Land Use and Remedy Selection: Experience from the Field – The Industri-Plex Site

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Preface

As the United States Congress debates revisions to the federal Superfund law, one of the most important topics of discussion is the degree to which cleanups at Superfund sites should be based on their expected future land use. This discussion has engaged the Superfund community for several years. Despite this apparent interest in linking cleanup with land use, however, surprisingly little analysis has been done on what role land use already plays in selecting remedies. RFF researchers have addressed the shortfall with case studies at three Superfund sites—Abex Corporation in Portsmouth, Virginia, Industri-Plex in Woburn, Massachusetts, and Fort Ord near Monterey, California—where land use has played a prominent role in the remedy selection process. Each of the case studies includes a description of: the contamination at the site; the different stakeholders involved in the remedy selection process; and the influence that land use considerations have had on this process.

The three case studies are part of a larger RFF research project on land use and remedy selection that was funded in part under a grant from the U.S. Environmental Protection Agency. The final report for that project, *Linking Land Use and Superfund Cleanups: Uncharted Territory*, is available from RFF's publications office (202-328-5000) or on RFF's web page (www.rff.org).

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Kris Wernstedt and Katherine N. Probst[1]

1. INTRODUCTION[2]

The Industri-Plex Superfund site in Woburn, Massachusetts furnishes an opportunity to examine the possible implications of a proposed change to the federal Superfund law that both the 103rd and 104th Congresses have wrestled with; namely, the provision of language in the law to give land use a more prominent role in shaping remedy selection at federal National Priorities List (NPL) sites. Some offer Industri-Plex as a instructive and successful model for basing a cleanup remedy on the reasonably anticipated future use of a Superfund property, claiming that the cleanup at the site has facilitated economic development at the site, enhanced public involvement, and lowered remedial costs, three primary motivations that undergird such Superfund reform efforts. Proponents of this view suggest that two generalizable features of the Industri-Plex remedial process are largely responsible for its success:

- the reliance on institutional controls at the site has lowered estimated remedial costs and should facilitate new development at the site, as well as allow existing business owners at the site to continue to operate their businesses; and

- the creation and operation of a new entity, independent of both the responsible parties and the community of regulators, in the consent decree at the site has encouraged public involvement and lowered some of the barriers to redevelopment that the Superfund law (known formally as the Comprehensive Environmental Response, Compensation and Liability Act, or CERCLA) typically imposes at Superfund sites through its liability provisions.

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[1] Kris Wernstedt, Fellow, Quality of the Environment Division, Resources for the Future; Katherine N. Probst, Senior Fellow, Center for Risk Management, Resources for the Future.

[2] Interviews for this case study were conducted between July 1995 and October 1996. Information from these interviews is incorporated in the text and is cited as personal communications. However, to protect the interviewees, we have not cited the specific individuals who provided the information except as a group in Appendix B. Our discussion of the Industri-Plex site is generally current as of November, 1996.

In addition, proponents claim that specific features of the Industri-Plex property -- its prime location and the fact that the soil contamination at the site generally can be contained and thus human health threats limited by controlling exposure through the use of covers and institutional controls -- also have played important roles in the site's favorable evolution toward reuse.

As portions of the Industri-Plex remedial action near completion, it is becoming obvious that public and private entities indeed *will* use much of both contaminated and uncontaminated parts of the NPL property for productive economic activities, thereby providing local benefits such as jobs and enhanced tax revenues. A large segment of the general public in Woburn and surrounding areas seems to support this development and the accompanying cleanup efforts. Not surprisingly, however, some have challenged the characterization of Industri-Plex as an unequivocal success. Among a number of concerns with the site, they question the efficacy of some of the public involvement efforts of the U. S. Environmental Protection Agency (EPA), the protectiveness of the implemented remedial actions, unresolved groundwater contamination and the interim and incomplete nature of the remedial action to address this contamination, and the timing of redevelopment at the site. The fact that the site occupies such an attractive and valuable piece of real estate also has prompted others to ask whether the Industri-Plex experience is very relevant for the more typical Superfund properties that are not so blessed with prime redevelopment potential.

This investigation has been developed to illuminate some of the tensions embedded in these conflicting viewpoints. It is part of a larger research effort that we are conducting on the role of land use in the Superfund remedy selection process. The larger study examines the public positions that stakeholders have taken on land use and remedy selection, draws on interviews that we have conducted with a number of representatives of different national-level groups involved in Superfund reauthorization, and rests centrally on three case studies of Superfund sites where land use has played a significant role. Industri-Plex is one of these case studies.

Our approach in this paper is as follows. In section 2, we introduce background material on the Industri-Plex property, describing the setting of the site and its physical characteristics and briefly summarizing the contamination, remedial alternatives, and principal players in site use and remediation. (We include a more complete discussion of the

contamination and remediation in Appendix A.) This background helps to set the stage for examining in later stages of the paper how remedial and reuse concerns at the site have become intertwined and how they figuratively have migrated beyond the boundaries of the site itself and spilled over into surrounding communities.

In section 3, we focus on the site itself and discuss in some detail the history of manufacturing activities, industrial park development, and regulatory oversight at Industri-Plex. These three eras have shaped the stage on which the responsible parties, regulators, local agencies, and the general public act. It is useful to excavate this site history so that the reader can appreciate the roles that current site actors play and the motivations behind these roles.

In section 4, we focus on reuse of the site, and explore how cleanup and reuse have become commingled. To provide an appreciation of the larger historical forces that have shaped reuse and cleanup dynamics at Industri-Plex, we first synopsize the history of economic development in the area surrounding the site, touching on the early manufacturing base of Woburn and the long-standing importance of industrial and commercial development. We then concentrate on the increasing preoccupation with traffic management at the site and to current plans for site redevelopment.

In section 5, we turn our attention to public involvement in reuse and cleanup. Enhanced public involvement is often offered as a rational or at least as an important benefit of linking land use and remedy selection, so it is important to examine critically how the public has participated in site decisions at Industri-Plex.

Finally, in section 6 we offer summary comments. As a preview of our conclusions, we believe that the Industri-Plex experience provides useful lessons for the Superfund program, by demonstrating that economic reuse can be promoted. We caveat this claim, however, with a cautionary note about making reuse a central objective of the program. We also take away from the site's experiences some reservations about whether the public involvement benefits that many assert would follow from combining reuse and cleanup are as uncomplicated or unambiguous as many would like to admit.

2. BACKGROUND ON INDUSTRI-PLEX

The Industri-Plex Superfund site occupies a partially developed 245-acre tract in Woburn, Massachusetts, twelve miles north of downtown Boston (see Figure 1). The Boston-

Lowell commuter rail line runs through the property, while Interstate 93 lies immediately east and Route 128 (Interstate 95) roughly one mile to the south. Largely because of these transportation arteries, the site is a prime location for reuse and economic development. Although the immediate area currently has excess industrial and office space capacity due to a slackening economy and Woburn itself is unlikely to experience significant population gains in the next several decades (most potential residential areas within City limits already have been developed), expansion along the Route 128 corridor and in northern metropolitan communities apparently has created a regional demand for large retail and commercial space (*e.g.*, warehousing and distribution centers and big-box retailers such as large furniture stores) as well as additional office space in the vicinity of Industri-Plex. The location of Industri-Plex on the commuter rail line also lends itself to the siting of a state regional transportation center, which has been proposed on a portion of the site to help manage regional traffic congestion and enhance air quality.

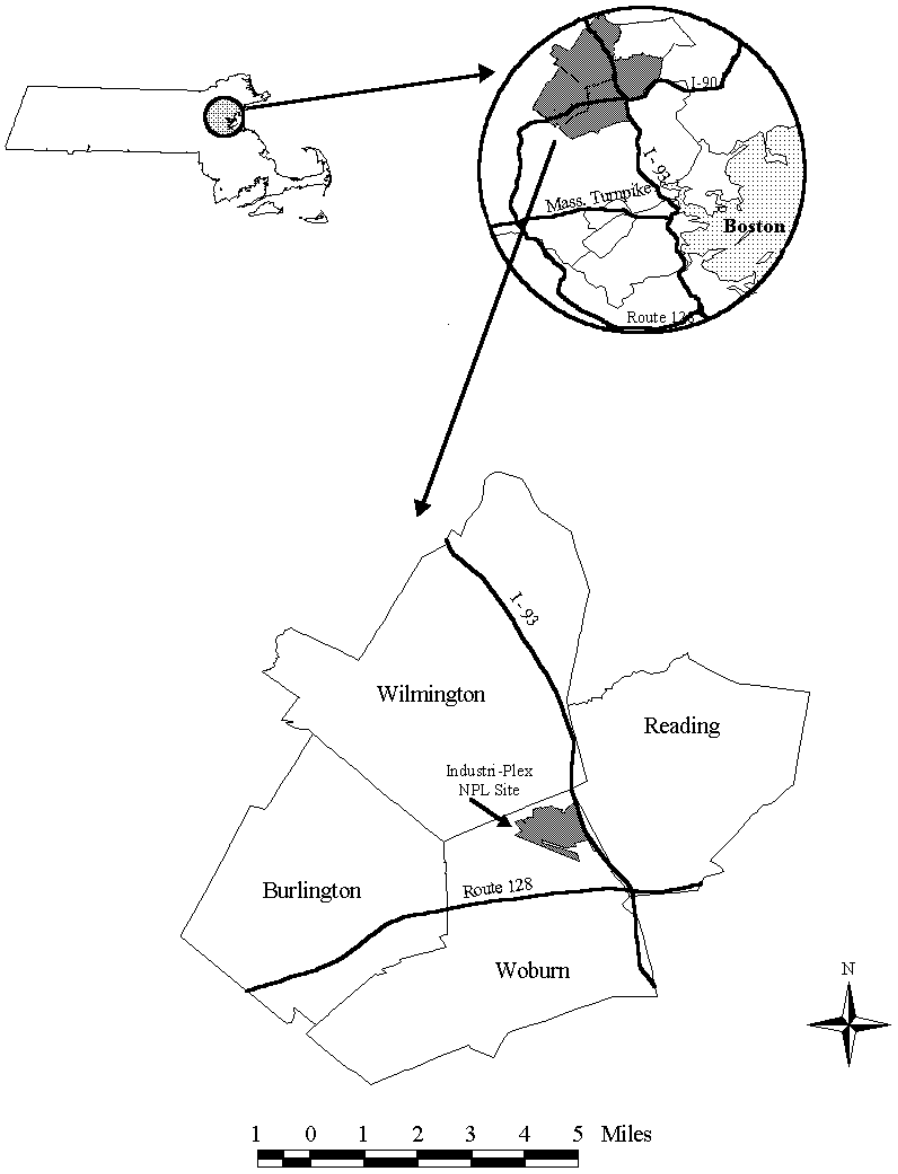
2.1 Site Description

The Superfund site lies in the northern portion of the Industri-Plex-128 Industrial Park, within the industrially- and commercially-zoned northeast corner of the City of Woburn (Figure 1). Commercial and light industrial/manufacturing activities (and Woburn's now-closed sanitary landfill) surround it on three (south, west, and north) sides. Interstate 93 borders the property on the fourth (east) side, with the town of Reading adjacent to the Woburn City limits east of the interstate. Nearly 10,000 employees work in over 200 businesses within one-half mile of the site, and the closest residential neighborhood lies roughly one-half mile away.[3] Roughly one-fourth of the NPL site itself is developed (17 buildings), and more than one-third of the site is largely uncontaminated.

