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RESEARCH REPORT

Institutional Controls Case Study: Mound Plant

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INSTITUTIONAL CONTROLS CASE STUDY: MOUND PLANT

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Executive Summary

The Mound Plant, in Miamisburg, Ohio, is a facility formerly used by the Department of Energy (DOE) as an integral part of the nuclear weapons production complex. In 1994, DOE decided to end defense production activities at the site. The site is slated for industrial reuse; and such reuse has already commenced on portions of the site under the terms of a lease executed between DOE and a community development corporation in 1994. DOE is considering institutional controls to assure that future uses are compatible with cleanup decisions, in order to protect the public and assure the effectiveness of the cleanup remedies.

In addition to DOE, the U.S. Environmental Protection Agency (USEPA) and Ohio EPA have identified cleanup objectives in connection with the cleanup of hazardous substance releases at the site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); the cleanup decisions being made under CERCLA also contemplate the use of institutional controls. The City of Miamisburg, citizen groups, and the community development nonprofit corporation that is guiding the Mound Plant reuse process (the Miamisburg-Mound Community Improvement Corporation) are also seeking the establishment of institutional controls that meet their respective objectives.

The Environmental Law Institute (ELI) has studied the ongoing decision-making process at Mound and the options being considered in order to aid DOE's and the public's understanding of the development and use of institutional controls as a component of cleanup and reuse of contaminated sites. The issues considered at Mound and the processes by which these are being considered can help inform decision-making elsewhere across the DOE complex nationally. In addition, issues being encountered at Mound also will help illuminate the alternatives that may need to be considered at many other sites.

Discussions about institutional controls emerged initially at the Mound Plant site through the multi-stakeholder Mound Reuse Committee. Although the need for institutional controls was recognized in general terms since DOE's decision to close the Plant was announced, consideration of the specific types of controls needed began in 1997. Initially, the various interested parties focused on developing an array of proposed "deed restrictions." Deed restrictions would be intended primarily to prevent future earth-disturbing activities and groundwater uses that might be incompatible with the chemical and radionuclide contaminants that will remain in place after remediation activities have ended.

Issues have arisen during the discussions concerning the enforceability of certain of these restrictions, and what entities would be able to enforce them. In addition,

issues have arisen with respect to the effect of such restrictions on the "marketing" of the site to industrial re-users. These issues are still under discussion. One significant issue is the enforceability of a deed restriction. Normally, such a restriction is enforceable only by the grantor (in this case, the United States) and the grantor's successors in interest (where parcels of property are conveyed in separate transactions). It may be desirable to ensure that the restrictions are enforceable by a number of entities (including, but not limited to, the state of Ohio and the United States) in order to increase the likelihood that compliance will be enforced.

Analysis of approaches other than deed restrictions has been limited. However, the potential role of zoning as an institutional control has been identified, and the City has taken some initial steps to plan and zone for reuses. A number of limited restrictions under the lease are also in place during the initial phase of site reuse. Decisions during this phase are being made on an informal basis. The Mound Reuse Committee adopted an "interim land use policy" to help guide decisions about subtenants and appropriate proposed reuses. While this is not an enforceable institutional control, it is playing a role pending the development of enforceable institutional controls.

The process for identifying, selecting, and applying long term institutional controls at the Mound site appears to be moving toward substantial, but informal, public involvement through the multi-stakeholder Mound Reuse Committee. Such participation appears to be likely to create more resilience in the institutional controls that are ultimately selected, as more parties will be aware of them and will have a stake in assuring their continuing effectiveness.

Some kinds of institutional controls must be developed and applied early in the process of transition to reuse if they are to operate effectively, particularly where they rely on property concepts such as deed restrictions, covenants, and leases. At Mound, however, some of the reuse and cleanup decisions are being made prior to the identification and development of the full complement of institutional controls. This may make it more difficult to impose some forms of controls, like covenants, that depend upon legal priority and specific relationships between grantors and grantees, and among grantees of parcels of land.

Moreover, consideration of institutional controls other than, or in addition to, "deed restrictions," may be appropriate in order to attain risk management and reuse objectives at the Mound Plant. These may include such controls as covenants, easements, institutional arrangements, trust funds, and various forms of land use and safety regulation. Given the orientation of DOE, USEPA, and Ohio EPA toward meeting federal and state cleanup requirements, more thought has been given to the content of institutional controls than to alternative approaches of structuring them or

ways to make them more effective. It may be useful for the various parties (including the public, the community development corporation, and the Mound Reuse Committee) to seek additional expertise from sources familiar with development restrictions, long-term covenants, and site-operating entities. The addition of some technical expertise in real estate and development to the process of developing institutional controls at the Mound Plant may help to produce controls that are more resilient and effective than those that might otherwise be identified.

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Introduction

The Department of Energy's (DOE's) Mound Plant is located within the city of Miamisburg, south of Dayton, Ohio. Since its construction 50 years ago, this 306 acre facility has been an integral part of the nuclear defense production complex. Now, the site is undergoing environmental cleanup and conversion from DOE operations to planned private sector ownership and management for industrial reuse.

The Environmental Law Institute (ELI) reviewed the decision-making process at the Mound site in order to assist the public's and DOE's understanding of the development and use of institutional controls at DOE sites. In general terms, institutional controls are legal or institutional mechanisms employed at contaminated sites to ensure that the uses to which such a site is put after cleanup are compatible with the level of cleanup achieved. ELI's research included a site visit as well as documentary research and additional interviews. The information presented is complete through the end of 1997, with some additional material in 1998 reflecting comments received from reviewers.

The issues considered at Mound and the processes by which these are being considered can help inform decision-making elsewhere.

The Mound Plant is located on high bedrock bluffs immediately surrounded by adjacent residential, recreational, farm, and commercial uses. With over 130 buildings, a hilly and dissected terrain, an aging and centralized utility infrastructure, and hazardous substance and radionuclide contamination of both buildings and the environment, the Mound Plant presents a challenge for successful reuse.

Before ending defense production operations, the Mound Plant employed over 2200 persons. Now half that number are employed at the site. The site is operated for DOE by a contractor. The physical plant, which now includes many vacant buildings, has significant DOE environmental management and cleanup activities coexisting with a small but gradually increasing private re-use presence.

Following a spirited public debate and re-evaluations of earlier decisions, DOE formally decided in 1994 to end defense production operations at the Mound Plant. The city of Miamisburg acted quickly to assure that economic activities would continue at the site. The city feared both the loss of its largest employer and the potential economic drag on the economy and on property values if the site were simply closed without economic reuse. In 1994, the city council created an eleven-member Mound Reuse

Committee to review uses of the site, and established the Miamisburg-Mound Community Improvement Corporation (MMCIC) to manage the reuse process. The Mound Reuse Committee, which is recognized by DOE as the Community Reuse Organization for the facility, includes representatives of city and state government, the business sector, grassroots organizations, and individuals.

The MMCIC was created by the city under Ohio law as a not-for-profit economic development corporation. The MMCIC was chartered for the purposes of negotiating with DOE for the conveyance of the site, and attracting and retaining industrial re-users. The MMCIC has its own board of directors - three from the city as required by state law, and four from the private sector. The MMCIC has a staff of nine, and its full-time president is a former municipal planner for the city. After its start-up, funded by city funds and some initial federal transition moneys, MMCIC was capitalized with $10 million in DOE transition funds received in late 1995 in addition to some city and state economic development funds.

The city also received help from its member of Congress, who secured enactment of the Hall Amendment to the National Defense Authorization Act for FY 1994. The amendment allows DOE to lease for up to ten years at nominal or below market rates the *facilities* at sites that are closing or being reconfigured; a related provision authorizes the transfer at below market rates of equipment and other personal property at such facilities. (42 U.S.C. " 7256, 7247*l*).

Using this authority, DOE and the MMCIC entered into a lease agreement on September 7, 1994, which provides for the lease to MMCIC of certain buildings and personal property for reuse by the private sector. This agreement is amended from time to time to add property and equipment as needed to accommodate additional industrial and commercial reuse opportunities as they are identified by MMCIC. The master lease expires in 1999 but may be renewed for an additional five year term at MMCIC's option. It provides for a lease rate of $1 per year, plus certain additional payments related to utilities, maintenance and other services. In accordance with the Hall Amendment, the U.S. EPA must review and concur with the lease and each modification.

The MMCIC has marketed the site as the "Mound Advanced Technology Center," and has focused its business development strategy on retaining and marketing the technical expertise of former employees at the site and marketing some of the site's specialized equipment and buildings. Part of the initial concept includes a "small business incubator" to allow the development of new businesses by former Mound employees.

