UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VII
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

NOV 1 2000

Ms. Sharon Cotner, Project Manager
U. S. Army Corps of Engineers
8945 Latty Avenue
Berkeley, Missouri 63134

Dear Ms. Cotner:

Re: Draft Feasibility Study and Proposed Plan for the North County Site

The Environmental Protection Agency (EPA) has completed its review of the subject documents. EPA's comments are attached. Note that many of the comments, though made only once, apply to both documents and several places within each document where the same information is presented. We have also enclosed a copy of the memo dated February 18, 2000, containing comments we received from EPA's National Remedy Review Board on this site. We request the Corps' assistance in responding to these comments as well.

Thank you for the opportunity to review these documents. Please call me at (913) 551-7710 if you have any questions or if you would like to arrange a meeting to discuss these comments.

Sincerely,

Daniel R. Wall
Remedial Project Manager

Enclosures

cc: Larry Erickson, MDNR (w/ encl.)
MDNR Field Office (w/ encl.)
St. Louis FUSRAP Oversight Committee (w/ encl.)

EPA Comments
Draft Feasibility Study and Proposed Plan
St. Louis North County Site
(October 27, 2000)

General Comments:

1. The draft Feasibility Study (FS) contains numerous discussions on the distinction between contaminants from FUSRAP-related activities and contaminants from non-FUSRAP-related activities, and on how the ACE will cleanup one and not the other. EPA is not in full agreement with the way this matter is presented.

   Under the Federal Facility Agreement (FFA), the ACE is committed to addressing contaminants associated with uranium manufacturing or processing activities, and other contaminants which have been mixed or commingled with the wastes resulting from uranium manufacturing or processing activities. Therefore, the described approach characterized by statements such as "Chemicals found not to be linked to FUSRAP-related activities will not be considered COCs, nor will they be considered in the evaluation of alternatives....", may not be appropriate. Also, the FS appears to present a higher standard for categorization of contaminants as FUSRAP-related than is contained in the FFA, i.e, *chemicals known to be used in the uranium process* is potentially less inclusive than *chemicals that may be reasonably associated with uranium processing activities.*

   The summary information on nature and extent of contamination tends to avoid presenting any findings related to contaminants not considered to be linked to FUSRAP related activities. In our view, significant findings should be presented even if ultimately determined to be outside the scope of this action.

   Lastly, the general manner in which the FUSRAP-related issue is handled tends to create the impression that significant or wide-spread contamination problems were encountered but are not being discussed because they are not FUSRAP-related. We don't believe this is generally an accurate impression.

2. Groundwater --EPA does not necessarily disagree with classification of the shallow groundwater unit as IIIA based on low yield and poor water quality, however, this appears to be more of an opinion than a technical conclusion supported by data. Under the groundwater classification system, a potential source of drinking water is one which is capable of yielding a quantity of water to a well sufficient for the needs of an average family (approximately 150 gpd). The case for insufficient yield could be made, for example, by using something as simple as a bail test to infer daily yield and then comparing against the daily needs of an average family.

3. The feasibility study portion of the FS does not present certain important information, and in some ways is not well constructed to bring out some of the key trade-offs. For

example, every alternative has a substantial off-site disposal component and no true on-site disposal option is evaluated. This makes it more difficult to draw distinctions between on-site and off-site options. Cost breakdowns that distinguish between capital costs and annual O&M costs are not made a part of the analysis. The trade-off in costs and uncertainties associated with maintaining institutional control versus cleanup to unrestricted standards are not sufficiently clear.

4. Institutional Controls (ICs) –For EPA, ICs are non-engineered instruments such as administrative and legal controls that limit use. As such, site security measures such as fences, signs, etc. are not considered ICs.

   The current guidance on ICs emphasizes the use of enforceable and overlapping controls. Current guidance also emphasizes the need to evaluate potential ICs with the same rigor as other remedial alternatives. The FS is not developed in sufficient detail to make decisions about ICs. Without knowing more specifically how the ICs would be implemented and what long-term monitoring would be necessary to assure compliance with those ICs, the ACE can not effectively evaluate either the implementability or the long-term costs of using ICs to limit potential exposure. For your information and use, enclosed is a copy of OSWER Directive 9355.0-74FS-P, *Institutional Controls: A Site Managers Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups; September 2000.*

   In our view, a detailed evaluation of ICs identifying limitations, uncertainties, and long-term costs is particularly important in this case given that the ACE's preferred alternative is the more costly cleanup to unrestricted use standards in a setting where the reasonably anticipated future land use is considered to be largely commercial/industrial. We believe a more detailed evaluation of ICs would assist the ACE in making the case.

5. Cleanup Criteria –The ACE identifies standards under 40 CFR Part 192, Subpart B and under 10 CFR 40, Appendix A as relevant and appropriate requirements (RAR) pursuant to CERCLA and relies on this framework to develop cleanup criteria. EPA agrees that it is appropriate to consider these standards as potentially RAR; however, EPA does not agree with some of the determinations made by ACE in conjunction with this process. For cleanup criteria under 40 CFR Part 192, Subpart B to serve as a standard for unrestricted use, they should be applied in the manner provided for in OSWER Directive No. 9200.4-25, *Use of Soil Cleanup Criteria in 40 CFR Part 192 as Remediation Goals for CERCLA Sites.* This means that when the 5 pCi/g and/or the 15pCi/g standards are used as RARs, these soil standards should apply to the combined levels of radium-226 and radium-228, as well as the combined levels of thorium-230 and thorium-232. To the extent the benchmark dose approach in 10 CFR Part 40 Appendix A is used as RAR, the rationale should be consistent with OSWER Directive No. 9200.4-35P, *Remediation Goals for Radioactively Contaminated CERCLA Sites Using the Benchmark Dose Cleanup Criteria in 10 CFR Part 40 Appendix A, I, Criterion 6(6).* This means that the benchmark dose should be no more than 15 mrem/yr and should be established based on a concentration of 5 pCi/g radium in the subsurface as well as the surface.

Specific Comments:

1. Pg. ES-4, ¶ 2, 2nd sentence –Here and elsewhere in the FS, "remedial action" is a term of art in CERCLA and response actions conducted to date have been removal actions. We suggest not using the term "remediated" to describe past work at the North County site.

2. Pg. ES-5, ¶ 5, last sentence –Here and elsewhere in the FS, the statement is made that the groundwater in HZ-A does not communicate with the water in the lower HZs. While we agree there is strong evidence to indicate that vertical communication is very small, it may not be appropriate to use absolutes to describe this boundary.

3. Pg. ES-7, 1st full ¶, 2nd sentence –"Radioanalytical" appears to be out of place.

4. Pg. ES-7, 2nd ¶ –It is stated that the sample data show that zones that could be used as a source of drinking water do not contain unprotective levels of contamination originating from FUSRAP-related activities. This indicates that there is contamination, just not at "unprotective levels"or not from FUSRAP related activities. This does not seem consistent with most of the discussion on this subject. The FS should present any measured impacts to the lower water bearing units and reconcile this with the conclusion that there is no vertical migration from the shallow zone.

5. Pg. E-9, Ground Water –The conclusion that there are no FUSRAP-related COCs in groundwater seems misleading, and the supporting explanation is not entirely clear.

6. Pg. ES-10, top partial¶, last sentence –The intended meaning of this sentence is not clear, since it uses terms which are similar to, but do not quite match CERCLA/NCP terminology. Is the phrase "plausible future land uses" intended to be consistent with the CERCLA concept of reasonable maximum exposure based on reasonably anticipated land use? Also, while applying ARARs consistently is probably a good thing, the ACE should not place a higher value on consistency with cleanup goals at other sites than on site-specific development and compliance with ARARs. While we agree that we should try to keep the commitments made to stakeholders, we are not sure that keeping such a commitment overrides otherwise controlling standards. We suggest rephrasing into more CERCLA remedy selection criteria-like statements, e.g., commitments to stakeholders could be described in terms of "community acceptance."

7. Pg. ES-10, ARAR discussion, 1st ¶ –In summarizing the definition of ARARs, the ACE has made it more confusing and not appreciably more concise than if the definitions had been taken more directly from the NCP. Perhaps it is not even necessary to provide a detailed definition of ARARs in the Executive Summary, leaving the more detailed discussion for the body of the FS report. If the latter approach is followed, a statement similar to that found in Section 300.430(e)(9)(iii)(B) might be appropriate for inclusion in the Executive Summary.

8. Pg. ES-11, Derivation of Remediation Goals and Cleanup Levels, 2nd ¶ –We don't understand how risk assessments can be used to support a finding of relevance and appropriateness. Further, adjusting remediation goals away from the point of departure is not related to relevance and appropriateness determinations. We suggest greater explanation of this should be included since the decision to depart from the 10^{-6} cleanup level is one of the more significant conclusions the FS is intended to support

9. Pg. ES-11, Derivation of Remediation Goals and Cleanup Levels, 3rd ¶ –Preliminary Remediation Goals (PRGs) are by definition the cleanup level corresponding to the 10^{-6} risk level. Therefore, a cleanup level corresponding to the "upper end of the CERCLA risk range" is not a PRG. Also, we don't believe a site-specific risk justification is needed to support the use of the standards in 40 CFR 192.

10. Pg. ES-12, 1st full ¶ –We question whether a discussion of the history of cleanup goals at uranium mill sites is relevant. What is relevant is an explanation of the underlying assumptions made when developing the 15 pCi/g in 40 CFR 192 and whether site-specific conditions are consistent with these underlying assumptions, so as to justify using the subsurface criteria. Also, we suggest clarifying the corresponding risk and the land use assumptions made in arriving at the 14/43, and 50/150 remediation goals, since the ACE intends these to represent the cleanup levels which, if met, would allow the property to be used for any purpose.

11. Pg. ES-12, 2nd full ¶ –The first sentence may have a word missing. Also, according to the NCP, primary balancing criteria are used to evaluate cleanup alternatives. We are not clear on how they are relevant to selecting or justifying cleanup goals.

12. Pg. ES-13, supplemental standards –We are not clear on the use of supplemental standards. Apparently there are instances where the ACE believes it makes sense to remediate soils under roads, bridges, etc. over the near-term. We assume roads, rail right of ways, etc. would have to be torn up, so why not go ahead and remediate to unrestricted use standards consistent with the preferred alternative rather than apply some less stringent standard that might require ongoing management of the property.

13. Pg. ES-13, last ¶, Table ES-3 –Since the proposed remediation goals are significant decision points in the FS, we recommend putting the discussion in the body of the Executive Summary along with the explanation of how these goals were developed, rather than in a somewhat difficult to read table several pages after this explanation.

14. Pg. ES-14, Alternative 1, No Further Action –Discontinuing monitoring and maintenance does not seem consistent with maintaining a "status quo".

15. Pg. ES-14, On-Going Removal Actions –The text says that under alternatives 2 through 6, removal actions started under the EE/CAs would be completed. This does not make sense given that the EE/CAs are intended to be complcte when the ROD becomes effective.

16. Pg. ES-16, Alternative 2 –This alternative would seem to be more appropriately categorized as partial excavation and capping. Referring to this as containment at SLAPS and HISS/Futura does not accurately convey the nature of the alternative. It appears to be primarily an excavation alternative , with capping of the limited area where contaminated soils were not excavated to unrestricted use level.

17. Pg. ES-16, Alternative 3 –This alternative would seem to be more appropriately categorized as partial excavation with treatment. Some acknowledgment and discussion of the issue as to whether treatment at SLAPS would be considered "on-site" under the NCP would seem appropriate.