Two tributaries of the Aberjona River traverse the property. The more northerly branch enters from the northeast corner, flows southwesterly, and meanders through an

[3] Agency for Toxic Substances and Disease Registry. 1992: "Public Health Assessment for Industri-Plex." Initial Release. U. S. Department of Health and Human Services, Public Health Service. September 22, 1992. p. 7. [ATSDR. 1992]

Figure 1. Location of Industri-Plex Superfund Site
(Woburn, Massachusetts)



11-acre wetland before discharging into a swale in the center of Commerce Way (the major north-south artery that provides road access to Industri-Plex). The southern branch enters the site and flows into Phillips Pond, a constructed pond along the southeastern border of the site that developers built in the 1970s to provide flood storage for the planned Industri-Plex-128 Industrial Park. From this pond, water flows into the swale along Commerce Way. From the north, another stream enters the site from a stormwater storage area in the industrial park immediately north of Industri-Plex. This stream forms a four acre pond/wetland along the northern edge of the site, before flowing southeasterly through the site and emptying into the Commerce Way swale. Halls Brook Storage Area, a detention basin created to control stormwater runoff by the developer of the industrial park, sits just outside the Industri-Plex site to the south. The outlet from this pond also eventually joins the Aberjona River, which empties into the Upper Mystic Lakes, a popular recreation area for swimming, sailing, and fishing that lies roughly six miles downstream.[4]

According to the Public Health Assessment of Industri-Plex, the aquifer underlying the property and the surrounding areas is extensive and capable of producing a high volume of water.[5] Groundwater underneath the site flows generally south, although along the western and eastern edges of the site the water tends to flow southeasterly and southwesterly, respectively. At the time of EPA's 1986 Record of Decision (ROD), groundwater in the immediate area around Industri-Plex was used only for non-contact cooling purposes,[6] although it appears that even this use has stopped. The closest currently operating municipal well draws water from another aquifer that appears unaffected by contamination in the Aberjona watershed.

Up until 1979, Woburn periodically used water from two nearby municipal wells, Well G and Well H, which became operational in 1964 and 1967, respectively. These wells, located about one and one-quarter miles downgradient from the Industri-Plex site, were closed in 1979 after the discovery of volatile organic compounds in the wellwater, and EPA listed

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[4] Aurilio, Anna C., John L. Durant, and Michele L. Knox. 1995: Sources and Distribution of Arsenic in the Aberjona Watershed, Eastern Massachusetts. *Water, Air and Soil Pollution,* **81** (3/4). pp. 265ff. [Aurilio *et al*. 1995]

[5] ATSDR. 1992: p. 9.

[6] U. S. Environmental Protection Agency. 1986: *Industri-Plex Record of Decision*. p. 3. [*ROD*. 1986]

them as a separate site on the NPL in 1982.[7] Although the Remedial Investigation/Feasibility Study (RI/FS) and hydrogeological investigations for Wells G & H indicated a hydraulic connection between these wells and the Industri-Plex site, the same investigations also indicated that Industri-Plex contaminants have not impacted Wells G & H.[8] Nonetheless, the Wells G & H site has played an important role in events at Industri-Plex, and publicity associated with the perceived public health impacts of Wells G & H has spilled over to the latter site. This probably has both helped to heighten public interest and involvement in Industri-Plex as well as created additional challenges for promoting reuse at Industri-Plex. Even absent the leukemia scare, the public likely would be concerned about possible health risks at Industri-Plex, but the Wells G & H experience likely has sharpened the public's sensitivity to possible health risks of the Industri-Plex Superfund site.

2.2 Overview of Contamination and Remediation

Contamination at the Industri-Plex site (primarily arsenic, lead, and chromium in soils and benzene, toluene, arsenic and chromium in the groundwater) is the legacy of over 100 years of heavy chemical industrial activity. Given the historical and current site activities and groundwater use, the Public Health Assessment for the site determined that the populations with the greatest potential for exposure to these contaminants are current and past on-site workers, site trespassers, and workers and residents near the site. The main concerns are on-site ingestion of soil and sediments that contain arsenic, lead, or chromium.[9] Secondary potential exposure pathways of concern include fugitive dusts, dermal contact, and ingestion of contaminated surface water. Possible off-site migration of contaminants (specifically arsenic) through surface water and sediment deposition throughout the watershed was recognized as being a potential problem at one point, and has been the object of several

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[7] The Wells G & H site has received much attention from the national and local print and television media because some residents have alleged that the high number of childhood leukemia cases reported in the Woburn area has resulted from the consumption of contaminated drinking water from the wells. In fact, together with the Love Canal Superfund site in upstate New York, Wells G & H helped galvanize the initial passage of CERCLA in 1980.

[8] *ROD*. 1986: p. 4.

[9] ATSDR. 1992: p. 1.

studies by the Massachusetts Institute of Technology, but currently it is not generally viewed as a public health concern of the site.[10]

Although the EPA added the site to the NPL in 1983, and signed the ROD in 1986, the remedy is not yet completely in place; the air remedy (an impermeable cap over one area of the site and gas collection and treatment) is in operation and the bulk of the soils remedy (a permeable soil and geotextile cap over much of the site and the use of existing structures and alternate covers over other portions of the site) is in place or, in the case of an alternate cover on the portion of the site that has been targeted for the state regional transportation center, is in its final construction phase. However, the interim groundwater remedy (pumping and treating hot spots of contamination) is only partially implemented. This interim remedy may be followed by a full groundwater remedy after further studies and full development of an ongoing regional, multiple source groundwater plan. Appendix A contains a more complete description of this interim remedy and the justification offered for it, as well as further details on the soil and air remedial alternatives.

The 1986 ROD also includes institutional controls, since EPA decided on a remedy that would not clean up Industri-Plex to unrestricted use levels. Although still under development, these controls have emerged as a critical element for allowing economic use of the property while still protecting the long-term effectiveness of the remedy and preventing human exposure to remaining on-site contamination. Unlike many other sites which use institutional controls somewhat narrowly to limit exposure to remaining on-site contamination, the Industri-Plex ROD and subsequent consent decree envisioned that in addition to limiting exposure, the controls also would outline the conditions under which future site owners could disturb the remedial action to accommodate a different type or scale of use.[11]

These controls will apply to the entire site, including areas with the permeable soil cap, EPA-approved alternate caps such as that for the proposed transportation center, and cap equivalents (an area with a parking lot that serves as a cap, for example). Although still being shaped, the controls likely will include notification and approval requirements for structural

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[10] ATSDR. 1992: p. 28; Aurilio *et al*. 1995; Hemond, Harold F. 1995: "Movement and Distribution of Arsenic in the Aberjona Watershed." *Environmental Health Perspectives*, **103** (supp. 1). pp. 35-40.

[11] *ROD*. 1986: pp. 82-83.

alterations and activity and use limitations.[12] Ultimately, the controls must be enforceable by the EPA in consultation with the state, but the controls themselves likely will take the form of private, self-administering deed restrictions that will run with the properties in perpetuity. These restrictions will operate principally through the mechanisms of the private property market, with government regulators stepping in for enforcement only if the privatized system fails. The restrictions will not rely on local zoning power for enforcement or be governed by zoning ordinances (since the City can change zoning at any time), but probably will be consistent with such ordinances.

Despite substantial progress on the development of the controls, as of late 1996 they still have not been finalized, even though more than a decade has passed since they were first outlined in the 1986 Record of Decision. The deferral of the final controls to this late date is troubling. As one stakeholder notes, the separation of the structural aspects of the remedial action from the institutional controls part of the remedy means that explicit tradeoffs can not easily be made between remedial options and land use and economic development at the site.[13] Potential flexibility in making these tradeoffs was lost because the controls are being designed after the bulk of the remedy is in place. Whether this has resulted in more- or less restrictive controls than would have been the case if both aspects of the remedy had been designed concurrently is an open question. It is fair to say, however, that risk and development at the site likely is not being managed in the most efficient or integrated fashion. In Appendix A, we present in more detail the history of the development of the controls, as well as explore several possible explanations for why it has taken so long to finalize them.

2.3 The Remedial Trust, Custodial Trust, and Regulatory Agencies

The two main potentially responsible parties (PRPs) at Industri-Plex, Monsanto and Stauffer-ICI, largely fund and direct the cleanup through the operation of the Industri-Plex Site Remedial Trust (Remedial Trust). This Remedial Trust -- which was set up under the 1989 consent decree signed by EPA, the state of Massachusetts, the City of Woburn, and the

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[12] For instance, certain modifications to the cap itself or to other existing structures such as buildings or parking lots may require authorization from EPA in consultation with the state Department of Environmental Protection. The proposer of such a modification would bear the burden of proof that the alteration would continue to ensure adequate protection of health and the environment.

[13] Personal Communication.

responsible parties -- also includes twenty smaller PRPs who currently own land at the site (landowner PRPs). It is run, however, by a management committee composed of one representative each from Monsanto, who effectively has a veto power since it is the lead PRP and is responsible for the single largest share of the remedial costs, and Stauffer-ICI.[14]

In addition to the Remedial Trust, the 1989 consent decree also provided for a Custodial Trust to receive and manage property conveyed by an insolvent and recalcitrant party at the site (see section 3.3). This Custodial Trust, which holds title to about one-half of the site (roughly two-thirds of its 120 acres are largely uncontaminated, but the remaining one-third contains some of the most environmentally damaged and contaminated property at the site), is atypical for Superfund properties, since although it depends on the Remedial Trust to finance its activities,[15] it is relatively independent of both the PRPs and the federal and state agencies involved with the site. As originally envisioned, its ability to own the land (a court-approved designated Trustee actually holds the deed on the property) without being liable, except for "its negligence, gross negligence, bad faith or willful misconduct" in carrying out its responsibilities under the Custodial Trust Agreement,[16] will allow it to move beyond the liability entanglements that many assert often freeze economic development and reuse at other NPL sites. This separation of ownership and liability, it is hoped, will allow the Custodial Trust to bridge the disparate and often conflicting interests among the PRPs, regulators, and the local community that commonly emerge at Superfund sites.

The Custodial Trust plays a central role in the development of institutional controls, but its primary responsibility lies in the management and sale of the lands it owns. The Custodial Trust Agreement directs the Trustee to sell all salable portions of the Custodial

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[14] The management committee also initially included a single representative of the landowner PRPs as stipulated in the Remedial Trust agreement, but this position was abolished by mutual consent among the parties in a 1995 buyout agreement. Because of high remediation costs and difficulties with some of the landowner PRPs, Monsanto and Stauffer-ICI signed this agreement with the other PRPs to amend the consent decree and cap the other PRPs''s liability (which collectively was 5 percent of remedial design and action costs) at $2 million. In return, the proceeds from any sales of Industri-Plex property (as described in the following text) that would have gone to the other PRPs per the original consent decree will be reallocated to Monsanto and Stauffer-ICI.

[15] The PRPs, operating through the Remedial Trust, provided the Custodial Trust initial funding of $50,000. The Remedial Trust also advances (through interest free loans) funds to pay Custodial Trust expenses connected with the sale of its property, and pays Custodial Trust expenses not connected with the sale of the property.