The MMCIC enters into sublease agreements with its business tenants. In several leased buildings, the MMCIC now houses 21 companies, with a total of 218 employees. Many of these are small start-up operations; but one precision machine firm at the site has 75 employees. There are ongoing negotiations between a three-member DOE sale-of-site team and the MMCIC concerning the permanent transition of the site to private ownership.

Under the Mound Plant's Ten-Year Plan, decontamination and decommissioning (D&D) of buildings, cleanup of contaminated areas, and DOE's departure from the site are to occur by 2005. The new operating contract with Babcock & Wilcox (which succeeded EG&G as the Mound facility contractor in September 1997) contemplates an exit by 2003. The U.S. EPA and the Ohio EPA are deeply involved in the cleanup decisions at the site, which was placed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL) in 1989 based on chemical contaminants including volatile organic compounds (VOCs) in the groundwater.

DOE planning for the Mound Plant contemplates that, unlike some facilities in the DOE nuclear complex nationwide, most of the contamination at the Mound Plant - both hazardous substances and radionuclides - can be addressed by existing technologies to achieve cleanup levels that will support industrial reuse of the entire site. However, some hazards will remain in place beyond 2005 even if a transition from DOE to MMCIC ownership or management is completed by that time. In addition, DOE's Office of Nuclear Energy, Science and Technology (NE) has continuing operations on a portion of the site, which includes buildings and underlying soils with radionuclide contamination. This portion of the site, which may or may not transfer to MMCIC, will present additional management issues during the transition and possibly beyond.

This case study summarizes the hazards that are expected to remain at the site after completion of cleanup activities and the transition to reuse. Then it examines in detail the processes used to make decisions about site cleanup and reuse, and the kinds of institutional controls that may be needed or that are under consideration to prevent or limit exposures and hence reduce risk to future users and neighbors of the Mound site.

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Site Conditions

The Mound site generally presents two sets of hazards that must be taken into account in assessing the need for, and design of, institutional controls. These are the residual hazards resulting from the substances that were released into the environment over the operating life of the Plant, and the residual hazards resulting from contaminated buildings left in place or demolished.

First, over its operating life, the Mound Plant site has had numerous releases of both hazardous substances and radionuclides into the environment. DOE and the U.S. Environmental Protection Agency (USEPA) and the Ohio EPA have identified more than 400 potential release sites (PRSs) at the Mound facility. Some of these are undergoing remediation, while others are still being evaluated. Some of these PRSs have been determined by the agencies to require no further assessment or action in order to meet standards based on the intended industrial reuse, while others require cleanup activities.

Second, there are more than 130 buildings and structures on the site. Many of these have varying degrees of contamination, including radionuclide contamination. Decisions must be made about decontamination and decommissioning (D&D) individual buildings, the disposal of the building materials and debris if the buildings are to be demolished, any limitations on the reuse of retained buildings, and the effect of D&D and retention or demolition on the reuse of other buildings on the site.

Although a wide array of contaminants and hazards could affect reuse of the site, this report focuses on four areas that, based on current information, appear to present likely needs for at least some institutional controls after the transition to industrial reuse of the site.

The Tritium Complex

This area consists primarily of 3 buildings located on the facility's main hill - the northwest portion of the facility. These are known as the T, SW, and R buildings. All of these buildings have tritium contamination, and certain other (classified) contamination.

Building SW and its subsoils are suspected of being the source of offsite tritium contamination found in seeps on the hillside just outside the facility perimeter and above the Conrail tracks and the old Miami-Erie Canal. (The canal property at the base of the hill is owned by the city of Miamisburg. It is currently undergoing excavation

and removal of a 1969 plutonium spill and will be returned to public recreational use following the cleanup). DOE currently believes that the seeps on the hillside will not pose a long term problem and that tritium contamination will cease to be generated after decontamination and demolition of the SW and R buildings. While the Ten-Year plan calls for the decontamination and demolition of R and SW buildings, the costs are estimated in excess of $50 million each; and the schedule is backloaded such that they would both be removed in the last 2 years of the plan.

The T building is in the center of the main hill and is surrounded by other buildings, including buildings in current use and scheduled for reuse. It is a five story, thick-walled underground building sunk into the hillside. It is contaminated with tritium and other unspecified radionuclides; it also currently serves as storage for the Mound site's remaining transuranic wastes which have no clear destination. After removal of these wastes, the Mound Ten-Year plan calls for the T building to be closed and the tritium contamination to be allowed to decay in place for approximately 100 years. However, alternatives, including decontamination of the T building for possible reuse, are being evaluated.

Institutional controls would be needed to deal with any tritium complex buildings that are left in place; in addition, some controls may be needed to deal with the related contaminated seeps until the contamination is eliminated or attenuated.

Groundwater Contamination

The Buried Valley Aquifer, a portion of which extends under the western side of the Mound Site, is a large and highly important drinking water aquifer for this region of Ohio. It is designated as a sole source aquifer under the federal Safe Drinking Water Act, offering it special protection under the Act. Currently the Mound facility is operating a pump and treat system to strip volatile organic compounds (VOCs) found in the portion of the Buried Valley Aquifer that extends under the site. Some metals contamination has also been detected in the aquifer onsite but is not currently being addressed by DOE. The Mound Plant's own three water production wells (pumping approximately 230 million gallons per year) are located in the Buried Valley Aquifer within a hundred yards downgradient of the well for the pump and treat system. There is, as yet, no defined endpoint for the ongoing treatment process because the source of the VOC contamination on the Mound site has not been clearly identified.

In addition to the Buried Valley Aquifer, the parties are concerned about contamination of the shallow groundwater found in the fractured bedrock underlying much of the area of the facility - including the main hill (on the northwest corner), the SM/PP hill (on the northeast), and the undeveloped portion of the facility (which slopes to the south). While the fractured bedrock is not a highly productive source of water

like the Buried Valley Aquifer, there is concern that any contamination left in place in the bedrock (including thorium and plutonium in small quantities) could be problematic if water were ever drawn from these areas.

Landfills

A number of past disposal areas on the site have mixed chemical and radionuclide contamination. Among these are a parking lot (also designated PRS 66) located near the head of the drainage swale that divides the main hill from the SM/PP hill. While part of this parking lot is undergoing a removal action for actinium, no final decision has been made as to remediation of the area. Options include excavating a larger area of the landfill, excavating several feet of material and constructing a cap for the remaining materials, or simply constructing a cap and/or using a parking lot as part of a cap. It appears likely that hazardous materials and radionuclides may be left in place under most options. Because of its central location (it currently serves as parking for the Mound Advanced Technology Center businesses) the PRS 66 landfill may pose a future hazard if incompatible activities and land uses are not restricted.

Similar decisions also need to be made about other landfills on the Mound site, including one known as the OU 1 landfill. This landfill, located on the west side of the facility, has only a single liner. Some other areas on the site may need restrictions where contamination is not significant enough to warrant excavation, but would pose a hazard if excavated, removed, or transported in the future.

Continuing DOE Operations

On the SM/PP hill, the DOE's Nuclear Energy, Science and Technology (NE) program has a continuing mission potentially extending beyond DOE's proposed exit in 2005. It uses buildings and facilities for the Heat Source/RTG program (specifically, for assembly and testing of isotopic heat sources and radioisotopic thermoelectric generators for NASA and the Department of Defense). If these operations are not transferred to another DOE site, then the previously existing contaminants and any new contaminants associated with the continuing NE operations will need to be dealt with in coordination with the transition to private reuse of the remainder of the site. The Mound Ten Year plan contemplates that these buildings (after removal of several buildings prior to 2001 by EM) will continue to be the responsibility of NE for landlord costs, safe shutdown, cleanup and disposition. These buildings are believed to have plutonium contamination and other contaminants beneath the foundations. Institutional controls may be needed to deal with eventual hazards from these operations if and when they end in the future.

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Institutional Issues

Ownership

The United States government is the site owner, and the Department of Energy has jurisdiction over the facility. DOE may elect to transfer the site to private ownership itself under the authority of the Atomic Energy Act, or it may decide to turn the site over to the General Services Administration for disposal as surplus property.

Regulatory Authority

Regulatory authority over the site is currently exercised by USEPA, Ohio EPA, and DOE (which self-regulates certain of its own operations). USEPA and Ohio EPA exercise authority over cleanup of environmental releases under CERCLA (the site was listed on the NPL in 1989) and pursuant to the Federal Facilities Agreement (signed in 1993). They also regulate, among other operational parameters, the site's wastewater discharges (National Pollution Discharge Elimination System [NPDES] permit), certain hazardous and solid waste units subject to the Resource Conservation and Recovery Act (RCRA), and the site's air emissions. The Ohio Department of Natural Resources' Division of Water regulates the withdrawal of water by the Mound Plant from the Buried Valley Aquifer. The City of Miamisburg has not exercised regulatory authority at the site, as it continues to be owned by the federal government. The entire site is zoned industrial on the city's zoning map.