18. Pg. ES-17, Alternative 5 –It is not explicitly discussed whether or not the inaccessible soils left under roads, bridges, railroads, etc. would be excavated and disposed of in the future upon becoming accessible. More explanation is needed, however, this would seem the only logical course of action. If this is the case, Alternative 5 differs from Alternative 6 only with regard to the timing of the activities.

19. Pg. ES-19, Alternative 2 –Here and elsewhere, the reference to reduced mobility from containment in the context of the statutory preference for alternatives that reduce mobility, toxicity, or volume through treatment is not appropriate.

20. Pg. ES-21, Alternatives 5 and 6 –Again, it is not clear whether Alternative 5 includes future remediation of inaccessible soils as they become accessible. Is this included in the cost? If this is the case, it does not seem correct to characterize Alternative 6 as offering greater long-term effectiveness and permanence than Alternative 5 due to the increased permanent off-site disposal of contaminated material. If this is not the case, no explanation is offered as to how this material would be managed in the event the road, bridge, etc. were removed.

21. Pg. ES-21, Alternative 5, 9th line –"property" should probably be "properly."

22. Pg. ES-23, Costs –To make this useful, the basic costing assumptions along with a breakout of component costs needs to be presented.

23. Pg. ES-24, Risk Summary Table –Lots of summary risk information is presented, however, nowhere were we able to find a simple presentation of total risk to an individual under reasonable maximum exposure (RME). See OSWER 9200.1-23P, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* for examples on presenting summary human health risk data. The purpose behind presenting risk numbers for every parcel as in Table ES-1 is not clear, since a response action decision is based on individual risk under the RME.

24. Pg. ES-25, Remedial Action Objectives –This table does not identify any objectives for surface water or groundwater. It would seem that minimizing the potential for ongoing migration to surface water and groundwater is a reasonable objective of this response action.

25. Pg. ES-27, Table ES-4 –Suggest some footnotes to explain why the values are the same in the surface and subsurface and for restricted use and unrestricted use, given that the exposure assumptions would presumably be different in each of these cases.

26. ES-30, Table ES-7 –Again, "most probable future receptor" is not recognized CERCLA terminology.

27. Pg. 1-4, top ¶ –There will be an opportunity for a public meeting, not a public hearing. Also, why include this information in the FS?

28. Pg. 2-24, Groundwater Classification, 2nd ¶ –The guidance manual suggests a Class III designation is appropriate for an aquifer that **is** contaminated by human activities (not could be). Also, the fact that an aquifer feeds a surface water body is not support for a Class III designation, rather it is support for designating Class III groundwater as either IIIA or IIIB.

29. Pg. 2-25, 1st partial ¶ –How was estimated daily yield of 50 gpd developed and can the rationale be presented?

30. Pg. 2-26, 2nd bullet –EPA's stated position in OSWER Directive 9200.4-18 actually is more like the following: the upper boundary of the risk range is not a discrete line and although EPA generally uses 1×10^{-4} in making risk management decisions, a specific risk estimate around 1×10^{-4} may be acceptable if justified based on site-specific conditions.

31. Pg. 2-26, 3rd bullet –As discussed in general comment number 5 above, to be consistent with EPA guidance the benchmark dose should be derived from 5 pCi/g radium in the surface and subsurface.

32. Pg. 2-26, 4th bullet –We question whether the 100mrem/yr dose limit is relevant and appropriate to CERCLA cleanup even though in this case it is being used as a fail-safe in the event ICs are lost, rather than as a protective standard.

33. Pg. 2-75, Table 2-16 and corresponding text –If all the RG's are ARAR-based, why is so much of the text devoted to description of how values were derived using the risk range, adjusting away from the point of departure, etc.? See for example pg. 2-72. What values were site-specifically derived using the risk range?

34. Figure 2-18, Conceptual Model –This figure shows a different interpretation of the 3M unit than was used in the past in DOE documents, i.e., continuous vs. non-continuous. The FS should probably provide an explanation for this.

35. Pg. 3-2, 2nd bullet –Suggest that the words inside the first parentheses be changed to "onc in ten thousand" to accurately reflect the general rule. Values slightly exceeding the risk range may sometimes be justified based on site-specific conditions, but that is not the general rule.

36. Pg. 3-10, 1st full ¶ –"In a CERCLA action, on-site activities do not require permits. Thus, this rule is relevant and appropriate at the North County site, rather than applicable" One statement does not logically follow the other.

37. Pg. 3-10, ARARs –Discussion on NESHAPS is conspicuously absent.

38. Pg. 3-14, Removal, 2nd ¶ –In what respect must RD consider contamination of hydrostratigraphic zone A?

39. Pg. 3-16, 2nd ¶ –Here and elsewhere, the term PRG corresponds to the point of departure calculation only. Also, why were site-specific PRGs calculated for radiological contaminants given that the remediation goals are ARAR-based, and if they were calculated, where are they presented?

40. Pg. 4-9, bottom –We did not find any evaluation showing what contaminants would be present in the wastewater to be able to make a meaningful evaluation as to whether the local POTW would be able to accept the wastewater for treatment.

41. Pg. 4-15, Alternative 4, 3rd bullet –Again, it makes no sense to say that non-time-critical removal actions currently being conducted at the site would be completed under this alternative. In the first place, the removal actions were intended to be complete at the time a ROD is executed. Secondly, given that virtually all the material could be remediated under the current removal actions, the conditions requiring institutional control would not exist.

42. Pg. 5-2, Threshold Criteria –Suggest the last sentence be revised or removed. Protectiveness is achieved by reducing site risks to within the acceptable risk range.

43. Pg. 5-9, Alternative 3, 2nd ¶, line 3 –"resolved" doesn't seem to be the correct word.

44. Pg. 5-11, Implementability –The analysis deals with the question of soil washing and sorting as if little or nothing were known about the prospects for this technology. In actuality, substantial treatability work has been performed on samples taken from the North County site. We suggest the ACE review the reports that were developed and incorporate some of the conclusions into the FS.

United States Environmental Protection Agency | Office of Solid Waste and Emergency Response | OSWER 9355.0-74FS-P
EPA 540-F-00-005
September, 2000

Institutional Controls:

A Site Manager's[1] Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups

Office of Solid Waste and Emergency Response

Purpose

This fact sheet provides Superfund and RCRA Corrective Action site managers and decision-makers with an overview of the types of Institutional Controls (ICs) that are commonly used or implemented, and outlines the factors that should generally be considered when evaluating and selecting ICs as part of the remedy. For more detailed information on the different types of instruments available, site managers and attorneys should consult the document, "Institutional Controls: A Reference Manual (Workgroup Draft - March 1998)." EPA site managers should also work closely with Regional attorneys and Headquarters staff in the Office of Emergency and Remedial Response (OERR), the Office of Site Remediation Enforcement (OSRE), the Federal Facilities Restoration and Reuse Office (FFRRO), the Federal Facilities Enforcement Office (FFEO) and/or the Office of Solid Waste (OSW) on any site-specific issues that may arise while evaluating, implementing, enforcing, or monitoring ICs.[2]

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Definition and Importance of ICs

Generally, EPA begins the remedy evaluation process with the expectation that treatment or engineering controls will be used to address principal threat wastes and that groundwater will be returned to its beneficial use. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) emphasizes that ICs, such as water use restrictions, are meant to supplement engineering controls during all phases of cleanup and may be a necessary component of the completed remedy. The NCP also cautions against the use of ICs as the sole remedy unless active response measures are determined to be impracticable. At the same time, ICs play an important role in site remedies. Often, ICs are a critical component of the cleanup process and are used by the site manager to ensure both the short- and long-term protection of human health and the environment. For this reason it is important to understand what constitutes an IC. Specifically for EPA, ICs:

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[1]Site Manager, as used in this fact sheet, refers to both CERCLA sites and RCRA facilities. In RCRA, project managers are the equivalent to site managers in CERCLA.

[2]This document provides guidance to EPA Regions and states involved in Superfund and RCRA corrective action cleanups. It also provides guidance to the public and the regulated community on how EPA intends to evaluate and implement institutional controls as part of a cleanup decision. The guidance is designed to implement national policy on these issues. The document does not, however, substitute for CERCLA, RCRA or EPA's regulations, nor is it a regulation itself. Thus, it does not impose legally-binding requirements on EPA, States, or the regulated community, and may not apply to a particular situation based upon the circumstances. EPA and State decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance where appropriate. Any decisions regarding a particular facility will be made based on the applicable statutes and regulations. Therefore, interested parties are free to raise questions and objections about the appropriateness of the application of this guidance to a particular situation, and EPA will consider whether or not the recommendations or interpretations in the guidance are appropriate in that situation. EPA may change this guidance in the future.

- are non-engineered instruments such as administrative and/or legal controls that minimize the potential for human exposure to contamination by limiting land or resource use;
- are generally to be used in conjunction with, rather than in lieu of, engineering measures such as waste treatment or containment;
- can be used during all stages of the cleanup process to accomplish various cleanup-related objectives; and,
- should be "layered" (i.e., use multiple ICs) or implemented in a series to provide overlapping assurances of protection from contamination. These concepts are discussed in the text box below.

Some examples of ICs include easements, covenants, well drilling prohibitions, zoning restrictions, and special building permit requirements. Deed restriction is a phrase often used in remedy decision documents to describe easements or other forms of ICs; however, this is not a traditional property law term and should be avoided. Fences that restrict access to sites are often termed ICs; however, because fences are physical barriers instead of administrative or legal measures, EPA does not consider them to be ICs. ICs are among the tools allowable under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) [as amended by the Superfund Amendments and Reauthorization Act (SARA)], the NCP, and the Resource Conservation and Recovery Act (RCRA). To read more about the regulatory framework for ICs, refer to the box on page 3 entitled, "A Look at ICs in CERCLA, the NCP and RCRA." Finally, where protectiveness depends on reducing exposure, ICs are a response action under CERCLA or a corrective action under RCRA. Accordingly, even in the unusual case where a CERCLA Record of Decision (ROD) only requires the implementation of ICs, it is considered to be a "limited action," not a "no action" ROD. Likewise, when a corrective action under RCRA includes an IC, whether it is part of an interim measure or occurs at the end of the cleanup as part of the final corrective measure, the IC is considered a part of the remedy.

Common Misnomers

"Deed restriction" is not a traditional property law term, but rather is a generic term used in the NCP and elsewhere as a shorthand way to refer to types of ICs. To avoid confusion, site managers should avoid the term and instead be specific about the types of ICs under consideration and their objectives. In addition, EPA does not consider physical barriers as ICs. Fences that restrict access to sites are often termed as ICs. However, fences are not considered by EPA to be ICs .

ICs are vital elements of response alternatives because they simultaneously influence and supplement the physical component of the remedy to be implemented. On the one hand, the right mix of ICs can help ensure the protectiveness of the remedy; on the other, limitations in ICs may lead to reevaluation and adjustment of the remedy components, including the proposed ICs. At some sites, remedy contingencies may protect against uncertainties in the ability of the ICs to provide the required long-term protectiveness. These points illustrate how important it is for site managers to evaluate ICs as thoroughly as the other remedy components in the Feasibility Study (FS) or Corrective Measures Study (CMS), when looking for the best ICs for addressing site-specific circumstances. Adding ICs on as an afterthought without carefully thinking about their objectives, how the ICs fit into the overall remedy, and whether the ICs can be realistically implemented in a reliable and enforceable manner, could jeopardize the effectiveness of the entire remedy.