[16] United States District Court, District of Massachusetts. 1989: *Consent Decree, Civil Action 89-0196-MC*. (Appendix IV: The Industri-Plex Site Interim Custodial Trust). p 18. [*Consent Decree*]

Trust's property within four years from the certification of completion of work at the property. Proceeds from these land sales will be distributed to the City of Woburn, the EPA, and the PRPs, as partial reimbursement for costs associated with the remedy, and placed in escrow for possible future remedial activities at the site by EPA.[17] To fulfill its fiduciary obligations to these prospective beneficiaries, the Custodial Trust has promoted development at the site, both on the land that it holds title to and on other portions of the site. It is required to inform Monsanto, Stauffer-ICI, and EPA of the proposed developments for the land the Trust owns, and it must obtain approval from these three entities (but not the PRP landowners) prior to final sale of any property.

In addition to these private parties, EPA and the Massachusetts Department of Environmental Protection (DEP) have been active at the site since the 1970's (the latter through its predecessor agency, the Department of Environmental Quality Engineering). Although the PRPs are funding the construction of the cleanup action and two of them (Monsanto and Stauffer-ICI) will fund the entire cost of operation and maintenance, EPA is the lead agency at the site, in consultation with DEP. According to EPA, one or both of these agencies may have a long-term role associated with the application of institutional controls.[18]

2.4 Other Players

Several other state agencies -- the Massachusetts Bay Transportation Authority, Massachusetts Port Authority, and the Massachusetts Highway Department -- also have played important roles at Industri-Plex. These transportation agencies have negotiated with

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[17] The distribution of proceeds from the sale of Custodial Trust property is as follows:

10 percent of first $3 million and 10 percent of any gross sales proceeds over $10 million (up to $645,000) to the City of Woburn, to satisfy the tax arrearage on property carried over from the previous landowner (the City agrees to abate the property taxes while the Custodial Trust holds title to the property);

outstanding balance of advances that the Remedial Trust makes to the Custodial Trust for expenditures directly associated with the sale of its property (*i.e.*, advances are treated as a cost of sale);

and the remaining balance to an escrow account, to be distributed as follows:

for first $8 million, Monsanto receives $3.7 million, Stauffer-ICI $3.4 million, and EPA $0.9 million;

for next $2 million, Monsanto receives $0.5 million, Stauffer-ICI $0.5 million, and remaining $1 million is retained in escrow for future groundwater remediation at site;

and for receipts over $10 million, Monsanto and Stauffer-ICI each receive 15 percent and the U.S. EPA 70 percent to reimburse response costs and to be placed in escrow for additional response costs and future groundwater remediation at the site.

[18] Personal Communication.

the Remedial Trust the alternate soil cover for the state regional transportation center targeted for the northwestern part of the property, which we discuss more fully in section 4. Active local players have included the City of Woburn, particularly the former 12-year mayor of the City, and the Woburn Redevelopment Authority, both of who have strongly supported development efforts at the site. The most active local environmental group, For a Cleaner Environment (FACE), has participated vigorously in site affairs since the early 1980s. This group was highly successful in bringing media attention to Industri-Plex and Wells G & H, the other NPL site that lies several miles away. It commented widely on documents during the RI/FS, ROD, and remedial design phases of the cleanup. More recently, however, FACE has disbanded as a group due largely to internal disagreements, but also because its original effort to get government and industry to address the potential threat to public health and the environment at the two NPL sites in Woburn has born fruit. Nonetheless, at least one outspoken former FACE member continues to comment on remediation and redevelopment issues at Industri-Plex.

3. HISTORY OF ACTIVITIES AT INDUSTRI-PLEX

Three distinct eras have characterized the long lineage of economic activities at Industri-Plex: manufacturing, industrial park development, and federal and state oversight of the site. Each of these has shaped the stage on which the PRPs, federal and state agencies, and the local community play their roles today.

3.1 Manufacturing (1853-1968)

During the 115-year period from 1853 to 1968, a progression of industrial activities took place at the Industri-Plex site.[19] In the 1800s, firms at the site manufactured chemicals principally for local textile, leather, and paper industries, but by the turn of the century and for the next fifteen years, the primary manufacturer, the Merrimac Chemical Company, was one of the largest producers of arsenical insecticides in the country. In 1915, Merrimac organized New England Manufacturing Company on the site to produce World War I munitions and organic chemicals such as phenol, benzene, picric acid, toluene, and trinitrotoluene (the chemicals could no longer be imported from Germany, the principal supplier before the war).

[19] Aurilio *et al*. 1995.

After a merger in 1917 and the addition of a plant southeast of Woburn, Merrimac grew to be the largest chemical manufacturer in New England. Shortly after Monsanto acquired Merrimac in 1929, it moved all chemical operations off of the Industri-Plex site and in 1934 it sold its land. From 1934 until 1968, a succession of glue and gelatin manufacturers bought and occupied the site, culminating in the purchase of the then existing manufacturer by Stauffer Chemical Company in the early 1960s. These manufacturers used animal hides, flesh from the hides, and chrome-tanned leather scraps in their production processes. Stauffer Chemical Company, the last operating glue manufacturer at the site, closed plant operations in 1968.

Prior to 1930, numerous small buildings were spread over roughly 90 acres of the site, and these were torn down and reconstructed as demand for chemicals changed.[20] Available evidence suggests that waste products were disposed of randomly over the years, to fill in low spots on the site (to increase the useable land surface area) or to cover other unoccupied areas of the site behind buildings, and to build dikes and levees to contain liquid wastes in certain areas. From 1934 on, the various glue companies buried residues from the glue and gelatin manufacturing (consisting of wood shavings, raw products, and hide materials) east and southeast of the plant and, in some cases, directly on top of materials left from previous chemical plant operations. Large piles of the hides and other residues (forty to fifty feet above grade) built up over the 35 years of glue plant operations. In 1938, the glue manufacturer operating at the time constructed a system of settling basins and lagoons at the southwestern corner of the site to provide primary treatment of wastewater before discharge to the municipal sewer system.

3.2 Industrial Park Development (1968-1977)

In the late 1960's, the Mark Phillip Trust (MPT), a real estate developer, purchased the Industri-Plex property from Stauffer Chemical and began to develop it as part of a larger industrial park, together with other land that MPT already owned to the south and east of the site. After starting development in 1969 on the parcels to the south of the former Stauffer Chemical parcel without the proper Massachusetts Department of Natural Resources permits, MPT received a permit in 1970. Work proceeded on the southern parcels (which constituted

[20] *ROD*. 1986: pp. 6-7.

roughly one-half of the industrial park, but not the portion that ultimately was placed on the NPL).

When MPT development reached the southern portion of the Industri-Plex site in 1975, it began to disturb the animal glue manufacturing wastes on the site, which resulted in sometimes severe hydrogen sulfide odor emissions (caused by anaerobic decomposition of organic wastes). These odors were particularly noticeable in the nearby town of Reading. Complaints of nausea and difficulties in breathing among those with respiratory problems became common, and teachers sometimes held schoolchildren indoors during recess because of the odors. Following these complaints, the Massachusetts Department of Environmental Quality Engineering (since reconstituted as the Department of Environmental Protection) issued notices of violations. MPT, however, continued to develop the site with the permission of the Massachusetts Department of Public Health, the state agency responsible for hazardous waste at the time. To prepare the land for development, MPT excavated and consolidated waste material on its property[21] and stockpiled animal hides and other wastes from the site's former glue manufacturing activities on two piles on the sides of a small pond on the northern border of the site. These deposits, which are now referred to as the east and west hide piles, filled a considerable portion of the pond and grew up to 40 feet high, 250 feet long, and 100 feet wide. Subsequent development has redistributed these wastes into four discrete above-grade hide piles on the site.[22]

3.3 Federal and State Oversight (1977-present)

After failing to stop MPT's development of Industri-Plex with repeated notices of violations, the Massachusetts Department of Environmental Quality Engineering and the Massachusetts Office of Attorney General filed suit in Suffolk Superior Court in 1977. The Town of Reading filed a similar suit in Middlesex Superior Court. These suits were merged and in 1977 the Court issued an order prohibiting MPT from disturbing two small parcels of land where the bulk of the remaining glue wastes were thought to be buried. However, the existing stockpiles (particularly the east one) continued to emit odors. Following continued

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[21] Latowsky, Gretchen P. 1995: "Woburn, Massachusetts: A Case Study of Contamination and Leukemia in a Massachusetts Community." JSI Center for Environmental Health Studies. p. 3.

[22] *ROD*. 1986: p. 10.

state and local complaints, in June 1979 the U. S. Attorney's office, on behalf of the U. S. Army Corps of Engineers and the EPA, filed suit alleging section 404 (Federal Water Pollution Control Act) wetland dredge and fill violations. This represented EPA's first substantial involvement at Industri-Plex. To support an EPA request for a court injunction to halt development, the Agency furnished the results of its soil and water testing at site, which showed high levels of arsenic, chromium, and lead in sludges at the site. In late 1979, the court issued an injunction and development stopped. In October, 1981 EPA proposed the site for listing on the NPL and 23 months later in September, 1983, Industri-Plex was added to the NPL.

Negotiations between MPT and state and federal regulatory agencies went on for five years while the site was under consideration for listing and after it was placed on the NPL, and finally in May, 1985 the principal parties approved separate state and federal consent decrees. The decrees required MPT to investigate the nature and extent of hazardous contamination, identify and clean up waste problems on the site, and resolve wetland filling issues. MPT would be able to develop certain portions of the site in order to generate enough revenue to continue with the investigation and cleanup. However, MPT never complied with the terms of the consent decrees, claiming that it could not generate sufficient capital to fund the investigation and cleanup.

Concomitantly with the MPT negotiations, the Massachusetts Department of Environmental Quality Engineering and EPA entered into a consent order with Stauffer Chemical -- the last operating manufacturer on a large piece of the site -- to undertake an RI/FS of the entire site and subject to certain conditions to pay for its apportioned share of the remedial costs.[23] Stauffer Chemical voluntarily signed this consent order with the EPA and the Department of Environmental Quality Engineering in 1982. The RI/FS for the entire site was completed in April 1985 and the ROD signed in September 1986.[24]

Over the next several years, negotiations among EPA, the state of Massachusetts, the City of Woburn, MPT, Stauffer Chemical, Monsanto, and the landowner responsible parties proceeded on the consent decree for the remedial design and action. MPT proved to be a

[23] *ROD*. 1986: p. 9.

[24] Monsanto, although it does not own any land at the NPL site and was not the lead PRP for the RI/FS, also is a major responsible party at Industri-Plex as noted earlier. It submitted an unsolicited feasibility study that proposed an alternative remedy for the soil, groundwater, and air contamination.

recalcitrant landowner and, by some accounts, was responsible for making the negotiations exceptionally slow. Largely in response to this recalcitrance, the consent decree, which all of these negotiating parties signed in 1989, had the unusual provision of releasing MPT from all liability in return for it transferring title to all of its remaining holdings (roughly one-half of the 245 acre site) to the Custodial Trust. As discussed earlier, the Custodial Trust was charged with holding and managing the former MPT property, arranging for the sale of as much of its property (both the uncontaminated part as well as portions of its remediated contaminated holdings) as could be sold, and distributing the sale proceeds to the principal parties.