The regulatory landscape will change significantly as the site privatizes. For example, OSHA, city, and other regulators (including municipal water utilities, fire inspectors, building inspectors, enforcers of road specifications and others) may become involved in regulating construction, site modifications, and private activities. If private businesses engage in handling of radionuclides (as they might, given the special designs of some of the buildings and equipment), the Nuclear Regulatory Commission may play a role as to those businesses. Obviously, the USEPA and Ohio EPA will continue to regulate ongoing activities at the site, as well as monitor the cleanup.

Management Authority

The site is managed by DOE. DOE responsibilities are primarily Environmental Management -- specifically EM-60 (landlord and transition functions), EM-40 (environmental restoration), and EM-30 (waste management). However, other portions

of DOE have roles at the site. For example the Defense Program (DP) is involved because excess nuclear materials (e.g. tritium, thorium, etc.) are still stored on site and a receiving location must be found in order for planned cleanup activities (especially D&D of buildings) and the site transition to occur. Nuclear Energy, Science and Technology (NE) is responsible for ongoing programs in one complex of buildings, and may need to assume landlord functions or arrive at some other arrangement with the MMCIC in the future in order to continue its operations after the remainder of the facility is conveyed.

The site is operated for DOE by a contractor. The contractor at the time of the site visit in 1997 was EG&G Mound Applied Technologies; however, a new contractor was selected following a lengthy competitive process. Babcock & Wilcox was awarded the contract in September 1997.

The MMCIC manages a small but increasing number of buildings and business tenants under its lease with DOE. However, the MMCIC still receives utility services (heat, air, electricity, water, waste, wastewater NPDES discharge) and maintenance, security, and other services from DOE under the lease. The Mound Reuse Committee provides guidance to the MMCIC in decisions about business development and recruitment.

Both DOE and the city contemplate that MMCIC will become the site owner. The terms of the transition are uncertain, although they are expected to occur within the term of the existing lease (5 years, renewable for 5 years). MMCIC currently envisions that it will not operate the site indefinitely, but that it will seek to find purchasers for individual buildings and parcels of land; however, it recognizes that some provision will need to be made for common operational needs such as roads, and certain utility or maintenance services. Whether that role will be filled by MMCIC or some other entity is not yet determined and is likely to depend to a large extent on how rapidly reuse can be accomplished and on whether capital is available to handle these expenses.

Whether or not MMCIC takes ownership of the entire site, it is likely that DOE will retain continuing responsibility for some portions of the site – at least given USEPA's and Ohio EPA's view of DOE's continuing liability under CERCLA and the need to assure that the CERCLA remedy is complete. DOE will be involved long term, as well, with respect to the maintenance of facilities such as the T building where long term monitoring and controls are likely to be needed.

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Reuse Considerations

Industrial and technology-oriented reuse of the Mound site is contemplated by all the parties. The likelihood of such reuse occurring is chiefly dependent upon two factors: (1) DOE's ability successfully and timely to complete environmental remediation and D&D of the structures, and 2) MMCIC's ability to attract and maintain industrial and technological businesses, particularly during the period of shared occupancy with DOE and with ongoing DOE cleanup activities.

The first factor, in turn, depends upon the adequacy of the Mound Plant's budget over the period of the anticipated cleanup, and upon continued cooperation between and among DOE and the environmental regulatory agencies overseeing the cleanup activities under CERCLA. It also depends upon the timely removal of excess nuclear materials stored at the site. There is no destination for, or commitment for receipt of, these materials. Until this inventory is removed to another site, D&D and other actions cannot occur for the buildings housing this material. Similarly, a successful transition to private reuse also depends upon the timely removal of the transuranic wastes stored at the site. There is currently no repository available for receipt of these wastes.

The second factor is also critical, because if sufficient businesses cannot be attracted and maintained, the issue of management will shift from dealing with active reuse to management of a vacant or partially vacant facility. This may present quite different site security and physical maintenance problems. Furthermore, if the reuse cannot be *sustained*, it may become difficult to deal with management of buildings and other site infrastructure in the future – especially if DOE has completed most of its planned expenditures and shifted its priorities to other facilities.

Successful reuse of the Mound Plant will be profoundly influenced by general economic factors, such as growth (or lack thereof) in the national and Ohio economy, and in the manufacturing and technology sectors generally. It will also be affected by the ability of MMCIC and DOE to disentangle the centralized utility and physical plant operation in such a way that the resulting infrastructure results in reasonable operating costs and operational flexibility for the desired private re-users. The site is now covered with an array of above-ground steam pipes for heating and cooling the 130 buildings, has its plumbing linked to a self-operated NPDES discharge rather than to a public treatment works, produces and distributes its own water supply from wells, and does not have separately metered electric service for each structure. While this centralized, costly, and self-contained system could serve a single-owner governmental industrial complex, it is an obstacle for multiple user private enterprises.

Transitioning from a centralized system built for a single plant with a single owner to a system that makes sense for multiple independent businesses presents significant management issues for both MMCIC and DOE as they negotiate and implement the transition. It may be necessary to set up a new entity to operate certain of the services (such as wastewater treatment), while transitioning away from others to a decentralized approach (such as demolishing the central steam system and providing natural gas or electric heating and cooling to individual buildings). The MMCIC's conceptual plan for reuse -- which it intends to phase in over time as capital becomes available and tenants or purchasers can be attracted -- includes the construction of new roads to rationalize traffic flow, the removal of other unnecessary roads, the removal or substantial alteration of the current system of central utilities, and the likely sale of individual parcels of land and buildings to individual businesses. The potential for future earth-disturbing activities under this multiple user reuse scenario is quite high, thus requiring the creation of adequate institutional controls across the site to make sure that contaminated areas are not disturbed.

Specific decisions about reuses are being made by the MMCIC in the context of its internal planning and business recruitment process. The MMCIC also seeks advice from the Mound Reuse Committee. Consultations among MMCIC, DOE, USEPA, and Ohio EPA occur concerning the release of particular buildings or new areas for reuse. These require amendments to the master lease.

The Mound Reuse Committee provides guidance on particular reuses as issues are drawn to its attention by MMCIC or by member stakeholders. Not all business reuse opportunities and decisions are reviewed with the Mound Reuse Committee. For example, the start-up businesses and business incubator operations that involved primarily the lease of office space were handled by MMCIC on its own. However, some potential reuses have presented issues that resulted in wider discussion and review. For example, in 1996, a local official (and member of the Mound Reuse Committee) publicly announced that a cooperative vocational-technical school would locate in a Mound Plant warehouse building just inside the site's main entrance. Members of the public expressed concern about the suitability of this use, and the Mound Reuse Committee took it up for further review. It later developed that there was enough concern with contaminants remaining in and around that structure, and concern with potentially exposing minors to any hazard, that the proposal was withdrawn.

In another recent instance, a firm interested in recovering tritium from exit signs expressed interest in establishing operations at the site. MMCIC raised the issue for discussion with the Mound Reuse Committee, as this would have been the first reuse that might result in the introduction of new or additional radionuclides to the site. The committee expressed skepticism about the desirability of this particular business opportunity, and it was accordingly not pursued by the MMCIC.

Because of these two experiences, the Mound Reuse Committee prepared a guidance document to help it and the MMCIC evaluate future proposals and business opportunities that might present issues of this kind. The *Miamisburg Mound Interim Land Use Policy* is intended to "govern decisions regarding the recruitment, placement, retention, and expansion of all businesses and development activities" at the site under the auspices of the MMCIC until such time as the City of Miamisburg gains regulatory jurisdiction for imposing and enforcing land use controls over the site - viz. until completion of the transition from DOE ownership. Obviously, decisions made about reuses during the period of shared occupancy and authority have a strong potential to affect future reuses and possible exposures and risks encountered by occupants of the site in the future. The wording of the Policy suggests that the MMCIC expects city land use regulations to address many of these concerns after transition of the site from DOE control.

The critical issues are the coordination of cleanup with reuse in the near term, and the planning for successful reuse over the longer term. These, in turn, require the development and enforcement of institutional controls to prevent risk to workers and the public. Moreover, if the Mound Plant is unable to complete its cleanup and D&D activities in a timely fashion, thus leaving contaminated buildings and hazards in place for longer periods of time, this will adversely affect the likelihood of successful reuse of the site.

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Exploring the Decision Process - Environmental Cleanup and Institutional Controls

In order to understand the context for institutional controls at the Mound Plant, it is necessary first to understand how the environmental cleanup decisions are being made at the site under CERCLA. The approach adopted by DOE, USEPA, and Ohio EPA has made it possible to consider implementation of a phased release of the site for reuse.