Often ICs are more effective if they are layered or implemented in series. Layering means using different types of ICs at the same time to enhance the protectiveness of the remedy. For example, to restrict land use, the site manager may issue an enforcement tool [e.g., Unilateral Administrative Order (UAO)]; obtain an easement; initiate discussions with local governments about a potential zoning change; and enhance future awareness of the restrictions by recording them in a deed notice and in a state registry of contaminated sites. Also, the effectiveness of a remedy may be enhanced when ICs are used in conjunction with physical barriers, such as fences, to limit access to contaminated areas.

ICs may also be applied in series to ensure both the short- and long-term effectiveness of the remedy. For example, the site manager may use an enforcement tool to require the land owner to obtain an easement from an adjacent property owner in order to conduct ground water sampling or implement a portion of the active remedy. This easement may not be needed for the long-term effectiveness of the remedy and is terminated when the construction is complete. At another site, the site manager may use an Administrative Order on Consent (AOC) or permit condition to prohibit the land owner from developing the site during the investigation. Later, the site manager may add a provision to the Consent Decree (CD) or the permit requiring

Layering and Implementing ICs in Series

ICs are more effective if they are layered or implemented in series.

Layering ICs means using different types of ICs at the same time to enhance the protectiveness of the remedy.

Using ICs in series is the use of ICs at different points in the investigation and remediation process to ensure the short- and long-term protection of human health and the environment.

the land owner to notify EPA if the property is to be sold and to work with the local government to implement zoning restrictions on the property.

A Look at ICs in CERCLA, the NCP, and RCRA

CERCLA as amended by SARA, the NCP and RCRA support the use of ICs in remediation of a site:

CERCLA—Section 121(d)(2)(B)(ii)(III) refers to the use of enforceable measures (e.g., ICs) as part of the remedial alternative at sites. EPA can enforce the implementation of ICs, but not necessarily their long term maintenance. For example, the local government with zoning jurisdiction may agree to change the zoning of the site to prohibit residential land uses as part of the remedy, but the local government retains the authority to change the zoning designation in the future. EPA is authorized, under CERCLA section 104(j), to acquire (by purchase, lease or otherwise) real property interests, such as easements, needed to conduct a remedial action provided that the state in which the interest is to be acquired is willing to accept transfer of the interest following the remedial action. Transfers of contaminated Federal property are subject to special deed requirements under CERCLA sections 120(h)(3)(A)(iii) and 120(h)(3)(C)(ii)(I) and (II).

NCP—the NCP provides EPA's expectations for developing appropriate remedial alternatives, including ICs under CERCLA. In particular, it states that EPA expects to use treatment to address the principal threats posed by sites; engineering controls for wastes that pose relatively low risk or where treatment is impracticable; and a combination of the two to protect human health and the environment [40 CFR 300.430(a)(1)(iii)(A), (B), and (C)]. In appropriate situations, a combination of treatment, containment, and ICs may be necessary. The NCP also emphasizes the use of ICs to supplement engineering controls during all phases of cleanup and as a component of the completed remedy, but cautions against their use as the sole remedy unless active response measures are determined to be impracticable [40 CFR 300.430(a)(1)(iii)(D)]. In the case where ICs are the entire remedy, the response to comments section of the preamble to the NCP states that special precautions must be made to ensure the controls are reliable (55 Federal Register, March 8, 1990, page 8706). Recognizing that EPA may not have the authority to implement such controls, the NCP requires that (for fund financed sites) the state assure that the ICs implemented as part of the remedial action are in place, reliable, and will remain in place after the initiation of operation and maintenance [40 CFR 300.510(c)(1)]. Lastly, for Superfund financed and private sites, the NCP also requires the state to hold any interest in property that is acquired (once the site goes into O&M) to ensure the reliability of ICs [40 CFR 300.510(f)].

RCRA—RCRA requirements are imposed through legal mechanisms different from those used under CERCLA. In RCRA, authorized states are the primary decision makers, this results in a wide variety of state-specific mechanisms being available. This fact sheet does not attempt to list all of the state and local IC mechanisms, but to identify key principles for the use of ICs. If the IC is being imposed through a RCRA permit, steps should be taken to ensure that long-term enforcement is not lost through property transfer or permit expiration. Cleanups under RCRA are conducted in connection with the closure of regulated units and facility-wide corrective action either under a permit [RCRA sections 3004(u) and (v)], interim status order [RCRA section 3008(h)] or imminent hazard order [RCRA section 7003] or other authorities. It should also be noted that landfill closure requirements under 40 CFR 264.119 require deed notices that the land has been used to manage hazardous waste, although the notice itself does not restrict future use. EPA expects to use a combination of methods (e.g., treatment, engineering, and institutional controls) under RCRA, as appropriate, to achieve protection of human health and the environment. EPA also expects to use ICs, such as water and land use restrictions, primarily to supplement engineering controls, as appropriate, for short- and long-term management to prevent or limit exposure to hazardous wastes and constituents. ICs are not generally expected to be the sole remedial action.

Types of ICs

General Categories

There are four categories of institutional controls: governmental controls; proprietary controls; enforcement and permit tools with IC components; and informational devices. Each of these categories is described below. In addition, a checklist that highlights steps in implementing ICs during the cleanup process and a matrix summarizing examples of ICs are included at the end of the fact sheet.

Governmental Controls—Governmental controls are usually implemented and enforced by a state or local government and can include zoning restrictions, ordinances, statutes, building permits, or other provisions that restrict land or resource use at

a site. Local governments have a variety of land use control measures available from simple use restrictions to more sophisticated measures such as planned unit development zoning districts and overlay zones. Development zoning districts allow for more flexible site planning and overlay zones impose additional requirements to those of the underlying zoning district. Regardless of which measures are relied on, the land use control should be carefully evaluated to make certain that there are no exceptions which could allow for improper use of the site (e.g., allowing a day care center use within an industrial district). Once implemented, local and state entities often use traditional police powers to regulate and enforce the controls. Since this category of ICs is put in place under local jurisdiction, they may be changed or terminated with little notice to EPA, and EPA generally has no authority to enforce such controls.

For active military bases, the local authority for regulating and enforcing ICs is the Commanding Officer. Therefore, EPA and the state should work with the installation personnel to incorporate restrictions into the base master plans, instructions, and orders used by the Commanding Officer to govern conduct, actions and activities on the base (in some cases these restrictions may be imposed as permit conditions if the base is subject to RCRA permit requirements).

Proprietary Controls—These controls, such as easements and covenants, have their basis in real property law and are unique in that they generally create legal property interests. In other words, proprietary controls involve legal instruments placed in the chain of title of the site or property. The instrument may include the conveyance of a property interest from the owner (grantor) to a second party (grantee) for the purpose of restricting land or resource use. An example of this type of control is an easement that provides access rights to a property so the Potentially Responsible Party (PRP), facility owner/operator, or regulatory agency may inspect and monitor a groundwater pump-and-treat system or cover system. The benefit of these types of controls is that they can be binding on subsequent purchasers of the property (successors in title) and transferable, which may make them more reliable in the long-term than other types of ICs.

However, proprietary controls also have their drawbacks. Property law can be complicated because a property owner has many individual rights with respect to his or her property. To illustrate this point, property rights can be thought of as a bundle of sticks, with each stick representing a single right (e.g., the right to collect rents). The terminology, enforceability, and effect of each of these rights is largely dependent upon real property common law and the state where the site is located. A property owner can convey certain rights to other entities (either voluntarily or involuntarily through condemnation) and keep other rights. For example, if it is determined that a long-term easement is required to ensure remedy protectiveness, this "right" would need to be transferred by the property owner to another entity. For the easement to bind subsequent purchasers, some states require that the entity be an adjacent property owner. This may complicate long-term monitoring and enforcement since the party receiving the right (the grantee) is often not an adjacent property owner. To eliminate this problem, a proprietary control may be established "in gross." This means that the holder of the control (the grantee) does not need to be the owner of the adjacent property. However, it should be noted that easements in gross may not be enforceable under the laws of some states. State property laws governing easements should therefore be researched before this type of IC is selected in order to determine its enforceability in that jurisdiction.

A distinction at Federal sites being transferred to the private sector is that CERCLA sections 120(h)(3)(A)(iii) and 120(h)(3)(c)(ii) and (iii) require that property interests be retained by the Federal government. At active Federal sites, proprietary controls may not be an option because a deed does not exist or the landholding Federal agency lacks the authority to encumber the property. However, the landholding Agency may be willing to enter a Memorandum of Understanding (MOU) with EPA and/or state regulators providing for specific IC implementation plans, periodic inspections and other activities which it will undertake (in lieu of deed restrictions) to assure that ICs for the active site will remain effective.

Enforcement and Permit Tools with IC Components—Under sections 104 and 106(a) of CERCLA, UAOs and AOCs can be issued or negotiated to compel the land owner (usually a PRP) to limit certain site activities at both Federal and private sites; CDS can also be negotiated at private sites under 122(d). Similarly, EPA can enforce permits, conditions and/or issue orders under RCRA sections 3004(a), 3004(u) and (v), 3008(h), or 7003. These tools are frequently used by site managers, but may also have significant shortcomings that should be thoroughly evaluated. For example, most enforcement agreements are only binding on the signatories, and the property restrictions are not transferred through a property transaction. For example, if a PRP under CERCLA signs a CD or receives a UAO and then sells his or her property, many types of ICs would not be enforceable against the next owner. This could jeopardize the protectiveness of the remedy. One possible solution to this problem is to ensure that the enforcement tool contains provisions requiring EPA or state notification and/or approval prior to a property transfer. In this instance, EPA could negotiate an agreement with the new owner. Another solution is to require signatories of an enforcement document to implement additional long-term institutional controls such as information devices or proprietary controls (*i.e.*, layering).

Informational Devices—Informational tools provide information or notification that residual or capped contamination may remain on site. Common examples include state registries of contaminated properties, deed notices, and advisories. Due to the nature of some informational devices (*e.g.*, deed or hazard notices) and their potential non-enforceability, it is important to carefully consider the objective of this category of ICs. Informational devices are most likely to be used as a secondary "layer" to help ensure the overall reliability of other ICs.

ICs at Federal Facilities

Because of Federal ownership, there are significant differences in the way ICs are applied at Federal facilities. Some proprietary or governmental controls cannot be applied on active Federal facilities. However, for properties being transferred as part of a base closure, the Department of Defense does have the authority to restrict property by retaining a property interest (i.e., an easement intended to assure the protectiveness of the remedy). For active bases, ICs are commonly addressed through remedy selection documents, base master plans, and separate MOUs. More detailed information on ICs and Federal facilities is contained in "Institutional Controls: A Reference Manual (Workgroup Draft - March 1998)" and in the FFRRO IC guidance ("Institutional Controls and Transfer of Real Property under CERCLA Section 120(h)(3)(A), (B), or (C)," January, 2000).

Legal Mechanisms for Imposing ICs Under CERCLA and RCRA

CERCLA and RCRA employ the same types of ICs to reduce exposure to residual contamination. However, as explained below, EPA's legal authority to establish, monitor and enforce ICs varies significantly between the two programs. As a result, officials involved in cleanups need to appreciate the range of options available under each program before determining whether, and to what extent, ICs should be incorporated into a remedial decision.