4. REDEVELOPMENT EFFORTS AT INDUSTRI-PLEX

One of the features of Industri-Plex that has made it attractive as a case study centers on on-going attempts to promote reuse of the site. As pointed at earlier, the much applauded Custodial Trust exists in large part to promote reuse at the site, and institutional controls, the other trumpeted characteristic of the site, arguably are as much a part of a reuse and development strategy as they are of the cleanup strategy. Because some of the pressures for reuse at the site (as well as some of the problems, notably traffic congestion) have followed naturally from the central role that business development has played in Woburn over the last 300 years, it is helpful to look at the history of economic development in the City.

4.1 From Shoes to Traffic, A Brief History of Woburn

Initially noted for its shoe production as far back as the middle of the 17th century when it incorporated as a town, Woburn boasts a long tradition of manufacturing activities. As a manufacturing center, it has relied on its ready access to transportation for access to raw and processed intermediate materials (*e.g.*, leather for shoes) and the consumer market in Boston. Its locational advantage was secured particularly after 1800, when the Middlesex Canal from Boston to Lowell (1803) and the Boston and Lowell Railroad (1835) opened. In the middle of the 19th century, leather production became the dominant manufacturing activity and over 1,500 men worked in more than 25 large tanneries in the town. Chrome tanning, which originated in Woburn in 1901, replaced the older bark tanning technology, and tanneries continued to flourish well into the 20th century. Chemical manufacturing also

played an important role in the latter part of the 19th century and early 20th century, as witnessed by activities at Industri-Plex.

Also in the 20th century, the location of two high speed, limited access highways (Route 128/Interstate 95 and Interstate 93) that run through Woburn and intersect just outside Industri-Plex and the City limits, has further increased the transportation advantages of Woburn. The Route 128 and I-93 interchange is one of the busiest intersections in the state, with both highways carrying roughly 100,000 vehicles per day in the vicinity of Woburn. The City also houses a commuter rail station on the Lowell to Boston line with a 195-car parking lot, as well as a facility where travelers flying out of Logan Airport in Boston can park their cars in Woburn and take public bus transportation to the airport to avoid driving in the notorious congestion of central Boston and the Callahan Tunnel to the airport.[25] The heavy traffic associated with these transportation activities has had an important bearing on Industri-Plex reuse pressures, as we shall see in the next several subsections.

4.2 Business Development, and More Traffic

Given the importance of manufacturing in the City's history, business interests have long played important roles in local politics. Industrial and commercial tax levies provide over one-fourth of the City's revenues, and over one-half of its property tax collections. Several local redevelopment authorities have been active in developing industrial parks in Woburn over the last 30 years, and many of the public comments on the 1986 Industri-Plex ROD came from advocates of commercial or industrial reuse of the site after remediation. Even FACE, the strongest local environmental group involved in Wells G & H and later Industri-Plex, has at times more strongly supported development than one might otherwise expect.[26]

As suggested above, however, the kinds of economic development that have been encouraged in Woburn have led to more traffic than a city of Woburn's size (roughly 35,000 residents) might otherwise expect. As a result, traffic management has become an important concern in the Woburn area. This concern has spilled over into deliberations about what

[25] Airplane travelers from northern Massachusetts and surrounding states find the service attractive, since Logan serves as the primary airport for a wide region.

[26] For example, a former president of the group also became chairman of the Woburn Redevelopment Authority.

activity to promote at Industri-Plex. A 1993 traffic management study prepared for the North Suburban Chamber of Commerce under contract to the City of Woburn anticipates having over 40 acres of land available for industrial or office development at Industri-Plex (which is likely an understatement, in that the Custodial Trust alone reportedly has 70-80 acres of developable land). The 40 acres can accommodate over 1.2 million square feet of developed space. The Chamber of Commerce report predicts that this anticipated development, coupled with two large approved industrial parks with an additional 2.5 million square feet and several smaller projects in the area, would add 12,000 new jobs to the area and increase peak hour traffic counts by 7,000 to 8,000 vehicle trips.[27]

This study may be over-optimistic in its estimation of the pace of development, but nonetheless the traffic implications of the potential development and the historical importance of commercial and industrial development in Woburn have become important factors in planning for reuse at the Industri-Plex site. Although a number local residents have expressed concerns about the increased traffic that development of the site might bring, others have viewed site development and associated infrastructure improvements as a way to manage existing and future traffic congestion more efficiently and to provide the foundation for new development before it goes in. The City plans to improve and extend several roads through Industri-Plex to link up with existing roads to the north and the west of the site (at a cost of roughly $1 million), and the Woburn Redevelopment Authority has put up funds for an environmental impact study and preliminary design for a new interchange from Interstate 93 that would provide ingress and egress to the heart of the site.[28,29] In addition, some City officials have vocally supported the planned state Regional Transportation Center which, as noted earlier, is targeted for the northwestern part of Industri-Plex. This project recently has rekindled interest in the site from a number of quarters.

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[27] McDonough & Scully, Inc. 1993: *Route 128 Phase II Study: North Area Transportation Congestion Management Access Plan*. Prepared for City of Woburn, Massachusetts and the North Suburban Chamber of Commerce. March 1993. pp. 38-39.

[28] The Custodial Trust and a developer who purchased some of the Custodial Trust property are paying for the final design, as we discuss in subsection 4.4.

[29] Personal Communication.

4.3 The Regional Transportation Center: More Traffic?

The state Regional Transportation Center (RTC) as envisioned at the time of this writing would offer a 3,500 square foot commuter rail station, 1,500 parking spaces for commuter rail and park-and-ride users, and 900 parking spaces for the airport express bus service. Sponsoring agencies include the Massachusetts Bay Transportation Authority, Massachusetts Port Authority, and Massachusetts Highway Department.

Construction of the RTC has not yet begun and it is not certain that the project will move forward, although it is highly likely since the alternate cover upon which the RTC is to be located (see Appendix A) is nearing completion. In 1995, the Executive Office of Environmental Affairs for the state (the umbrella office under which the state Department of Environmental Protection fits) granted a waiver from state requirements for an Environmental Impact Report for the project. To support this waiver, the Executive Office cited the likely insignificance of localized negative air and water quality impacts, the adequacy of supporting infrastructure, and the anticipated significance and importance of regional air quality and transportation benefits from the RTC (criteria under the state law for granting a waiver from the requirements). In addition, the final decision on the waiver noted that the "[d]esign, construction and maintenance of the alternate cover, as well as ongoing groundwater remediation and monitoring efforts, will be regulated and supervised by EPA in accordance with CERCLA."[30] Thus, the Executive Office argued that adequate protection would be provided since the RTC must satisfy CERCLA requirements.

Opinions about the RTC not surprisingly have been divided. Some City officials have vigorously pushed for it, although in the past several council members have questioned whether the City should force the state to go through a local permitting process to site the project in Woburn. During the public hearing held in July 1995 on the waiver for the Environmental Impact Report and the subsequent public comment period, some expressed concern about the adequacy of the remediation at the site where the RTC would be located.[31]

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[30] Commonwealth of Massachusetts Executive Office of Environmental Affairs. 1995: "Final Record of Decision: Regional Transportation Center." September 14, 1995. p. 4.

[31] For example, a July, 1995 letter to the Massachusetts Executive Office of Environmental Affairs that was signed by a number of local residents argued against the granting of a waiver from the Environmental Impact Report requirements. Among other issues, the letter expressed concerns about allegations of improper conduct during construction of the remedial cap at Industri-Plex that were the subject of ongoing investigations by the

Others have voiced worries about increased traffic, crime, and insurance rates that might result from the RTC, and objected to Woburn having to bear negative impacts of the transportation center while commuters in other parts of the Boston commuting shed would garner the benefits.

The state transportation agencies stand firmly behind the RTC, however, since they believe that it could deflect thousands of vehicles from Boston daily and generate regional air quality improvements by reducing auto emissions. The RTC would help the state comply with federal Clean Air Act requirements and provide 25 percent of the mass transit improvements required to be implemented as part of the Central Artery/Third Harbor Tunnel project in downtown Boston. It also will relieve overburdened parking in the nearby Reading and Wilmington commuter rail stations. Few if any other sites in the Boston metropolitan area offer the locational advantages (near the intersection of two of the principal thoroughfares) and the space that the Industri-Plex parcel offers.

4.4 Access to the Site . . . and to What?

Another catalyst for economic development at Industri-Plex -- a possible intervention related once again to traffic -- is the planned Industri-Plex interchange on Interstate 93. As mentioned earlier, this project would provide direct access to the highway from the site. The projected $18 million project, whose construction would be 100 percent state-funded, is viewed as being essential for relieving local traffic congestion and for managing traffic into and out of the RTC if that project in fact does go forward. Furthermore, it would provide critical relief to local and area highways even were the RTC not built. Thus, although not yet a *fait accompli*, it appears all but certain that it will go forward.

Although the interchange may not be absolutely necessary for the development of Industri-Plex, the Custodial Trust has recently negotiated an agreement with the Massachusetts Highway Department for the Trust to fund the $1.3 million design work for the interchange, and the highway department in turn has promised to fund the $18 million construction. Clearly, the ready access to the metropolitan transportation network that the interchange would provide would enhance the development potential of the site. In fact, one

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state and EPA; inadequate attention to groundwater contamination at the site; and the fact that institutional controls were not yet fully developed.

large retailer (Home Depot) stated in the past that its prospective purchase of a thirty-acre parcel at Industri-Plex from the Custodial Trust hinged on the completion of the interchange to handle traffic to and from a future store on the parcel. It reportedly expressed willingness to give the state $1 million to complete final plans for the interchange. More recently, the actual purchaser of the same thirty-acre parcel (see below) agreed to co-fund the interchange design work with the Custodial Trust, as part of its purchase agreement.[32]

For large retailers to locate on the Custodial Trust parcel, the City of Woburn has had to rezone the thirty-acre parcel from Industrial Park to Business Interstate (for retail use). The City Council member whose ward includes Industri-Plex sponsored the rezoning request, and in early December 1995 the Council unanimously approved the change in zoning. During the public hearings leading up to the unanimous Council vote, some citizens, while not necessarily opposing the proposed redevelopment *per se*, questioned the timing of the rezoning request. For example, several complained that the rezoning would allow the Industri-Plex site to develop in a piecemeal fashion without an overall, comprehensive plan. Others feared potential increases in traffic and competition with downtown retail areas.[33] Woburn officials, on the other hand, pointed out that the City quickly would receive back taxes ($645,000) from the sale of the parcel and annual property tax revenues of $400,000 to $500,000 (compared to zero taxes if the property is not reused). The Custodial Trust also understandably strongly pushed for rezoning the parcel, noting that box retail use could bring in up to 50 percent more in taxes than would an office or industrial use, and it agreed to borrow funds to design the Interstate 93 interchange if the City would approve the rezoning.[34]

Less than a year after the Council approved the rezoning request, the Custodial Trust signed a purchase agreement with a large developer for the sale of the thirty-acre parcel. As a condition for closing the sale, this agreement includes a proviso that the developer will receive a prospective purchaser agreement from the EPA, which will state that the developer will not be held liable for past contamination at the site. As mentioned above, the purchase

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[32] Personal Communication.

[33] Haggerty, James. 1995: "Retail Plan Aired to Mixed Reviews." *Daily Times Chronicle* (Woburn edition). September 20, 1995. pp. 1, 3.

[34] Personal Communication.

agreement with the Custodial Trust also includes a clause that the developer will help fund the design work for the interchange.