The CERCLA Model and the Mound Experience

For sites on the National Priorities List (NPL), CERCLA requires the responsible party to perform a remedial investigation/feasibility study (RI/FS) of the site. This is intended to identify the hazards in detail and to determine what remedy should be employed. The remedy selection is then embodied in a record of decision (ROD), which is subjected to public comment and then finalized. Once the ROD has been approved, then the remedial actions occur, including necessary construction, and operation and maintenance of remedial facilities. Complex sites may be broken into smaller "operable units" (OUs) in order to facilitate this investigation and remediation process.

The process at Mound started out this way. The site was divided into nine operable units and preliminary work was done, including substantial identification of actions at several of the units. However, two circumstances of the Mound facility and its proposed cleanup did not fit the typical CERCLA model well.

First, the contaminants at Mound are dispersed widely – almost randomly – across the site at hundreds of release sites. This made it difficult to define coherent operable units – units where a limited set of remedies could be used consistently. The typical operable unit at a CERCLA site is a single landfill, or a plume of contaminated groundwater. And indeed, at Mound the operable unit concept is working reasonably well for the treatment of the contamination of the Buried Valley Aquifer, and for the cleanup of the offsite Miami-Erie Canal. But elsewhere on the site, the concept was forcing aggregation of separate releases with disparate forms of contaminants.

Second, the desire to expedite private industrial reuse of the site, and to allow reuse and cleanup to occur concurrently, led to a search for an approach that could accomplish needed cleanups more rapidly and allow phased releases of portions of the site. DOE, the City, and the environmental agencies believed that waiting for

completion of lengthy assessments and feasibility studies for large areas before taking any remedial action or releasing particular areas for reuse might have undermined the feasibility of the economic reuse plan.

The PRS or Mound 2000 Approach

In late 1994, DOE, USEPA and Ohio EPA adopted a new approach to the Mound CERCLA cleanup based on the "potential release site" (PRS) concept. The PRS concept (initially called "Mound 2000") is intended to deal with the fact that the contamination is ubiquitous and highly variable across the site. Instead of studying the entire facility (or large, distinct operable units), conducting an RI/FS, preparing a ROD, and only then conducting remediation activities, the new approach focused on individual PRSs in order to streamline both the evaluation and the cleanup process.

The process begins with identification of each PRS. Over 400 have been identified at Mound. A PRS evaluation package is prepared for each PRS site, drawing heavily on existing information and documentation on the releases that are present. The package includes evaluations of the data and recommended actions. These are presented to the public for comment, reviewed, and then finalized by agreement of DOE, USEPA and Ohio EPA. The outcome of this process puts the PRS in one of three "bins":

(1) no further assessment is required based on existing information (usually because the site does not require any response action to meet the agreed cleanup level);
(2) a response action is clearly needed, based on existing information; or
(3) further assessment is required to determine whether a response action is needed.

This process is intended to streamline decision-making by rapidly identifying situations where no action is needed; by allowing site staff to move directly to response actions on the basis of existing assessment information where this is possible without the need for further research; and by limiting the areas where resources will need to be invested in further assessment work. In order to deal with cumulative effects and to facilitate phased release of the site for reuse, the PRSs have been grouped into geographic "release blocks" (denominated A through S), that are much smaller than the former operable units. (In this context, "release" means release of the land from DOE for re-use, rather than release of a contaminant to the environment).

After completion of all response actions identified at all PRSs in each geographic release block, then a cumulative assessment is performed for the entire release block. This assessment is intended to determine that collectively the individual actions (or

decisions to take no further action) have resulted in protection of health and the environment based on a standard of industrial reuse.

The PRS approach used at Mound is not typical of CERCLA responses at NPL sites. Because the National Contingency Plan (NCP) requires USEPA and responsible parties to use the decision-making process described above as "the CERCLA Model," it will be necessary to conform the PRS approach to these legal requirements. Thus, it will still be necessary to prepare a record of decision (ROD) subject to the usual forms of review and public comment. Currently, the plan at Mound is to roll all of the PRS and release block decisions into two final RODs *after* the work has been completed. One ROD would apply to the onsite areas, the other to the offsite areas. The expectation is that both would recommend no further physical cleanup actions based on the completed assessments, removal actions, and other response actions taken during the PRS process. Then, as identified in the RODs, institutional controls would be put in place to ensure that the intended land use for which the remedies were deemed protective (viz. industrial use) is maintained and that incompatible uses are not allowed.

At the time of this study, the decision-making process at the site was focused almost entirely at the PRS level rather than longer term. To some extent, decision-makers were also considering how to prepare the release blocks that were expected to be made available for transfer first. The USEPA and Ohio EPA must approve transfer of each of the release blocks for their consistency with agreed cleanup levels. Decisions about possible institutional controls for these blocks may be made during the cumulative risk evaluation of each release block. The RODs are expected to provide a further opportunity to develop institutional controls that might have been missed, or that are site-wide in scope. However, as is discussed later in this report, the timing of these decisions may significantly affect decision-makers' ability to use certain kinds of controls.

Decontamination and Decommissioning of Buildings

An approach similar to the PRS / Mound 2000 is under development to manage D&D of the Mound Plant buildings, many of which will be retained for re-use. (Buildings that are decontaminated and *demolished* also undergo the PRS process to assess any environmental releases associated with the demolition as well as contamination of the subsoils underlying the buildings).

DOE managers at Mound have developed a building disposition process flowchart to reflect the decisional process on D&D and building reuse. Like the PRS process, the flowchart is designed to require the site managers to make initial decisions based on whether *existing* information is sufficient to conclude that each building's

condition is or is not protective of human health and the environment given the intended re-use. This assessment results in assignment of structures to one of three categories:

(1) recommendation for reuse of the structure with no further action,
(2) moving directly to a response action (e.g. decontamination, or decontamination and demolition), or
(3) further assessment required.

DOE decisions on possible reuse or demolition are driven by a cost-benefit analysis. Whether or not a given building is ultimately designated for reuse is, according to DOE, ultimately determined by DOE's three-member sale-of-site team after recommendation by the onsite D&D team. The flowchart contemplates a 30-day public comment period after a decision to decontaminate for reuse, or to decontaminate and demolish. The process provides for another 30 day comment period if the building is to be sold.

Conflicts have arisen between DOE and MMCIC over the reuse of particular structures and facilities. For example, DOE's cost-benefit analysis may call for decontamination and reuse of a building that the MMCIC wants to have demolished at government expense. Such situations arise over buildings that may be hard to lease or sell, or that may have high operating costs, or that are sited in a place wanted by MMCIC for a road, parking lot, or other infrastructure conducive to marketing the Mound Advanced Technology Center. Conversely, there are buildings that the MMCIC has identified for reuse that are currently slated for demolition by DOE in order to reduce costs. While these issues must be negotiated, they affect not only budgetary matters, but also the issues of risk and institutional controls.

Process for Decision-Making on Institutional Controls

Although DOE and the MMCIC are negotiating over reuse of the site and its facilities, other parties also have substantial influence on cleanup decisions. These decisions will affect the development and implementation of institutional controls. Among the key players are citizen groups and the environmental agencies. This section describes some of the players in more detail and points out where legal requirements to address institutional controls will shortly come into play.

Mound Environmental Safety & Health (MESH) is a grassroots citizens organization concerned with the health effects of the Mound Plant on the surrounding community. MESH has received a technical assistance grant (TAG) from USEPA to assist it in evaluating health risks and remediation strategies, and it has a seat on the Mound Reuse Committee. While deeply concerned with environmental exposures and

health risks, MESH supports reuse of the Mound Plant. It takes the position that an expedited and orderly transition to reuse of the site may result in less risk to the surrounding community than a slow cleanup accompanied by partial DOE abandonment of the facility. MESH also recognizes that residual hazards may need to be left at the site - not only because removal of all hazards may be so costly and difficult as to prevent timely reuse, but also because of a moral stance that acknowledges that Mound contaminants and radioactive materials disposed of offsite or at other DOE facilities may affect people and communities in those areas. MESH serves as the leading citizen group "watchdog" for the site.

The Mound Action Committee (MAC) is a community forum organized by DOE staff at Mound. Originally constituted to examine cleanup options at the Miami-Erie canal property and other former "operable units" at Mound, the MAC has evolved into a monthly meeting open to any citizen to discuss cleanup issues. Essentially, it is a forum hosted by DOE with participation by the public. In May 1997, DOE and Ohio EPA representatives proposed that the MAC thereafter add to its regular agenda a review of the PRS packages currently undergoing the public comment period. This would give the meetings a clearer function with respect to cleanup decisions. Thus, the MAC meetings serve as a forum to assure at least some public review of each PRS package, even if these might otherwise not be addressed by public commenters.