At CERCLA sites, EPA often imposes ICs via enforcement tools (e.g., UAOs, AOCs, and CDs). Since these enforcement tools only bind the parties named in the enforcement document, it may be necessary to require the parties to implement ICs that "run with the land" (i.e., applied to the property itself) in order to bind subsequent land owners. For Fund-lead CERCLA sites, the lead agency has the responsibility for ensuring ICs are implemented. Legal mechanisms such as UAOs, AOCs and CDS should also require reporting to EPA and/or the state of any sale of the property.

Under RCRA, ICs are typically imposed through permit conditions or by orders issued under section 3008(h). In certain circumstances cleanup may also be required under the imminent hazard order authority of section 7003. In the case where an IC is meant to continue beyond the expiration of a permit, an order may be required to ensure the IC remains in effect for the long term RCRA permit writers should incorporate ICs as specific permit conditions, where appropriate. By doing so, such conditions would be enforceable through the permit. At the same time, permit writers should consider whether additional ICs are available (e.g., governmental and/or proprietary controls) to ensure that subsequent property owners will be aware of, and bound by, the same types of restrictions. Similar factors should be considered when preparing RCRA corrective action orders to ensure that both the current facility owner/operator and any subsequent property owners are subject to effective and enforceable ICs that will minimize exposure to any residual contamination.

One significant difference between RCRA and CERCLA is that RCRA generally does not authorize EPA to acquire any interests in property. Therefore, many proprietary controls (such as easements) will require the involvement of third parties (e.g., states or local governments) under RCRA.

ICs and Future Land Use

Land use and ICs are usually linked. As a site moves through the Superfund Remedial Investigation/Feasibility Study (RI/FS) or RCRA Facility Investigation/Corrective Measures Study (RFI/CMS), site managers should develop assumptions about reasonably anticipated future land uses and consider whether ICs will be needed to maintain these uses over time. EPA's land use guidance (Land Use in CERCLA Remedy Selection Process, OSWER Directive No. 9355.7-04, May 25, 1995) states that the site manager should discuss reasonably anticipated future uses of the site with local land use planning authorities, local officials, and the public, as appropriate, as early as possible during the scoping phase of the RI/FS or RFI/CMS. Where there is a possibility that the land will not be cleaned up to a level that supports unlimited use and unrestricted exposure, the site manager should also discuss potential ICs that may be appropriate, including legal implementation issues, jurisdictional questions, the impact of layering ICs and reliability and enforceability concerns. It is also important for the site manager to recognize that, in addition to land uses, ICs can be used to affect specific activities at sites (e.g., fishing prohibitions).

Screening ICs

The need for ICs can be driven by both the need to guard against potential exposure and to protect a remedy. If any remedial options being evaluated in the FS or CMS leave waste in place that would not result in unrestricted use and unlimited exposure, ICs should be considered to ensure that unacceptable exposure from residual contamination does not occur. However, ICs may not be necessary if the waste that is left at the site allows for unrestricted use and unlimited exposure. Remedy options that typically leave residual wastes on site and necessitate ICs include capping waste in place, construction of containment facilities, natural attenuation and long-term pumping-and-treatment of groundwater.

ICs should be evaluated in the same level of detail as other remedy components. ICs are considered response actions under CERCLA and RCRA. ICs must meet all statutory requirements, and are subject to the nine evaluation criteria outlined in the NCP (40 CFR 300.430 (e)(9)(i)) for CERCLA cleanups. The balancing criteria recommended for corrective actions should generally be used in evaluating ICs under RCRA. However, before applying these criteria, the site manager should first make several determinations:

- Objective—Clearly state what will be accomplished through the use of ICs.

Example: Restrict the use of groundwater as a drinking water source until the Maximum Contaminant Levels are met.

- Mechanism—Determine the specific types of ICs that can be used to meet the various remedial objectives.

  Example: Work with the local jurisdiction to develop ordinances to restrict well drilling or prohibit groundwater access until cleanup goals are met; record the groundwater contamination in the land record to provide notice of the issue to the public; and record contaminated aquifers on state registry to maintain institutional tracking.

- Timing—Investigate when the IC needs to be implemented and/or secured and how long it must be in place. Since ICs are often implemented by parties other than EPA, the time required to secure an IC should be taken into consideration.

  Example: A deed notice may be required in the short-term, and a formal petition for a zoning change may be necessary in the long-term, both of which need to be in place prior to site deletion from the NPL.

- Responsibility—Research, discuss, and document any agreement with the proper entities on exactly who will be responsible for securing, maintaining and enforcing the control. It might be useful to secure a written statement of the appropriate entities' willingness to implement, monitor, and enforce the IC prior to the signature of the remedy decision document.

  Example: Work with the State to determine whether it is willing and able to hold an enforceable easement to ensure appropriate land use; in addition, determine whether the local government is willing and able to change and enforce the applicable zoning requirements. If assurances cannot be obtained, then ICs may not be a viable component of the remedy.

Typically, the site manager is faced with balancing the relative strengths of ICs in terms of enforceability, permanence, etc., with achieving remedial objectives. As discussed previously, one option is to "layer" different controls to ensure long-term reliability. For example, layered ICs may involve concurrent use of enforceable agreements, deed notices, and adoption of land use controls by a local government. ICs may also be used in series. For example, an enforcement order may prohibit the land owner from disturbing the cap on his/her property (i.e., a short-term control), until the local government goes through the process of restricting the future use of the land (i.e., the long-term control).

Determining the State Role

Where EPA is implementing a remedy, states often play a major role in implementing and enforcing ICs. As stated previously, some governmental controls may be established under state jurisdiction: the state may use its enforcement tools to compel the PRP or facility land owner to limit site activities; the state may provide the notification or information on the contamination that remains on-site; or the state may assume ownership of a property in order to implement, maintain, and enforce proprietary controls. Under RCRA, the state will typically be imposing and overseeing the remedial action.

When to Begin Coordinating with the State

No matter what role the state assumes with ICs, the EPA site manager should begin coordinating with the state early in the RI/FS (for CERCLA) or RFI/CMS (for RCRA) process or after sampling has been completed and the extent of the risk is known. Even if ICs are not required for the long-term maintenance of the selected remedy, they may be necessary during the response activities.

Factors to Consider in State Coordination

In evaluating the need for and the type of ICs that may be implemented at a site, the site manager should consult with their Regional attorney to determine who has the proper legal authority to implement and enforce the proposed controls. Certain states have enacted statutes that provide the state with the legal authority to restrict land use at contaminated properties. In addition, several states have adopted statutes providing for conservation easements. These easements override common law barriers to the enforcement of easements by parties who do not own adjacent property. For example, at many sites, the state, in cooperation with the PRPs or facility owner/operator, may use its own enforcement tools to restrict the use of the land and ensure that the selected remedy, including ICs, is implemented and maintained. At other sites, a property interest may be conveyed (either directly or, if necessary, through EPA at Superfund sites) from the owner of the land to the state which becomes the holder and enforcer of a proprietary control. Finally, the state is often responsible for issuing advisories or warnings of potential risks (e.g., fishing or swimming prohibitions), and providing registries of hazardous waste sites (i.e., informational controls).

If it appears that the state will be relied upon to establish the ICs, the site manager should immediately talk to state agency personnel to gauge their willingness to establish, maintain and enforce the control, if necessary. This discussion is encouraged regardless of the type of IC(s) that will be implemented. The site manager should work with his or her state counterpart to identify and contact the appropriate state agency and personnel for each proposed IC. In addition, if a property interest is conveyed by the land owner to EPA to perform a remedial action (e.g., to ensure the reliability of the ICs restricting the use of the land), CERCLA requires the state to accept transfer of the title from EPA following completion of the CERCLA remedial action. If the state does not agree to accept title to the property, the site manager must find another party to assume ownership (e.g., a local government,

community group or trust) or another type of IC (e.g., local government control)[3] must be selected. State assurances for O&M or for transfer of property interest are formalized in a Superfund State Contract (SSC), cooperative agreement, or MOU that is negotiated between the state and EPA.

State Role at Fund-Financed CERCLA Cleanups
The state assumes other responsibilities for ICs if the remedial action, including the ICs, will be Fund-financed under CERCLA. CERCLA specifically requires that the state provide assurance that it will assume responsibility for operation and maintenance (O&M) of the selected remedy before a Fund-financed remedial action is implemented. The NCP requires the state to ensure that any ICs implemented as part of the remedial action at the site are in place, reliable, and will remain in place after the initiation of O&M. These assurances are also documented in a cooperative agreement, SSC or MOU.

State Role at RCRA Sites
Under RCRA, states will typically be the implementing and overseeing agency. Therefore the state, when authorized and overseeing corrective action, will be responsible for identifying appropriate institutional controls. Where EPA is overseeing the remedy there are no state assurance requirements in RCRA Corrective Action. However, because there is no Federal mechanism in RCRA allowing EPA to acquire interest in property, EPA may be forced to rely on third parties (typically state or local government) to establish, maintain and enforce most types of ICs.

State Role at Federal Facilities
At Federal facilities, the landholding agency is ultimately responsible for all response activities. The state is not required to provide assurance that it will assume responsibility for O&M. However, states may enter into an agreement with the landholding Federal agency to monitor and enforce ICs at Federal sites.

Determining the Role of Local Governments

CERCLA, RCRA, and the NCP do not specify a role for local governments in implementing the selected remedy. However, a local government is often the only entity that has the legal authority to implement, monitor and enforce certain types of ICs (e.g., zoning changes). While EPA and the states take the lead on CERCLA and RCRA response activities, local governments have an important role to play in at least three areas: (1) determining future land use; (2) helping engage the public and assisting in public involvement activities; and (3) implementation and long-term monitoring and enforcement of ICs. Therefore, it is critical that the site manager and his or her state counterpart involve the appropriate local government agency in discussions on the types of controls that are being considered. The capability and willingness of the local government to implement and ensure the short- or long-term effectiveness of the proposed ICs should be considered during the RI/FS or RFI/CMS. In certain cases, cooperative agreements may be considered to assist local governments in the implementation, monitoring and enforcement of required ICs.

[3]Likewise, either the state or a third party must be willing to accept property interests at PRP-led sites.

Evaluating ICs

Once the site manager has considered the objectives, mechanism, timing, and entity responsible for implementing, monitoring and enforcing the ICs, the next phase is selecting the ICs. The following sections contain a discussion of the CERCLA and RCRA factors that site managers should generally consider when evaluating ICs during the FS or CMS. If the site manager proposes to layer or use the ICs in series, he or she should also characterize the likelihood that this approach can actually be achieved. It is important to note that at CERCLA sites, the statute requires the site manager to evaluate ICs, just like other remedy components, against the nine NCP criteria. The site manager must ensure that remedies are protective of human health and the environment. ICs may be an important element in this determination. RCRA sites managers have the latitude to use balancing criteria, but unlike CERCLA, RCRA regulations do not require this balancing step. The CERCLA and RCRA criteria are categorized below in three groups: threshold, balancing, and modifying.

ICs in CERCLA Removal Actions

ICs will rarely be a component of true emergencies where a time critical action serves as the only response at a site. It is more likely that a site manager will choose ICs as a component of a non-time critical removal action or during a follow-up remedial action. A post-removal site control agreement must be completed before commencing a fund-financed removal action where ICs are included in post-removal site control (OSWER Directive No. 9360.22-02). As in the remedial process, begin considering ICs when conducting an analysis of land use assumptions during the removal decision-making process. Where a final, site-wide, non-time critical removal remedy decision will be made, ICs should be thoroughly and rigorously evaluated with all other response actions in the Engineering Evaluation/Cost Analysis (EE/CA). In short, because ICs are considered to be actions, apply the full criteria required by the NCP for EE/CA evaluations. It is anticipated that ICs would not be chosen as the sole action for a removal.