Somewhat ironically, in light of the assumed pall that is cast on Superfund properties, the agreed-upon purchase price for the property that is included in the purchase agreement significantly exceeds the top price that any other unimproved parcel has commanded in the Boston real estate market in recent years. Moreover, the unit price of the thirty acre parcel (*i.e.*, the cost per acre) is reportedly four times the unit price of other available land. This of course reflects the prime location of the Industri-Plex property, and probably the fact that years of remedial investigation and cleanup at Industri-Plex have reduced the uncertainty about possible contamination that prospective buyers of other properties may face. The fact that prospective purchaser agreements are available and that the identified Industri-Plex PRPs are on the hook for any additional remediation of past contamination likely has helped to make the site a surprisingly attractive development alternative.[35]

Specific development plans for the thirty-acre parcel have been reviewed (the developer has proposed a large box retail development), and Home Depot remains a possible tenant. In addition, the Custodial Trust and the developer are negotiating the sale of the remaining Custodial Trust holdings that are on the market. Prospective development on this acreage includes 450,000 square feet of office space and a 220-room hotel.[36]

5. PUBLIC INVOLVEMENT IN REUSE AND CLEANUP

The recent efforts by several players including the City Council to encourage public support for reuse at Industri-Plex continues a long history of public involvement and interest in Industri-Plex cleanup and redevelopment. Notwithstanding the fact that the remedial action is still ongoing more than fifteen years after EPA first proposed the site for the NPL -- a long span that without question has challenged the ability and motivation of the public to stay involved -- a diverse set of groups representing health, environmental, and development public interests have at different times participated vigorously in Industri-Plex affairs. Starting from complaints by the general public about odors from the site in the 1970s -- when development activities by the Mark Phillip Trust opened the rather foul smelling Pandora's

[35] Personal Communication.

[36] Personal Communication.

box of hide piles -- and continuing up to the just-discussed recent efforts to attract new retailers, many participants have played and continue to play active roles at the site. In the following three subsections, we discuss how three different types of players -- the local grassroots group FACE, City officials and quasi-public groups, and the Custodial Trust -- have shaped public involvement at Industri-Plex. Because public involvement is such an important feature for many advocates of linking land use and remedy selection, in a fourth subsection we offer a short critique on public involvement efforts at the site and the problems such efforts have encountered.

5.1 For A Cleaner Environment (FACE)

The local environmental group FACE brought media attention (local, Boston metropolitan, and national) to Industri-Plex, particularly in the early years after listing on the NPL. Although originally founded by a local resident and a local clergyman in response to the high number of childhood leukemia cases in the area allegedly associated with the nearby Wells G & H Superfund site, FACE also focused on Industri-Plex, and members of the group (as well as other local residents and representatives of Woburn, surrounding towns, and the Chamber of Commerce) participated in the Industri-Plex Citizens Advisory Committee. This Committee originally was set up by the state prior to the NPL listing to advise the state on the site, and it reviewed documents and provided comments during the RI/FS and ROD public hearings once the site became listed.[37]

FACE received a Technical Assistance Grant (TAG) from the EPA for Industri-Plex in 1985 (as well as one for the nearby Wells G & H site), which allowed it to hire a technical consultant to help interpret data from the RI/FS. By its own and EPA's account, it reviewed and commented on remedial investigation and design reports, met regularly with the EPA, DEP, and the Remedial Trust, sponsored regular public meetings, and worked with EPA and DEP to establish guidelines for the institutional controls and reviewed the 30 percent and 60 percent design documents for these controls.[38]

The principals at the site agree that FACE is no longer an active organization (its Industri-Plex TAG expired in January 1996 and no members have reapplied for it), although

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[37] *ROD*. 1986: p. 71.

[38] Personal Communication.

they interpret this turn of events quite differently. Several have questioned the motives of the group and called some of its leaders obstructionists, contrasting the group's marginal role now with its past importance. City officials claim that some former members of FACE would obstruct any development of the site, claiming that "if you wanted to put up a convent, they would oppose it."[39] Supporters of FACE counter by saying that the group never has been against redevelopment *per se*, but rather that it believes that the remedy should be completed before redevelopment takes place.[40] Much of the tension embodied in such diverging viewpoints flashes in personal clashes between the two sides and is centered on a former director of FACE in particular, who has remained active and vocal even as the group has disbanded.

As site investigation and remedy design give way to the construction of the remedy and to site redevelopment, by some accounts former FACE members have been ignored and increasingly marginalized, by both the Remedial Trust and EPA. For instance, the working relationship between the active and outspoken former FACE member and the Remedial Trust reportedly has deteriorated since Monsanto changed its site manager when construction of the remedial action started.[41] Communication between this former FACE member and EPA also has been recently problematic and apparently has relied on the state DEP as an intermediary, an institutional *ménage à trois* that probably has complicated relationships among all the parties. EPA for its part has argued that no members of FACE have requested any meetings with EPA in the eighteen months following the 100 percent Remedial Design approval by EPA in the summer of 1994, although EPA and DEP did hold an informational meeting with one former member in December 1995.[42] Unfortunately, it is unclear how proactively EPA reached out during that time.

Within FACE, internal disagreements have contributed greatly to the disintegration of the group. These disagreements followed from personality clashes, to some degree, but they also reflected competing notions of the appropriate roles and functions of the group. Some in the group emphasized the technological and scientific aspects of the Industri-Plex and Wells

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[39] Personal Communication.

[40] Personal Communication.

[41] Personal Communication.

[42] Personal Communication.

G & H contamination, bringing skills and interests for wading through and evaluating the wealth of data provided by the remedial investigation and remedial design documents. Others exhibited more interest in the direct fallout from the contamination on the quality of life in the community, the effects on public health and, more specifically, the concern over childhood leukemia deaths. These two visions were not mutually exclusive by any means, but some former FACE members believe that several years ago the technological focus began to overwhelm the human focus, thereby moving the group away from its grassroots beginnings. Camps formed behind the different notions, and tensions were exacerbated by more personal resentments that while some in the group were paid for their work, most volunteered their time, and while some gained media attention and booked speaking engagements, others did not.[43]

5.2 City of Woburn and Other Quasi-Public Entities

In addition to FACE and the Industri-Plex Citizens Advisory Committee, the general public has participated in Industri-Plex decision making in a number of other ways. Although the City of Woburn -- the Mayor, Board of Health, City Engineer, and the bulk of the City Council -- for a number of reasons generally did not support FACE's efforts in the early years of site discovery and investigation, and in some cases actively opposed these efforts, it was a City Council member who played a critical role in bringing federal and state attention to environmental problems in the Woburn area in the very earliest years of site discovery. This alderperson successfully garnered the attention of the office of U. S. Senator Ted Kennedy in the environmental problems and public health concerns of the Woburn area, and staff from that office attended an early FACE meeting. Once Senator Kennedy's office became involved, interest by the Massachusetts Department of Environmental Quality Engineering and EPA quickly followed.[44]

More recently, one of the most forceful involvements has come from the former six-term (12 years) mayor of Woburn, who aggressively promoted reuse at Industri-Plex and pushed for the RTC and the interchange. Furthermore, in contrast to the earlier years when most City officials did not champion cleanup and reuse at the site, since the mid-1980s, City

[43] Personal Communication.

[44] Personal Communication.

offices under the mayor (such as the planning office) and groups appointed by the mayor (such as the Woburn Conservation Commission) also have played important roles in redevelopment and wetland and open space issues associated with the site. The City Council has been somewhat less involved historically than the mayor, although several years ago it established an Industri-Plex committee (comprised of a chairman and four aldermen) to keep the Council apprised of progress and plans for redevelopment at the site. Lately, the Council has become increasingly involved and tried to exert more influence on the siting of the RTC and in attracting development to the site, as noted previously.[45]

In addition, economic development advocates, represented by among others the Economic Development Committee of the North Suburban Chamber of Commerce, the Woburn Business Association, and the Woburn Redevelopment Authority have participated actively, both during discussions on the remedial alternatives and in current planning for reuse. The Redevelopment Authority, in particular, has played a central role in financing and facilitating the preliminary design of the planned I-93 interchange and in coordinating the feasibility study and alternate cover design for the Regional Transportation Center (with funding from the Massachusetts Port Authority). Also on the development front, the North Suburban Planning Council of the Metropolitan Area Planning Council has promoted Industri-Plex redevelopment. This Suburban Planning Council represents nine jurisdictions in the area around Woburn and, as part of the metropolitan planning process for the over one-hundred jurisdictions in the Boston area, it has proposed that Industri-Plex be designated as one of a handful of concentrated development centers in the metro area.[46]

5.3 Custodial Trust

Finally, the Custodial Trust, a third type of player in public involvement, has quite effectively worked with and cultivated legislative representatives at the local, state, and federal levels and the media to create a fertile ground for furthering the Trust's mission to sell the former MPT property. By all accounts, the Trust has taken the lead at Industri-Plex on redevelopment and promoted the most successful recent public involvement. It has made the RTC project possible, with its political activities and garnering of public support, including its

[45] Personal Communication.

[46] Personal Communication.

successful work with the transportation agencies to gain approval in the state legislature for $20 million in bond bills to build the RTC and the new I-93 interchange.[47] At the grassroots level, it has hosted or participated in local events such as Woburn's Earth Day celebration, conservation day, and meetings with the local Lion's Club and other organizations.[48] Trust representatives attend public meetings on Industri-Plex and often play a major role in presenting and explaining developments at Industri-Plex to the public. And, as noted earlier, the Trust has aggressively promoted the rezoning of a part of its property and used the occasion of the public hearing on the rezoning request to explain to the public the range of development plans and the benefits of rezoning to the City.

5.4 Observations on Public Involvement

In general, judging from local newspaper coverage, the bulk of public involvement currently appears to center on aspects of reuse rather than remediation. This may largely reflect the life cycle of the site, insofar as much of the remedy is already in place, whereas redevelopment is gathering momentum and some parcels are just now becoming available for development. Perhaps to a lesser degree, the focus on reuse also may reflect the fact that the entity that has stepped into the void and taken the lead on public involvement over the last several years is the Custodial Trust. Its specific mission is to hold, manage, and sell its holdings (and, less formally, to promote reuse across the site), not to press the EPA, DEP, and the Remedial Trust on remediation *per se* (although it clearly plays a key role in the ongoing development of institutional controls and in promoting environmental improvements to the extent that these influence the attractiveness of the site for reuse).

Clearly, those interested in development are legitimate members of the public and deserve representation in any public involvement process. Nonetheless, several stakeholders at Industri-Plex have bemoaned the fact that the public appears to be engaged overwhelmingly on development questions at present, and very little on remediation. Not surprisingly, many of those who would want more public involvement on remediation issues come from those camps that take issue with the pace of development at Industri-Plex and the role of the Custodial Trust in this, but some stakeholders who largely support current development

[47] Personal Communication.

[48] Personal Communication.

efforts also have voiced concerns about the lion's share of public involvement that redevelopment receives. As one central figure notes, a person identified as a strong ally of redevelopment and the Custodial Trust's work, there is a broad public "out there" who needs to be involved and listened to but who isn't. In this person's opinion, only a tiny fraction of the people in Woburn have even heard of the Custodial Trust, let alone have a "clue" about its activities.[49]

This is not a condemnation of the Trust -- who by most accounts has been quite inclusive in involving stakeholders in redevelopment -- but rather a commentary on the difficulty of involving or even defining the community of interests that warrant representation on all of the various aspects of a hazardous waste cleanup. In addition to those already seated at the table, there may be a public that, despite its silence, may have many concerns about health and larger quality-of-life issues, a public that is perhaps rendered inarticulate by the powerful set of federal, state, and City agencies that, together with the Remedial Trust and the Custodial Trust, dominate the debate. At a complex site like Industri-Plex, in a community such as Woburn that has been shaped by the trauma of the Wells G & H site and a long history of development and contamination within its borders, it is not likely that one can narrowly demarcate the broad range of public interests that are at stake or concisely define or bound who the affected public is. Furthermore, when one enlarges the area that will be affected by decisions about a site, by siting a regional transportation center to help manage a regional traffic problem, for example, a regional public becomes yet another affected stakeholder.