Under CERCLA, the USEPA and Ohio EPA need to review and approve cleanup decisions. They also have a key role in the development and approval of institutional controls, both in approving the cleanup documents (the PRS decisions, and the RODs) and by virtue of CERCLA's provisions in § 120(h) dealing with the transfer of federal facilities to non-federal ownership. DOE must, in any contract for the sale or transfer of real property on which a hazardous substance was stored, released, or disposed, include a notice of the type and quantity of the substance and the time when it was stored, released, or disposed. CERCLA § 120(h)(1). In the deed for transfer of the property DOE must provide the same information and a "description of the remedial action taken, if any." § 120(h)(3).

The deed must include a covenant warranting that "all remedial action necessary to protect human health and the environment with respect to any substance remaining on the property has been taken before the date of such transfer" and that any additional remedial action found to be necessary after the transfer will be performed by the United States. The deed must also contain a clause allowing the United States access to the property if further remedial action is found to be necessary after the date of the transfer. § 120(h)(3). These provisions do not require completion of the remediation, such as long-term pumping and treating operations, before transfer so long as the remedial construction is complete and operating properly, nor do they apply in the case of a lease. § 120(h)(3)(A),(B).

The USEPA, with the concurrence of the state governor, may allow deferral of the requirement to *complete* remedial action before transfer if the property is found to be "suitable for the use intended by the transferee, and the intended use is consistent with protection of human health and the environment." Deferral of the completion obligation is authorized only when "the deed or other agreement" for transfer provides for "any necessary restrictions on the use of the property" to ensure the protection of human health and the environment, and to ensure that remedial activities will not be disrupted. The deed or agreement must also provide that all necessary response action will be taken, and that adequate funding will be requested for completion of all necessary response action. § 120(h)(3)(C).

The relationship among these provisions and the PRS "release block" approach will be tested by DOE's decision to begin to make the first few release blocks available for sale or other transfer. DOE plans to make available both the undeveloped A and B parcels (on the south acreage of the facility), and the D parcel (on the eastern edge of the facility). The D parcel includes a building already occupied by the Thaler Precision Machine Company under a sublease with the MMCIC. Each of these parcels has some residual contaminants left in place under the PRS process. DOE officials responsible for the Mound Plant and DOE's Ohio Field Office (located at Mound) are contemplating the preparation of a sale of site document (initially covering only parcels A, B, and D). In May 1997, these DOE staff held an internal meeting to launch this process. Their preferred approach was to use Department of Defense (DOD) transfer documents as a template. Thus, the sale of site document for these blocks would likely include: a description of the purpose of the transfer, a property description, a discussion of regulatory coordination, National Environmental Policy Act (NEPA) documentation, environmental findings, conclusions, *recommended deed restrictions*, a finding of suitability to transfer, and checklist of factors considered.

DOE staff contemplated involving USEPA and the Ohio EPA after the initial stage of work toward pulling the necessary information together. After that point, according to DOE staff at the site, the public and the MMCIC would be consulted as DOE drove the transfer process forward.

USEPA and Ohio EPA clearly will play key roles in evaluating institutional controls in the context of cleanup. The formal role of the public comes in the form of opportunities to comment on: (1) the individual PRS package that contains the recommendation for no action or for cleanup, (2) the cumulative assessments at the completion of each of the release blocks, (3) decisions to offer buildings for reuse, and (4) comment on the RODs that will be prepared at the end of the CERCLA process. (The public also has an opportunity to comment on action memoranda/EECA decision documents related to specific removal actions.)

But compliance with CERCLA is not the only consideration in making decisions about institutional controls at Mound. In practice, institutional controls may not be limited to what USEPA, Ohio EPA, and DOE need to satisfy legal requirements. Such controls will also need to address issues of successful reuse and perceived community needs. This places a heavier burden on cooperative decision-making and discussion, and the kinds of issues emerging in the context of the deliberations of the Mound Reuse Committee. Indeed, the MMCIC is itself interested in controlling the reuse determinations and accompanying processes in order to make them consistent with its development goals for the site. These goals are not always the same as those of DOE which is seeking to end its involvement and limits its long-term liability. And the public, represented on the Mound Reuse Committee, the MAC, and acting independently, has additional objectives and priorities. If DOE can engage with these interest groups early enough, the transition is more likely to be successful and to incorporate the kinds of institutional controls desired by all the parties.

Some early indications of how institutional controls will be developed are already evident. As the next section shows, the Mound Reuse Committee appears to be a key forum.

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Institutional Controls at the Site

This section looks at the substance of existing and proposed institutional controls at the Mound site. These controls relate back to the residual hazards discussed earlier in this case study, and include the reuse considerations also discussed above.

This section first identifies the controls that are currently in place. Then it identifies other controls that are under consideration as the cleanup and site transition move forward. Finally, it describes several other controls that may be considered for use at the site, based on the goals of the various parties.

What Institutional Controls are in Place at This Time?

Because the MMCIC and its sublessees are currently engaged in reuse of portions of the site, concurrently with continued DOE uses and cleanup activities, some institutional controls are currently in place.

Lease controls

In 1994, DOE made a Finding of No Significant Impact (FONSI) based on its environmental assessment under NEPA of the decision whether to lease portions of the Mound facility to the MMCIC. The FONSI stated explicitly that "[a]ll leases and subleases would contain restrictive lease conditions to ensure no new radionuclides would be introduced to the site..." Further, it stated that all leases and subleases "would contain restrictive lease conditions to ensure compliance with regulatory requirements and to ensure that the proposed users are within the bounds of the environmental assessment." *While the latter conditions were included in the MMCIC master lease, the former were not.* However, the lease does contain DOE approval conditions for subleases that could address these issues.

The master lease has a number of provisions that serve as "institutional controls" on MMCIC activities, but not on DOE operations. The MMCIC must obtain the written permission of DOE before using the property for other than the agreed industrial and commercial reuse purposes, and must present any potential sublessees to the Government for approval prior to any sublease. The lease is not assignable nor may subleases occur without the prior written consent of the Government.

The lease provides that the MMCIC and its sublessees "shall comply with safety and health regulations applicable to commercial and industrial businesses" including

regulations of other federal agencies, the state, and local government. Sublessees must obtain necessary environmental permits and remain in compliance with them in all respects. Violations of permit requirements that result in fines and penalties are the responsibility of MMCIC and the responsible sublessees. If the MMCIC fails to comply and does not thereafter take appropriate measures to achieve compliance with any of these obligations, DOE has the right to stop its operations.

The lease further provides that upon expiration of the lease, all leased property will be returned to DOE in the same condition of environmental cleanliness (as defined in the lease exhibits). All costs of achieving that condition are to be borne by the MMCIC. This provision is intended to assure that DOE does not assume responsibility for any new contamination caused by the MMCIC and its tenants.

The lease provides that the MMCIC is not permitted to make permanent physical alterations to or installations upon the property without the written approval of DOE. The MMCIC also agreed to indemnify the Government for any MMCIC or sublessee release of hazardous substances, failure to comply with environmental laws, and the transportation, deposit, storage, or disposal of hazardous substances or petroleum off site.

DOE retains access to the leased property for any purposes, including inspection, maintenance, repairs, emergency response and other activities of the DOE, and reserves the right to grant additional easements or rights of access that it shall determine to be in the public interest (provided, however, that such additional rights shall not unreasonably interfere with MMCIC's right of peaceful occupancy under the lease).

One event that occurred during the course of MMCIC's occupancy sheds some light on the operation of the lease provisions. DOE's wastewater treatment facility for the Mound facility experienced violations of its NPDES discharge permit – specifically a discharge of copper in excess of the facility's permit limits. DOE notified the MMCIC and the parties traced the likely source of the exceedance back to an industrial tenant of MMCIC's. The tenant took measures to correct the problem. In effect, the lease terms could be said to have worked as contemplated. This case is made even more interesting, however, by a possibility raised in the context of the investigation – the speculation that the actual source of the copper discharge might not have been material introduced by the new industrial tenant, but rather was residue from prior DOE operations dislodged by the new tenant's discharge.

The possible disturbance of residual contamination is a classic problem for the design of institutional controls. In this instance, the lease terms – and the ongoing business relationship between DOE and MMCIC – were sufficient to assure that the problem was remedied by the tenant without leading to a conclusive determination of

whether the copper was actually new material or residual contamination. But if the Mound site is privatized by sale, and particularly if individual buildings or parcels are then sold to industrial users, lease terms will not be available as enforceable mechanisms. Necessary issues will need to be resolved by deed restrictions, access agreements, covenants, or other types of controls.