Threshold Criteria
It is fundamental that a remedy under RCRA or CERCLA that includes ICs meet the following threshold criteria:

- protect human health and the environment; and
- for CERCLA sites, comply with Applicable or Relevant and Appropriate Requirements (ARARs).

The site manager for RCRA facilities should also consider whether remedies that include ICs:

- attain media cleanup standards or comply with applicable standards for waste management; and
- control the source(s) of releases so as to reduce or eliminate, to the extent practicable, further releases of hazardous waste that might cause threats to human health and the environment.

Balancing Criteria

The site manager evaluates the individual, layered or series of ICs to determine their respective strengths and weaknesses. ICs are also evaluated in combination with engineered controls to identify the key tradeoffs that should be balanced for the site. Following are balancing criteria required by CERCLA and the NCP and recommended by the RCRA program in guidance.

Long-term effectiveness and permanence (CERCLA) or reliability (RCRA)—Under both CERCLA and RCRA, this factor assesses the permanence/reliability and effectiveness of ICs that may be used to manage treatment residuals or untreated wastes that remain at the site over time. When evaluating whether an IC will be effective over the long-term; the site manager should consider factors such as: whether the property is a government-owned site or a privately-owned site that is likely to change hands; the applicability of ICs to multiple property owners; the size of the area to be managed; the number of parcels; the contaminated media to be addressed; the persistence of the contamination; whether site contamination is well-defined; and whether local governments or other governing bodies are willing and able to monitor and enforce long-term ICs. The site manager should also consider the contaminated media to be addressed by the ICs. Different ICs may be required for different media.

Where ICs must be effective for a long period, either proprietary or governmental controls should be considered because they generally run with the land and are enforceable. However, both proprietary and governmental controls have weaknesses in terms of long-term reliability. For example, with proprietary controls, common law doctrines may restrict enforcement by parties who do not own adjoining land. This can render proprietary controls ineffective if EPA or another party capable of enforcing the control is not the owner of the adjacent property. To eliminate this problem, proprietary controls may be established "in gross," signifying that the holder of the control does not need to be the owner of the adjacent property. However, some courts do not recognize in gross proprietary controls.

At some sites, governmental controls may be preferable to proprietary controls. For example, the site manager might work with a local government to pass an ordinance to restrict construction or invasive digging that might disturb or cause exposure to covered residual lead contamination in a large residential area. The implementation of government controls might be considered a beneficial addition to information tools that may be forgotten over the long term or an enforcement action that would be binding only on certain parties. Proprietary controls would likely be deemed impractical at such a site due to the complex and uncertain task of obtaining easements from multiple property owners.

Like proprietary controls, the use of governmental controls may not be effective over the long term. Of primary concern are the political and fiscal constraints that may affect the ability of a state or local government to enforce the controls. Similarly, governmental controls may be problematic when the local or state government is or may become the site owner or operator because of the appearance of a conflict of interest. Regardless of the control selected, its viability over the long term needs to be closely evaluated.

Reduction of toxicity, mobility, or volume through treatment—This CERCLA and RCRA criterion does not apply since ICs are not treatment measures.

Short-term Effectiveness—Short-term effectiveness of ICs at CERCLA and RCRA sites should be evaluated with respect to potential effects on human health and the environment during construction and implementation of the remedy. In order to satisfy this criterion, the remedy might entail the use of an IC through an enforcement order to compel the PRP to restrict certain uses of the groundwater at or down gradient from the site during remediation. After remediation is complete, other ICs might be implemented if residual contamination remains on site (i.e., implementing ICs in series).

Implementability—This CERCLA and RCRA criterion evaluates the administrative feasibility of an action and/or the activities that need to be coordinated with other offices and agencies. Implementation factors that generally should be considered for ICs include whether the entity responsible for implementation possesses the jurisdiction, authority, willingness and capability to establish, monitor and enforce ICs. A proper analysis of implementability can be complex, considering such diverse factors as the extent to which land being restricted is owned by liable parties and the willingness and capability of the local government or other authority responsible for establishing controls for land or resource use.

Cost—This CERCLA and RCRA criterion includes estimated capital and O&M costs. In CERCLA, estimated costs for implementing, monitoring, and enforcing ICs should be developed. For example, cost estimates for ICs might include legal fees associated with obtaining easements restricting land use, the costs of purchasing property rights (e.g.., groundwater rights, easements), or the wages of the state or local government personnel that will regularly monitor the IC to ensure that it has not been violated. It is interesting to note that once the total life-cycle costs of implementing, monitoring and

enforcing an IC – which may exceed 30 years – are fully calculated, it may actually be less costly in the long term to implement a remedy that requires treatment of the waste. For more information on estimating response costs, see "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study," EPA 540-R-00-002, OSWER 9355.0-075. In RCRA, costs historically have played a less prominent role in remediation selection. Typically cost estimates are expected to be developed at the discretion of the owner/operator, although implementors should take into account sites where ICs are inappropriately costly.

Modifying Criteria

Typically the site manager presents the proposed remedy, including ICs to the state, local government, and community for comment prior to implementation. The issues and concerns of these stakeholders may result in modifications to the remedy and are addressed by the site manager in the remedy decision document. Following is a discussion of these modifying criteria *(note: these criteria are only recommended in RCRA guidance)*.

State Acceptance—The site manager should make the appropriate state authorities aware of the basis and scope of the ICs to be implemented under CERCLA or RCRA, and what role, if any, the state is expected to play to make ICs an effective part of the remedy. The state can formally express its concerns about the use of ICs, in general, and its role, in particular, or indicate its willingness to take on the responsibility for implementing and enforcing the proposed ICs.

If the state's position is uncertain at the time the remedy is selected (e.g., for CERCLA sites, when the ROD is signed or, for RCRA facilities, when the permit/order is issued or modified), it may be necessary to outline contingent remedial approaches in the decision documents. Specifically, remedies that require long-term ICs to remain protective may require alternative actions (e.g., additional soil removal) if the ICs are later determined to be unenforceable or cannot meet the remedial objectives. Alternatively, at a RCRA site, it may be necessary to leave a facility under a permit or other mechanism enforceable by the regulating agency. If the state's willingness or ability to implement or enforce an IC changes after remedy selection, the protectiveness of the remedy should generally be re-evaluated and, when necessary, remedial decisions revised. Under CERCLA, this may require an Explanation of Significant Differences (ESD), or even a ROD amendment. Under RCRA, a permit modification or change to a corrective action order may be necessary. It is important to note that under no circumstances can a Fund-financed CERCLA remedial action be initiated without receiving state assurances on ICs and property transfer.

Local Government and Community Acceptance—Involving the community and local government early during the remedy decision process will enable the site manager to more fully evaluate IC options. Discussions with the local government and community give the site manager the opportunity to:

- gather local government and community input on the proposed ICs;
- identify whether a particular stakeholder group may be harmed as a result of a proposed IC (for example, will a ban on fishing cause an economic hardship in the community);
- receive comment on the impacts of the potential ICs on religious or cultural customs and beliefs (e.g., preventing access to property which grows the plants that are used in a tribal ceremony); and
- determine if the community has special needs in regards to the IC (for example, will it be necessary to publish informational devices in multiple languages).

In addition, the local government and community's response to certain types of ICs and the willingness and capability of the local government to monitor ICs will help the site manager determine whether the ICs will be effective overall. This is especially important if nearby property owners will need to agree to implement proprietary controls or if other governmental ICs (e.g., zoning changes) will have an impact on the community. Early involvement will also enable the community to work with the local government to develop innovative approaches to using ICs, especially in light of any future land use plans.

As with other aspects of the proposed remedy, the community should have the opportunity to comment on the proposed IC component of the remedy during the public comment period. It may be necessary to educate the community about ICs so that its members understand how the different ICs may impact their property and activities. Under CERCLA, it may also be possible, as long as all appropriate requirements are met, to provide a Technical Assistance Grant to the community so they can hire a technical expert to assist them in evaluating ICs and the overall remedy.

In some cases, it may be appropriate not to identify the exact IC required at the time of the remedy decision. In these instances the critical evaluation of the available ICs should still be conducted and the specific objective(s) of the ICs should be clearly stated in the ROD or other decision document. Examples of when this flexibility may be appropriate are contingent remedies based on pilot studies or if a remedy would not be implemented for several years and the state is developing enabling language for Conservation Easements authority.

Site Manager Responsibilities After ICs are Selected

The site manager's responsibilities for ICs does not end once the ICs are selected. Site managers also should ensure that the ICs are actually implemented, are reliable, are enforced, and remain effective. It should be noted that NPL sites cannot be deleted until the entire remedy, including ICs, have been implemented. This may involve the following:

- working with state and local governmental entities to obtain commitments and resources for implementing and enforcing ICs, including negotiating a CERCLA SSC with the state to obtain assurances that the ICs will be put in place, are reliable and will remain in place after initiation of O&M activities;
- ensuring that the PRP or facility owner complies with the provisions in the enforcement tools to implement the ICs and provides notice of the ICs to potential future users/owners of the property;
- working with other Federal agencies to implement and enforce ICs;
- acquiring property for implementation of the CERCLA remedy; and
- checking the status of ICs during the CERCLA five-year review.

Conclusion

The ICs outlined in this fact sheet can be important elements of environmental cleanups. ICs play an important role in limiting risk and are often needed to ensure that engineered remedies are not affected by future site activities. When selecting ICs, the site manager needs to evaluate the situation at the site, define the needs that ICs are intended to address, identify the kinds of legal and other tools available to meet these needs, and ensure the ICs are implemented effectively. All of this requires up-front planning and working closely with the Regional office attorneys, the state, community, and PRPs or facility owner/operators. Key concepts to keep in mind when implementing ICs are provided in the text box below.

If you have questions regarding the material covered in this fact sheet, consult the draft document, "Institutional Controls: A Reference Manual" or contact your Regional Coordinator in the OERR Technical Regional Response Center. For information on model language for enforcement or legal documents used to implement ICs, consult your Regional Counsel, OSRE or the Office of General Counsel.

Key Concepts

- Under the NCP, the use of ICs should not substitute for active response measures (unless active measures are not practicable).
- If the site cannot accommodate unrestricted use and unlimited exposure, an IC will generally be required.
- Make sure the objective(s) of the IC are clear in the decision document.
- Coordinate early with state and local governments.
- Layer ICs and/or place them in series depending upon site circumstances.
- Evaluate ICs as rigorously as other remedial alternatives.
- Understand the life-cycle strengths, weaknesses and costs for the implementation, monitoring and enforcement of ICs.
- Get assurances, in writing, from entities that will implement, monitor, and enforce ICs.
- Remember that since all ICs have weaknesses, the role of the RCRA/CERCLA decision makers is to select the best ICs to protect human health and the environment.

GLOSSARY OF TERMS

Administrative Orders on Consent (AOC) - A legal agreement signed by EPA and the potentially responsible parties (PRPs) through which the PRP agrees to pay for or take the required corrective or cleanup actions, or refrain from an activity. It describes the actions to be taken, may be subject to a comment period, applies to civil actions, and can be enforced in court.

Advisories - Warnings, usually issued by public health agencies, either at the federal, state or local level, that provide notice to potential users of land, surface water, or ground water of some existing or impending risk associated with their use.