6. SUMMARY

As noted at the outset of this paper, Industri-Plex provides a glimpse at what might become more common at Superfund properties if a reauthorized Superfund law links remedy selection at such properties more closely to the sites' expected future land uses. Based on the Industri-Plex experience, some may take away a fair amount of optimism about the likely benefits of such a proposed change to the Superfund program, believing that the focus on land use throughout the cleanup process at the site has helped to promote economic development, encouraged a higher level of public involvement, and kept remedial costs down. Others may

[49] Personal Communication.

be less sanguine about specific events at the site as well as the broader lessons it offers for the Superfund program.

To some degree these different interpretations may reflect different perspectives on the site (the well-worn half-empty or half-full glass cliché), but the conflicting interpretations also may follow from different expectations about the goals of the Superfund program and different notions as to the program's past successes and failures. For those who may believe that a fundamentally flawed Superfund law sets unreasonable goals and allows the EPA too much discretion – and leads to a program that is a colossal waste of public and private money with little to show for years of effort -- Industri-Plex may offer a ray of hope. On the other hand, for those who may believe that while implementation is poor, the fundamental goals of the program are sound, Industri-Plex may offer a less favorable portrait of what could happen to the program if new language gives land use increasing weight in influencing cleanup and reuse becomes a more central goal of the program.

What do we think about the experiences of Industri-Plex and the broader lessons of the site for land use and remedy selection in the Superfund program? We provide a more complete commentary in our companion project report that we will issue several months after this paper, but in this final section, we offer four inter-related summary observations.

First, in our view Industri-Plex offers convincing evidence that economic reuse of Superfund sites can take place, although we do not know how generalizable this conclusion is. It is almost beyond question that after cleanup the Industri-Plex property will house commercial and industrial establishments, both continuing enterprises that predate NPL listing as well as new tenants attracted to the reinvigorated site. Clearly, the preferred land-use based remedy identified in the 1986 ROD has facilitated continued economic use of the property, since it allows existing structures on the site to serve as caps (as opposed to mandating the removal of structures and replacement with a constructed cap) and provides for institutional controls that will allow businesses to continue to operate and even expand their activities at the site. Furthermore, the establishment of the Custodial Trust and the charge given to it to promote reuse has facilitated reuse at the site and likely led to more involvement by the segment of the public interested in site development. Equally without doubt, however, the prime location and large size of the Industri-Plex property has made the site uncommonly attractive for redevelopment. The enthusiasm shown by prospective purchasers and

developers is unlikely to be matched by the overwhelming majority of properties on the NPL. It is a truism that at the "right" price every property is attractive, but it also is likely that more private parties and local, state, and federal agencies will be interested in doing what they can to promote redevelopment at high-value properties than at properties with more limited development options and interest. This is not to say that the tools of redevelopment in play at the Industri-Plex NPL site -- separating liability from redevelopment, promoting public involvement, relying on institutional controls -- should be ignored at other Superfund properties when the finances of reuse are not so favorable, but rather that the scope of reuse options and the likely benefits are likely to be smaller at most other NPL sites.

Second, and following from this, it seems to us that Industri-Plex should offer a cautionary tale for making reuse a major component of a Superfund cleanup effort when the program has other stated objectives. EPA has promoted the Industri-Plex experience as an example of development of a contaminated site, noting that at Industri-Plex the "EPA, [Remedial Trust], City of Woburn, and Custodial Trust have been proponents of beneficial re-use of the contaminated portions of the site." In the Agency's view, successful site development could increase the City's tax base, provide the Custodial Trust and Remedial Trust with a future "marketing tool" for future Superfund redevelopment work, and, if EPA does not use the escrow funds generated from property sales to support future remedial actions at the site, possibly furnish the Remedial Trust with additional compensation for its remedial actions. The Agency itself is using Industri-Plex as an example of a national initiative that aims at "establishing the beneficial re-use of Superfund Sites."[50] These benefits of reuse likely gladden the hearts of many Industri-Plex stakeholders and others, but one must keep the goal of the Superfund program in mind: the protection of human health and the environment. Economic reuse by no means necessarily conflicts with adequate protection, but one must be vigilant in ensuring that the statutorily-defined primary goal of CERCLA remains primary. Unfortunately, for much of the public around Industri-Plex the primary goal at this late date seemingly has become successful reuse.

This brings us to our third observation, which is that the remedy at the site is incomplete even as redevelopment proceeds. One interpretation of the shift in the public's

[50] Personal Communication.

interest from remediation to reuse at Industri-Plex, of course, is that the public has developed a new interest largely because protection of human health and the environment already has been or is being addressed at the site. This leaves reuse as the next logical focus at the property. This may in fact be true, in the sense that the public has moved on, but as noted in the text, the remedy is not fully implemented. A fully functioning groundwater remedy has not been implemented and institutional controls, a critical component of the soil remedy, are still under development, even as developers are signing agreements to buy Industri-Plex parcels. This not only reveals the remedy selection process as a less-than-integrated effort, but it also hearkens back to the previous caveat about redevelopment taking center stage from the remedy. It is most troubling perhaps that economic development has proceeded on the site while the *selection* (let alone the implementation) of a long-term final groundwater remedy may yet be years away. One inevitably must ask the question of whether such an approach is consistent with the overall goal of the Superfund program?

Finally, we are left at the end of this case study with an ambivalent feeling about whether the full range of community interests have been represented at Industri-Plex. It is EPA's responsibility to provide a climate for public involvement that will encourage public participation and to address the public's concerns. At Industri-Plex, EPA certainly has fulfilled its formal public involvement requirements, but this does not necessarily mean that the community members feel that they had and continue to have adequate representation and opportunities for involvement. At other Superfund sites, the evidence suggests that even when it appears that all community relations activities required by statute and regulation are met, the public may believe that it wasn't involved enough, that it wasn't listened to, or that it didn't receive adequate information.[51] In our discussions with a wide range of Industri-Plex parties, from both foes and allies alike of the EPA, we have heard that the Agency has not been as aggressive as it might have been in its outreach to a wide cross-section of the public. The Custodial Trust has stepped into the breach somewhat, but understandably has promoted public participation almost exclusively on the development rather than the remediation side. In EPA's defense, there is no straightforward formula for the Agency to follow to reach out successfully and effectively and to forge a consensus opinion on all issues among all of the

[51] U. S. General Accounting Office. 1994: *Superfund: EPA's Community Relations Efforts Could be More Effective*. U.S. GAO/RCED-94-156. [GAO. 1994]

many affected publics. In fact, it is unlikely that in any situation as complex as that presented by Industri-Plex, all stakeholders will agree on all aspects of remediation, reuse, and public involvement. As noted by one central stakeholder at Industri-Plex, "public participation and public consensus are two separate matters."[52] However, it seems to us that the Agency not only must invite public comments, but it also must aggressively solicit public involvement at all stages of the process, to be as inclusive as possible, not just as inclusive as required. Indeed, as noted at the outset, for many supporters of land use based remedies, enhanced public involvement in Superfund decision making is one of the principal benefits that would follow from linking land use to remedy selection more closely. If land use is to become something more than a proxy measure for risk in remedial investigations and remedy selection, if it is to become a vehicle by which local citizens can help to rescue Superfund properties from the dark freeze on reuse that CERCLA liability allegedly imposes -- enabling citizens to reincorporate such properties into their communities -- extensive public involvement is critical. Absent forceful efforts to include a broad range of public interests at the land use table -- not just those interests who stand to gain directly from redevelopment and those that have a strong incentive and resources to participate fully in decision-making on land use based remedies -- a balanced and representative shaping of future land use at a site is likely to be difficult to achieve. Thus, because land use is an inherently local phenomenon that embodies the constraints, opportunities, and ambitions of community members, making land use a more significant and meaningful part of the remedy selection process may require a different, more proactive model of public involvement that is guided by a broad, inclusive notion of community.

[52] Personal Communication.

Appendix A

A.1 Remedial Action

As noted in the text, the remedy at Industri-Plex relies on both engineering elements and institutional controls. Following the terms of the 1989 consent decree, the settling defendants in the consent decree (*i.e.*, the two large potentially responsible parties and the site's landowners other than the Custodial Trust and the Mark Phillip Trust) are responsible for the design and construction of the remedy, while EPA in consultation with the state Department of Environmental Protection must approve and provide oversight of this design and construction.

Both the air and soil remedies have remained relatively constant since the signing of the Record of Decision in 1986. The air remedy -- an impermeable cap over one of the hide piles and trapping, collecting, and treating the gas -- closely follows its original design, although ironically the release of odors from the active hide pile has virtually stopped. The soil remedy also is generally consistent with the preferred alternative outlined in the ROD. It includes a basic permeable soil cover consisting of a geotextile layer and 16 inch soil cap, and it allows individual landowner the option to install "alternate covers" (such as asphalt or bituminous concrete) to allow for commercial load-bearing land uses.

Contrary to these two components, however, the original interim groundwater remedy in the ROD has largely been discarded. As described in the ROD, the original interim groundwater remedy included pumping at benzene and toluene hot spots followed by air stripping. This option was never implemented, however, since it was thought to be infeasible and not cost-effective during the remedial design phase. Instead, the responsible parties through the Remedial Trust implemented a remedial action of groundwater pumping followed by air sparging, but this has not proven effective (air sparging relies on the injection of air *in-situ* to create an air bubble to strip the volatile organics). In addition, after the signing of the consent decree, it was discovered in the early 1990s that chromium and arsenic have unexpectedly mobilized and these contaminants may pose an unanticipated groundwater problem. The Remedial Trust recently has modified the technique and proposed the implementation of a pilot oxygen injection bioremediation system, which the responsible

parties believe will biodegrade benzene and toluene and precipitate out these metals from the groundwater. As of the time of this writing, the proposal is under review by EPA.

The following subsection discusses the 1986 selected remedy from the ROD in more detail, while the subsection after that covers the actual remedial actions that have been completed and those that are underway. The final subsection of the Appendix reviews the development of institutional controls at the site.

A.2 Selected Remedy in the EPA Record of Decision

In the 1986 ROD, the selected remedy has three components (see Table A-1). These are designed to prevent exposure to soils contaminated principally with arsenic, lead, and chromium; to capture and treat noxious odors from the degeneration of the hide piles, sites where animal and other waste products from chemical manufacturing and tannery operations were deposited; and to capture and treat groundwater contaminated with benzene and toluene.