Interim Land Use Policy

A second, informal, level of institutional control recently put in place is the *Miamisburg Mound Interim Land Use Policy*, drafted by the Mound Reuse Committee in 1997 to guide its decisions on business development. The Policy identifies 15 categories of authorized reuses. These are primarily industrial and technological businesses, but also include office and support services for such businesses. The Policy also gives general guidelines for site planning and design. It establishes general performance standards, including avoidance of hazards and pollution, and includes requirements applicable to the use of radioactive materials in these businesses. The requirements relating to businesses using radioactive materials include provisions mandating the removal of all radioactive wastes, compliance with state and federal laws and regulations, and requirements that a radiation safety plan (with a probable risk analysis) be prepared in connection with the permitted use.

The Policy's "institutional" mechanism is its final article, "Administrative Procedures." This article prohibits any business from receiving "a lease, conveyance, or other permission to conduct activities at the Mound" site unless the business has been issued a "Certificate of Appropriateness." The certificate may be issued by either an Administrative Review Committee (consisting of the president of MMCIC, the chair of the Mound Reuse Committee, and the City's Director of Planning and Development) or by a majority vote of the Mound Reuse Committee. The Policy is to govern decisions only "until the City of Miamisburg obtains jurisdiction for Land Use Regulation of the Site."

Off-site removal easement

One might expect to see current institutional controls in connection with the cleanup of the plutonium contamination from the off-site, city-owned Miami-Erie Canal property. DOE is excavating and shipping contaminated soils to Utah for disposal at Envirocare. This material is being removed in accordance with a decision made by DOE, USEPA, and Ohio EPA, with public review. The public review included formation by DOE of a Canal Focus Group, which later became the MAC. The cleanup is intended to allow the return of the property to public recreational use. Although the site is off-limits to the public during the cleanup, neither the cleanup decision nor the

implementing agreements include any provisions for institutional controls upon completion of the removal action.

Access for the cleanup was provided by a set of agreements signed by the City and the United States in September 1995. These included an easement providing DOE access to the property for up to five years, and requiring return of the property to park uses after completion of the remedial action. The agreements provided for DOE payment of $4.6 million to the city, of which $1.63 million was attributed to the easement. The remainder was allocated to the construction of a replacement community swimming facility elsewhere in the city, and to other purposes. DOE and the city agreed to defend and indemnify each other for any claims or expenses resulting from their own actions at the site. Neither the agreements nor the easement included requirements limiting the city's subsequent use of the property, apparently given both parties' understanding of the intent of the cleanup and the currently intended recreational use – which is based on public use and exposure to the surface, not subsequent redisturbance of the subsurface and/or permanent occupancy. DOE site staff maintain that if the future land use is defined and the cleanup meets the intended land use without restrictions, institutional controls are not needed. If any institutional controls are determined to be needed in the future, they would have to be imposed in some other way than under the existing easement, and would, consequently, require the consent of the city.

What Institutional Controls Have Been Definitely Selected for Implementation at Some Future Time?

At the time of the site visit in 1997, no institutional controls had been definitely selected for use at the site. All of the parties recognized that some institutional controls would be needed. As discussed in the following sections, certain specific institutional controls have become highly likely.

The factor which brought institutional controls to center stage in 1997 was the desire of DOE and the MMCIC to accelerate the reuse schedule to accomplish a rapid transfer of the site and to increase the magnitude of private industrial reuses occurring concurrently with cleanup activities. This, in turn, prompted the environmental regulatory agencies to look more closely at what would be needed to satisfy their objectives of assuring that exposures during reuse of the site are consistent with the level of cleanup selected under the PRS/Mound 2000 approach (viz. cleanup to industrial reuse standards).

As noted above, in May 1997, DOE began internally to consider the phased conveyance of release blocks A, B, and D in advance of the site as a whole. Although

these parcels are less complex and somewhat less contaminated than other parts of the facility, institutional controls will be needed to ensure that the future uses are compatible with decisions to leave certain contamination in place. For example, the relatively undeveloped B parcel has trichloroethylene (TCE) in the soils potentially affecting the shallow bedrock groundwater. These levels are higher than the Maximum Contaminant Level (MCL) allowed under the Safe Drinking Water Act; so future use of groundwater on this parcel for drinking water purposes cannot be allowed. There is also some thorium in the soils. While this is at levels below the acceptable risk range for industrial reuse, it will be necessary to assure that this material is not encountered in the future in a manner which creates a risk.

Decisions made during the preparation of documents for these first parcels are likely to influence future decisions about institutional controls on the remainder of the site. The larger issues relating to selection of institutional controls for the entire site are discussed in the next section.

What Institutional Controls are Under Consideration?

Although no long term institutional controls have been put in place, discussions of particular controls began among the parties in 1997. This discussion first emerged in the Mound Reuse Committee, which is the broadest representative forum dealing with reuse issues on a regular basis. Discussions have focused primarily on two kinds of institutional controls: deed restrictions and local land use regulation. A third kind of institutional control, providing for the possible long term monitoring and maintenance of the T building (if it is left in place) was identified by DOE staff and raised in the Mound Reuse Committee midway through 1997.

Possible deed restrictions (May 1997)

In the spring of 1997, an informal, one-page discussion paper was prepared by Ohio EPA's representative to the Mound Reuse Committee in order to stimulate discussion of deed restrictions necessary to support the agreed cleanup level, which is based on industrial reuse. The Ohio EPA discussion paper also identified some institutional control ideas that had been developed informally by DOE staff at Mound.

The document suggested two "known deed restrictions" and four "potential deed restrictions." Despite this terminology, whether a "deed restriction" or some other form of institutional control would best serve each of the identified interests had not yet been determined. Deed restrictions were proposed simply because they were the most familiar form of institutional control. Also the descriptive identification of "known" versus "potential" restrictions reflected only the views of the preparer of the discussion

paper as to the level of implicit understanding among the various parties to the site cleanup at that time, not any formal or agreed-upon designation.

As described in the discussion document, the first "known deed restriction" would restrict future uses of the site to *industrial* uses consistent with the Mound 2000/PRS approach. (This approach, as described above, leaves low levels of contaminants in place in various locations across the site, and premises its risk calculations on exposure pathways consistent with industrial reuses). The discussion document identified uses that would not be consistent with this approach: residential property, child care facilities, farming, and non-adult education. If put in the form of a deed restriction, presumably these uses would be specifically proscribed – either outright in perpetuity, or subject to some detailed review and release process.

The second "known deed restriction" would prohibit the installation and use of *potable water wells* in the fractured bedrock area of the property (areas outside of the Buried Valley Aquifer). This recommendation was based on (1) the ubiquity of contaminants in the many PRS areas that are to be left in place because they are below response action thresholds, and (2) the lack of any substantial assessment of groundwater presence or quality in this area. The groundwater in the fractured bedrock area was not assessed in any detail during the PRS process largely because of the intended industrial reuse of the site, and the likelihood that any water wells installed on site in the future would be developed in the more productive Buried Valley Aquifer rather than in any marginal waters that might be in the fractured bedrock.

It is worth noting that although the second proposed deed restriction would prohibit future development of water wells in the fractured bedrock area, there was no initial discussion about institutional controls relating to future use or development of water in the Buried Valley Aquifer. Known VOC contamination in that aquifer is being addressed by a pump and treat system. Current treatment has evidently prevented contamination of Mound's water production wells. Appropriate institutional controls needed after this treatment, if any, have not been identified – possibly because the source of contamination and the likely treatment endpoint have not yet been identified.

The four "potential deed restrictions" proposed for discussion all dealt with future excavation that might occur on the property after conversion to private reuse. The potential for earth moving may be quite high if the complex evolves, as planned, into a multiple owner or multiple tenant industrial and technological center. Such a development will likely require numerous modifications for services, construction and maintenance of parking areas and roads, a retention of the ability to modify existing facilities to serve the needs of future owners or tenants, and a process of phased development and construction of new facilities on vacant portions of the property.

The first potential restriction proposed for discussion would have prohibited all excavation in specific areas of the Mound facility (still to be identified). This kind of provision would be intended to deal with possible exposure of workers, site occupants, and visitors, to materials in the landfills and other PRS areas that may present particular hazards. Such a prohibition would reduce operational flexibility by the re-users of the site, but would provide clear limits on excavation in particular places. At the same time, assuring that the limits defined by such a control could be readily discerned on the ground by future users presents some difficulties. For example, if an excavation prohibition were described by metes and bounds or on a plat exhibit, it may be difficult for someone conducting allowable excavation on the site to recognize when he or she has strayed into a prohibited area, unless there is some way to assure that the excavator has actually consulted the deed.

The second potential restriction identified would complement the first. It would have prohibited the further subdivision of areas with excavation restrictions. In theory, this provision would decrease the likelihood of future excavations by owners much later in the chain of title who might be less aware of, or attentive to, excavation deed restrictions initially attached to a larger parcel.