Appurtenant - A traditional property law term used to describe an easement that is created to benefit an adjacent parcel of land (and it is held by the owner of that land). For example, an easement allowing the owner of one parcel the right to cross an adjoining parcel would be appurtenant. (See also "In Gross")

Chain of Title - A history of conveyances and encumbrances affecting a title from the time that the original patent was granted, or as far back as records are available.

Common Law - The body of law developed primarily from judicial decisions based on custom and precedent, unwritten in statute or code, and constituting the basis of the legal system in all of the U.S. except Louisiana.

Condemnation of Property - When a local government, exercising eminent domain, condemns a property in order to take over title.

Consent Decree (CD) - A legal document, approved by a judge, that formalizes an agreement reached between EPA and PRPs through which PRPs will conduct all or part of a cleanup action at a Superfund site, cease or correct actions or processes that are polluting the environment, or otherwise comply with EPA initiated regulatory enforcement action. The consent decree describes the actions PRPs will take and is subject to a public comment period.

Conservation Easements - Statutes adopted by some states that establish easements to conserve and protect property and natural resources.

Conveyance - The transfer of title to property or a right of that property (i.e. easement) from one person to another.

Cooperative Agreement - An assistance agreement whereby EPA transfers money, property, services or anything else of value to a state, university, or non-profit or not-for-profit organization for the accomplishment of authorized activities or tasks.

Covenants - A promise by one landowner to another made in connection with a conveyance of property. Generally, a covenant is a promise by the holder of a possessory interest in property to use or refrain from using the property in a certain manner. Covenants are similar to easements but have been traditionally subject to somewhat different formal requirements.

Deed - A signed and usually sealed instrument containing some legal transfer, bargain, or contract.

Deed Notice - Commonly refers to a non-enforceable, purely informational document filed in public land records that alerts anyone searching the records to important information about the property.

Deed Restriction - Not a traditional property law term, but rather is used in the NCP as a shorthand way to refer to types of institutional controls.

Easements - A property right conveyed by a landowner to another party which gives the second party rights with regard to the first party's land. An "affirmative" easement allows the holder to enter upon or use another's property for a particular purpose. A "negative" easement imposes limits on how the landowner can use his or her own property.

Enforcement Tools - Tools, such as administrative orders or consent decrees, available to EPA under CERCLA and RCRA that can be used to restrict the use of land. Enforcement authority can be used to either (1) prohibit a party from using land in certain ways or from carrying out certain activities at a specified property, or (2) require a settling party to put in place some other form of control, such as a proprietary control.

Equitable Servitude - A real estate interest, similar to a covenant, that arose when courts of equity enforced agreements that did not meet all of the formal requirements for a covenant.

Government Controls - Controls using the regulatory authority of a governmental entity to impose restrictions on citizens or sites under its jurisdiction. Generally, EPA must turn to state or local governments to establish controls of this type.

In Gross - A traditional property law term used to describe easements that provide a benefit not related to any property owned by the holder of the easement. Easements used under CERCLA and RCRA will generally be "in gross" because the restrictions are generally not for the benefit of any particular neighboring parcel owned by the holder of the easement.

Informational Devices - Informational tools that provide information or notification that residual or capped contamination may remain on site. Common examples include state registries of contaminated properties, deed notices, and advisories.

Institutional Controls - Non-engineering measures intended to affect human activities in such a way as to prevent or reduce exposure to hazardous substances. They are almost always used in conjunction with, or as a supplement to, other measures such as waste treatment or containment. There are four categories of institutional controls: governmental controls; proprietary controls; enforcement tools; and informational devices.

Local Permits - Special permits outlining specific requirements before an activity can be authorized.

Memorandum of Understanding - A document which outlines an agreement in principle between its signatories.

Proprietary Controls - Tools based on private property law used to restrict or affect the use of property.

Reversionary Interest - A real estate interest created when a landowner deeds property to another, but the deed specifies that the property will revert to the original owner under specified conditions.

"run with the land" - An expression indicating a right or restriction that affects all current and future owners of a property.

State Use Restrictions - Statutes enacted by some states providing authority to establish use restrictions specifically for contaminated property.

State Registries of Hazardous Waste Sites - Registries established by state legislatures that contain information about properties. Types of registries include a list of hazardous waste sites in the state; annual reports submitted to the legislature summarizing the status of each site on the registry; and notice with the deed for sites on the registry that the site is contaminated.

Superfund State Contract (SSC) - An agreement between EPA and the state before remedial action begins (at Superfund sites where EPA is leading the response activities) that documents the state's assurances under the law and outlines the roles and responsibilities of both parties.

Tailored Ordinances - Ordinances put in place by local governments with broad land use authority to control access to or the use of certain areas. For example, ordinances that require fences or buffers around or that ban fishing or swimming in contaminated areas.

Technical Assistance Grant - A EPA grant awarded to eligible community groups for the purpose of hiring an independent technical advisor, enabling community members to participate more effectively in the decision-making process at Superfund sites.

Unilateral Administrative Order (UAO) - A legal document signed by EPA directing the PRPs to take corrective action or refrain from an activity. It describes the violations and actions to be taken, and can be enforced in court.

Zoning Restriction - Zoning authority exercised by local governments to specify land use for certain areas. For example, a local government could prohibit residential development in an area of contamination or limit gardening in certain areas.

Checklist for Implementing ICs

During the initial phase of cleanup (i.e., RI/FS or RFI/CMS), the site manager should:

- establish clear objectives (what are you trying to accomplish through the use of ICs?)
- discuss future land use plans with the community and local government to help in analyzing the appropriate ICs and other remedial alternatives
- evaluate ICs using the appropriate threshold, balancing, and modifying criteria
- coordinate with regional attorneys on legal matters and the State as appropriate
- be innovative/creative but realistic

During remedy selection, the site manager should:

- present information that helps the public understand the impacts of the specific ICs and their relationship with the overall remedy
- clearly describe the objectives to be attained by ICs
- specify performance standards (e.g., prevent exposure to contaminated ground water by prohibiting well drilling)
- consider layering ICs to enhance their overall effectiveness
- discussions with entities (e.g., local/state governments) involved in implementing ICs
- discuss the kinds of controls envisioned and include enough information to show that effective implementation of the ICs can reasonably be expected
- discuss plans for monitoring land use and other aspects of the remedy that depend on ICs
- discuss the enforcement mechanisms that are anticipated to ensure the long-term reliability of the ICs
- continue coordination with attorneys

During remedy implementation (i.e., RD/RA and CMI), the site manager should:

- ensure that appropriate measures are taken to implement the ICs (e.g., arrange discussions between PRPs, other property owners, and local government or state officials)
- be aware that ICs need to be fully implemented to obtain a RCRA permit termination, or for CERCLA sites, fully implemented to obtain RA completion, a site completion, and partial or full deletion
- prepare an ESD or ROD amendment for CERCLA sites or a permit modification or order revision for RCRA sites if the ICs will not result in the remedy being protective of human health and the environment; if this becomes necessary, also ensure that the public is provided an opportunity to comment on the proposed replacement ICs

During Post-Remediation activities (e.g., a CERCLA five-year review), the site manager should:

- Evaluate both the administrative/legal components as well as the physical evidence to ensure that ICs are both implemented and fully effective
- Document these results in the Five-Year Review Report (for CERCLA sites)

Institutional Controls Matrix				
Type of Institutional Control	**Definition & Example**	**Benefits**	**Limitations**	**Enforcement**
GOVERNMENTAL CONTROLS	Controls using the regulatory authority of a governmental entity to impose restrictions on citizens or property under its jurisdiction. Generally, EPA must turn to state or local governments to establish controls of this type. For example, a local jurisdiction may zone the site to disallow uses that are incompatible with the remedy.	Do not require the negotiation, drafting, or recording of parcel-by-parcel proprietary controls. This is important with large numbers of distinct parcels, particularly where some of the landowners are not liable parties. The legal impediments (e.g., whether the control "runs with the land"; whether the right to enforce the control can be transferred to other parties) to long-term enforcement of proprietary controls can be avoided; governmental controls remain effective so long as they are not repealed and are enforced.	Will almost always have to be adopted and enforced by a governmental entity other than EPA (e.g., state or local governments). Thus, their effectiveness depends in most cases upon the willingness of state or local governments to adopt them, keep them in force, and enforce them over the long term. There may also be enforcement costs for the state or local jurisdiction.	Usually enforced by the state or local government. The willingness and capability of the state or local government to enforce the IC should be 12given due consideration.

Type of Institutional Control	Definition & Example	Benefits	Limitations	Enforcement
1. Zoning	A common land use restriction specifying allowed land uses for certain areas Example: A local government could prohibit residential development in an area of contamination or limit gardening in certain areas	Zoning can be used to prohibit activities that could disturb certain aspects of a remedy or to control certain exposures not otherwise protected under a remedy.	Zoning ordinances are not necessarily permanent; they can be repealed or local governments can grant exceptions after public hearings. Typical zoning classifications such as "industrial" and "commercial" may not be stringent enough for a remedial context. For example, many zoning ordinances allow land uses below a certain level of intensity (e.g., allowing residential uses in industrial districts.) In addition, existing "blanket" zoning districts may not provide appropriate restrictions for specific remedy considerations, and local authorities may be concerned about potential legal challenges for "spot zoning" when rezoning a single parcel or small group of parcels. Therefore, an amendment to, or creative application of the zoning ordinance may be necessary to clarify which uses are	Zoning laws may not be fully effective unless they are monitored and enforced over the long term and local governments may not have or be able to commit the resources necessary to such oversight.

Type of Institutional Control	Definition & Example	Benefits	Limitations	Enforcement
2. Local permits	Special permits outlining specific requirements before an activity can be authorized Example: An ordinance requiring that anyone seeking a building permit in a particular area be notified of contamination	Can take advantage of existing restrictions and apply them to site-specific situations	Often permits are narrowly focused and the requirements can be modified over time.	Effectiveness of enforcement depends on the willingness and capability of the local governmental entity to monitor compliance and take enforcement action.
3. Other police power ordinances	Controls placed on access or use of certain areas Example: Placing bans on fishing and swimming in specified areas	Can take advantage of existing restrictions and apply them to site-specific situations	Bans on fishing or swimming may be communicated through posting of the ordinance. However, postings, by themselves, may not be effective in preventing incidental contact or consumption.	Effectiveness of enforcement depends on the willingness and ability of the local governmental entity to monitor compliance and take enforcement action
4. Ground water use restrictions	Restrictions directed at limiting or prohibiting certain uses of ground water which may include limitations or prohibitions on well drilling. Example: Establishment of ground water management zones or protection areas; capping or closing of wells	Can take advantage of existing restrictions and apply them to site-specific situations	Implementation of such restrictions are dependent on a state's ground water ownership and use laws. Local or state expenditures may be necessary to compensate owners of condemned property.	Effectiveness of enforcement depends on the willingness and ability of the local governmental entity to monitor compliance and take enforcement action

Type of Institutional Control	Definition & Example	Benefits	Limitations	Enforcement
5. Condemnation of property	Taking over title of a property by condemning it under a government entity's eminent domain authority. Example: Taking over title through condemnation to prevent the site from being used.	Used as a way to take title of a property to control land use or impose a desired land use for a public purpose. Property may be condemned under Federal, state, or local authority.	The owner of the property is entitled to compensation, may be recoverable under section 107 of CERCLA.	Not applicable.