The soil component of the preferred remedy consists of a permeable soil cap (24 inches of clean fill and 6 inches of topsoil) over roughly 100 acres of the most contaminated areas of the site (with concentrations exceeding 300 parts per million [ppm] for arsenic, 600 ppm for lead, or 1,000 ppm for chromium). It also specifically includes covers on the east-central and west hide piles.[53] In addition, for portions of the site with existing buildings and roads, the structures would be left intact to serve as a protective cap. Institutional controls, which are included in the ROD but left largely unspecified, would be developed to proscribe what activities could take place across the site (since the site was not being cleaned up to unrestricted use), particularly to control possible changes to the protective cap where structures serve as barriers to exposure. At the time of the ROD, it was thought that these controls would include restrictive covenants or deed restrictions -- which would run with the land, be binding on all heirs and successors, and benefit and be enforceable by EPA and the state[54] -- as well as possibly new zoning regulations by the City (see subsection A.4 for further discussion).

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[53] *ROD*. 1986: p. 43.

[54] *Consent Decree*. 1989: Appendix I (Remedial Design/Action Plan), Attachment B (Institutional Controls). pp. B-3.

Table A-1. Remedy Selection

(and cost comparison with next "best" alternative)

Treatment Unit	Selected Remedy	Cost*	Cost of Alt.*
soil	place cap on 100 acres with 24 inches of clean fill and 6 inches of topsoil; place permeable cap on two hide piles; use existing structures and roads as cap for developed portions of site; rely on institutional controls to control development	7	20
air	install synthetic impermeable membrane on east hide pile, collect gas, and treat through thermal oxidation or carbon absorption	3	16
groundwater	pump and treat groundwater at hot spots on site and discharge treated water to subsurface (interim remedy)	4	13
*costs are in millions of 1986 dollars (discounted to present value)	**TOTAL**	**14**	**49**

The remedy selected for soils was projected to cost a little more than one-third of the likely next best alternative ($7 million compared to $20 million). The more expensive alternative would have excavated soils with contaminants exceeding 100 ppm and consolidated these on the hide piles under an impermeable cap. The selected remedy also was viewed as being less disruptive since it would not involve the same degree of excavation, impacts on water quality, or infringement on wetlands at the site. However, the ROD acknowledges the uncertainty of whether the institutional controls in the preferred remedy will provide as secure protection of public health and environment as the more expensive, next best alternative, which would have removed wastes and placed them in areas less likely to be disturbed by future development.

The preferred air remedy, installation of a synthetic impermeable membrane and collection of gas from the one active hide pile and treatment either through thermal oxidation or carbon absorption, was expected to add another $3 million to remedial action costs. Air emissions from this and the other two hide piles were not seen as being health threats, but EPA decided that the active emissions were a significant enough nuisance to public welfare to warrant a remedial action. Proposed air remediation alternatives which would have removed the hide piles and relocated them to an on- or off-site RCRA landfill appeared less suitable because they potentially would have introduced severe odors, as well as entailed higher costs (between $16 million and $36 million), destroyed more wetlands, and negatively affected

water quality.[55] Although the odor and water quality problems would be short term perturbations, the noxiousness of the odors (which in many ways galvanized the initial public concern at Industri-Plex) and ambient water quality criteria under the Clean Water Act (an applicable or relevant and appropriate requirement, or ARAR, for standard setting at Superfund sites) made these impacts important considerations.

The third part of the remedy, the groundwater component, has been the most complicated and the least successful of the three remedial areas. In the ROD and consent decree, the groundwater remedy aims to reduce benzene and toluene concentrations in the groundwater through a pump and treat program at hotspots, and subsurface discharge of the treated water. This $4 million action was seen as an interim remedy until further groundwater investigations proceeded. The ROD notes that CERCLA guidance recognizes that specific decisions about the groundwater remedy at a site should be made in conjunction with decisions about groundwater problems in the larger groundwater basin, and that the guidance allows the Agency to select interim measures at a site until a more comprehensive investigation of an area's groundwater problems can be made. Moreover, such interim measures are not required to fully meet ARARs. Given the widespread presence in the area of other facilities which may have contaminated the groundwater, EPA selected an interim remedy that would protect public health and the environment, pending completion of a Multiple Source Groundwater Response Plan that would involve an investigation of the area-wide groundwater problem.[56,57]

As partial justification for an interim rather than a final action, the Agency noted that no one was consuming water from the aquifer at the time. One of the primary reasons behind the interim remedy was EPA's belief that public health, welfare, and the environment would not be adversely impacted during the time period when regulatory agencies were designing a

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[55] The likelihood of unacceptable odors being released by excavation of the hide piles also constrained some of the possible remedial alternatives to address the soil contamination. For example, several proposed soil remediation alternatives that also would have excavated some or all of the hide piles to decrease the risk posed by soil contamination were viewed unfavorably in part because of the same concerns with odors.

[56] *ROD*. 1986: p. 96; ATSDR. 1992: p. 8.

[57] The Massachusetts Department of Environmental Protection, for example, placed at least thirty sites within one mile of Industri-Plex on its March, 1990 "List of Confirmed Disposal Sites and Locations to be Investigated."

comprehensive plan for groundwater cleanup.[58] Although the interim remedy would not meet ARARs fully, since some toluene and benzene would migrate beyond the site boundaries, EPA viewed it more favorably than the alternative that would meet ARARs (interception and treatment at the leading edge of the plume and discharge to local surface waters). The latter alternative would take longer to implement and yield results, cost more than three times as much, and potentially dewater on-site wetlands. The EPA notes in the ROD that ". . . the substantial period of operation (10+ years) and increased capital and operation and maintenance costs make . . . [the more protective alternatives] . . . unsuitable as interim remedies."[59] The selected interim alternative was viewed as ". . . the most cost-effective response to minimize the impacts to the public health, welfare and environment . . ." while the larger regional problem is studied.[60]

Comments in the ROD responsiveness summary about the preferred groundwater remedy are illuminating. The Water-Soil Subcommittee of the Industri-Plex Citizens Advisory Committee (discussed in section 5.1) argued that the proposed groundwater remedial option by Stauffer Chemical (the potentially responsible party that developed the RI/FS) was overly protective and expensive. This option would have intercepted and treated groundwater at the site boundary. The Committee asked for a more detailed explanation as to why the hot spot remedy was not chosen. EPA agreed with the Committee in part and ultimately selected a pump and treat remedy for hot spots rather than the Stauffer Chemical alternative, one of the two alternatives under evaluation that would have provided a "greater degree of protection for the public health and welfare and the environment" than the selected remedy.[61] (In the responsiveness summary, EPA reiterated that it viewed this more protective alternative less desirable as an interim remedy because of its higher cost and longer required period of operation relative to the selected remedy.[62]) On the other hand, the U.S. congressional representative in the area disagreed with EPA's preferred interim remedy and proposed a more extensive pump and treat system downgradient of the site. An owner of land

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[58] *ROD*. 1986: p. A-8.

[59] *ROD*. 1986: p. 97.

[60] *ROD*. 1986: p. 96.

[61] *ROD*. 1986: p. 97.

[62] *ROD*. 1986: p. A-6.

adjacent to the site argued that elevated levels of benzene and toluene in wells on property within the east and west hide piles indicated a potential contaminant problem from the hide piles (although the benzene and toluene plumes are widely believed to be the result of a single illegal dumping unrelated to the hide piles). EPA responded that the Remedial Investigation had not detected any groundwater impact from toluene and benzene in the hide piles and that the cap on the piles would in any case minimize additional leaching of material from the piles. Ironically, as noted in the text, the discovery in the early 1990s of the unexpected and recent mobilization of chromium and arsenic from the hide piles (speculated to result from the high groundwater table and the anoxic conditions in the organic rich hide piles) has created an unanticipated groundwater remediation problem, which the principals are attempting to address as described below.

A.3 Remedial Accomplishments

Immediate short-term response and removal actions taken at the site before final NPL listing have included placement by the Massachusetts Department of Environmental Quality Engineering in 1980 of a sprayed latex cover over a large exposed arsenic and lead deposit to minimize air entrainment of arsenic and lead dust, and construction of various fences to secure the site. In 1981, EPA installed a chain link fence around the site, but extensive damage to the main areas of the fence occurred and trespassing (by ATV and dirt bike riders) and illegal dumping of unknown substances on the site apparently continued. Just before EPA signed the ROD in 1986, the fence was repaired and extended to 10,000 feet. Work to re-secure the site and post a second set of warnings also took place in 1988. Since the Remedial Trust opened its on-site office and posted security guards (on a round-the-clock basis during active on-site construction operations, and daily during the winter), there has been little trespassing.

With respect to the remedy itself, the structural aspects of the soil remedy are largely in place over most of the site. This includes EPA-approved “alternate covers” (such as asphalt or bituminous concrete) and the standard permeable soil cover (*i.e.*, a geotextile layer and 16 inches of soil, an EPA- and state-approved cover that is seen to offer the same protection as the original 30 inch cover selected in the ROD) over most of the 100 acres of highly contaminated soils. A permeable soil cap covers the west, south, and east-central hide

piles. The east hide pile, which is the only pile currently producing odors, has an impermeable soil cap and synthetic liner. The air remedy, which has been fully installed and is operational (although not yet automated), consists of a gas collection system at this hide pile and treatment of the gas through thermal oxidation. In a thirty-five acre parcel in the northern and western portions of the site, the Remedial Trust has constructed a $4.5 million alternate cover (with EPA and state approval) to support the Regional Transportation Center that state transportation agencies are interested in building at Industri-Plex.[63] This alternate cover has additional fill over much of the thirty-five acres and a three-inch gravel cover.[64] The state transportation agencies will pick up much of the cost of the alternate cover, although the Remedial Trust and the City have incurred additional expenses in transferring title over from the parcel's previous private owner.[65] Much of the alternate cover has already been constructed, and the final part of it is scheduled for an early 1997 completion.

The third part of the site's remedial action, the groundwater remedy, has only been partially implemented. The Remedial Trust has completed Phase I and Phase II of the Groundwater/Surface Water Investigation Plan, which includes an evaluation of the potential for off-site migration of metals through surface water and collection of information for the Multiple Source Groundwater Response Plan. During these two phases of the Groundwater/Surface Water Investigation Plan, it was discovered that heavy metals (primarily chromium and arsenic) had unexpectedly mobilized and thus posed an additional groundwater concern. In addition, as noted earlier, with EPA approval in 1994 the interim groundwater remedy switched from a proposed pump and treat system with air stripping to a pilot air sparging system. In response to the poor performance of this approach, the Remedial Trust recently has modified the technique and EPA is reviewing a Remedial Trust proposal to implement a pilot oxygenation system that the Remedial Trust hopes will address the volatile organics as well as precipitate the metals.

Currently, contractors for EPA are searching for spill data, site assessment data, and other relevant existing data for properties surrounding Industri-Plex as part of the Multiple

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[63] Personal Communication.

[64] Personal Communication.

[65] The Remedial Trust holds title to the parcel on which the Regional Transportation Center would be constructed, after satisfying creditors of the previous owner in bankruptcy court proceedings.

Source Groundwater Response Plan. In addition, a Remedial Trust proposal for Phase III of the Groundwater/Surface Water Investigation Plan would further define the nature and extent of groundwater and surface water contamination. It also would focus on ecological studies of areas of the site not already addressed under the remedy, including the Halls Brook Storage Area. The results of the Phase III studies will be used to evaluate an overall remedy for the site. The proposal for the studies is under EPA review in conjunction with the proposed pilot oxygenation system, and if EPA approves the study proposals and the pilot oxygenation system, the Remedial Trust anticipates commencing monitoring work for the system and the Phase III work in Spring 1997.[66] By all accounts, however, the final groundwater remedy still may be years away.