A third potential restriction proposed in the discussion document would have provided that in *all* areas of the site, any allowable excavation or drilling must be conducted with monitoring by a qualified health physicist and industrial hygienist. Such a requirement might help deal with those areas of minor contamination not covered by an outright prohibition, and might also help assure that someone is paying attention to the boundaries of areas where the first potential restriction applies. It is reasonable to assume that a monitor engaged in connection with an allowable excavation might have a reason to consult deed restrictions and other records to determine what materials might be encountered, and hence increase the likely effectiveness of an excavation prohibition.

The fourth potential restriction offered for discussion would have required any transportation of contaminated soil or building debris outside the boundary of the Mound parcel (as it existed in 1997) to be monitored and approved before transport, in order to avoid dissemination of contaminants throughout the community or elsewhere by subsequent owners or users of the site. The discussion document did not propose by whom the monitoring or approval would be done, partly in order to allow full discussion of the issue by the Mound Reuse Committee.

Possible deed restrictions (October 1997)

Starting with the discussion paper, the parties began discussing, negotiating, and modifying the proposed deed restrictions. By October, the six restrictions identified in

May had become seven. Several had been dropped, others had been added, and several had been modified.

At the same time, DOE's effort to move ahead rapidly on release blocks A, B, and D had not moved as quickly as it had hoped in May. This was partly because of the need to work out a process for such release (and to integrate the site's new contractor into that process), and partly because agreement had not yet been reached on the terms of the proposed deed restrictions – which were assuming a larger role in everyone's calculations as the reality of a site transfer drew closer. Institutional controls would be needed, would set a precedent for other portions of the site, and would need to be consistent with decisions being made as to the entire site.

This section summarizes the seven restrictions under discussion as of October 1997. They are an interim product, not agreed to by all parties, and to some extent still fluid. Because their acceptability to the various parties is closely linked to the issues of the terms of conveyance (particularly funding and liability), the extent to which DOE will agree to fund site improvements desired by the MMCIC, and certain contingencies of the CERCLA cleanup and the D&D of buildings, they represent a negotiating stage along the way. Nevertheless, the likely fate of certain proposed restrictions has become more apparent with the passage of time.

The first deed restriction proposed in May remains largely the same. It would prohibit non-industrial uses of the site, reciting the fact that the cleanup decisions are based on exposures for a subsequent industrial use. As in May, it specifically proscribes four uses: residential use, child care facilities, farming, and non-adult education. This proposed restriction appears highly likely to appear in any final conveyance documents as it is not inconsistent with anyone's plans for the site.

The second deed restriction, dealing with the shallow bedrock groundwater, was refined for clarity. It would now prohibit the development of wells for potable use anywhere onsite *except* in the Buried Valley Aquifer. This restriction too appears quite likely to be adopted in any final conveyance. This, too, does not conflict with any significant plans. Water well development in a poorly producing groundwater area with some variable contamination is not attractive on its own terms given the proximity of the highly productive Buried Valley Aquifer (and the further option – under consideration – of tying into the city water supply and abandoning the Mound Plant's production wells).

In order to complement the second deed restriction and to address an issue not addressed in the May list, the parties are discussing a (new) third deed restriction. This would prohibit the installation of new wells for potable use *in* the Buried Valley Aquifer until completion of certain cleanup activity (such as the OU1 area) which might affect

the quality of the Aquifer on site. The need for some kind of controls on the use of the Buried Valley Aquifer is perceived as temporary, since any CERCLA cleanup of the site will need permanently to protect the integrity of this aquifer, which is extremely important on a regional basis. At the same time, the regulatory overlay – including Safe Drinking Water Act requirements, and Ohio requirements relating to the installation of producing wells in the Buried Valley Aquifer – takes some of the pressure off needing to do all of the control and protection of future users through a "deed restriction" approach. A deed restriction of limited duration may be acceptable to the various parties, moreover, because it does not prohibit continuing use of the existing onsite production wells in the Aquifer and because of the possible option of connecting to city water.

The fourth restriction proposed for discussion would prohibit all excavation in specific areas of the Mound facility, still to be identified. As in May, the specific areas would be identified as the PRS process succeeds in characterizing the contamination in specific areas. It is likely that such areas will include the landfills. The proposed restriction (in the May discussion paper) prohibiting subdivision of parcels with excavation restrictions was apparently dropped as not needed. It would have clouded the marketability of the title while not clearly providing meaningful benefit. Another of the May proposed restrictions was also dropped. It would have required monitoring of all allowable excavation or drilling by a qualified health physicist and industrial hygienist. The parties decided that such onsite exposures could be adequately controlled by other means, including health and safety regulations.

The fifth restriction, an outgrowth of the last "potential restriction" proposed in May, would impose detailed requirements on the future transportation of contaminated soil or building debris outside the boundary of the Mound site. The brief description in May has expanded to approximately a page of limitations, including monitoring and reporting requirements, assessment of contaminant levels, tracking of the volume of material moved, and other provisions sought by (among others) the Ohio Department of Health. Interestingly, the MMCIC has raised concerns with the appearance of this level of detail and the length of these provisions if expressed as a deed restriction. In particular, putting these lengthy requirements on the face of the deed may impair the market attractiveness of the site to potential purchasers and tenants. Unlike mere prohibitions on digging up particular areas (common enough deed restrictions in the general commercial context given underground utilities and areas of soil instability), detailed requirements relating to contaminant assessments, tracking, monitoring, and the like may be read by potential re-users as a red flag – a warning that, despite the release of the site for reuse, there may still be potential dangers to worry about. Such provisions may turn normal buyer wariness into decisions to locate somewhere else. Although there is no great expectation that the Mound site will ever be a desired source of fill for disposal or use off-site, the possibility that material may leave the site has

given rise to the proposal of a deed restriction. Whether such concerns could be addressed by other means, including regulation of excavation and transport, or other mechanisms that are not on the deed; or whether a complete prohibition in the deed of offsite disposal might be seen as less adverse to marketing for reuse; are issues that may receive further attention.

The sixth proposed deed restriction would deal with the T building. It is still under development. It was recognized, however, that if there is a need for monitoring and maintenance (and response capabilities) for a 100-year period, a deed restriction – or easement, or limitation on the interest conveyed, will be needed to enable these activities to occur.

The seventh proposed deed restriction would provide a right of access for regulatory agencies, so that they could respond to site conditions without relying solely on regulatory authorities (which may change or which may provide too narrowly limited authority to address all necessary situations).

It is likely that deed restrictions will be a substantial part of the mix of institutional controls used at the Mound site. If deed restrictions are used, it will be important to give some attention to how they can be made most effective. The mere recordation of a deed restriction does not itself assure that future users of the site will adhere to the restriction at all times and with respect to all uses.

The concern for the effectiveness of deed restrictions may be particularly acute for restrictions on excavation - a circumstance in which looking up the property deed is not a typical act for the excavation contractor. Deed restrictions can be made more effective if there are supplemental institutional mechanisms designed to call attention to the restrictions. Thus, for example, a city ordinance requiring an excavation permit or grading permit, and imposing a requirement for submittal of a copy of the deed with the permit application, could increase the likelihood that a future user of the site would be aware of the relevant restriction.

A related issue is the enforceability of a deed restriction. Normally, such a restriction is enforceable only by the grantor (in this case, the United States) and the grantor's successors in interest (where parcels of property are conveyed in separate transactions). It may be desirable to ensure that the restrictions are enforceable by a number of entities (including, but not limited to, the state of Ohio and the United States) in order to increase the likelihood that compliance will be enforced. As discussed under "additional institutional controls," below, the use of alternative mechanisms such as covenants can provide a mutual enforceability of obligations that may be desirable for some purposes.

Local land use regulation

Other institutional controls that can be anticipated at the Mound site include local land use planning, zoning, and regulation by the City of Miamisburg. Some zoning is in place and will apply to activities once the land exits federal control. The current zoning for the entire site is industrial.

The Miamisburg Mound Reuse Plan, prepared by and for the MMCIC, calls for the enactment of "a zoning provision that creates a special planned development zone" for the Mound site. The Plan further recommends that the City of Miamisburg adopt a development review process for all projects to be accomplished with the zone. The process would require city review and approval of all projects, requiring the issuance of a special permit in order for a project to proceed. The proposed review and approval process would be guided both by the comprehensive reuse plan and by a set of "design standards, which should be formally adopted by the City." The Reuse Plan also recommends that the review and approval process be administered by a "Design Review Committee" established by the City and MMCIC.