Type of Institutional Control	Definition & Example	Benefits	Limitations	Enforcement
PROPRIETARY CONTROLS	Tools based on private property law used to restrict or affect the use of property	Can be implemented without the intervention of any federal, state, or local regulatory authority Advisable when restrictions on activities are intended to be long-term or permanent (contaminants will be left in place that prevent unrestricted use)	Since property laws vary by state, always check whether or not there are court-recognized doctrines that would limit the extent to which the controls run with the land or are transferable to other parties Property law requires a conveyance of a property interest from a landowner to another party for a restriction to be enforceable	To be enforceable in most courts, the instrument used for the conveyance of any property right should clearly state: • the nature and extent of the control to be imposed; • whether the control will "run with the land" (i.e., be binding on subsequent purchasers); • whether the right to enforce the control can be transferred to other parties

Type of Institutional Control	Definition & Example	Benefits	Limitations	Enforcement
1. Easements	A property right conveyed by a landowner to another party which gives the second party rights with regard to the first party's land. An "affirmative" easement allows the holder to enter upon or use another's property for a particular purpose. A "negative" easement imposes limits on how the landowner can use his or her own property. Examples: Affirmative easement - access by a non-landowner to a property to conduct monitoring Negative easement - prohibit well-drilling on the property by the landowner	Most flexible and commonly used proprietary control EPA can hold an "in gross" easement since it generally will not own an adjacent parcel of land. An "appurtenant" easement can only be given to adjacent landowners. (Note: the site manager or Regional Counsel should check all applicable state property laws and should not consider "in gross" easements to be transferable). Most useful in situations where a single parcel of land is involved and the current owner of the land is subject to regulation under CERCLA or RCRA	For an easement to be created there must be a conveyance from one party to another. An easement cannot be established unless there is a party willing to hold the easement. This can present difficulties since EPA cannot hold an easement under the NCP without compliance with all procedures required by section 104(j) of CERCLA. Furthermore, some state governments cannot hold easements, and other parties may be unwilling to do so. Since the owner may not be the only party with whom it is necessary to negotiate, a title search should be conducted to ensure that agreements have been obtained from all necessary parties (e.g., holders of prior easements with right of access) Less useful where a large number of parcels are involved and the owners are not PRPs because negotiations would have to	In general, an easement is fully enforceable as long as its nature and scope are clear and notice is properly given to the parties against whom the agreements are binding (e.g. by recording the easement in land records) Use caution when determining who will hold the easement. Sometimes PRPs acquire easements from other landowners thus taking on the burden of negotiating and paying for them. However, as a third party, EPA may not have the right to enforce or transfer the easement unless that right is specified in the agreement between the PRP and other landowners. The terms of easements are enforceable by the holder in the state court with jurisdiction over the property's location.

Type of Institutional Control	Definition & Example	Benefits	Limitations	Enforcement
2. Covenants	A covenant is an agreement between one landowner to another made in connection with a conveyance of property to use or refrain from using the property in a certain manner. Similar to easements but are subject to a somewhat different set of formal requirements Example: A covenant not to dig on a certain portion of the property.	Can be used to establish an institutional control where the remediated property is being transferred from the current owner to another party	This agreement is binding on subsequent owners of the land if: (1) notice is given to the subsequent land owner, (2) there is a clear statement of intent to bind future owners, (3) the agreement "touches and concerns" the land, and (4) there is vertical and horizontal privity between the parties.[1]	Enforcement of covenants is subject to state law and enforceable by the holder in the state court with jurisdiction over the property's location.

[1] Horizontal privity means that only a contract party may claim relief for a breach of a contract warranty or a condition. In other words, no person other than the buyer can sue for damages that arise out of the breach of a contract warranty or condition. Vertical privity means that each party in a distribution chain only has a contract with the person ahead of him or her in the chain. For example, vertical privity would mean a consumer only has a remedy against the person from whom he or she purchased a particular item and could not sue the manufacturer.

Type of Institutional Control	Definition & Example	Benefits	Limitations	Enforcement
3. Equitable Servitude	Closely related to covenants, equitable servitudes arose when courts of equity enforced agreements that did not meet all of the formal requirements of covenants.	Most likely to have value as an institutional control where a party responsible for cleanup expects to own neighboring property for a long period (as might be the case in partial military base closures)	The agreement is binding on subsequent owners of the land if: (1) notice is given to the subsequent land owner, (2) there is a clear statement of intent to bind future owners, (3) the agreement "touches and concerns" the land. The third requirement should be met by any agreement that restricts what the owner can do with the land.	The ability to enforce an equitable servitude "in gross" against subsequent landowners is less likely to be recognized compared to easements and covenants, but this depends greatly on jurisdiction. The terms of equitable servitudes are enforceable by the holder in the state court with jurisdiction over the property's location.
4. Reversionary Interest	A reversionary interest is created when a landowner deeds property to another, but the deed specifies that the property will revert to the original owner under specified conditions. It places a condition on the transferee's right to own and occupy the land. If the condition is violated, the property is returned to the original owner or the owner's successors. Example: Failure to maintain the integrity of a cap	Binding upon any subsequent purchasers Most useful where it can be assumed that the original owner will be available over a long period to conduct further response determined to be necessary (e.g., where a Federal agency is selling the property)	Not useful if there is a chance that the original owner will not remain in existence for a long time	Each owner in the chain of title must comply with conditions placed on the property. If a condition is violated, the property can revert to the original owner, even if there have been several transfers in the chain of title. The terms of reversionary interests are enforceable by the holder in the state court with jurisdiction over the property's location.

Type of Institutional Control	Definition & Example	Benefits	Limitations	Enforcement
5. State Use Restrictions	State statutes providing owners of contaminated property with the authority to establish use restrictions specifically for contaminated property For example, Connecticut property owners who wish to file an environmental use restriction must demonstrate that each person holding an interest in the land irrevocably subordinates their interest in the land to the environmental use restriction, and that the use restriction shall run with the land.[2]	Overrides common law impediments to allow for long term enforceability of real property interests	In some cases, the authority to acquire or enforce the restrictions is conferred only on the state. Therefore, the state's assistance is necessary to implement and enforce.	Determine whether the restriction can be federally enforced; if not, investigate whether the state is willing to take on the role of enforcement

[2]CT General Statutes, 1997, Vol. 8, Title 22a, Section 22a-133n through 22a-133s, contains the following provision: "No owner of land may record an environmental use restriction on the land records of the municipality in which such land is located unless he simultaneously records documents which demonstrate that each person holding an interest ... irrevocably subordinates such interest to the environmental use restriction. An environmental use restriction shall run with
land, shall bind the owner of the land and his successors and assigns, and shall be enforceable ....."

Type of Institutional Control	Definition & Example	Benefits	Limitations	Enforcement
6. Conservation Easements	Statutes adopted by some states that establish easements to conserve and protect property and natural resources Example: Open space or recreational space is maintained to prevent exposure or prevent uses that might degrade a landfill cap	These statutes override common law technicalities and barriers that may pertain to traditional easements and covenants (e.g., "in gross" easements are not upheld in some jurisdictions).	May only be used for a narrow range of possible purposes which could limit their usefulness as institutional controls	In general, the holder must be a governmental body, a charitable corporation, association, or trust
ENFORCEMENT TOOLS (With IC Components)	Enforcement authority is used to either (1) prohibit a party from using land in certain ways or from carrying out certain activities at a specified property or (2) require a settling party to put in place some other form of control. This section addresses Federal enforcement tools as opposed to those that may be available to state or local governments.	May be easier to establish than proprietary controls because EPA is not dependent on 3rd parties to establish and enforce them.	Typically only binding on the original signatories of the agreement; or binding only the party(ies) to whom it is issued in the case of a Unilateral Administrative Order. Negotiations and finalization of AOCs and CDs can be lengthy.	Enforceable by EPA under CERCLA and RCRA or by a state if state enforcement tools are used.

Type of Institutional Control	Definition & Example	Benefits	Limitations	Enforcement
1. Administrative Orders	An order directly restricting the use of property by a named party An order also can used to restrict the use of land owned by a *non-liable party*. This approach would be used if no other method (e.g., proprietary control, governmental control) is successful (see limitations). Example: An order prohibiting the transfer of drums off site or dredging in a containment area.	EPA has broad scope of authority to issue orders to protect public health and the environment (section 106 of CERCLA) Can be implemented without the execution of any further property instruments Can include provisions requiring the property owner to disclose the order's existence to any potential purchaser or lessee, and notify EPA of any anticipated change in ownership, the identities of any potential purchasers or lessees. Does not require an agreement with the landowner (though consent orders are generally considered more desirable). Unilateral orders can be easily modified in the event that the control needs to be modified or withdrawn	Does not bind subsequent owners or parties not named in the order (e.g., lessees). However, depending upon the facts of the case, an environmental regulator may have the authority to issue a new order to the new owner. An order to restrict a *non-liable party*, may result in a claim for compensation under section 106(b).	Enforcement is by EPA (or state if issued under state authority). Creates the threat of potential penalties for violations as an incentive to properly maintain the control

Type of Institutional Control	Definition & Example	Benefits	Limitations	Enforcement
2. Consent Decrees	A CD is signed by a judge and documents the settlement of an enforcement case. Similar to an Administrative Order, it is used to specify restrictions on use of land by the settling party. Example: No well drilling on the property.	Can be used to require a settling party to: 1. file a separate instrument conveying a proprietary control, such as an easement or covenant to EPA or a third party; 2. notify successors-in-title of the CD, site, and any easements; 3. notify EPA of any anticipated change in ownership and the name and address of the potential purchaser or lease; and 4. can be used to require settling non-property owners (PRPs) to attempt to obtain easements from parties that own land contaminated by the PRP in order to restrict land or resource use.	CDs alone are not binding on subsequent owners and occupants.	Enforced by EPA (or state if issued under state authority); failure to comply can result in penalties.[3]

[3]While EPA may not be able to enter into CDs with federal agencies, states can.

Type of Institutional Control	Definition & Example	Benefits	Limitations	Enforcement
INFORMATIONAL DEVICES	Tools, which often rely on property record systems, used to provide public information about risks from contamination	May effectively discourage inappropriate land users from acquiring the property Easier to implement than other controls because they do not require a conveyance to be negotiated	Has little or no effect on a property owner's legal rights regarding the future use of the property If not drafted well, informational devices may discourage appropriate development and uses of land	Not legally enforceable
1. Deed notices	Commonly refers to a non-enforceable, purely informational document filed in public land records that alerts anyone searching the records to important information about the property Example: Notice may state that the property is located within a Superfund site, identify the kinds of contaminants present and the risks they create, or describe activities that could result in undesirable exposures to the contaminants left on site.	May discourage inappropriate land use Easier to implement than easements because they do not require a conveyance to be negotiated Use only as a means of alerting and informing the public about information related to a particular piece of property	Because deed notices are not a traditional real estate interest, proper practice in using them is not well established. Investigate state law and local practice in advance to determine whether such a notice will be recorded, how it should be drafted, and who would be entitled to revoke it. Before filing a notice, obtain the property owner's consent to avoid the risk of claims for slander of title. If not written properly, the notice may discourage all development, including uses that would be appropriate for the site, by creating a perceived liability risk.	A deed notice is not an interest in real property, so recording a notice has little or no effect on a property owner's legal rights regarding the future use of the property (i.e., they are non-enforceable).