The projected total cost of the remediation (including investigations) is roughly $60 million in present worth terms (1996 dollars),[67] which the Remedial Trust will be responsible for. In addition, the state's share of the alternate cover may cost several million more. By way of contrast, the projected costs in the ROD were $14 million for cleanup (in 1986 dollars). Even assuming a relatively high five percent annual inflation rate over the ten plus years since the ROD was signed, the projected costs in the ROD inflated to current dollars would be roughly $23 million, still substantially less than one-half of the currently estimated remedial costs. The reasons for this wide difference are unclear to us, but the discrepancy is not surprising given the necessarily preliminary nature of many cost estimates included in the ROD. In addition to these remediation costs, public entities may invest over $35 million in site development ($18 million for a highway interchange, $15 million for the Regional Transportation Center including track improvements, and $3 million for road improvements).[68] This investment certainly would represent a large commitment of public resources to promote reuse at Industri-Plex, although it bears noting that the state and City presumably also would face substantial costs to provide similar transportation services at an alternative, less-contaminated site. Thus, a significant portion of the $35 million in costs likely still would be incurred elsewhere were reuse at Industri-Plex not being promoted.

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66 Personal Communication.

67 Personal Communication.

68 Personal Communications.

A.4 Institutional Controls

Despite the fact that both the 1986 ROD and the 1989 consent decree describe institutional controls as being important to assure the continued effectiveness of the remedial actions, as of late 1996 with the soil remedy largely in place, the institutional controls are still being developed. These controls will apply to the entire site, but they emphasize protocols for the disturbance of soils with contamination above the action levels described earlier (including subsurface contaminated soils that do not require a cap because they are too deep). Although agreement among the principal parties on the overall framework of the controls has been reached, the draft document that details the controls is under review by the EPA and landowners and as of late 1996 is not publicly available.[69]

The ongoing development of the controls presents an interesting story, both due to the long gestation period of the controls and because of the dynamics of the parties involved in their development. In 1992, EPA received a 60 percent design of the institutional controls,[70,71] which a collection of attorneys representing the large potentially responsible parties and the small landowners principally developed. The general public also participated in this stage, largely through representatives of FACE and its attorney who met with EPA and the state Department of Environmental Protection several times and with the responsible parties' attorney on one occasion. EPA and the state, however, never commented formally on this design. EPA has indicated, however, that the document was unworkable because it was overly complex and the legal prescriptions in it likely would be incomprehensible to the majority of the small landowners affected by it.[72]

With encouragement from the Custodial Trust, EPA decided to scrap the 60 percent design in 1994 and start over with a new working group that would focus initially on the goals, philosophies, and principles of the controls rather than the formal legal mechanisms.[73] This working group currently includes legal and technical representatives from the EPA, state

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69 Personal Communications.

70 The consent decree requires the submission of remedial design plans to EPA and the state for review and approval at four stages of development, the second of which is the intermediate stage that addresses 60 percent of the total design. The deliverables for this stage were specified in the Remedial Design Work Plan.

71 *Consent Decree*. 1989: Remedial Design/Action Plan. pp. 16-17.

72 Personal Communication.

73 Personal Communication.

Department of Environmental Protection, Custodial Trust, and Remedial Trust, as well as a landowners' representative. The principal player from the local citizen's group who actively participated earlier in the process during the 60 percent design phase, however, was not invited into the working group. According to several accounts, this was due in part to the reluctance expressed to the agencies by some of the potentially responsible parties in involving the citizens group in future institutional controls negotiations.[74] Thus, no local citizen representing the general public currently participates in the working group; the group is limited to those parties directly responsible for designing and inaugurating the controls. EPA plans to give others the opportunity to review the controls, however, when the draft document on the controls is completed.[75]

The working group has attempted to develop controls that are simple for landowners to follow, without the legal morass that plagued the 60 percent design document. Although the controls clearly imply limits on land use, the philosophy behind them is not to dictate land use *per se*, but rather to establish procedures and performance standards by which caps and covers may be altered in the future to accommodate changes in use while protecting the integrity of the remedy. This likely will involve designating several classes of land, with different procedures and protocols for the permitted uses on each class. As envisioned at the time of our first round of interviews in 1995,[76,77] Class A land will have a restriction on drilling wells (as will all classes of land), but otherwise not be restricted, since it is largely uncontaminated. Most of this land lies in the eastern portion of the site and is owned by the Custodial Trust. Class B land will have some restrictions imposed on activities, specifically to provide precautions for the excavation and disposal of potentially contaminated soils more than 36 inches below grade (insufficient data exist to accurately determine contamination in some portions of the site). Class C land, the areas with the permeable caps, the alternate covers, and the cover equivalents provided by existing structures, will include more restrictions. And on Class D land, the most contaminated portions of the site that contain the

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[74] Personal Communications.

[75] Personal Communications.

[76] The more recent version of the institutional controls, which we were not able to review, purportedly has reduced the number of classes from four to two.

[77] Personal Communication.

hide piles, no disturbance or modification is likely to be allowed. According to recent communication from the EPA, the controls will include a provision that will allow anyone to request an amendment to the controls if site conditions change or certain aspects of the controls are not effective. Such an amendment would require final approval by EPA and/or the state Department of Environmental Protection.[78]

As noted in section 2, the allowance for modification of the permanent, constructed caps (permeable and impermeable) by a site owner or developer is unusual. It means that the permanent caps are not inviolate since a developer can breach them, as long as the caps are acceptably reinstated. It is unclear how large a role EPA and the state will take in approving modifications, but the permanence of the caps ultimately will depend on what the controls will allow. As suggested above, the impermeable cap on the east hide pile is not to be modified since it falls in the Class D land. The permeable caps, alternate covers, and cover equivalents, on the other hand, may be altered in ways that conform with the final Class C restrictions.

The fact that the controls have not yet been finalized more than a decade after the signing of the ROD in part reflects the complexity of the site -- its large areal extent, the wide array of on-going and planned business activities and other uses across its constituent properties, and the presence of large number of affected parties -- and the scant precedence for such a involved set of mixed land uses and parties at other Superfund sites. In addition, the remedy itself (which includes the impermeable cover on the east hide pile, the standard permeable cover of soil and a geotextile liner, EPA-approved alternate covers of asphalt and bituminous concrete, and cover equivalents such as existing buildings and roads) make designing institutional controls difficult, since the controls must apply and work for a wide range of conditions.

In addition to intricacies posed by the physical characteristics of the site and its complex mix of contamination and uses, the inability of the stakeholders involved in the development of the institutional controls to reach closure in a timely fashion may reflect at least three other problems. First, since the submission of the 60 percent design document, neither EPA nor the state nor apparently any other entity has insisted that the controls be

[78] Personal Communication.

finalized by a certain date, even as redevelopment has begun to move forward. Some parties have argued that such redevelopment should await the completion of the controls. For example, a letter from community members to the Massachusetts Executive Office of Environmental Affairs (the umbrella office under which the state Department of Environmental Protection fits) argued that a full Environmental Impact Report should be required for the Regional Transportation Center slated for a portion of the site. The letter noted that the institutional controls have not yet been written, reviewed, and approved, and it implied that they should be before the Regional Transportation Center proceeded, to ensure that the project would be compatible with the future uses of the site as proscribed by the controls.[79] Ultimately, the Executive Office granted a waiver for the project's environmental impact report requirements. Some have suggested that this was a lost opportunity to force closure on institutional controls, although it is unclear whether such a forced closure was practical.[80] In any case, with no firm date for closure, many parties have lacked at least one incentive to reach agreement on contentious points, although it bears noting that the Custodial Trust can not completely fulfill its purpose as stated in the consent decree without final controls.

Second, the controls are difficult to fashion, since they need to be general enough for affected and non-technically trained parties to understand and observe, but specific enough to eliminate ambiguity. Consensus among all members of the working group on how to do this has been difficult to achieve. This reflects in part different intentions or goals among the group members. For examples, the development ambitions of landowners at the site will be constrained to some degree by the controls, so these stakeholders prefer to limit the constraints of the controls. On the other hand, the Remedial Trust (Monsanto and Stauffer-ICI in particular) may have to shoulder costs if future development by the site's landowners renders the remedy ineffective, so these latter parties are more concerned about maintaining the effectiveness of the remedy.

Third, and related to both of the previous points, the delineation of *specific* institutional controls and final shaping of these specific controls has taken place toward the

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[79] Letter from Gretchen Latowsky (former FACE director) and eight co-signers to Secretary Trudy Coxe, Secretary of the Massachusetts Executive Office of Environmental Affairs, July 27, 1995.

[80] Personal Communication.

end of the implementation of the remedy, more than ten years after the signing of the ROD, rather than earlier on in the alternative evaluation or during the final design of the soils remedial action. The finalization of these controls is forcing stakeholders to abandon the somewhat open-ended flexibility of the past to define more precisely what land uses are appropriate and those that are not. This is not to say that the controls have suddenly appeared out of nowhere. The 1986 ROD included a several paragraph discussion of the controls and the controls as they are currently developing are consistent with that discussion. To this degree, they are not anything new or unforeseen. However, it is fair to say that the ROD treated the controls relatively shallowly, and as long as subsequent discussions remained open-ended, such discussions allowed a relatively unconstrained range of prospective activities. In the end, though, specific restrictions need to be implemented. This dose of reality after a long period of more vague conversations highlights the above-mentioned potential tension between allowing property owners the fullest use of their property and providing adequate protection at the site. This tension is not new, of course, since it has been an integral part of Industri-Plex since environmental and health regulators became more active at the site in the 1970s. As EPA has noted recently, the controls are being developed "so each landowner/stakeholder has as much use and enjoyment of their property as possible,"[81] an objective in the abstract with which few of the parties would disagree. However, when one must actually define the "possible" use and enjoyment, which in the context of the Superfund program must be bounded by the overarching goal of protection of human health and the environment, it should come as no surprise that agreement on the controls has been difficult to reach. For a long period stakeholders have not had to directly confront controls that, the amendment proviso of the controls notwithstanding, will restrict site activities into the indefinite future.

81 Personal Communication.

Appendix B: List of Interviewees

(with positions and affiliations at time of interview)

Cindy Brooks
President, Resources for Responsible Site Management, Inc.
Environmental Trust Group, Inc.
Cambridge, MA

Paula Lia Fitzsimmons
Chief, Massachusetts II Superfund Section
U. S. EPA, Region 1
Boston, MA

Gretchen P. Latowsky
JSI Center for Environmental Health Studies
Boston, Massachusetts

Joseph LeMay
Remedial Project Manager
U. S. EPA, Region 1
Boston, MA

D. Michael Light
Industri-Plex Remedial Trust Coordinator
Industri-Plex Site Remedial Trust
Woburn, Massachusetts

John F. Marlowe
Gulde Insurance Agency
Burlington, MA

Anna H. Mayor
Environmental Analyst
Massachusetts Department of Environmental Protection
Boston, MA

Jay Naparstek
Massachusetts Department of Environmental Protection
Boston, MA

John Rabbitt
Mayor (former), City of Woburn
Woburn, MA

Helen Waldorf
Massachusetts Department of Environmental Protection
Boston, MA

Dan Winograd
Assistant Regional Counsel
U. S. EPA, Region 1
Boston, MA

Reverend Bruce Young
Pastor, Trinity Episcopal Church
Woburn, MA