The MMCIC has requested formal city council adoption of its Reuse Plan as part of the city's comprehensive plan in order to expedite future review of activities consistent with the reuse plan. Legal adoption of the plan would also strengthen MMCIC's hand in dealing with DOE over the transition, because the plan contains requirements relating to infrastructure improvements and upgrades, and conditions for the acceptance of buildings for reuse.

Whether or not a special district is adopted or the MMCIC's recommendations for review procedures are implemented, some land use controls will operate automatically because the city has adopted basic land use laws. Subdivision and development activities will need to be reviewed by the city's planning commission. Building permits, site plan approval, and use and occupancy permits will be required. Thus, after transition from federal ownership, any further subdividing of a parcel must be approved, as must construction and development activities on the parcel. This can offer an institutional safeguard to help assure that site users are on notice of residual risks and a point of contact for changes in land use, which can help reinforce other types of institutional controls.

It is important to note that zoning and other municipal restrictions can be changed without the consent of property owners (or former property owners or easement holders). Thus, while zoning regulations and other land use controls imposed by the city may offer practical means to review and oversee changes in site uses, they do not have the legal durability of property-based institutional controls like deed restrictions. On the other hand, they do have clear enforcement mechanisms, and an

ongoing regulatory character that makes it more likely that land users will be on notice of limitations.

Monitoring, maintenance, and management

Apart from deed restrictions and local land use regulation, certain institutional controls will be needed to deal with any contaminated structures left in place. At present this has been examined only in preliminary fashion for the T building, where the Ten Year Plan recommends letting it remain in place while tritium decays over a 100 year period.

A 1996 pre-conceptual engineering study comparing decontamination and decay-in-place options for the T building assumes the need for institutional controls for the decay-in-place option. These are defined as (1) building maintenance, (2) site security, and (3) environmental monitoring. The values used for estimation purposes assign 24,000 labor hours to these functions over 100 years, at a presumed cost of $5.2 million (not discounted). The breakdown estimates for each year are 40 hours of safeguards and security, 40 hours of air monitoring, 80 hours associated with interior inspection by remote camera, and 40 hours of sampling and monitoring groundwater wells; plus a 200 hour inspection conducted every five years to verify structural integrity of the building. While these numbers cannot be relied on beyond gross identification of likely needs, they do give some indication of current thinking about likely human controls needed should the building be left in place.

Identification of an avenue for consistent funding of these actions, and identification of a particular entity or entities to which these duties could be assigned, had not occurred at the time of the site visit. Fundamental decisions about the disposition of the building and its role in the transition to reuse remained.

Monitoring, maintenance and management needs with respect to the rest of the site had not been identified in detail. The assumption about privatization and reuse of the entire facility assumes the active presence of people on the site, and limits on their actions are currently being thought of in terms of the deed restrictions and land use regulations identified above.

What Additional Institutional Controls May be Considered?

Other institutional control instruments may be considered for use at the site. Deed restrictions have advantages of durability, and they provide formal notice to subsequent purchasers and financers of development activities. But they also have limitations. They are only enforceable by those in the chain of title. And deed records

are not always consulted before activities are undertaken by those who are currently occupying a site.

Based on ELI discussions with the particular parties involved at Mound, alternative or supplemental institutional controls may include some of the following tools. However, none of these have been analyzed or discussed among the parties, who have chosen to focus first on "deed restrictions" and, to a lesser extent (primarily the City and the MMCIC) on local land use regulation.

Restrictive covenants. Restrictive covenants are agreements made among landowners to limit uses. They are enforceable mutually by all the beneficiaries. Thus, any owner may maintain an action in court to compel any other owner to comply. Mutually restrictive covenants differ in some respects from some other deed restrictions. For example, the purchaser of lot A can enforce against the purchaser of lot Z, even though the latter purchaser acquired the land later from the original common owner. Such covenants have been used to control land uses and owner activities where land has been subdivided among many owners; they are used primarily to maintain common restrictions across the community. In Ohio, where such restrictions appear "in a final subdivision plat, they can be enforced by a governmental agency. But, where they do not, then only the beneficiaries of the agreement [viz. the other property owners] can enforce the restrictions." (Meck, 1995, at T 2.5). Thus, although covenants can be created voluntarily by owners after subdivision, it is important to create these covenants early (before subdivision) if broad enforceability is to be assured. Where a covenant restriction is not recorded in the land records, it cannot be enforced against a subsequent purchaser without actual notice of the covenant. Finally, under Ohio law, restrictive covenants are not enforceable against public bodies that have the power of eminent domain; thus they cannot bar government agencies such as cities or certain state and federal entities from taking actions inconsistent with the covenant if they are acting through the exercise of these powers.

Conservation easement. The state or some other entity could hold a conservation easement or similar easement interest across the site allowing it to enforce certain obligations against successors in title. This kind of deed restriction could be used to assure access for monitoring, maintenance, and cleanup purposes, or to create affirmative obligations such as notice requirements and refraining from actions incompatible with the residual hazards left in place. Such easements can be assigned to parties not in the chain of title for the parcel of land, thus potentially broadening the prospects of enforceability.

Institutional manager. The MMCIC is considering creating an association to manage the infrastructure and common space for the site. Such an entity could also be granted the authority to enforce any covenants or assigned any rights retained by DOE

as original landowner to enforce deed restrictions inserted by DOE into the titles of individual parcels of land.

Trust fund. Assuring environmental management, maintenance, and the ability to confirm continued compliance with restrictions over the long term is dependent in part on the availability of funding for such functions in the future. Various financial mechanisms could help increase confidence in the success of any long-term commitments. One mechanism mentioned in interviews was a trust fund. Such a trust fund could support necessary monitoring activities by an entity for the period(s) of concern -- whether DOE, MMCIC, a successor organization, a contractor, USEPA, Ohio EPA, or some other entity charged with specific duties. Note that even successful industrial parks often have a lifespan in the decades rather than 30 or more years. Thus, institutional controls need to be assured beyond the expected life of the immediate industrial reuse. The consideration of a 100-year budget for monitoring and maintenance of the T building under one of the pre-conceptual engineering scenarios is also consistent with an approach of this sort. It could be possible to have one entity serve as the fiscal agent or fiduciary for such a fund, and another entity to draw on or be able to draw on it as required.

Regulatory requirements. As noted, local land use regulation is expected to play a role in assuring that only industrial uses are authorized for the Mound site. But regulatory controls can address other issues. For example, state regulations could be adopted requiring notice to some entity or entities before digging anywhere on the site. Such requirement might be supplementary to any deed restrictions also imposing such limitations. Existing Ohio regulatory law currently would prohibit digging into the OU1 landfill, for example. Similarly the sinking of new water wells into the Buried Valley Aquifer would require notice and approval from the state under existing water use laws. However, reliance on a regulatory requirement raises the issue of how an actor becomes aware of the requirement, how violations are to be discovered, and how the regulation is to be enforced. Regulations appear likely to play a supplemental or backup role at the Mound site.

Other tools could be thought of, but the ones identified above were mentioned during interviews.

Institutional controls are emerging in the context of cleanup and reuse discussions. Given the orientation of DOE, USEPA, and Ohio EPA toward meeting federal and state cleanup requirements, more thought has been given to the content of institutional controls than to alternative approaches of structuring them or ways to make them more effective. "Deed restrictions" has been adopted as the catch-all term for such controls. It may be useful for the various parties (including these, but also including the MMCIC, MESH, MAC, the city, and others) to seek additional expertise

from sources familiar with development restrictions, long-term covenants, and site-operating entities. DOE expects to receive some of this assistance should it involve the General Services Administration in the transfer of the site. The MMCIC is thinking in these terms, and the Ohio EPA is also cognizant of the need to assure that controls can be structured and designed with greater care once the parties reach agreement on the kinds of activities and threats to be protected against.

The process for identifying, selecting, and applying institutional controls at the Mound site appears to be moving in a direction of substantial public involvement in decision-making. Such participation is likely to create more resilience in the institutional controls that are ultimately selected, as more parties will be aware of them and have a stake in their continuing effectiveness. At the same time, the move toward rapid reuse concurrently with cleanup makes it essential that institutional controls are created and implemented as rapidly and effectively as possible. The addition of some real estate and development expertise to the process of developing institutional controls may provide some value as the options are explored and developed further.

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Art Kleinrath, DOE On-Scene Coordinator, Mound Plant.
Brian Nickel, Ohio EPA.
David Porco, Econ. Dev./Strategic Planning, Ohio Field Office.
Craig Scott, DOE, Germantown, Sale of Site Committee.
Debbie White, Environmental Remediation, Mound Plant.
Attended Ohio Field Office and DOE Mound meeting on requirements for sale of property, May 27, 1997

Reviewed all press clips (multiple volumes), in the Mound CERCLA Reading Room, Miamisburg Senior Center.

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