9606(a) (enabling district courts to grant required relief in instances of hazardous substance release).

127. *See Rationale for the Potential Addition of a Vapor Intrusion Component to U.S. EPA's Hazard Ranking System*, *supra* note 20, at 1 (introducing EPA's rationale for subsurface intrusion addition).

128. *See Our Mission and What We Do*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/aboutepa/our-mission-and-what-we-do> (last updated Feb. 7, 2018) (stating EPA mission).

129. *See id.* (elaborating on EPA's purpose).

program.¹³⁰ The Superfund program, in previously evaluating sites through the HRS based on contamination of surface water, ground water, soil and air, also had reason to assess the threats posed by hazardous vapors intruding into homes and buildings.¹³¹

Prior to the addition of subsurface intrusion, the EPA only evaluated sites based on the other types of threats traditionally examined under the HRS, giving no consideration to potentially harmful vapors.¹³² The EPA had no process for directly evaluating the threat of vapor intrusion.¹³³ While the air migration pathway previously considered contaminants within the atmospheric air, it did not consider indoor air.¹³⁴ Because this gap existed in the site evaluation system, there are potentially a large number of sites with vapor intrusion concerns that have yet to be investigated by the EPA.¹³⁵ Because these sites have not been addressed through the Superfund Program, states have been left to address the issue independently.¹³⁶ States, given their constrained budgets, may not necessarily have the fiscal capacity to properly clean up the sites.¹³⁷ Federal assistance is crucial in the cleanup effort because, without it, sites with dangerous levels of contaminants may remain unaddressed.¹³⁸

V. IMPACT

Generally, the EPA's addition of subsurface intrusion to the HRS will enable it to directly identify and confront the risks of human exposure to hazardous materials that permeate into building structures from the subsurface environment.¹³⁹ As a result of

130. *See generally id.* (overviewing how EPA pursues goals).

131. *See Rationale for the Potential Addition of a Vapor Intrusion Component to U.S. EPA's Hazard Ranking System, supra* note 20 (prefacing rationale of subsurface intrusion addition to HRS).

132. *See id.* (giving background about HRS prior to subsurface intrusion addition).

133. *See id.* (giving background about HRS prior to subsurface intrusion addition).

134. *See id.* (explaining why HRS system prior to addition did not adequately evaluate all threats).

135. *See id.* (explaining existence of gap in HRS system).

136. *See* Addition of a Subsurface Intrusion Component to the Hazard Ranking System, 82 Fed. Reg. 2760, 2761 (Jan. 9, 2017) (to be codified at 40 C.F.R. pt. 300) (referencing report by Government Accountability Office that explains risk of not evaluating sites based on subsurface intrusion threat).

137. *See id.* (expanding on risks of not evaluating sites based on subsurface intrusion threat).

138. *See id.* (expanding on risks of not evaluating sites based on subsurface intrusion threat).

139. *See* Hoefner, *supra* note 89 (explaining resulting effect of subsurface intrusion addition).

adding subsurface intrusion to the scoring and ranking process of the HRS, sites with subsurface intrusion, either alone or in combination with other contamination issues, will be eligible for addition to the NPL.¹⁴⁰ This modification of the NPL listing process is important because listing on the NPL ultimately helps the Superfund prioritize these sites for cleanup action.¹⁴¹

Subsurface intrusion is now a part of the soil exposure pathway as a factor for the EPA to consider when constructing a HRS score.¹⁴² The HRS scoring mechanism is functionally unaffected, with subsurface intrusion risks simply influencing the soil exposure pathway.¹⁴³

The addition does not impose additional regulations on small businesses.¹⁴⁴ The EPA and government agencies partnering with the EPA perform the site assessments.¹⁴⁵ The addition to the HRS only expands the criteria for evaluating sites via the HRS and does not add extraneous requirements.¹⁴⁶ Businesses will thus not have to take any new action regarding vapor intrusion threats following the modification of the HRS.¹⁴⁷

The subsurface intrusion addition primarily affects EPA investigators, who must implement the changes discussed above, as well as possible victims.¹⁴⁸ Improvements like this to the HRS promote the goals of the Superfund and give the EPA the ability to prevent numerous health risks to potential victims of exposure.¹⁴⁹ Specifically, threats such as fires and explosions, which can result from subsurface intrusion, are especially concerning.¹⁵⁰ Accordingly, address-

140. *See id.* (explaining effect on NPL).

141. *See id.* (mentioning importance of modification).

142. For a discussion of HRS scoring and the incorporation of subsurface intrusion into the scoring pathways, see *supra* notes 93-96.

143. For a discussion of how HRS scoring will only be mildly affected by the addition of subsurface intrusion, see *supra* notes 93-96.

144. *See* Addition of a Subsurface Intrusion Component to the Hazard Ranking System, 82 Fed. Reg. 2760, 2765 (Jan. 9, 2017) (to be codified at 40 C.F.R. pt. 300) (discussing lack of regulation imposition on small businesses).

145. *See id.* (clarifying why HRS modification will not impact small businesses).

146. *See id.* (clarifying effect of modifying HRS).

147. For a discussion of how HRS modification will affect businesses, see *supra* notes 144-146 and accompanying text.

148. *See generally* *The Superfund Program: Protecting Healthy Communities, Advancing Environmental Protection*, *supra* note 1 (summarizing effect of Superfund on communities).

149. *See generally id.* (stating health benefits resulting from Superfund Program efforts).