Type of Institutional Control	Definition & Example	Benefits	Limitations	Enforcement
2. State registries of hazardous waste sites	Registries containing elements that can be used as institutional controls Examples: Compilation of hazardous waste sites in the state; annual reports summarizing the status of each site on the registry; notice with the deed for sites on the registry that the site is contaminated; and the requirement that any person conveying title to property on the registry to disclose to all potential purchasers the fact that the property is on the registry	With the cooperation of the state, registries can be useful with other measures as part of an overall remedy, especially in providing information to the public. Some laws provide that the use of a property on the registry cannot be substantially changed without state approval.	The procedure for listing and removing sites from registries is solely at the state's discretion	Any requirements are only enforceable by the state
3. Advisories	Warnings that provide notice to potential users of land, surface water or ground water of some existing or impending risk associated with their use. Advisories are usually issued by public health agencies, either at the Federal, state or local level. Example: An advisory issued to owners of private wells in a particular area that contamination has been detected in the ground water	Can be useful with other measures as part of an overall remedy, especially in providing information to the public	These types of warnings, by themselves, are not likely to prevent incidental contact or consumption. Use advisories also have a very short useful life and must continually be enforced.	Advisories do not have any legal effect nor do they create any enforceable restrictions.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

February 18, 2000

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

MEMORANDUM

SUBJECT: National Remedy Review Board Recommendations for the St. Louis FUSRAP North County Superfund Sites

FROM: Bruce K. Means, Chair *(/s/ B. K. Means)*
National Remedy Review Board

TO: Michael J. Sanderson, Director
Superfund Division
EPA Region 7

Purpose

The National Remedy Review Board (NRRB) has completed its review of the proposed remedial action for the St. Louis FUSRAP (Formerly Utilized Sites Remedial Action Project) North County Superfund Sites. This memorandum documents the NRRB's advisory recommendations.

Context for NRRB Review

The Administrator announced the NRRB as one of the October 1995 Superfund Administrative Reforms to help control response costs and promote consistent and cost-effective decisions. The NRRB furthers these goals by providing a cross-regional, management-level, "real time" review of high cost proposed response actions prior to their being issued for public comment. The board reviews all proposed cleanup actions that exceed its cost-based review criteria.

The NRRB review evaluates the proposed actions for consistency with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and relevant Superfund policy and guidance. It focuses on the nature and complexity of the site; health and environmental risks; the range of alternatives that address site risks; the quality and reasonableness of the cost estimates for alternatives; regional, state/tribal, and other stakeholder opinions on the proposed actions, and any other relevant factors.

Generally, the NRRB makes "advisory recommendations" to the appropriate regional decision maker. The region will then include these recommendations in the Administrative Record for the site before it issues the proposed response action for public comment. While the region is expected to give the board's recommendations substantial weight, other important factors, such as subsequent public comment or technical analyses of response options, may influence the final regional decision. The board expects the regional decision maker to respond in writing to its recommendations within a reasonable period of time, noting in particular how the recommendations influenced the proposed cleanup decision, including any effect on the estimated cost of the action. It is important to remember that the NRRB does not change the Agency's current delegations or alter in any way the public's role in site decisions.

Overview of the Proposed Action

The NRRB understands that the United States Army Corps of Engineers (USACE) is recommending excavation and remote commercial disposal for approximately 400,000 cubic yards of radioactively contaminated soils at the St. Louis Airport Site, the Hazelwood Interim Storage Site, and related properties in St. Louis, MO. The USACE proposes that most properties be cleaned to a level that would allow for unrestricted use. Several areas of inaccessible contamination and some groundwater contamination would be managed through long-term monitoring, maintenance, and institutional controls.

NRRB Advisory Recommendations

The NRRB reviewed the informational package for this proposal and discussed related issues on January 11, 2000, with EPA project manager Dan Wall and State of Missouri officials Bob Geller and Mimi Garstang. Based on this review and discussion, the NRRB offers the following comments.

- The information presented to the board indicates that the USACE assumes an industrial/commercial future land use for most of the site. However, the cleanup criteria are based generally on unrestricted use. An "unrestricted land use" assumption unnecessarily limits the number of potential cleanup alternatives. The board recommends that the USACE develop an alternative to allow for commercial/industrial use of the property and include it in the remedial analysis. Such an alternative might limit depth of excavation to levels traditionally associated with commercial/industrial land use. The board believes that if Alternatives 2 and 4 used more conventional excavation depths, lower estimated costs for these alternatives may result. This approach would be consistent with the land use assumptions used to select cleanup criteria at the St. Louis Downtown Site. (The board notes that for alternatives allowing commercial/industrial property use, attainment of one of the primary "applicable or relevant and appropriate requirements" (ARARs) for the site, 40 CFR Part 192, may involve greater use of " supplemental standards.")

- The USACE did not evaluate in detail a consolidation/containment alternative. The board recommends that the decision documents for this site should either include such an alternative or explain why it was screened out.

- The USACE is proposing to apply less stringent cleanup criteria to small subsurface areas, but what constitutes a small subsurface area is not adequately defined. Such areas could include as much as 20% of the area covered by this cleanup proposal. The residual risk in such areas might not achieve the stated goal of unrestricted residential land use. The USACE should explain in detail in its decision documents how the "small area subsurface criteria" will be established and used to achieve the "unrestricted land use" outcome.

- The Remedial Action Objectives (RAOs) call for compliance with surface water and sediment ARARs on Coldwater Creek. The USACE did not specify these ARARs, nor did it provide information on how the preferred alternative would achieve the surface water and sediments RAOs. The USACE should document how this alternative will achieve these RAOs and whether there is a need to address shallow ground water contamination that apparently discharges to Coldwater Creek. The USACE also plans to use Coldwater Creek mean water levels to determine sediment removal levels. The USACE should clarify how this strategy will meet the surface water and sediment RAOs.

- The USACE identifies 40 CFR part 192 and 10 CFR part 40, Appendix A, Criterion 6(b) as potential ARARs and uses them to establish surface and subsurface cleanup levels for soils, supplemental standards for some areas under roads, bridges, and railroad right-of-ways, and cleanup levels for non-radium radionuclides. It concludes that these levels will be protective without specifying the basis for that conclusion. The board recommends that the USACE provide this rationale the site decision documents.

- The information presented to the board identifies as a potential ARAR the subsurface soil standard of 15 pCi/g found in 40 CFR part 192. This regulation was developed specifically for cleaning up uranium mill tailings at 24 sites designated under Section 102(a)(1) of the Uranium Mill Tailings Radiation Control Act of 1978 (Title I sites). OSWER Directive No. 9200.4-25 states that this standard is a potential ARAR in the Superfund program only if the contaminants at a site are the same (i.e., radium-226, radium-228, thorium-230 and/or thorium-232) and the distribution of contamination is similar to that at Title I sites (i.e., little subsurface contamination from 5 to 30 pCi/g), and there is no backfill. The USACE does not adequately demonstrate that this site meets these criteria, especially with respect to pCi/g levels. The board recommends that the USACE justify its identification of 15 pCi/g as an ARAR in the context of OSWER Directive 9200.4-25 and demonstrate that the cleanup will achieve a level of 5 pCi/g.

- The USACE risk assessment uses exposure assumptions such as a non-24 hour day scenario for residential exposure, and a 1-hour outdoor exposure scenario for workers. These assumptions are not considered "standard defaults" according to OSWER Directives 9285.6-03 (March 25, 1991) and 9285.7-01B (December 1991). The board recommends that USACE include in its decision documents the rationale and technical bases for all site-specific exposure assumptions.

- The USACE did not calculate the total carcinogenic risk, summed across all

radionuclides and non-radionuclide carcinogens. This is inconsistent with recommendations in OSWER Directives 9200.4-18 and 9200.4-31P. In addition, the USACE did not adequately present the non-carcinogenic threats presented by the site. The board recommends that the USACE calculate the total carcinogenic risk and non-carcinogenic threats (i.e., Hazard Indices), include this data in the site decision documents, and use it to develop the cleanup goals where appropriate.

- The risk assessment assumes the continued presence of existing structures, roadways, railroad right-of-ways, etc., making them de facto parts of the remedy. Because these structures and roadways serve as the basis for determining the protectiveness of the remedy, the board recommends that specific institutional controls be identified and considered part of the final remedy to ensure their maintenance and that the remedy remains protective. The remedial action objectives (RAOs) should reflect the use of existing structures in the remedy, and the decision document should include contingencies to address the substructure soils should these structures require repair or removal. Decision documents should consider also the cost of that work. Finally, the board notes that the proposed use of a 100 millirem/yr limit in supporting supplemental standards to address substructure soils is inconsistent with OSWER Directive 9200.4-25 which indicates that cleanup levels be derived from the risk range when invoking supplemental standards under 40 CFR 192.

- The cost estimates for alternatives 2 through 6 describe primarily soil excavation and disposal activities. The estimated unit cost for excavation, transportation, and disposal in these alternatives is over $500 per cubic yard, which appears high for this type of action. The board also notes inconsistencies in the costs for supervision and administration (S&A). The board recommends that USACE examine projects similar to this one and reconsider/recalculate the S&A costs where appropriate.

- The USACE has not sufficiently articulated its overall strategy for addressing ground water. The board questions whether the upper aquifer is potentially potable and should be remediated (considering the uranium concentrations identified at well M10-S), and whether it is connected with the higher quality potable aquifer below it. The board recommends that the USACE in its decision documents either (1) show evidence that the upper aquifer is not classified as a potable drinking water source and that it will not contaminate the lower one, or (2) present and evaluate remedial alternatives to address the groundwater contamination consistent with OSWER Directive #9283.1-12, October 1996, "Presumptive Response Strategy and Ex-Situ Treatment Technologies for Contaminated Ground Water at CERCLA Sites).

- The USACE cleanup proposal addresses only the Manhattan Engineering District (MED) contaminants and co-located non-MED contamination on the site. CERCLA requires that remedial actions address the threat to human health and the environment from all contaminants that present unacceptable risk. To ensure a fully protective cleanup, the board recommends that the region and the state work with the USACE and other PRPs to define a coordinated strategy to address all potential contaminants of concern on the site properties addressed by this action.

The NRRB appreciates the region's efforts to work closely with the USACE, state, and community groups at this site. We encourage Region 7 management and staff to work with

their regional NRRB representative and the Region 5/7 Accelerated Response Center in the Office of Emergency and Remedial Response to discuss any appropriate follow-up actions.

Thank you for your support and the support of your staff in preparing for this review. Please give me a call at 703-603-8815 should you have any questions.

cc: S. Luftig
T. Fields
B. Breen
J. Woolford
C. Hooks
R. Hall
OERR Regional Center Directors

Cataloging Form
{Technical/Project Managers fill in C through G, K through Q. RM completes other fields}

A. Document ID Number: Assigned by database 00-377 B. *Further Information Required?*: ☐

C. *Operable Unit (Choose One):*

USACE	☐
St. Louis Sites	☐
Downtown	☐
North County	☒
Madison Sites	☐
Inaccessible Areas	☐
PRP	☐
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D. *Site (Optional):*

SLDS VPs	☐
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SLAPS VPs	☐
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F. *Primary Document Type (Choose One):*

Site Management Records	☐	Remedial Action	☐
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Record of Decision	☐	Real Estate	☐
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H. *Bechtel Number:* — I. *SAIC Number:* —

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K. *Subject:/Title:* EPA Comments on the Regulatory Review Draft R.I.C. FS/PP

L. *Author:* Dan Wall M. *Author's Company:* EPA

N. *Recipient(s):* Sharon Cotner O. *Recipient(s) Company:* PM-R

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