150. *See id.* (highlighting most urgent and immediate risks that result from contamination).

ing such risks is highly warranted.¹⁵¹ A reduction of health risks can be especially significant to more vulnerable groups of people, including children, pregnant women, and the elderly.¹⁵²

Comments submitted to the EPA during the public commentary period revealed concerns that Superfund attention to sites with contaminated drinking water may be diminished by the Superfund now placing importance on subsurface intrusion.¹⁵³ The EPA's focus on drinking water, however, will not be diminished because the factoring in of subsurface intrusion in the HRS score may actually increase the scores of sites with contaminated drinking water.¹⁵⁴ This is probable because sites with contaminated drinking water from the ground are also sites where the contaminated water may volatilize, causing vapor intrusion.¹⁵⁵ It is also important to note that while drinking water is a priority within the Superfund program, it is not the only one.¹⁵⁶ Direct human contact with hazardous substances is also a priority, which is why the EPA now rightfully focuses on subsurface intrusion as well.¹⁵⁷

The public has also directed concern at the potential increase in cost and required effort by state and federal agencies resulting from the EPA's rule change, given the intricacy of investigating subsurface intrusion.¹⁵⁸ While some site evaluations may be more complex than they previously were, site evaluations already varied

151. *See id.* (showing importance of reducing health risks resulting from contamination).

152. *See generally id.* (identifying groups of people at highest risk from contamination effects).

153. *See* Addition of a Subsurface Intrusion Component to the Hazard Ranking System, 82 Fed. Reg. 2760, 2774 (Jan. 9, 2017) (to be codified at 40 C.F.R. pt. 300) (summarizing public comments regarding EPA's priority of drinking water sites).

154. *See id.* (explaining why public should not be concerned regarding EPA focus on public drinking water).

155. *See id.* (explaining connection between contaminated drinking water and subsurface intrusion).

156. *See id.* (reiterating diverse aims of the Superfund program).

157. *See* Addition of a Subsurface Intrusion Component to the Hazard Ranking System, 82 Fed. Reg. at 2774 (justifying EPA focus on subsurface intrusion); *see also* 42 U.S.C. § 9605(a)(8)(A) (2002) (requiring President, under CERCLA, to publish national hazardous substance response plan with procedures for responding to hazardous substance releases including "criteria for determining priorities among releases or threatened releases throughout the United States for the purpose of taking remedial action and, to the extent practicable taking into account the potential urgency of such action, for the purpose of taking removal action.").

158. *See* Addition of a Subsurface Intrusion Component to the Hazard Ranking System, 82 Fed. Reg. at 2774 (discussing public concern related to agency costs and time).

greatly in terms of complexity, time, and cost.¹⁵⁹ Presently, the EPA does not expect its site assessment budget to change significantly.¹⁶⁰ If any change does occur to reflect the consideration of subsurface intrusion, the EPA expects it to simply be the allocation of resources.¹⁶¹

Another concern that the public presented was whether the incorporation of subsurface intrusion into the HRS would be consistent with the recently released VI Technical Guide.¹⁶² More specifically, the public's concern was that possible inconsistencies would create confusion when assessing subsurface intrusion at sites.¹⁶³ The EPA has addressed these concerns and clarified why there will not be inconsistencies.¹⁶⁴ First, the now modified HRS and the VI Technical Guide work together to aid evaluation of subsurface intrusion threats.¹⁶⁵ They endorse the same principles, procedures, and concepts to characterize sites with such threats.¹⁶⁶ Second, the modified HRS and VI Technical Guide serve different purposes entirely.¹⁶⁷ The VI Technical Guide is a tool for site assessors, who use it as a reference in evaluating vapor intrusion threats.¹⁶⁸ The HRS, however, is not a guide and does not explain site assessment processes.¹⁶⁹ The HRS is a ranking system that prioritizes sites for further investigation.¹⁷⁰ Because the two documents serve different purposes, the public concern regarding inconsistency is unfounded.¹⁷¹

159. *See id.* (explaining variance in site assessment costs).

160. *See id.* (stating EPA's expectations related to site assessment costs going forward).

161. *See id.* (explaining EPA expectations regarding allocation of government resources following subsurface intrusion addition).

162. *See id.* at 2775 (discussing role of subsurface intrusion addition to HRS and VI Technical Guide).

163. *See* Addition of a Subsurface Intrusion Component to the Hazard Ranking System, 82 Fed. Reg. at 2775 (specifying public's concern regarding consistency between subsurface intrusion addition to HRS and VI Technical Guide).

164. *See id.* (prefacing EPA's response regarding consistency between subsurface intrusion addition to HRS and VI Technical Guide).

165. *See id.* (explaining why modified HRS and VI Technical Guide are not inconsistent).

166. *See id.* (highlighting consistencies between modified HRS and VI Technical Guide).

167. *See id.* (differentiating modified HRS and VI Technical Guide).

168. *See* Addition of a Subsurface Intrusion Component to the Hazard Ranking System, 82 Fed. Reg. at 2775 (clarifying purpose of VI Technical Guide).

169. *See id.* (differentiating HRS from VI Technical Guide).

170. *See id.* (clarifying purpose of HRS).

171. *See id.* (dismissing public concern).

All things considered, the ultimate impact of the addition of subsurface intrusion to the HRS is that the EPA will be able to more efficiently and directly assess hazardous substance threats.¹⁷² While the public has expressed a few concerns regarding complications that could follow this addition, the EPA has worked hard to incorporate the consideration of subsurface intrusion seamlessly into the already existing HRS.¹⁷³ Overall, the public can feel confident that the EPA is now taking a more comprehensive approach to evaluating and assessing hazardous substance threats.¹⁷⁴

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172. For a discussion of the positive impacts likely to occur from the addition of subsurface intrusion to the HRS, see *supra* notes 148-152 and accompanying text.

173. For a discussion of public concerns and the EPA's response, see *supra* notes 153-171 and accompanying text.

174. For a discussion of the general impact likely to result from the HRS incorporation of subsurface intrusion, see *supra* notes 139-173 and accompanying text.

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